2021 ASEE ANNUAL CONFERENCE
Virtual Meeting | July 26–29, 2021 | Pacific Daylight Time
Paper ID #32346

COVID-19 Effects on Student Internships in the Construction Industry: Experiences from Georgia and Oklahoma

Dr. Sanjeev Adhikari, Kennesaw State University

Dr. Sanjeev Adhikari is faculty from Kennesaw State University. Previously he was faculty at Morehead State University from 2009 to 2016 and faculty at Purdue University – Indianapolis from 2016 to 2019. He has completed Ph.D. degree in civil engineering, focusing on construction management from Michigan Technological University in 2008. He has an extensive teaching background with a total of 18 years academic experience at five different universities. He has always been praised by students and department for his outstanding teaching and research excellence. To supplement his teaching and research, he has been involved in numerous professional societies, including ASCE, ACI, ASEE, ASC, ATMAE and TRB. His research output has been well disseminated as he has published thirty journal papers and thirty-nine conference papers. His research interests are 1) Creating Innovative Sustainable Materials, 2) Structural BIM Integration, 3) 4D/5D BIM, 4) Virtual Testing Lab, 5) Innovative Construction Demolition, and 6) Carbon Footprint Analysis on Roadways.

Dr. Rachel Mosier P.E., Oklahoma State University

Dr. Rachel Mosier is an Associate Professor at Oklahoma State University, with a background in structural engineering and project management. Dr. Mosier has received regional and international teaching awards through the Associated Schools of Construction. Research interests include the cost of sustainable construction to owners and engineering education.

Dr. Heather N. Yates, Oklahoma State University

Dr. Yates joined the Oklahoma State University Construction Faculty in 2006 as an Assistant Professor. She received her Bachelor of Science in Engineering Technology from the OSU Construction Management Department in 1998. She graduated with a Masters of Engineering Technology from Pittsburg State University in 2002. She also earned a Specialist in Education Degree from Pittsburg State University in 2006. In 2010 she was promoted to Associate Professor. She completed her Doctorate in Higher Education from OSU in 2012 where she focused her research on women in Science, Technology, Engineering and Math. She accepted the position as Program Coordinator of Construction Engineering Technology at OSU in 2013.

Dr. Yates began her teaching career at Pittsburg State University in 2002, and has taught numerous construction courses throughout her academic career including: Construction Drawings, Concrete Technology, Estimating I, Strength of Materials in Construction, Structures I, Construction Contracts, and Capstone courses. She received the Halliburton Excellent Young Teacher Award in 2008, and the CEAT Advisor of the Year in 2010. Dr. Yates served as the Associated Schools of Construction Region 5 Director from 2014-17, ASC International Secretary from 2018-20, and was named CMAA Educator of the Year in 2019. She was also Elected ASC International 2nd Vice-President.

She also enjoys sharing her passion for increasing the recruitment and retention of women in Science, Technology, Engineering, and Math through local, national, and international presentations. Additionally, she speaks on charting your own path in college, navigating your future, teaching technology to the new generation, and international experiences.

COVID-19 effects on student internships in the construction industry: Experiences from Georgia and Oklahoma

Abstract

This research project is to determine how the student internships have been affected by the COVID-19. The paper examines student internships in the construction industry experiences from Georgia and Oklahoma. This research evaluates internship requirements, the challenge of getting internships, safety measures in the work environment, and identifies construction experience perceptions during the COVID-19 pandemic. Students were surveyed to provide information about how internships have been affected during this time. The results of the survey are used to predict how future economic changes would affect internships. An online survey instrument was created to circulate among construction students to a) evaluate internships experience during COVID-19, b) identify adaptation of working environment in the office and field, c) use of additional safety measures, d) identify any project changes due to COVID-19, and e) describe their role of the COVID-19 response team. The results of the student internships activity are analyzed to examine the changes associated with their previous internships before COVID-19 versus their internship during the COVID-19 pandemic. The two states, Georgia and Oklahoma, are compared with students' respondent perspectives. Additionally, insights into external views of the media or political background are identified in the students' responses.

Keywords: COVID-19, Student internships, Construction industry, Safety measures, Work environment

Introduction

With the current pandemic, we are also experiencing a potential recession. Looking back towards the "Great Recession", 2007-2010, student enrollments went up while taxpayer support to public universities fell. Also associated with these changes was the increase in unemployment which correlates with the increase in enrollment. Additionally, non-traditional students (not typical recent high school graduates) entered the university as jobs were more difficult to find [1]. In a thorough review of the American Society of Engineering Education, there is little to be said regarding the Great Recession and college internships. Instead, it seems that engineering jobs were plentiful, and engineering graduates were still in high demand [2, 3].

Looking to construction and considering internships require jobs, the COVID-19 proposed changes concern students and faculty alike. The U.S. Bureau of Labor Statistics, using North American Industry Classification System (NAICS) code 23 for construction, reported that unemployment in construction for March of 2020 was under 7%. In January and February, the unemployment rate in construction was under 6%. However, it surged in April to over 16% [4]. Many states started closing non-essential businesses in March. Revisions or updates to those

initial federal lists increased the "essential" business list and allowed construction workers to resume work [5]. This is perceived in the immediate unemployment rate drop to under 13% [4].

Internships are a part of many construction, engineering, and architecture degree programs [6]. Internships can be used to provide students with practical construction experience [7]. These might be mandatory for course credit or strongly encouraged, yet voluntary, during college. Students who enter co-op or internship programs have been shown to earn higher grades in associated coursework, indicating the value of this off-campus work [8].

Little is known about any correlation between internships and recessions. However, anecdotal relationships between recessions and internships have been reported [6]. Internships are a triad relationship requiring the student, educational institutions, and industry [9]. Since internships can require course credit and require industry participation, it is essential to determine how industry changes also affect internships. With the current economic situation associated with the COVID pandemic, there is an opportunity to identify changes in the construction industry.

Oklahoma State University has a required practicum or internship for all students. In this program, the students report bi-weekly through an electronic journal. The students are enrolled in a course with submissions needed. The employer must agree to provide feedback as part of the program. The sample population was drawn from this same group of students. The students enroll in two internships, one after their sophomore year and again after junior year. A second university with voluntary internships also participated in the study. This program does not have any submissions, nor do students and employers have an agreement with the university about requirements.

As this is the first genuinely global pandemic in a century, it is important to document its effects. To determine how the pandemic affected students, a survey instrument was developed. It is anticipated that the survey results can be used to help universities and students understand the anticipated effects of both recessions and pandemics. In addition, the survey seeks to determine student perceptions of change in their internships due to the pandemic.

Methodology

For this research, a survey was developed to examine students' experiences of COVID-19 during their internships. Students were asked to answer critical questions about their challenges and opportunities faced due to COVID-19. A survey instrument was developed to determine student perceptions of the internship process and any effects due to the pandemic. The survey questionnaire was designed through Qualtrics software and sent through anonymous links to construction students from Georgia and Oklahoma.

Demographic data was also collected through the survey. It was encouraging that some schools and programs have a more diverse population than others. Students were asked to identified gender identity, race, enrolled year, and their primary degree program. Internship-specific questions were asked. Students had identified their perception of 1) having a challenge of getting

an internship, 2) retraction of internship, 3) safety precaution during work, and 4) knowledge acquirement during the pandemic. The survey also had open-ended questions to get students' story of COVID-19 crisis and effect towards their summer internship. That question helps researchers identify the challenge and opportunity facing the construction industry.

Data Analysis

A total of 95 students from two universities (Georgia and Oklahoma) responded to the survey. Survey response from Georgia and Oklahoma was 54 (56.8%) and 41 (43.2%) respectively (Figure 1). The majority of the students are in traditional Construction Management programs including, Construction Engineering Technology (CET) and Construction Management (CM). However, one student identified as Building Construction (BC) and one student as Civil Engineering (CE) degrees (Figure 1).

Students from universities Distribution of declared majors.

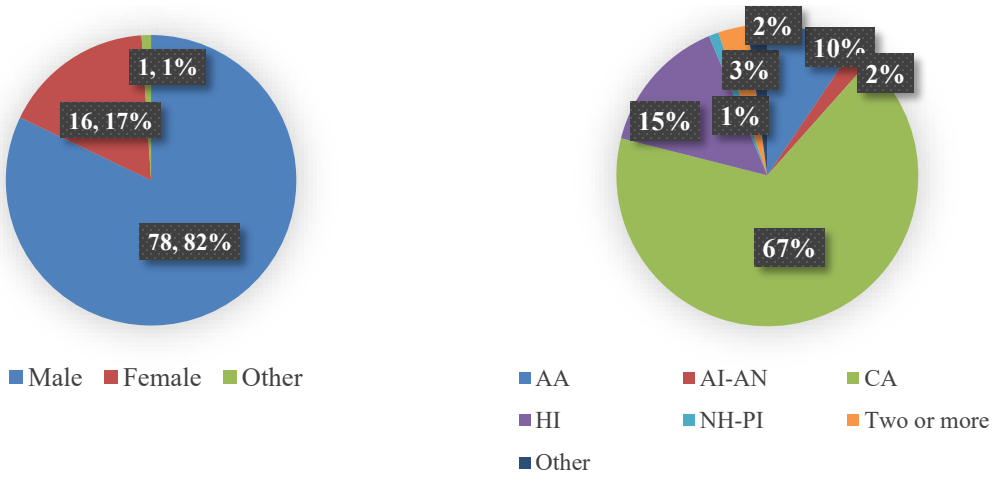
Figure 1: Student response number with declared majors and universities

Over the two universities, respondents identify as male, female, and other (or a non-binary option). These results are encouraging as students are still mostly male, which is expected in engineering-related fields [10]. Figure 2 shows 82.1% (78) are male, 16.8% (16) are female, and 1.1% (1) are other. Similarly, the majority of the respondents are Caucasian (CA). However, they also include African Americans (AA) and Hispanic origin (HI) in large enough groups to be identified. American Indian and Alaska Native (AI-AN) and Native Hawaiian or other Pacific Islander (NH-PI) were other race choices. Respondents were also offered the ability to identify as two or more races (2) or (OT), while some respondents choose to indicate the individual races. There was no respondent of Asian origin (AS). Although respondents did identify in most categories, those with minimal responses are not visible in Figure 2.

To determine the level of studies and degree program, respondents were asked, "In which year are you enrolled currently?" The largest group, 42.1% or 40 of the 95 respondents, are seniors. 39 (41.1%), 12 (12.6%), and 4 (4.2%) respondents were junior, sophomore, and first-year

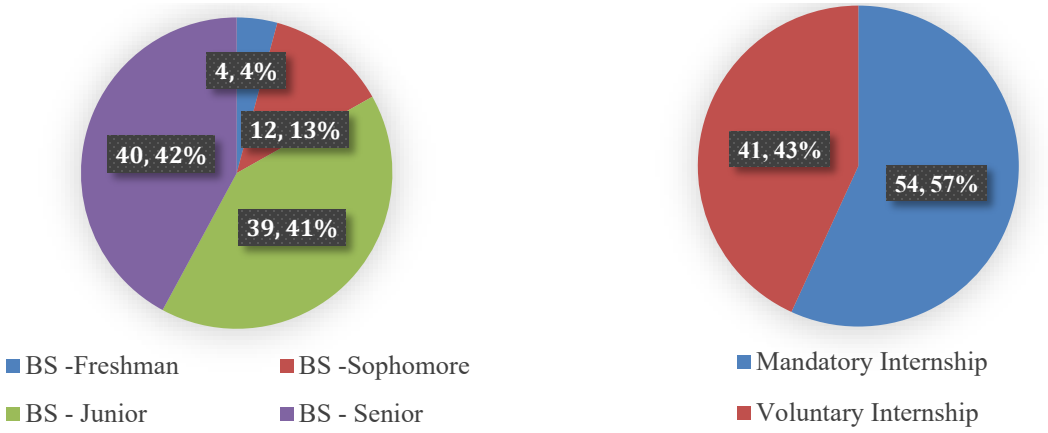
students respectively. From figure 3, it is shown that the majority of respondents are counted as senior and junior students, which is a total of 83.2%. These senior and junior students are typically prepared to work in the industry as they have a foundational knowledge of construction through previous coursework. Students self-identified their level in school as Freshmen, Sophomores, Juniors, or Seniors. As there is no after-senior year internship, it is assumed that they indicated going into their senior year. This is more complicated by students identifying as Freshmen as there is no pre-Freshman internship. All the students were asked if their internship was voluntary or mandatory. Students from Georgia indicated a voluntary or not required internship.

Conversely, students from Oklahoma indicated a required internship. Figure 3 shows that voluntary internship is 40 (42.1%), which aligns with Georgia respondents of 41 (43.2%). One respondent from Georgia chose another, indicating they did not know whether the internship was mandatory. The respondent was added to the voluntary category matching their program requirements. Figure 3 shows that compulsory internship is 54 (56.8%), which aligns with 53 (55.8%) Oklahoma respondents. Thus, the response of a volunteer or mandatory internship is directly aligned with the location of Georgia and Oklahoma university requirements.



Gender distribution Race distribution

Figure 2: Gender and Race Distribution



Student undergraduate level Internship requirement

Figure 3: Students response with Internship requirement and undergraduate level

To determine if it was a challenge for the students to obtain summer internships due to COVID-19, students in the construction program of both universities were asked, "was this summer the same or more difficult to find an internship as compared to previous summers/years?" Figure 4 shows the results of students' challenges to get summer internships. From all students' perspectives, the same was before the response was 37.35%, more difficult response was 32.5%, and never looked before the response was 30.1%. The response of "same as before", "more difficult", and "never looked before" are identical to about one-third of both university student's responses. When comparing Georgia and Oklahoma students, Oklahoma students have more responses on "same as before" compared to Georgia students. Georgia students have more response to "more difficult" than Oklahoma students due to the COVID-19 pandemic. Oklahoma students have more response on "never looked before" as compare to Georgia students.

Considering other internship challenges, 31.33% of students responded that their offer was retracted (Figure 5). Comparing Figure 4 and Figure 5, Georgian students identified more difficulty getting summer internship employment, and their offer was more likely to be retracted than Oklahoma students. Thus, it appears that Georgian students had more challenges with finding and obtaining summer internship employment due to the effects of the COVID-19 pandemic.

To determine the students' perception of getting knowledge from a summer internship in the crisis of the COVID-19 pandemic, the students were asked to answer questions, including "Did anything change over the summer?" and "Did you learn anything about economics and the construction industry?" Figure 6 shows the student's perception of getting knowledge from a summer internship in the crisis of the COVID-19 pandemic. The results indicated that most of the students (54 respondents out of 83 students, 65.1%) responded for nothing change over the summer. The results also suggested that most of the students (56 respondents out of 83 students,

67.5%) responded nothing was learned about economics and the construction industry. Although it might not seem applicable, the authors sought to determine if interns were included in discussions about changes in several projects, the potential recession, or the cost of PPE. Figure 6 shows two universities regarding change environment and learning knowledge from summer internship due to the COVID-19 pandemic. The results indicated that the students (29 respondents out of 83 students, 35 %) responded that there was change over the summer.

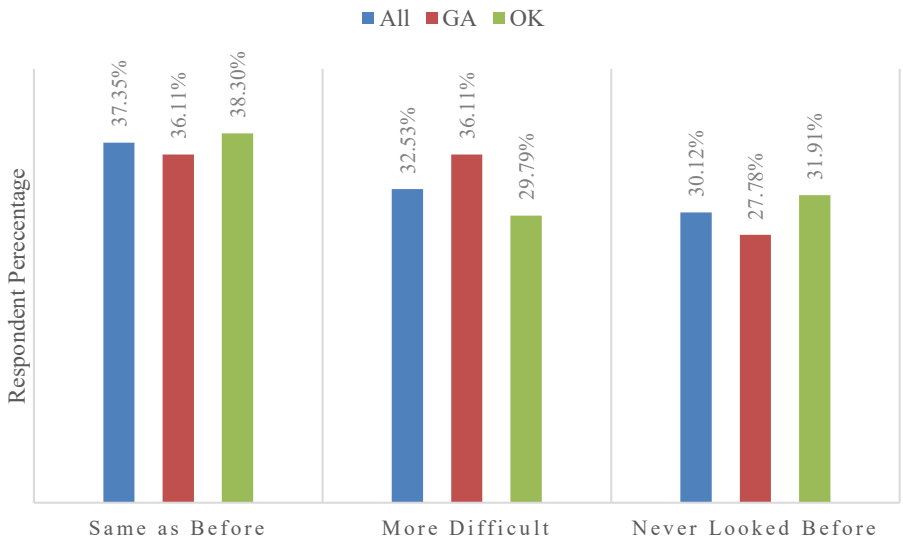


Figure 4: Students' response on summer internship challenge due to COVID-19

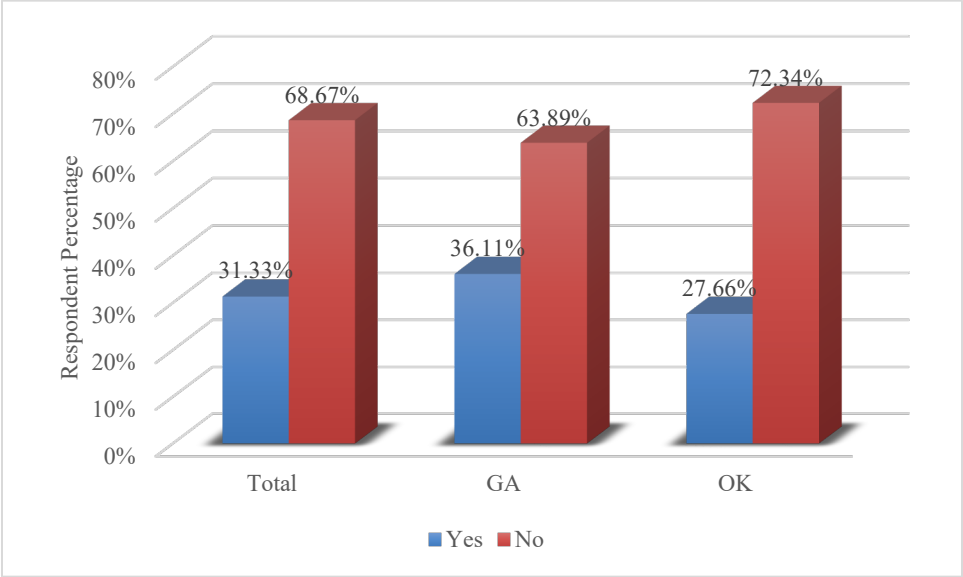


Figure 5: Students' response on offers retracted due to COVID-19

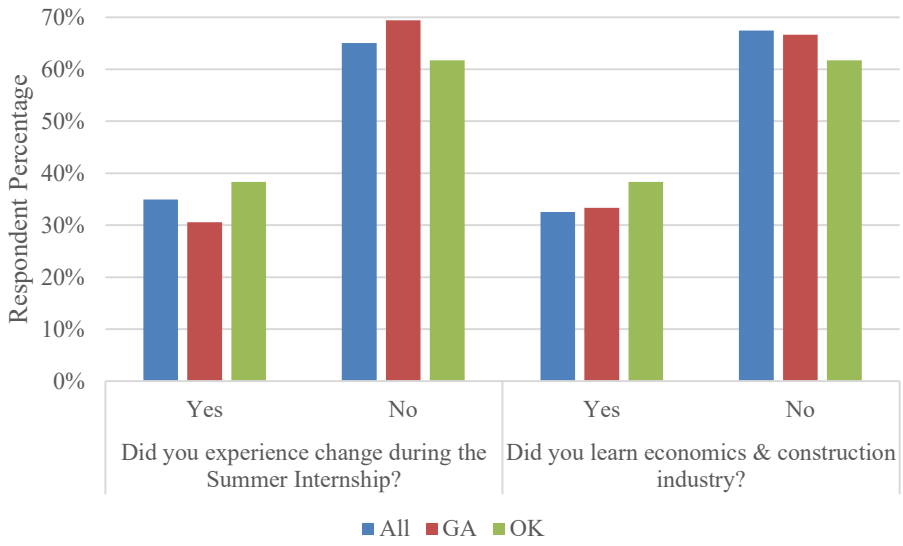


Figure 6: Students' perception of summer internship during COVID-19

The students were also asked what changed over the summer, and their responses are summarized in Table 1. The results indicated that the students (27 respondents out of 83 students, 32.5 %) responded that they have learned about economics and the construction industry over the summer. The survey also asked if they knew anything about economics and the construction industry, and the student responses are summarized in Table 1.

Table 1: Summarization of change and learn from an internship during COVID-19

What changes over the summer?	What learn about economics and the construction industry?
1) The start date was pushed for a month 2) The working conditions and safety changed due to COVID 3) Internship was canceled due to COVID 4) PPE standards change due to the ongoing pandemic 5) Start date moved to later during the summer 6) Hours were severely cut due to loss of projects 7) Only in office three days a week 8) Option to work from home and in the office throughout the week 9) Internship was delayed, and unsure of	1) Due to more places shutting down, it took extra time getting materials into the job site 2) Construction industry is considered essential and can keep going during a shutdown 3) Low-interest rates keep residential construction going regardless of a pandemic 4) Some projects were delayed, but construction was still happening 5) Budgeting 6) When the economy isn't doing well, jobs like internships become less available 7) Even with the pandemic worked progressed, there is no slowdown in the

having the opportunity 10) Worked two days on the construction site and three days at home 11) They reached out later and extended the offer again 12) Can't find a job 13) Location of internship got moved 14) Have to wear face masks 15) No longer working from offices 16) The COVID protocols and site shutdowns have delayed 17) The lockdown kept construction on hold, so companies did not need interns	heavy/civil sector 8) Change in the price in oil affects contractors so that they can employ more 9) Way more than taught in school 10) Roles of a Superintendent 11) Learned the first people to get cut from a project are the consultants 12) The construction industry is essential and still looking for interns and qualified candidates 13) Construction is a volatile industry 14) Supply chains disruptions 15) Cost tracking 16) Construction is always happening even when the economy decline

Discussion

To determine students' perception of the crisis of the COVID-19 pandemic and its effect on summer internships, the students were asked to answer the question of "*Is there anything you would like to share about the current crisis and how it affected your summer internship?*" Based on students' responses, three main themes were prepared: 1) No Difference Experienced; 2) Work Environment; 3) Internship Procurement. Figure 7 shows students' perception of COVID-19 based on the theme "No Difference Experienced". In addition, four responses from GA students have stated "construction is essential." There is also two response of "fake news" regarding the COVID-19 pandemic. Why students identified "fake news" is outside the scope of this research, however, this response was not unexpected. As the students only identified "fake news" and did not provide additional information, and assumed definition of myths associated with the COVID-19 pandemic would be used here [11]. In this case, the students may suggest their perception of the pandemic as a myth or that PPE was not required as a preventative measure.

Figure 8 shows a breakdown of student perceptions of COVID-19. A theme was developed based on long-answer responses provided. One theme that was identified is "Work Environment". There are five sub-themes under work environment, they are namely: a) Work from home and office, b) Made it easier to take classes and work (time), c) PPE (Masks, COVID Screening), d) Reduced Social Events, and e) Example of Crisis Management. The majority of responses focused on PPE (Masks, COVID Screening) and crisis management.

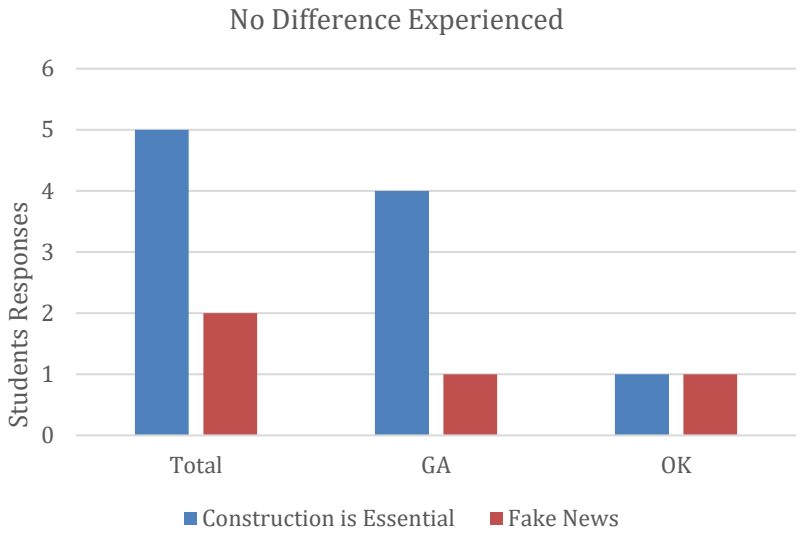


Figure 7: Students' perception of COVID-19 based on the theme "No Difference Experienced."

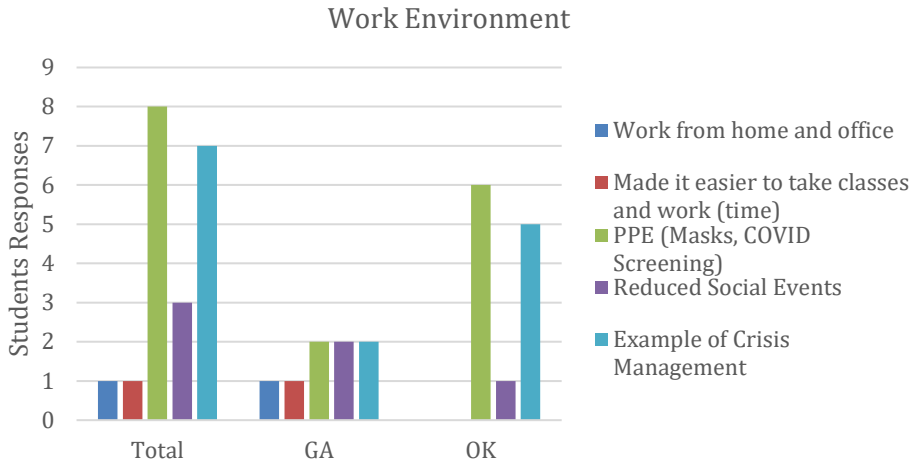


Figure 8: Students' perception of COVID-19 based on theme "Work Environment"

Another theme that was developed is "Internship Procurement." Figure 9 illustrates the distribution of responses that support this theme. There are six sub-themes under internship procurement, they are namely: a) Cannot Find Work, b) Harder to Find Work, c) Internship Cancelled, d) Drive Further for Work, e) Internship Delayed, and f) Felt it was unsafe to work. Analyzing student responses, sub-themes b) Harder to Find Work, f) Felt it was unsafe to work, and c) Internship Cancelled were ranked number 1, number 2, and number 3.

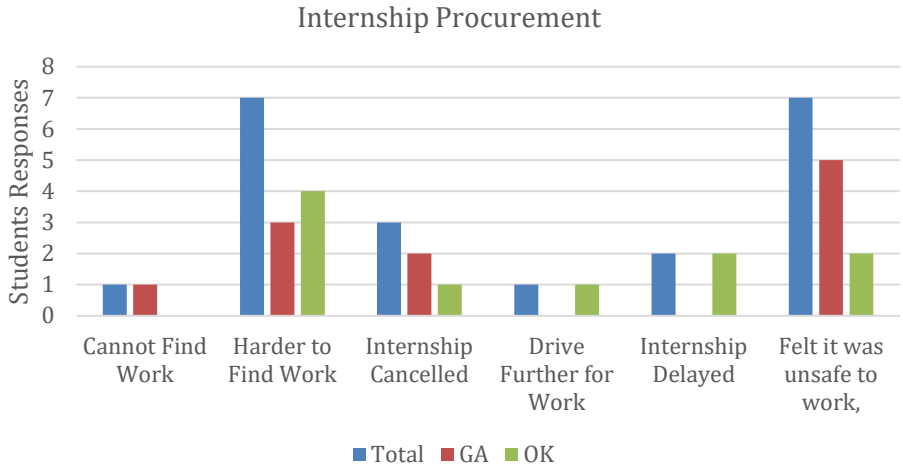


Figure 9: Students' perception of COVID-19 based on the theme "Internship Procurement"

Summary and Conclusion

Although internships are an essential part of student growth [6], there is little known about the relationship between recessions and internships. However, due to the pandemic, an immediate response was seen in the construction industry. The paper examines student internships in the construction industry experiences from Georgia and Oklahoma. Students provided information about how internships were affected during the COVID-19 pandemic. This research evaluates internship requirements, the challenge of getting internships, safety measures at the work environment, and identifies construction experience perceptions during COVID-19. The students shared about the current crisis and how it affected their summer internship. Of the 95 respondents, 41 respondents provided long answer responses on the perception of the crisis of the COVID-19 pandemic and its effects on a summer internship.

Based on student perceptions, the top three COVID-19 internship themes are ranked as 1) PPE requirements, 2) difficulty finding work, and 3) Concerns about COVID safety at work. Based on the student responses, most students experienced changes in their internships due to COVID-19. Only a few students did not experience changes during their internships during the summer of 2020. Although from an economic perspective, PPE might appear to be non-consequential, for construction, the additional PPE is an additional cost. More importantly, the difficulty in finding work that was identified is quite essential. This finding indicates that internships during times of economic change, whether sudden or due to an ongoing recession, affect students. Additional research is required to determine if all recessions affect internships, as they are often required as part of graduation requirements.

References

[1] Barr, A., Turner, S.E. and Danziger, S.(2013). "Expanding Enrollments and Contracting State Budgets: The Effect of the Great Recession on Higher Education." The ANNALS of the American Academy of Political and Social Science. V.650 I.1 pp. 168-93.

[2] Brewer, M., Sochacka, N., and Walther, J. (2015). "Into the Pipeline: A freshman student's experiences of stories told about engineering." Paper presented at 2015 ASEE Annual Conference & Exposition, Seattle, WA. https://peer.asee.org/11811

[3] Anderson-Rowland, M., Rodriguez, A., and Grierson, A. (2015). "Discovering How to Get Engineering on the Radar of Community College Students". Paper presented at 2015 ASEE Annual Conference & Exposition, Seattle, WA. https://peer.asee.org/13510

[4] Bureau of Labor Statistics (BLS). (2020). "Construction Sector - Workforce Statistics." <https://www.bls.gov/iag/tgs/iag23.htm> Retrieved June 15, 2020.

[5] Forman, C. (2020). "Coronavirus in Oklahoma: What is essential? Opinions differ on Stitt's business closure mandate." The Oklahoman. <https://oklahoman.com/article/5659158/coronavirus-in-oklahoma-what-is-essential-opinions-differ-on-stitts-business-closure-mandate>

[6] Bernstein, S. (2003). "The Effect of Construction Related Internships On Academic Studies: Is It Positive Or Negative". Paper presented at 2003 Annual Conference, Nashville, TN. https://peer.asee.org/12672

[7] Senior, B. A. (1998). "Infusing Practical Components into Construction Education." Journal of Construction Education V. 3 N.2 pp. 92-101.

[8] Kramer, S. W.(2008). "Does Prior Project Management Work Experience Have an Effect on the Academic Achievement of University Students in the Classroom?". International Journal of Construction Education and Research. V.4 N.1 pp. 18-33, DOI:10.1080/15578770801943877

[9] Moore, J. D., and Plugge, P. W. (2008). "Perceptions and Expectations: Implications for Construction Management Internships." International Journal of Construction Education and ResearchV. 4 N.2 pp. 82-96.

[10] National Science Board. (2018) "Science and Engineering Indicators 2018." Arlington, VA, USA: National Science Foundation (NSB-2018-1). <https://nsf.gov/statistics/2018/nsb20181/>.

[11] Naeem, S. B., and Bhatti, R. (2020). "The Covid-19 'Infodemic': a New Front for Information Professionals." Health information and libraries journal. V.37 N.3. p.233–239.