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Small Changes Can Have a Big Impact on Generation Z Students in Construction Classrooms

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In Associated General Contractors' most recent Workforce Survey Release, data collected from the construction industry has noted the failure to attract qualified people, grow the right skillsets and prepare future workers for careers in construction. University construction management programs are seeing their classrooms filled with Generation Z students, similar to Millennials but also very different attributes, who will be hired into these early career positions in the industry. In order for university programs to help industry fill these management and sub-management positions, it is necessary for educators to be aware of the unique learning style and preferences of Gen Z and adapt our classroom and culture to build student academic careers and enhance the college experience. This paper will provide some of the ways in which one program has begun to incorporate changes in their curriculum and classrooms to accomplish these goals while meeting the employment needs of the construction industry.

Keywords: Construction Education, Gen Z, Soft Skills

Introduction

In AGC's Workforce Survey Release (2023a), Ken Simonson stated that the nation is failing to prepare future workers for careers in construction. He also notes that often, those who do apply often lack even basic qualifications needed to be employable. In that same release (2023a), Allison Scott stated that the industry is not only failing to attract qualified people but also not growing the right skillsets. Scott goes on to emphasize how the survey showed that 87% of the industry participants placed importance on digital technology skills for employees to be successful in modern construction operations. She also reminds readers that there is even more concern as many in the current workforce begin to retire. We must also consider the additional demand for technological jobs that do not even exist yet (Hernandez-de-Menendez et al, 2020).

Of notable mention is the shift in the generation of those being hired in early career positions in the industry. Generation Z, referred to as Gen Z (sometimes called Zoomers) includes those born between the years of 1995 and 2010 (Fong et al, 2018; Zlatkov, 2019; Hernandez-de-Menendez et al, 2020). While this generation is closely aligned with the previous one, the Millennials, they have very different attributes (Fong, J. et al, 2018) and learning styles (Murad, R. et al., 2019).

University construction management programs are working to prepare students for employment in management and sub-management positions which can require additional qualifications beyond the basic. In order to help the industry fill these positions, it is imperative that we adjust our approach to educating the current generation of students in our programs to meet the needs of the industry and to attract more students into the programs. In order to effectively do this, we need to be cognizant of the unique learning styles and needs of the Gen Z students entering our classrooms (Miranda, 2020) and of additional skills they need to be successful in their construction careers. Additionally, while building their academic careers, we can enhance the college experience.

Literature Review

Gen Zers are more likely to finish high school and pursue college than earlier generations (The Annie E. Casey Foundation, 2023). They believe a 4 year degree is necessary for a good job and professional success. But 75% also believe there are other ways of getting good education than going to college. The majority have an understanding that formal education adds value (especially females) but believe that universities would be more valuable if they awarded certificates as they reach milestones in the programs. Additionally, they feel MOOCs and other credentials can demonstrate value if they create job opportunities. (Fong et al., 2018)

Gen Z believes ongoing training is essential for success (Harlick, 2015). 59% would learn in order to increase their salary or get a bonus; 46% would spend more time learning to get a promotion; and 62% believes hard skills are important (Zlatkov, 2019). With more than half of Gen Zers considering the cost of college when deciding to attend full or part time (Fong et al., 2018), it is important for university construction programs to understand what will make this generation see the value in attending and the return on that investment (Supiano, 2023). Unfortunately, many educational programs are still designed for Millennials and older (Fong et al, 2018).

Gen Z-ers are the first generation to grow up immersed in technology (The Annie E. Casey Foundation, 2023). They have an intense relationship with technology spending at least 9 hours a day in digital environments (Hernandez-de-Menendez et al., 2020). Due to the amount of time they spend online, they prefer learning through images, video and audio rather than text (Hernandez-de-Menendez et al. 2020; Harlick and Halleran, 2015). 95% say they use YouTube (Fong et al., 2018) which can be helpful in their learning (Miranda, 2020). It is important to use strong visuals, interactivity and minimal words (Fong et al., 2018). Getting and keeping their attention will be challenging. Using technology in the classroom without adjusting teaching styles will not serve as an effective modification. (Harlick and Halleran, 2015) It is imperative for higher education to understand how to effectively communicate with them and design products and services to meet their needs (Fong, J., 2018). Students can be more easily engaged with an interactive lecture that encourages them to consider examples drawn from their personal experiences (Harlick and Halleran, 2015).

While most want independence and autonomy (Zlatkov, 2019), they also want engagement, interaction and customization (Fong et al., 2018). They work well both together and independently (Moore et al., 2017; Fong et al., 2018). Gen Z is divided on in-person versus online education, but they do like the benefit of face to face learning. Working in small groups and class discussion are the most helpful tools for their learning. (Fong et al., 2018) Programs can also offer some on demand learning to support their need for self-directed learning (Zlatkov, 2019).

Experimental or practicing is more preferred over just sitting in class. They are more likely to focus on critical thinking to be able to solve a problem rather than just memorizing information, allowing them to understand the application of concrete concepts. (Murad et al., 2019) Learning as a game (Miranda, 2020) will be more fun and effective pushing them towards greater control of the subject matter (Murad et al., 2019).

Gen Z appreciates clear goals and fast feedback (Murad et al., 2019; Hernandez-de-Menendez et al. 2020). The part of their brain responsible for audio visual capabilities is far more advanced (Murad et al., 2019). They are more positive and sure of themselves because they have more information and resources to make decisions, more likely to have support systems and are empowered self-starters (Fong et al., 2018). Despite this confidence, a sample study conducted by Mangano et al. (2021), showed students had low recognition of their individualism, less personal relationships and did not value their creative potential.

Students will come to in-person classes for the social aspect (Supiano, 2023). Decision making is often team persuaded (Hernandez-de-Menendez et al. 2020) influenced by friends, social networks and, with a high level of parental interaction among Gen Zers, family (Fong et al., 2018). They prefer and learn well if teachers can position themselves as their friends, teaching in a personal approach (Murad et al., 2019). Increasing class discussion can enhance the learning for this generation, as well. Class discussion can be more meaningful when students have a connection with one another. It enhances the connection to the content because the people they are connected to have a connection to it. (Supiano, 2023).

Gen Z students like to learn collaboratively, independently and at their own pace (Moore et al, 2017). They will acquire technical and other hard skills in the classroom but often lack in transferable competencies such as soft skills (Mangano et al., 2021). Technical skills and management competencies are related to construction career success, however, they will also require social skills, communication skills and the ability to work with teams. Improving these skills can help students have better social interaction, communication abilities, conflict resolution, negotiation, self-motivation and improve their ability to adapt to the changing environments (Mangano et al., 2021), all skills important in successful construction careers.

Many Gen Z students have underdeveloped social and relationship skills (Hernandez-de-Menendez et al., 2020). Additionally, their in person communication skills are deficient. It is important for construction programs to assist in the development of these skills. (Harlick and Halleran, 2015) Once they enter their construction careers, students will need to function effectively in teams, a requirement for all construction projects (Tumpa and Skaik, 2021; Wu et al., 2017), with their ultimate success dependent on a high degree of collaboration and team work among various stakeholders (Tumpa and Skaik, 2021; Zhang and Fan, 2013). Programs should emphasize to students the importance of collaboration and teamwork in our industry, which can lead to better learning (Supiano, 2023). These teams will also include different generations so it is important for classroom content to include activities to make students more aware of the differences among the generations, including behavior (Mangano et al., 2021). Additionally, ensuring your classroom activities are well run can build mental health for the students (Supiano, 2023).

In consideration of these Generation Z attributes, there are modifications that can be made to the current delivery of information in university construction program classrooms that could help students with learning while also enhancing the skills that the construction industry has noted as necessary for

current employees. The next section will offer a few suggestions based on modifications implemented in the classrooms of faculty teaching in construction focused programs.

Methods and Results

University construction programs have incorporated more industry related components into the curriculum including having industry professionals as guest lecturers, incorporating internships and cooperative experiences, using industry case studies and working in industry software (Stevens, et al., 2021). Still, we need to do more to help our Gen Z students improve their success opportunities. At Drexel University, we have realized the shift in learning and behaviors of the students now entering our classrooms. Students enrolled in five separate term introductory construction management courses were asked to complete a VARK Learning Styles Questionnaire (2024). A total of 105 inventories were completed. Outcomes were totaled based on the learning style being selected either as the primary style alone or tied with another learning style. This resulted in the total base count increasing due to tied selections to 119. The styles represented by the VARK included Visual, Aural, Read/Write and Kinesthetic. As shown in the figure 1 below, Kinesthetic was chosen as the predominant learning style by 57%, more than half the students, with Aural as the second leading predominate style at 27%.

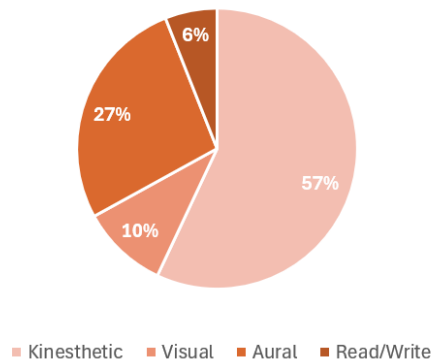


Figure 1. VARK Styles Questionnaire Results

Based on the results, faculty have incorporated several changes to meet the student needs. This paper will discuss three areas of modifications to the program and curriculum. These include 1) Building a strong sense of community and belonging among the students; 2) Enhancing self-efficacy of students by incorporating exercises in their first term in the program; and 3) Modifying the delivery of information in the classroom. Student satisfaction ratings on student exit surveys have improved over this five year period as noted in comparing Figure 2.

Building a strong sense of community and belonging

At Drexel University, first year students are placed in two early level courses with the same professor. This professor is tasked with starting the process of building the strong sense of community in the program. They learn all the students names and consciously refer to them by name during each of the courses. This lets the student to know we “see” them and allows other students to informally learn the names of peers. This same professor is a constant presence on campus, making themselves available to the students between classes. Hernandez-de-Menendez et al. (2020) noted that faculty should offer

convenient office hours and engage in discussion with students outside of class time. When the professor sees the students in the program space, they make a point to acknowledge them by name. Supiano (2023) emphasizes that members of Gen Z might not be sure how to make the initial connection to peers and that learning names in the classroom helps students to expand their social circle and with forming study groups. Research has proven that students who form connections in courses can carry those connections, or even friendships, to other courses aiding them in their academic success. It helps them feel like they belong giving them an incentive to show up because they enjoy the social aspect of classes (Supiano, 2023) and participate (Supiano, 2023; Stevens et al., 2021).

During the first term, students are also expected to create a short 3-5 minute introduction video that is shared with the class. This is a required, graded assignment and students are encouraged to watch each of their peers videos by providing a bonus assignment where students try to guess which person matches the statement provided by the professor.

Within the student space, faculty offices are arranged in a row outside the regular classrooms used by the students. Study spaces are also provided for use by the students to encourage collaboration. The space is personalized with framed photos of the students during their internships placed along the hallway leading to the classrooms. Faculty office doors remain open as much as possible, acknowledging students by name as they pass to go to class. Faculty have met during each term to develop additional small gestures to incorporate such as placement of a candy dish with hard candies in the study area and feminine hygiene products provided in a basket in the women's restroom, both of which have been acknowledged by the students as welcome additions.

Enhance self-efficacy of students by incorporating exercises in the first term course

Self-efficacy, a belief in a person's ability to be successful in achieving a goal, is a significant variable in student learning because it affects the students' motivation and learning (van Dinther et. al, 2011). Five years ago, the construction program began having students complete two different personality inventories, a conflict resolution inventory and a VARK Learning Styles questionnaire during their first term in the program. The goal was to assist students in being more self-aware, enhance their communication skills, improve conflict resolution, and consider their individual dominant learning styles. We hoped this would enhance student success in the program and in the industry. We later added an additional assignment where students would read Chapter 1 of Daniel H. Pink's book *When: The Scientific Secrets of Perfect Timing* (2019). This chapter discusses the concept of circadian rhythms and has readers determine their "chronotype", allowing them to consider their best time of the day to make decisions or deal with difficult subject matter. A class discussion is subsequently had to allow students to share results and how they think these results will impact their future choices, academic success and industry careers. To date, there has been a positive response by students completing this exercise.

Though emotional intelligence has not been widely researched specifically in construction management, it is considered a critical attribute of successful project management professionals (Jahan et al., 2021). During the students' final year in the program, they are enrolled into a leadership focused course and provided the Bar-On Emotional Quotient Inventory (Bar-On EQ-i). This is the most widely used measure of emotional intelligence, developed by Reuven Bar-On in 1996. Emotional intelligence is defined by Bar-On as "an array of emotional, personal and social abilities

and skills that influence one's ability to succeed in coping with environmental demands and pressures" (Bar-On, 2023).

Modifying the delivery of information in the classroom

Realizing the challenge of getting and keeping the attention of students in the classroom was becoming more difficult, faculty at Drexel University worked together to create and incorporate ways of relaying information that were more aligned with the experiential learning model. This included creating some learning-based games that could be used in the classroom. Faculty wanted to use different types of games in the hope that learning as a game (Miranda, 2020) would be more fun for students and effective towards them having a greater understanding of the subject matter. Sevens et al. (2021) has reported that learning games are an established method of teaching and learning.

To enhance learning and understanding of the CSI MasterFormat, one faculty member created a bingo game listing the CSI MasterFormat numbers in varying order on playing cards. They then created an assignment that required students to pull three numbers from a bowl, tasking them to find pictures of items in the built environment that would align with the three different numbers as CSI MasterFormat divisions. They were to find items that might be difficult for students to guess the matching division. During the playing of the bingo game using the student pictures, the class would discuss where they believed the items belonged and why. Once it was revealed, students would mark the numbers on the bingo card. Small prizes were provided by the instructor for those who filled lines. Verbal discussion by the students of the process after the assignment and subsequent game were very positive. The same faculty also created a construction terms bingo card by putting various construction terms on cards and randomly selecting definition cards to read to the class. Students would then guess the term, discuss the answers and mark the spots on their cards.

A variation of the construction terms bingo game involves providing students with index card containing the terms then taping definitions/descriptions of construction terms around the room and having students tape their cards below the matching definition/description. Class discussion occurs after all the students have placed their index card on the wall. To add to the discussion, the faculty provided some terms and definitions/description that could be matched with more than one answer. For example, more than one definition could match the term "aggregate".

Another variation of the terms exercise could have students provided with a card containing a construction term and a card containing an unrelated definition/description. Students would then be tasked to find their matching definition/description and term card holders as an assignment. This would encourage social interaction of the students. This exercise could also be used at program social or networking events.

In the building materials class, the instructor created assignments that require students to walk around the campus to find examples of materials being discussed in class. For example, during the discussion on wood as a material, students are required to find six different applications of wood used in the built environment and create a report with pictures, descriptions of the use and why they think the use is appropriate or not. Students then present their reports in an informal presentation and discussion as part of the course requirements. This activity has been popular with the students since its' inclusion in the homework assignments. Several students have provided feedback to the instructor noting this assignment has them looking at materials wherever they go now and thinking differently about them.

One faculty member has incorporated a small research activity as a course requirement with undergraduate students beginning their second year in the program. Students work collaboratively in small groups to identify a research area related to the construction industry and then develop a short survey related to the topic. Students will then collect data from industry members and report to the class on the results. This exercise has resulted in at least one student approaching the faculty member to request an opportunity to engage in more industry related research. The student is currently working with that faculty on a research project.

While these are only a few of the changes made in the program, the student exit surveys provided to the university show a notable increase in program satisfaction between the 2018/19 school year and the 2022/23 school year (Figure 1) in every category except quality of peer interaction. It is believed that the incorporation of additional opportunities for students to interact will improve this.

Conclusion and Future Work

In order to prepare students for success in the construction industry, it is imperative faculty listen to what the industry is telling our programs they need and ensuring these needs are being incorporated into the curriculum. In doing so, faculty must adapt teaching styles to meet the current student learning styles. The examples provided in this paper are only a few of the things university construction education programs can include in their curriculum and culture to appeal to the Gen Z students now filling our classroom seats. Creating learning-based games to enhance transfer of information can be fun and improve the student experience. Providing more opportunity for students to build social relationships within the program can create a sense of belonging and commitment for the students.

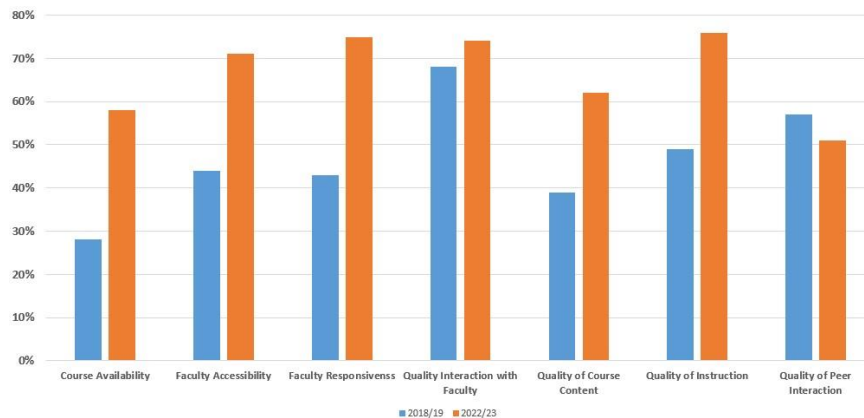


Figure 2. Satisfaction with Construction Management Major

Incorporating soft skills in engineering education has already proven to have a positive impact on student performance and satisfaction (Mangano et al., 2021). The construction industry continues to see a need for these skills in their employees. Many older workers are retiring from the construction industry, adding additional strain to the already existing shortage of employees. This can be a real opportunity for university construction programs to build a culture that appeals to Gen Z learners and enhance the classroom experience drawing more students to our programs.

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