PREPARING CONSTRUCTION EMPLOYERS FOR THE GEN-Z WORKFORCE: A CASE STUDY

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ABSTRACT

The construction industry has been facing many challenges in the recent years such as labour shortage, aging workforce, productivity decline, and resistance to change. These challenges have pushed both practitioners and academicians to investigate and invest in new transformations that can alter the industry's traditional business-as-usual model. To successfully address the challenges and create an industry that successfully adapts to and fits in the changing environment, construction employers must prioritize attracting, recruiting, and retaining the new workforce generation. Thus, it becomes important to understand the expectations that construction students are looking for in organizations after graduation. Such studies are still missing, notably on Generation-Z and the construction industry in USA. This paper attempts to fill the gap through providing the first case study on Gen-Z students graduating from of the state of Kentucky and wanting to join the construction industry. A total of 51 students were surveyed and asked to evaluate the importance of 27 factors when accepting a job offer, describe their ideal workplace, and elaborate on whether the COVID-19 pandemic shifted their perspective on the workplace. Findings of this paper can help construction employers in and around the state of Kentucky in preparing for the Generation-Z workforce.

KEYWORDS

Generation-Z workforce; workplace; construction industry; employer of choice; Lean construction

BACKGROUND

Work environments in the 21st century have been described as both dynamic and complex, which is intensifying the natural and unique stress levels that workplaces have on their employees (Darling & Whitty, 2020). In the last couple of years, stress levels reached staggering peaks as industries continue to navigate the effects of the COVID-19 pandemic which riddled every work environment (Borg et al., 2021). The construction industry is

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no exception: the pandemic impacted the schedule of projects, increased costs, scarcened materials, and created a spike in workforce concerns and complaints (Alsharef et al., 2021; Bou Hatoum et al., 2021). The pandemic, while a major challenge for the construction industry on its own, has also aggravated the long-standing problems of lagging productivity, the pressing needs to reduce fragmentation and integrate technology, and the urge to address labour and talent shortage that have been dauting the construction industry for decades (Barbosa et al., 2017; Bou Hatoum et al., 2020).

A key aspect for overcoming the challenges faced by the construction industry is the need to attract, recruit, and retain the young workforce (Ammar & Nassereddine, 2022; Borg et al., 2021; Hatoum et al., 2021). Like other industries, construction employers should be ready for the wave of Generation-Z (Gen-Z) graduates that already started making their way into the workplace (Schroth, 2019). As explained by the Pew Research Center (PWC), Gen-Z represents people born between 1997 and 2012 (Dimock, 2019). A major distinction between Gen-Z and previous generations is that Gen-Z are "digital natives", meaning that they were born into an era dominated by technology (Dimock, 2019). Research on Gen-Z shows that they are motivated, self-confident, and ambitious, with a strong sense of autonomy and solid opinions on matters that they care about (Horton, 2021). Another important finding about Gen-Z is that financial compensations are not its major drive for work, implying that Gen-Z is ready to switch and leave a workplace when a sense of belonging no longer exists (Deloitte, 2021). Thus, not only should the construction employers appeal to the Gen-Z and utilize their talent, they should also dedicate resources to secure their loyalty and address their needs (Borg et al., 2021).

Research on the Gen-Z workforce joining the construction industry are starting to rise, with recent publications from Australia, United Kingdom, and Spain (Denny-Smith et al., 2021; Turner et al., 2021) – but not USA. Therefore, this study was initiated to address the gap through launching a nation-wide survey to understand the needs of young Gen-Z students who will join the construction industry. This paper is the first publication from this study, which provides the preliminary findings of insights collected from construction management students in the state of Kentucky.

OBJECTIVE AND METHODOLOGY

This study aims to understand the expectations of the new construction management Gen-Z workforce that is joining the construction industry. The study is conducted with students in the state of Kentucky. Findings of the paper can help employers in the construction industry, including those that self-identify as lean organizations, in attracting and retaining the new workforce. The paper answers the following questions:

- What are the factors that Gen-Z consider when accepting job offers?
- How does Gen-Z paint their ideal workplace?
- Did the COVID-19 pandemic shift Gen-Z perspective on an ideal workplace?
- How does the Gen-Z ideal workplace reflect on Lean construction ideologies and principles?

To answer the research questions, a survey was developed to ask students to: (1) evaluate the importance of 27 factors when accepting a job offer, (2) describe their ideal workplace, (3) describe their non-ideal workplace, and (4) elaborate on whether the COVID-19 pandemic shifted their perspective on the workplace. Respondents were also asked to identify whether they have experience in the construction industry, and whether they have

close or distant relatives working within the industry. These two binary variables were used to study their impact on the importance of the 27 factors. Once the data was collected, statistical tests including k-means clustering and non-parametric pairwise comparisons were employed to analyse the input collected from close-ended questions, and thematic analysis was applied to analyse the open-ended questions.

FACTORS OF INTEREST

To identify factors that students consider when selecting their preferable employer, a Scopus search for the key-terms "employer of choice" in "construction industry" yielded only two studies (Denny-Smith et al., 2021; Sedighi & Loosemore, 2012). Both studies alongside Branham (2005) – the most cited paper on "employer of choice" – were used to comprehensively compile the list of 27 factors listed and defined in Table 1.

Table 1: Factors analyzed in the survey

Factor	Definition
Benefits	Offer includes paid time off, retirement plans, bonuses, etc.
Clarity	Organization is clear about your roles and responsibilities
Competition	Organization creates a competitive environment between workers/ teams
Compensation	The financial salaries that the organization offers
Creativity	Organization allows workers to be creative and provides them with means to express their opinions and thoughts
Collaboration	Tasks are teamwork oriented
Diversity	Organization supports the presence of different race, gender, religion, sexual orientation, socioeconomic status, ethnicity, nationality, age, etc.
Education Offering	Organization provides online or in-person academies to take classes
Fairness	Organization is fair in compensation and benefits
Flexibility	Offer allows flexible work hours as long as the contract hours are met
Freedom	Organization allows workers to work on their own pace
Growth	Organization offers opportunities to advance and/or get promoted quickly
Honesty	Organization's mission and vision are well-defined
Innovation	The organization has an "innovative" reputation when compared to others
Relocation	The need to relocate in order to join the organization
Location Stability	The potential need to relocate to another state over the course of the career with the organization
Mentoring	Organization assigns a mentor within the organization for support, advice, and growth
Professional Development	Organization provides support to gain certificates, licenses, graduate studies, etc.
Recognition	Organization has a system of rewards for accomplishments
Realistic	Realistic work expectations and tasks have realistic deadlines
Respect	Respect for people
Safety	Hazard free; proper protection; safety manuals; safety training
Job Security	Organization provides a sense of relief in terms of job loss

Standardization	Organization provides clear instructions on how to perform tasks
Technology	Organization is advanced when it comes to the use of technology
Wellbeing	Organization is aware of mental health and cares for the wellbeing
Work-Life Balance	Roles and responsibilities maintain a balance between life and work

SAMPLE SIZE

According to recent data, an estimated 150 students graduate annually with a construction management degree or civil engineering with construction management emphasis from the five main universities in the state of Kentucky (Data USA, 2022a, 2022b).The survey was shared with students studying civil engineering with an emphasis on construction management. Thus, using the finite population equation for sample size, the 51 data points collected for this paper are enough to have 95% confidence that the real value of every measured metric is within ±10% of the measured/surveyed value. The age of the participants ranged between 19 and 24, indicating that all students were born in the Generation-Z era between 1997 and 2012 (Dimock, 2019). In terms of gender, 73% of students were male and 27% were female. Most of the students were undergraduates (86%) and 14% were graduate students doing their masters. Moreover, 12% of students were non-white, 6% were married, and 6% identified as part of the LGBTQIA+ community.

ANALYSIS OF FACTORS

As the factors were ranked on a 3-point scale, Cronbach's Alpha was calculated to measure the internal consistency of the scale and estimate the measurement accuracy (i.e. reliability) of the factors (Taber, 2018). The calculations yielded a value of α_{cron} equals to 0.898, indicating good reliability (George & Mallery, 2019).

For every factor, an Average Weighted Index (AWI) was calculated using the following equation:

$$AWI = \frac{1}{n}(\omega_{NI} \times NI + \omega_I \times I + \omega_{VI} \times VI)$$

Where:

- NI is the number of respondents who chose "Not Important" multiplied by a weight of $\omega_{NI} = 1$;
- I is the number of respondents who chose "Important" multiplied by a weight of $\omega_I = 2$;
- VI is the number of respondents who chose "Very Important" multiplied by a weight of $\omega_{VI} = 3$;
- n is the total number of respondents who ranked the factor.

Next, k-means clustering was employed to group factors and break them into multiple tiers based on their AWI. To determine the number of clusters, the elbow method was used as seen in Figure 1. The scree plot of the variation of within sum of square errors (SSE) as a function of clusters shows that the variance within-group sum of squares decreased as the number of clusters increased. Based on the elbow method, the elbow at cluster three represents the optimal balance between minimizing the number of clusters and the variance within each cluster, indicating that the data can be clustered into three clusters. Results were verified using the "KneeLocators" function in *python* (Arvai, 2021).

Figure 1. Scree plot for the k-means cluster analysis of the factors' AWI.
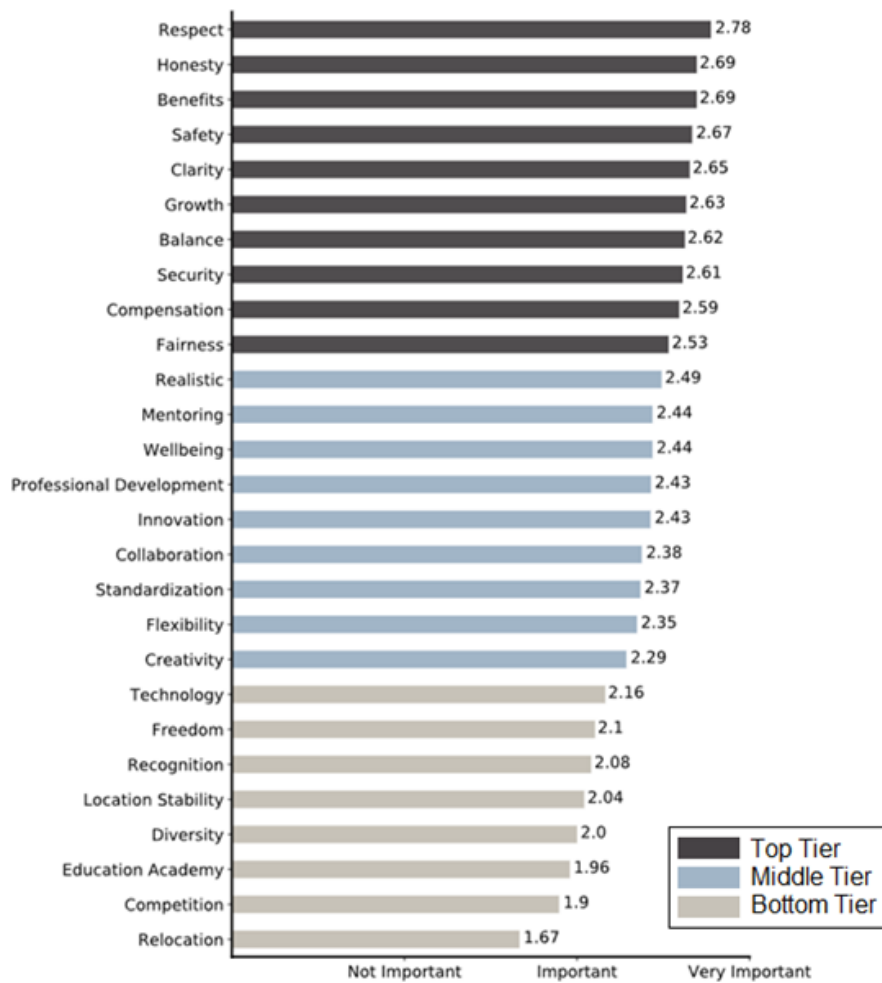
Figure 2. Factors with their AWI and clusters.

The three clusters were referred to as *Top Tier*, *Middle Tier*, and *Bottom Tier*. Results for the AWI and the k-means clustering are shown in Figure 2.

As shown in figure 2, most of the factors had an AWI between *Important* and *Very Important* except for "Education Academy" (AWI=1.96), "Competition" (AWI=1.9), and "Relocation" (AWI=1.67). Overall, students ranked "Respect" (AWI=2.78), "Honesty" (AWI=2.69), and "Benefits" (AWI=2.69) as the highest three factors of importance when accepting job offers, leading the *Top Tier* factors.

ANALYSIS BY CONSTRUCTION EXPERIENCE

Respondents were asked to specify whether they have experience in the construction industry or not. Results showed that 76% of students did have an experience, while 24% did not. This distribution warranted testing the following hypothesis: *Students with experience in the construction industry have different perception of the factors that play a role in joining an organization than those with no experience.*

Two tests were performed for the hypothesis. First, k-means cluster analysis was performed on the data of every group, and the *Top Tier* cluster was compiled and presented in an alphabetical order as shown in Figure 3. Then, pairwise comparisons using Mann-Whitney test (non-parametric t-test) were performed on all 27 factors to detect significant differences between the two groups, and the significant comparisons are highlighted in Table 2.

Figure 3 plots the AWI of *Top Tier* factors of each group. The AWI values vary between 2 (i.e., Important as illustrated at the center of the chart) and 3 (i.e., Very Important as illustrated by the outer circle of the chart). As shown in Figure 3, "Respect" and "Clarity" led the *Top Tier* for students with construction experience, while "Respect" and "Benefits" led the *Top Tier* for students without experience. Moreover, students with construction experience had "Balance", "Clarity", and "Fairness" exclusively in their *Top Tier*, while students with no experience has "Realistic [expectations]" in theirs.
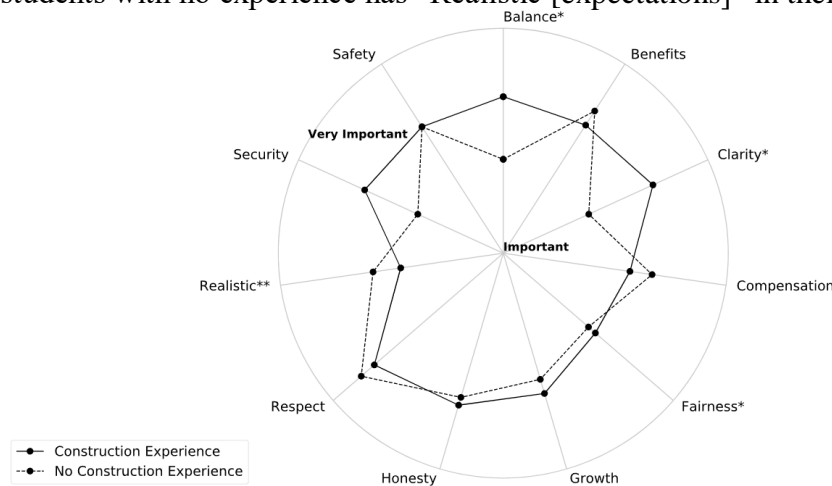

Figure 3. *Top Tier* factors for the students with Construction Experience (solid line) and students without Construction Experience (dashed line). Note that (*) implies that the factor was in the *Top Tier* for "Construction Experience" only, while (**) implies that the factor was in the *Top Tier* for "No Construction Experience" only.

As for the significant pairwise comparisons (Table 2), students with experience in the construction industry ranked "Clarity", "[job] Security", and "[work-life] Balance" significantly higher than students with no experience.

Table 2. Significant comparisons of the pairwise comparisons across the 27 factors.

Factor	Construction Experience (AWI)	No Experience (AWI)	P-value	Significance
Clarity	2.729	2.416	0.056	Significant at 90%
Security	2.675	2.416	0.058	Significant at 90%
Balance	2.694	2.416	0.038	Significant at 95%

ANALYSIS BY INDUSTRY RELATIVES

Respondents were asked to specify whether they have family members working in the construction industry. The collected responses showed that 55% said yes while 45% said no. The distribution warranted testing the following hypothesis: *Students who have family relatives in the construction industry have different perception of the factors that play a role in joining an organization than those who do not have family members in the construction industry.*

K-means clustering and pairwise comparisons were performed, with the *Top Tier* clusters and the significant comparisons presented in an alphabetical order as shown in Figure 4 and Table 3 respectively. Similar to Figure 3, the AWI values vary between 2 and 3. As shown in Figure 4, "Respect", "Honesty" and "Clarity" led the *Top Tier* for students with relatives working in the construction industry, while "Benefits", "Safety", and "Respect" led the *Top Tier* for students with no relatives working in the construction industry. Moreover, students with relatives in the construction industry distinctly had "Collaboration", "Innovation", "Mentoring", "Professional Development", "Realistic [expectations]", "Standardization", and "Wellbeing" in their *Top Tier*.
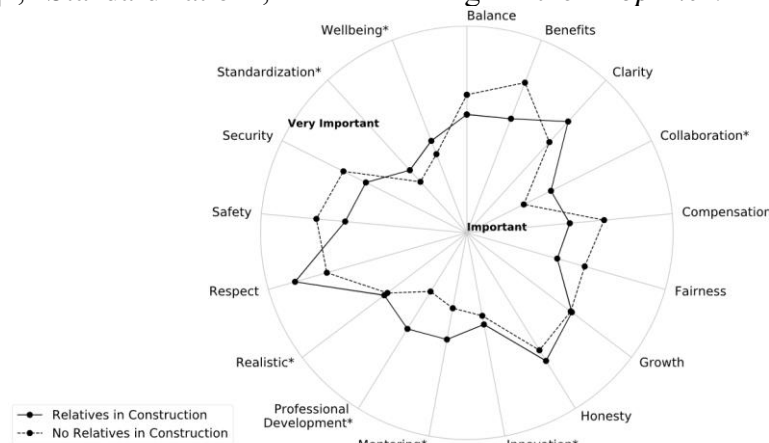
Figure 4. *Top Tier* factors for students who have relatives in the construction industry (solid line) and students who do not have relatives in the construction industry (dashed line). Note that (*) implies that the factor was in the *Top Tier* for "Relatives in the Construction Industry" only.

As for the significant pairwise comparisons (Table 3), students who have relatives in the industry ranked "Respect" and "Professional Development" significantly higher, while students with no relatives ranked "Benefits", "Compensation", and "Safety" higher.

Table 3. Significant comparisons of the pairwise comparisons across the 27 factors.

Factor	Family in Construction (AWI)	No Family in Construction (AWI)	P-value	Significance
Benefits	2.591	2.777	0.057	Significant at 90%
Compensation	2.500	2.666	0.098	Significant at 90%
Respect	2.863	2.703	0.095	Significant at 90%
Safety	2.526	2.760	0.092	Significant at 90%
Professional Development	2.545	2.333	0.096	Significant at 90%

THE IDEAL WORK CULTURE

Respondents were asked to elaborate in their own words on the ideal environment that they would want to work in, and the environment that they would like to avoid. A thematic analysis approach was used to analyse the descriptions, yielding six themes as shown in Figure 5: colleagues, managers, culture, workplace, personal preferences, and projects.

Ideal Work Environment		Non-Ideal Work Environment
Available – Collaborative – Communicative Competitive – Cooperative – Driven – Encouraging – Enjoyable – Friendly – Fun – Hardworking – Helpful – Motivated – Respectful – Shared Ethics and Goals Sociable – Supportive – Welcoming	Colleagues	Antisocial – Backstabbers – Careless – Closeminded – Difficult – Disrespectful – Ego – Gossip – Hateful – Intimidating to Ask Questions – Lazy – No Goals – Pray on Downfalls – "Ride on Coattails" – Rude – Selfish – Undermining – Unequal Contributions – Unlikable – Unsupportive – Unwilling to Collaborate and/or Communicate
Available – Balances Expectation – Cares About Success and Growth – Collaborative – Constructive Criticism – Cooperative Friendly – Genuine – Helpful – Kind – Nice – Respectful	Managers	Abuses Power – Antisocial – Careless – Disrespectful – Discrimination – Intimidating to Ask Questions – Lack of Trust – Micromanaging – Overloads Work – Poor Guidance – Strict – Unappreciative – Yelling and Use of Condescending Commends
Accepting – Changing – Clarity – Collaborative – Comfortable – Communication – Competitive in a Challenging Way – Diverse – Encouraging – Equal Opportunities – Fairness – Flexibility – Happy – Health and Safety – Honest – Inclusive – Innovative – Peaceful – Productive – Professional – Recognition – Respect – Relaxed – Safe Space – Transparent – Welcoming	Culture	Discrimination – Hostile – Lack of Recognition – Limited Tasks – No Career Growth – No Overtime Compensation – No Paid-Days Off – Over Competitiveness – Overworking – Politics Driven – Promotions Through Competition – Unwelcoming
Clean – Creative Design – Dedicated Space for Collaboration – Easy Access to Amenities – Functional Space and Furniture – Thermal Comfort – Well Lit	Workplace	Cubicles – Cold – Damp – Dark – Messy – Unhealthy – Unsafe
Benefits and Bonuses – Brainstorming Sessions – Continuous Learning – Enjoyable Tasks – Fair Compensation – Feeling Values – Happiness – Hybrid Model – Professional Development – Promotions and Ranks – Small Breaks – Supports Growth – Work and Life Balance	Personal Preferences	Feeling Uncomfortable – Opinions Not Heard or Wanted – Personal Traits Valued Over Job Traits – Roles and Responsibilities Beyond Job Description – Routine – Work and Life Unbalance
Aligned Goals – Continuous Progress Checks – Focus on Quality – Large Scale	Projects	Unoriginal – Uninspired

Figure 5. Thematic Analysis of Ideal and Non-Ideal Work Environment as Discussed by the Students (Figure was designed using icons from Flaticon.com; author attributes provided in "Remarks" section)

IMPACT OF THE COVID-19 PANDEMIC

Students were asked whether the COVID-19 pandemic impacted their perception of an ideal working environment. Results showed that 49% chose "Yes", 45% chose "No", and 6% had "No Opinion". Elaborations on their choices were mostly limited to discussions on in-person versus remote working.

Starting with students who chose "Yes", discussions revolved around the success they perceived from working remotely, and the personal benefits of working from home. Some major highlights:

- The pandemic proved that many tasks could transition from in-person to remote work, in contradiction to the popular belief that the industry cannot operate in a remote or hybrid model.

- Significant reduction in congested meetings, where large assemblies are carried remotely instead of people crowding-up and standing "elbow to elbow".

- Significant reduction in travel time between the office and construction site or between sites, especially when the outcome of the visit can be sorted remotely or by using technology.

- Some companies transitioned to hybrid models where students were able to balance between working from home and commuting to the workplace.

- Increased attention on health and safety practices including sanitization, cleanliness, personal-protective equipment, availability of vaccines, and healthcare benefits.

- Highlighted personal benefits of working from home such as convenience, wellbeing, less paid-time off due to sickness, flexible schedules, and increase in family time.

As for the students who chose "No", discussions revolved around the benefits of in-person work. Some major highlights:

- Working fully-remotely lacks the social aspect of working closely with colleagues and having genuine conversations.

- The nature of some tasks cannot be done remotely, and certain positions such as a "project manager" require on-site presence.

- Visiting construction sites remains essential, as it helps with career development.

- Some students experienced a decrease in productivity when working fully remotely, and they would rather have the option to commute to the workplace.

- Students also highlighted that the perception before and after the pandemic did not change because their career goals and motivations remain intact. Whether working remotely or in-person, they still care about excelling at their jobs, gaining recognition, and being treated with respect.

REFLECTION OF FINDINGS ON LEAN CONSTRUCTION

Findings of the survey highlighted the importance of multiple aspects that are supported by Lean Construction. Starting with the results of Figure 2, the high importance of *Top Tier* factors including respect, honesty, clarity, growth, and fairness are all dimensions of a Lean culture (Osman et al., 2021). Respect – which leads the *Top Tier* group in terms of overall importance and surpassed any other factor when ranked by students with

construction experience, students with no construction experience, and students with relatives in the construction industry – is at the center of any Lean environment. More precisely, respect for people is a main pillar for any "real Lean environment", and is critical to enable continuous improvement, another critical pillar for successful organizations (Seed, 2015).

The features of an ideal work environment articulated by the students are, for the most part, achieved and facilitated through the following three Lean principles defined by (Liker, 2021):

- Process-related principles such as principles 2 (continuous flow), 4 (levelling), and 5 (standardization) facilitate features discussed on "colleagues", "managers", and "culture" (Figure 5) such as communication, collaboration, inclusion, shared and balanced roles and responsibilities, and constructive criticism.

- People-related principles such as principles 9 (grow leaders) and 10 (develop people and teams) facilitate features discussed in "personal preferences" (Figure 5) where students emphasized personal aspirations like continuous learning, professional development, promotions, and work-life balance.

- Problem solving-related principles like principle 13 (align goals) facilitate features discussed in "projects" (Figure 5) where students highlighted the importance of aligned goals, quality, and progress checks in projects.

One additional insight from the analysis of the input concerns the "workplace", where students emphasized their preference for collaborative spaces and functional furniture instead of rows of isolated cubicles. This finding is aligned with multiple Lean studies that highlight the importance of places and spaces in organizations, and how "Lean offices" can provide benefits for individuals' professional development, behaviours, attitudes, and skills (Bodin Danielsson, 2013; Freitas et al., 2018) .

Regarding the impact of COVID-19, great emphasis was placed by many students on the ability to work remotely and successfully to complete tasks that do not require commute to a workplace. This reflects on Liker's eighth principle, which calls organizations to adopt technology that support people and processes (Liker, 2021). This observation also reflects on major transformations affecting the construction industry such as Lean Construction 4.0, which highlights how technology needs to serve the organization and address human needs (Hamzeh, González, Alarcon, & Khalife, 2021).

Finally, it can be stated that findings discussed in this paper highlight long-term thinking – the first main Lean principle and the foundation of a Lean environment (Liker, 2021). Long-term thinking was reflected on in students' emphasis on career aspirations, excelling at jobs, gaining recognition, professional development, and continuous learning.

CONCLUSIONS, LIMITATIONS, AND FURTHER STUDIES

This paper provided insights into Gen-Z of Kentucky wanting to join the construction industry. Through a survey, students were asked to rank the importance of 27 factors when selecting a job, describe their ideal workplace, and elaborate on whether the COVID-19 pandemic shifted their perception of the workplace. It is important to note that the findings present a case study on the state of Kentucky and are based on the gathered responses from the construction management students in Kentucky. The next step in this research effort is to conduct a nation-wide survey to help US construction employers prepare for the new wave of the Gen-Z workforce, attract new talent, and establish a culture that meets fresh graduates' expectations.

REMARKS

Figure 5 was designed using icons from Flaticon.com including: "Participation" icon created by Eucalyp, 'Manager' icon created by Monkik, 'Team' icon created by Eucalyp, 'Workplace' icon created by Linector, 'Opinion' icon created by Freepik, 'Project Management' icon created by Ultimatearm.

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