

High School Students in Architecture and Construction Management University Summer Camp Program

¹Joel Ochieng' Wao, ²Emile Huie Dixon, ³Rogers Hunt III, ⁴Charner Rodgers

¹Department of Environmental Engineering, Civil Engineering and Construction Management, Florida Gulf Coast University, Fort Myers, Florida, USA.

²Department of Architecture, Ball State University, Muncie, Indiana, USA.

³Facilities Services and Construction, Tuskegee University, Tuskegee, Alabama, USA.

⁴Department of Construction Science, Tuskegee University, Tuskegee, Alabama, USA.

Abstract

Recruiting high school students to join undergraduate educational programs can be challenging for many universities. Alleviating the challenges may require approaches that attract and retain interested quality students. Some programs go through rigorous screening processes requiring students to take, pass and submit their Scholastic Aptitude Test (SAT) scores, high school Grade Point Average (GPA) scores, and/or even interviewing applicants to evaluate their abilities before admission. Others have extension or specific programs that invite potential applicants to gain theoretical and practical aspects of certain educational programs thereby aiding students in making informed decisions before applying. The latter approach may prove better as it provides the platform for the university admission team to interact with students beforehand. Therefore, an educational summer camp program was conducted and it targeted high school students who would be interested in pursuing Architecture and/or Construction Management (CM) undergraduate education. Survey questionnaire was administered to the students at the beginning, middle and end of the program. The aim was to investigate the factors that made them choose the summer program, their prior knowledge of the two disciplines and how their interests in the disciplines changed over time after exposure to the summer program. All students were in the same environment throughout the course of the program and each was provided an equal chance to choose a preferred academic major. Data were gathered and analysed with MS Excel software. Results showed greater interest of students with clear understanding and distinction of architecture and CM, and demonstrating a steadfast attitude to join the disciplines after high school. The research provided potential factors that recruiters and students may consider for undergraduate admissions as well as documenting the importance of active and/or experiential learning as a strategy for efficient educational mastery and excellence.

Keywords: Architecture, Construction Management, High School Students, Summer Camp

1. Introduction

Recruiting students from high school to college/university can be challenging for many educational programs globally. University programs resort to different ways to reduce the challenges and improve their recruiting efforts. Alleviating potential challenges may prompt the programs to develop different avenues to attract, select, admit and retain quality college students; a process that can be long, tedious and require a significant amount of university resources.

Some programs choose to go through rigorous screening processes that require high school students to take, pass and submit their Scholastic Aptitude Test (SAT) scores, high school GPA scores, and/or even interviewing prospective student applicants to assess their abilities or potentials before admission (Wao et al., 2017). Other universities have specific or extension programs that bring together high school students on campus to gain both theoretical and practical aspects of college/university educational programs so they can evaluate and make informed decisions about their undergraduate program choices and career paths before they apply, all in the college/university environment. The latter approach could be better as it provides the

platform for admission personnel or administrators to interact with potential students before they make the decision to join the program or submit any standardised exam scores as part of the rigorous admission criteria. Usually, administrators develop informational university programs in a manner that students can engage in an active learning atmosphere thereby having the chance to know the students better. Most of these students can be generation Z and generation alpha who are thought to have outlooks different from those from the baby boomers' generation (those born in 1940s-1960s), especially with regard to their different mind-set about work or overall work values (Smith et al., 2018). Hence, letting them see first-hand the impact of what they are doing is imperative to their professional or career development.

Population estimates released by the U.S. Census Bureau shows that about 35% of the workforce in 2015 are millennials (those born between 1980s-late 1990s) and the number is forecast to rise in the next 2-3 decades (Fry, 2016; Hoover, 2015) which will see more of generation Z and generation alpha. This calls for a focused approach to strategically attract, educate and retain these groups of students so that they become available for the workforce and for a sustainable future in the construction industry.

Currently, students wishing to go in fields such as architecture, engineering or construction management tend not to know the various expectations in each of these areas, or do not know what the construction management, engineering or architecture disciplines fully entail. Past research has shown a negative image of construction as a discipline where the research has reported that most people lack knowledge or critical information about the construction industry, do not know career opportunities the construction industry can offer, or are not fully adept with the required qualifications needed to be proficient in construction (Escamilla & Mohammadreza, 2017). Further, millennials and the younger generations are not quite aware of the different paths that a career in construction could take them once they complete their education (Clarke & Boyd, 2011); unconventional scenarios could be seen with the generation alpha who are upcoming in the development of the overall economy.

Most often, the majority of the students are first generation students and, in most cases, do not have someone in their surrounding or in the family lineage to motivate and mentor them towards their educational pursuit. Further, some believe that construction management is a dirty job and a mere mention of the word construction elicits an idea or gives a mental picture of someone who is sweating and working long hours in the hot sun on a construction project. Inasmuch as all kinds of work are to be respected in any capacity, misinformation can drive off some individuals from their path to lifelong professionalism and career success.

With the opportunities available in the construction field, it is imperative that young people know the options available for them in the construction industry. They need to get the necessary education to know that architecture, engineering or construction management are viable career paths, and they should know this before selecting their college majors. In other words, they need to have requisite knowledge of their career paths before admission into any academic program.

Therefore, an educational summer camp program was conducted at a university targeting high school students who would be interested in joining Architecture and/or Construction Management (CM) undergraduate educational programs after they completed high school. The summer program was designed to aid high school students in making informed decisions on whether they could pursue architecture and/or CM academic career paths once they complete their high school education. Both disciplines were introduced to students through active learning or project based collaborative approach. This was planned and executed in a manner that mimics the construction field, particularly the integrative (or collaborative) nature of the construction industry that is highly preferred today compared to the traditional approach where people tend to work individually and not in collaborative teams. The expectation was that students would be able to know their passion at the conclusion of the program and ultimately make well-informed career choices.

2. Literature Review

A review of literature was conducted to document the characteristics of current students in schools. In addition, the review covered the transitions that mirror the characteristics of the construction industry, especially the collaborative project-based approaches that are used to enhance learning of students.

2.1 Millennials, Generation Z and Generation Alpha in the school system

According to the U.S. Bureau of Census, the number of millennials (Generation Y) are skyrocketing and are expected to continue rising (Fry, 2016; Hoover, 2015). Some people tend to view these generation

Ys(1980s-1990s) as self-centred, entitled and largely disloyal (Smith et al., 2018), a viewpoint that some researchers have found to be not vastly different from generation X (mid 1960s-mid 1980s) and baby boomers (those born in 1946-mid 1960s) in many aspects (Fry, 2016; Smith et al., 2018). They tend to have a different view of work and so the construction industry needs to consider their views in order to have them in the workforce given that there are worker shortages currently experienced in the industry. The situation is even worse with Generation Z (1990s-mid 2000s) and generation Alpha (2010 to present). To get these latter groups up to speed in fulfilling the rising worker needs in the construction industry, integrated approaches are highly encouraged; the approach whose principles and subsequent applications are contrary to the unilineal approach used traditionally.

Most courses in the universities or schools tend to emphasize a specific field of study and less of interdisciplinary approaches leading to a single learning area like physics or life science (Carrasquillo et al., 2017; Vassigh, 2016). But research has shown that the most sustainable or efficient construction ventures have been achieved through integrated design and construction processes which make this collaborative approach most viable today (Carrasquillo et al., 2017; Vassigh, 2016). Collaboration is a relationship that has benefits for the parties involved; usually obtaining results that are greater than the results obtained alone (Wao et al., 2018; Slusarek et al., 2010). Integrated approach is an interdisciplinary collaboration between construction professionals, architects, engineers, project owners and other construction/design personnel where they combine their knowledge from their respective fields for project success (Carrasquillo et al., 2017; Vassigh, 2016).

Therefore, better understanding and engaging of millennials, generation Z and generation alpha in a collaborative and integrated atmosphere through active, experiential or service learning projects would provide viable avenues for them to see and appreciate the value of pursuing a career in the construction industry. This is because of the sustainable products and/or benefits that come with it in the end.

2.2 Service based learning projects

The National Society for Experiential Education (NSEE) defines service learning as any carefully monitored service experience where students have intentional learning goals and have the ability to reflect actively on what they are learning throughout the whole experience (Furco, 1994). Olbina et al. (2018) and Cho et al. (2015) define service learning as an experiential education method using a service-learning project where students apply their educational skills to solve real world problems, and they use their reflections to learn from the service learning projects.

Service learning project or project based learning entails active participation of students in a project where they learn in the process. It uses hands-on, active learning approaches to create successful solutions to problems. Students must first learn the concept and then prove that they understand the concept by completing in class activities (Carrasquillo et al., 2017; Kolmos, 2009). They must be motivated to complete these activities, and this motivation is paramount to the success of service learning projects.

Motivation brings in collaboration that creates social networks which are geared towards succeeding in the project or activities assigned. The social networks bring forth peer to peer interactions that culminate in increased student's retention and deeper understanding or learning of concepts that further strengthen the collaboration among members involved (Carrasquillo et al., 2017; Brewe et al., 2009). This is instrumental for project success in the construction industry.

Research has shown that service-learning projects are effective in university level construction educational programs (Redden & Simons, 2018). Arumala (2002) found an increase in the number of students passing strength of materials and structural design courses after they were engaged in service-learning exercises as part of the courses. Farrow et al. (2011) were involved in a service learning project overseas during summer semester and those who attended reported that they would not hesitate to go on the same trip again if they were offered the chance just by the way they were involved in the project based learning.

Overall, the literature review presents evidence that the millennials, generation Zs and generation alphas could learn better when they are aligned with service learning projects because of the benefits brought about by its collaborative nature. They could be engaged in those projects mimicking the operations in the construction industry that would help them have a better understanding of what design & construction entail and eventually aiding them in making better lifelong career decisions. Finding educational programs with service learning projects is not obvious and there could be some influential factors that are also not apparent.

Therefore, a research method was formulated to assess the factors driving students to potential career choices in architecture and/or CM.

3. Research Methods

High school students were invited to apply for a summer camp program that was focused on introducing the students to the discipline of architecture and construction management. The students were not expected to have prior background in these areas for them to be selected and admitted into the program. However, they were expected to have interest in these areas and be able to make informed career decisions at the end of the two-week summer program. The camp was a fee per participant summer camp where each student was to pay some standard fee to be included in the program membership. They were to engage mainly in hands-on activities, i.e., craft based architecture and construction management activities in addition to producing and managing the design and construction procurement and trades.

The program started on a Sunday and concluded on a Sunday during a two-week period. Students were required to stay in the university dorms and be on the university meal plan, just to give them the college life experience. They had student assistants who would guide them on anything about students-university operations. In addition, these assistants were current students with solid background in both architecture and construction management as academic majors.

A survey questionnaire was administered to the students on their arrival with their parents who brought them to school. The parents would assist the students in answering the questionnaire before they left them to partake in the camp requirements, and they would only come back to pick them up at the end of the camp. This initial survey required feedback on their background including what they knew about architecture and/or construction and who motivated them to come to the summer program.

On Friday of the first week, a mid survey questionnaire was administered to assess their level of satisfaction with the program thus far and to see if they had picked up a different mind-set of the program and whether they were considering either or both architecture and CM as their majors once they graduate from high school. The final survey was administered at the conclusion of the program and was geared towards overall assessment of the program in addition to assessing whether the program had made any impact in their career choices including if they would consider their hosting university as a preferred choice for their future educational career pursuit.

Descriptive statistical data and results consisting of mean, mode, median and standard deviation showed the variations and distribution of the ratings. Qualitative data were used to explain the impact of the camp to the students and the career choices in architecture or CM.

3.1 Aim/objective and sample size

The aim of this research was to explore the factors that drive high school students to pursue architecture and CM undergraduate educational programs and how these factors influence their career choices. This information would be useful to the university admission team as part of their recruiting efforts. A two-week summer educational program was used as the platform for this investigation. The sample size consisted of 45 students who attended the full program from start to end. Therefore, a convenient sampling method was chosen due to the nature of the subjects for this research. Students were engaged in the tiny house project build as a service learning project over the duration of the program.

3.2 Tiny house project build

As part of the service learning project work, students started by learning how to sketch, draw construction plans, read construction blueprints and learn some of the soft skills needed such as effective communication, time management, qualities of effective teams, interpersonal skills, group dynamics, characteristics of cohesive groups, among others. They were then engaged in the construction materials movement on the project site and the physical construction of a tiny house to give them hands-on experience of both architecture and construction management fields. Scheduling, estimating, safety, quality control issues as well as project management principles were introduced and applied in this tiny house project. They learned how to read plumbing, electrical and mechanical drawings as well as architectural and structural drawings. Thus, they had to be familiarized with symbols for power or electrical outlets, piping and ductwork systems, different wall systems, insulations, etc. The following shows the initial construction of the tiny house (see Figure 1 for details) as the service learning project.



Figure 1: Tiny house at the beginning stages before getting finished. The wall is still fitted with rough lumber sheathings laid on studs and sole/double plates.

As shown in Figure 1, the tiny house had lumber girder systems laid on concrete blocks and built up wall systems made of oriented strand boards (OSB) or sheetrock. The roof and wall framing were generally made of wood as can be seen. The roofing was relatively flat with a very small pitch for efficient rainwater drainage. The tiny house was to be fitted with plumbing fixtures for a two floor house, otherwise dubbed a ‘tiny dorm’. Figure 2 shows the completed tiny house with the finished wall and related fenestration.



Figure 2: Tiny house with finished walls and windows. A movable scaffold is still in place for wall painting operation. See the worker platform for higher or elevated reach during wall painting.

This tiny house construction from start to end provided the venue for students to learn by doing. It was a good example of a service learning project where students experienced both architectural as well as construction management field in a physical setting. The skills were introduced, developed and put into practice so students could have a clear-cut understanding of the fields as applied in the construction industry.

3.3 Survey questionnaire administration and data analysis

Initial, middle and end of summer program survey questionnaires formed the basis of data collection from the students. A pilot survey was administered to 3 participants who volunteered to take part. The pilot study was to test the validity or reliability of the questionnaire items where Cronbach’s alpha estimate of 0.83 was found and this implied that the questionnaire items were reliable enough to proceed with the research.

Before the pilot test, the survey questionnaire was approved by Institution Review Board (IRB) as it involved students as human subject participants. The survey questionnaire items were open-ended as well as multiple-choice types of items on a 5-point Likert scale that required rating of different aspects of the summer program.

Data were analysed using MS Excel software for the quantitative data. This statistical analysis tool was selected because the dataset was not too large to require using sophisticated statistical analysis systems or tools such as SAS or SPSS. Specific themes were developed and discussed for the qualitative aspect of the survey questionnaire feedback data.

4. Results

The data consisted of 60% males and 40% females who were in their high school freshmen (26.7%), sophomore (33.3%), junior (13.3%) and senior (26.7%) levels. They were from various regions in the United States of America and were 100% minorities in their ethnic background or classification.

At the beginning of the summer program, these students expressed interest in learning architecture (33.3%), both architecture & construction management (66.7%) and no one specifically stated they wanted to learn CM only. In order to know where they got the information about the summer program, 66.8% stated that their parents informed them of it while the rest got information from their high school counsellors, teachers, the hosting university open house sessions and the university's college/school website; each comprising of 8.3% of the total number respectively. They were also asked who encouraged them to attend the summer program and most of them stated their mothers as instrumental (66.7%); both parents (16.7%), their own (8.3%) and teachers (8.3%) constituted the rest respectively. About 93% had no background in architecture and 100% had no background in construction management. The descriptive statistical results were presented and discussed to better understand the students, their perceptions at the beginning, mid and end of the program.

4.1 Descriptive statistics

The details of the survey questionnaire items were summarized below for quantitative analysis results shown in Table 1.

- Initial survey questionnaire
 - Q7 = Cumulative grade point average (GPA) in high school (Scale: 0-4).
 - Q11 = Whether architecture and construction management are different (5-point Likert scale: strongly agree-5, strongly disagree -1).
 - Q12 = Level of excitement to attend the summer program (5-point Likert scale: very excited-5, not excited-1).
- Mid survey questionnaire
 - Q4 = Assessment of the program/activities thus far (5-point Likert scale: very good-5, not good-1).
 - Q5 = Assessing the learning of new information (5-point Likert scale: very much-5, never-1).
 - Q6 = Overall schedule or timing of the program (5-point Likert scale: very much liking-5, not at all-1).
 - Q7 = Level of understanding and retaining materials discussed (scale: 1-100).
 - Q8 = Whether architecture and construction management are two different fields (5-point Likert scale: strongly agree-5, strongly disagree-1).
- End of survey questionnaire
 - Q4 = Overall assessment of the program/activities (5-point Likert scale: very good-5, not good-1).
 - Q5 = Overall assessment of learning new information (5-point Likert scale: very much-5, never-1).
 - Q7 = Overall assessment of the schedule or timing of the program (5-point Likert scale: very much liking-5, not at all-1).
 - Q8 = Whether architecture and construction management are two different fields (5-point Likert scale: strongly agree-5, strongly disagree-1).
 - Q12 = Overall individual assessment of understanding and retention of the camp activities (scale: 1-100).

- Q13 = Overall level of satisfaction with the exercise/program (5-point Likert scale: very satisfied-5, never satisfied-1).

Table 1 shows the results of the descriptive statistics consisting of mean, median, standard deviation, minimum and maximum values for the initial survey, mid survey and end survey questionnaire of students at the summer camp.

Table 1: Descriptive statistics of the survey questionnaire items and the summer camp ratings.

	Item	N	Mean	Median	Mode	Std.	Min	Max
Initial Survey	Q7	45	3.27	3.25	3.25	0.33	1.00	5.00
	Q11	45	3.50	3.00	3.00	0.90	2.50	3.75
	Q12	45	3.33	4.00	4.00	1.23	1.00	5.00
Mid Survey	Q4	45	3.60	4.00	4.00	0.91	2.00	5.00
	Q5	45	3.80	4.00	5.00	1.08	2.00	5.00
	Q6	45	2.86	3.00	4.00	1.30	1.00	5.00
	Q7	45	79.0	75.0	75.0	9.86	55.0	95.0
End Survey	Q4	45	3.60	4.00	4.00	0.83	2.00	5.00
	Q5	45	3.80	4.00	3.00	1.01	2.00	5.00
	Q7	45	2.53	3.00	3.00	1.06	1.00	4.00
	Q8	45	4.07	4.00	4.00	0.88	2.00	5.00
	Q12	45	82.3	75.0	75.0	8.80	75.0	95.0
	Q13	45	3.33	3.00	3.00	0.90	2.00	5.00

From Table 1, the initial survey questionnaire feedback showed that the attending students were those who were performing well in high school with relatively high GPAs ($M = 3.27$, $SD = 0.33$) and they tended to agree that architecture and construction management were different fields ($M = 3.50$, $SD = 0.90$). At the start of the program, they expressed excitement to learn new things ($M = 3.33$, $SD = 1.23$) more so in both architecture and CM (66.7%); only 33.3% expressed interest only in architecture and no one was interested in CM.

After one week in the program, the survey questionnaire feedback showed that students were relatively receptive to the program and they liked it ($M = 3.60$, $SD = 0.91$) as they were learning new things considering their high school educational career ($M = 3.80$, $SD = 1.08$). However, the scheduling of tasks and other events were not fully pleasant to them ($M = 2.86$, $SD = 1.30$). Overall, they felt that they were understanding and retaining program educational items at 79% level of mastery and strongly believed (as compared to the beginning of the program) that architecture and construction management were indeed different fields ($M = 3.80$, $SD = 0.94$).

The end survey questionnaire feedback showed that students were still pleased with the program in equal proportion overall and they had learned useful information with regard to architectural designs, modelling and constructing buildings ($M = 3.80$, $SD = 1.01$). They specifically stated that they had learned about architecture and construction, how to draw floor plans and construct buildings, how to create blueprints and understand them in addition to creating power outlets and light switches, and learned how to read drawings and scale them. However, they were not pleased with the overall schedule of activities of the summer camp ($M = 2.53$, $SD = 1.06$). Noteworthy, students strongly believed that architecture and construction were completely separate fields ($M = 4.07$, $SD = 0.88$). To distinguish between the two disciplines, some students stated that architecture is about designing while construction is about building; some stated that it seemed like both were the same fields as they worked side by side and further explained that so you need to understand both fields to be fully proficient in construction. Some also stated that they are different fields because they end up as different jobs in the construction industry; others stated that architecture is coming

up with design while construction management is building what has been designed. Noteworthy, one stated that architects design buildings and structures while construction management coordinates and schedules design and construction of buildings. All in all, their viewpoints showed that the tiny house service learning project had given them a better understanding of the two fields. Thus, they assessed themselves at the end of the program and believed that they had achieved a higher level of mastery ($M = 82.3$, $SD = 8.80$) as compared to the midpoint of the program. When they were asked to make a choice between architecture and/or construction management as their educational or professional career, they responded as architecture (26.7%), construction management (40%), both architecture and construction (13.3%), while others reported sports management, interior design and medical field, each constituting 6.7% respectively. This shows how many students had changed their mind and were now inclined to CM even though a number of them had expressed little to no knowledge about the CM area at the start of the summer camp.

Overall, students were found to be satisfied with the activities of the summer camp ($M = 3.33$, $SD = 0.90$). They stated that they enjoyed being engaged in active hands-on building of the tiny dorm. They appreciated the rigor provided by the administrators especially in answering their concerns or questions and in executing the project activities with uttermost precision and accuracy. They also enjoyed meeting new people and collaborating with them to execute project goals that they presented at the end of the summer camp. The class project entailed collaboratively getting involved in the design, modelling and construction of the project during the 2-week intensive program. Nevertheless, they also recommended that keen attention to details needed to be in the scheduling and planning of the camp events and in communicating with them well in advance for any pending preparation be it physically or mentally.

5. Discussion and Conclusion

This research has shown that engaging young adults in active, experiential or service learning projects can be one of the ideal methods used to instil long-term knowledge and overall learning. The approach ensures that learning and mastery is reinforced by active participation in project-based activities and collaboration that is characterized by symbiotic relationships where all participants mutually benefit and respect one another as they think through about themselves as a unit and not as separate entities in project based settings. A summer camp program was developed and students were recruited to participate in the program. The idea was to introduce students to the intricacies involved in architecture and CM fields so that they could make informed career decisions in these areas not familiar to them. Additionally, this platform would form a recruiting ground for the university's architecture and/or CM educational programs.

Survey questionnaire was used to collect data from student participants at the summer camp. Data were analysed and the results showed that students were indeed from backgrounds that had not experienced any bit of architecture and CM as a career and their mothers were the main drivers of their education. Parents (especially mothers) were largely influential in the academic pursuit of their children. They had a greater impact on student's selection and eventual participation in the desired summer camp programs. They searched for the information and encouraged their children to doggedly pursue the goal of attending the camp to learn more about the details since they themselves as mothers did not know much about the disciplines as shown in the survey by the students not having any background about the camp programs. This revelation is in alignment with the prior research that stated that CM is unpopular to people and so more information need to be put out to market these lucrative fields, especially the construction management field. The results have also shown the benefits of service learning projects. In this, students were introduced to both architecture and CM areas and then given projects to execute the tasks that are akin to the operations in the construction industry. It is evident that the outcome was well received by students who were showing increasing ability to differentiate the two disciplines right from the start of the program when they had no prior knowledge of the fields, to the end when they could distinctly tell the difference between the two fields. This deduction was shown further when most students expressed greater interest in pursuing CM as their educational and professional career.

This type of approach in developing the summer camp seemed viable since students were able to engage with professionals from both fields. Students were able to gain knowledge that would be useful to them in making timely informed career decisions rather than joining college as 'undecided' in their major classification or getting admitted in majors they do not know about and then end up jumping from one major to the other leading to career choice confusion and resource wastage.

Overall, this research provides useful information that current students may consider when making decisions to join university educational programs. Also, it shows the active and experiential learning strategies employed in the academic setting for efficient mastery and excellence in the educational programs. Further, it provides lessons learned such as those about scheduling or planning issues that program organizers need to reconsider when arranging summer programs, and also provides the platform that could be used by university administrators interested in recruiting promising future college students. In the latter scenario, the service project has shown that it could be one of those ways that could be used to attract, engage, and recruit promising students into the university academic majors. This was evident from this research as it showed students liking the summer program and some actually stating their preferences for certain discipline(s) at the end of the summer program which they had no prior knowledge about at the beginning. Recruiters could also think about disseminating more information to parents, especially the mothers because they tend to have a greater bearing on the academic pursuit and career orientation and success of their children. This viewpoint can be substantiated by the fact that students recognized their mothers as the main parental head giving them more information about the summer program and encouraging them to attend, notwithstanding coming with them for admission. Therefore, they could be a valuable point of contact for recruiting students into university academic programs.

The contribution in this research that differs from other research in this area is the dynamic change in career choice from when students come into the program and when they leave the program, which is also expected to affect recruiting potential. Also, this research documents who in the life of students mainly affect or influence their career choices.

The limitation of this study lies in the fact that it was carried out in one region. Results from research conducted in different geographical locations and even in the international setting would be worth looking at in greater depth for better research generalisability.

6. Future Research

Future research may focus on finding the factors that influence career choice of students after they attend the summer programs and then follow them closely after they complete high school to evaluate if they eventually joined construction management and/or architectural related fields.

References

1. Arumala, J.O. (2002). Student-Centered Activities to Enhance the Study of Structures. *Proceedings of the 38th ASC Annual International Conference*, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, April 11-13, 2002.
2. Brewe, E., Kramer, L., O'Brien, G., Sabella, M., Henderson, C., & Singh, C. (2009). Investigating Student Communities with Network Analysis of Interactions in a Physics Learning Center. doi:10.1063/1.3266688
3. Carrasquillo, A., Nipesh, P. & Eraso, M. (2017). A university-based summer camp to promote construction technology career for high school students. *Proceedings of the 53rd Associated Schools of Construction Annual International Conference*, University of Washington, Seattle, USA, April 5-8, 2017.
4. Cho, C., Mazze, E.C., Dika, S.L., & Gehrig, G.B. (2015). Enhancing construction education: Implementing Habitat for Humanity projects as service-learning for construction materials. *International Journal of Construction Education and Research*, 11(1), 4-20.
5. Clarke, S. N. & Boyd, B. J. (2011). Youths' Perceptions of the Construction Industry: An Analysis at the Elementary, Middle, and High School Levels. *Proceedings of the 47th ASC Annual International Conference*, University of Nebraska-Lincoln, Omaha, NE, April 6-9, 2011.
6. Escamilla, E. & Mohammadreza, O. (2017). Construction management academy career exploration program: strategy for recruitment of under-represented minority groups. *Proceedings of the 53rd Associated Schools of Construction Annual International Conference*, University of Washington, Seattle, USA, April 5-8, 2017.
7. Farrow, C.B., Kramer, S.W., & Meek, D. (2011). International Short-Term Service Learning Trip: Assessing Student Perceptions. *Proceedings of the 47th ASC Annual International Conference*, University of Nebraska-Lincoln, Omaha, NE, April 6-9, 2011.

8. Fry, R. (2016). Millennials overtake baby boomers. [WWW document]. Retrieved on May 16 2022 from <http://www.pewresearch.org/facttank/2016/04/25/millennials-overtake-baby-boomers>
9. Furco, A. (1994). Service-Learning: A Balanced Approach to Experiential Education. *Introduction to Service Learning Toolkit*, pp. 9-18.
10. Hoover, S. (2016). Millennials: A good bet for construction. [WWW document]. Retrieved on May 16 2022 from <http://www.durabilityanddesign.com/blog//fuseaction=view&blogID=296>
11. Kolmos, A. (2009). Problem-Based and Project-Based Learning. *University Science and Mathematics Education in Transition*, 261-280. doi:10.1007/978-0-387-09829-6_13
12. Olbina, S. Mehany, M. & Jesse, K. (2018). Service learning project implementation and assessment in construction management program-a case study. *Proceedings of the 54th Associated Schools of Construction Annual International Conference*, University of Minnesota, Minneapolis, USA, April 17-21, 2018.
13. Redden, L. & Simons, A. (2018). Summer camp's impact on high school students' perceptions of construction management: a case study. *Proceedings of the 54th Associated Schools of Construction Annual International Conference*, University of Minnesota, Minneapolis, USA, April 17-21, 2018.
14. Slusarek, J., Sobota, B. & Mendec, E. (2010). Collaboration between university and industry based on experience of the Silesian University of Technology. *Proceedings of the International Conference on Engineering Education*, Gliwice, Poland, July 18-22, 2010.
15. Smith, J., Burgett, J. & Venugopa, A. (2018). Work values of millennial construction management students. *Proceedings of the 54th Associated Schools of Construction Annual International Conference*, University of Minnesota, Minneapolis, USA, April 17-21, 2018.
16. Vassigh, S. (2016). Hybrid Technologies for Interdisciplinary Education. *Journal of Civil & Environmental Engineering*, 05(06). doi:10.4172/2165-784x.1000201
17. Wao, J.O, Bivins, K., Ries, R., Schattner, S. & Hunt III, R. (2017). SAT and ACT scores as predictors of undergraduate GPA of construction science and management students. *53rd Annual ASC International Conference, April 5-8 2017, University of Washington, Seattle, USA*.
18. Wao, J.O, Jones, S. & Jiles, D. (2018). Improving students learning outcomes in construction surveying course. *Proceedings of the 54th Associated Schools of Construction Annual International Conference*, University of Minnesota, Minneapolis, USA, April 17-21, 2018.