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Sense of Community in a Midwestern Construction Management Program

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The U.S. construction industry lacks diversity in respect to female and minority populations. This lack of diversity presents a threat and an opportunity for construction firms and the industry as a whole. Undergraduate construction management programs can support the industry by recruiting and retaining a diverse student population. Previous studies indicate that sense of community is positively related to recruiting, student satisfaction, academic achievement, and retention for underrepresented populations in higher education. The researchers compared sense of community to investigate differences between demographic groups. The findings indicate a significant difference in sense of community based on gender and no difference based on race. The study provides insights on the experience of underrepresented populations within construction programs. The findings will assist construction programs as they seek to support underrepresented populations and measure the impact of interventions over time.

Key Words: Diversity, Sense of Community, Retention, Underrepresented Populations, Construction Management

Introduction

It is well documented that the U.S. construction industry lacks diversity (Data USA, 2018; United States Bureau of Labor Statistics, 2018a). This lack of diversity may compound the challenges currently facing the construction industry including a shortage of skilled workers and lagging productivity in comparison to other industries. Across the U.S. and around the globe, trade organizations, educators, and construction firms have recognized the need to promote diversity.

As the construction industry seeks to create a more diverse workforce, it is important to provide an inclusive environment where underrepresented populations feel valued. Previous research indicates that community involvement and a positive sense of community (SoC) promotes recruiting, retention and student performance for underrepresented populations (Bigelow, Bilbo, Ritter, Mathew and Elliott, 2016; Shane, Lopez del Puerto, Strong, Mauro, and Wiley-Jones, 2012). These studies establish the value of investigating sense of community within undergraduate construction management (CM) programs. For this study, SoC is defined as "a feeling that members have a belonging, a feeling that members matter to one another and to the group, and a shared faith that

members' needs will be met through their commitment to be together" (McMillan and Chavis, 1986, p.9).

The purpose of this study was to investigate differences in sense of community within an undergraduate CM program. It provides additional investigation in response to the authors' previous work that presented a method for investigating community (Sauer, Gebken, & Callahan, 2019). A previously validated survey instrument was administered to collect a standard measure of community that could be compared among demographic groups. The Mann-Whitney U test was used to test for differences between males and females, and non-white and white students. The research question that guided this study asked if there is a difference between the Sense of Community for construction management students based on gender and race?

The authors proposed the following two hypotheses to investigate the research question. Rather than present a null hypothesis, a directional hypothesis was used. This approach is based on insights gained from existing scholarly work that will be presented in the literature review.

H1: Sense of Community will be higher for female versus male construction management majors.
H2: Sense of Community will be higher for non-white versus white construction management majors.

The results of this study will provide a better understanding of the experience of underrepresented populations within CM programs.

Literature Review

Diversity in the Construction Industry

National statistics for construction industry participation confirm that white males are the dominant demographic group. For the year 2017, the United States Bureau of Labor Statistics (2018a) reported that of the estimated 10,692,000 persons employed in the construction industry, only 9.1% were women. In regards to race, 6.1% were African American, 1.9% were Asian, and 88.8% of all persons employed were white. Hispanic ethnicity was reported by 29.8% of the workforce. It is important to note that these estimates include all sectors of the construction industry (trade workers and construction management). For the year 2016, Data USA (2018) provided the following estimates for professional construction managers. Based on an estimated population of 554,481 employed professionals, 9.2% were female. In regards to race, 3.1% were African American, 2.1% were Asian and 90.5% of construction managers were white. Viewed alone, these estimates indicate a lack of gender and racial diversity in the construction industry. This observation is reinforced when compared to the overall U.S. workforce where 46.9% are female, 12.1% are African American, 6.2% are Asian and 78.4% of workers are white (United States Bureau of Labor Statistics, 2018a). It is clear that the construction industry does not represent the available workforce and is heavily populated by white males. Additionally, the diversity gap appears to grow larger when considering construction management as a profession.

The benefits of diversity in the workplace has been the focus of extensive research. Diversity has been shown to drive innovation, creativity and problem solving through creating heterogeneous teams that bring multiple points of view and a broad base of experiences together (Cox & Blake , 1991; Forbes, 2011). Diversity can also help firms attract top candidates, especially in tight labor markets. Firms must build a reputation as a welcoming employer of a diverse workplace in order to fill talent

acquisition demands (Cox & Blake, 1991; Forbes, 2011). Along with recruiting, effectively managing diverse groups can lead to cost savings resulting from reduced turnover through improved job satisfaction (Cox & Blake, 1991) and may lessen exposure to legal claims associated with discrimination and sexual harassment (Carr-Ruffina, 2005). Diversity has been shown to foster organizational flexibility which stems from including minority groups with a higher tolerance for ambiguity and by employing less standardized systems necessary to manage a diverse workplace (Cox & Blake, 1991). Techniques learned from managing a diverse workforce can be applied when addressing other challenges such as managing differing corporate cultures that come together when participating in joint ventures (Carr-Ruffina, 2005). A final benefit of diversity identified in the literature are studies that report "the positive effect that diversity management has on a company's image and stock prices" (Mor Barak, 2014, p. 246). One factor driving improved financial performance stems from diverse firms seeking to purchase services who tend to favor partners with a reputation for diversity (Cox & Blake, 1991). While the appeal of the benefits cited will have varying interest for firms based on their individual needs, the overall benefits of a diverse workplace should not be overlooked, especially in the highly competitive construction industry.

Creating Community to Recruit and Retain a Diverse Construction Management Student Body

According to the United States Bureau of Labor Statistics (2018b), the path to a career in construction management is through undergraduate construction management programs. Therefore, in order to meet the diversity demands of the construction industry, CM programs should place an emphasis on recruiting and retaining a diverse range of students. While there are many factors that influence recruiting and retention, the available literature indicates that creating community is an important aspect of recruiting, retention/persistence and student success for diverse populations.

Building community and the development of learning communities has been the focus of extensive research in higher education. Student learning communities are described by Lenning and Ebbers (1999) as "consciously and proactively structured student groups organized to promote student learning" (p.11). When comparing students within a formal learning community to students with an unstructured curricular path, Tinto (1997) found that learning community involvement led to more positive views of the college experience and higher levels of student persistence. Tinto credits supportive peer groups that formed within the learning communities as a significant contributor to student persistence. Similarly, McKinney, McKinney, Franiuk and Schweitzer (2006) demonstrated that community could be stimulated by instructors and that strong communal ties within the classroom contribute to increased student satisfaction with the learning experience and improved levels of performance.

While the previous studies address the community in a generic college setting, the following research was performed within undergraduate CM programs. With an emphasis of recruiting and retaining female construction engineering students, Shane, Lopez del Puerto, Strong, Mauro, and Wiley-Jones (2012) implemented a cornerstone learning community with curricular (cohort) and identity building (women's organizations) components for freshman and transfer students. The result was an increase in female enrollment at levels that exceeded the university, college and departmental gains. Bigelow, Bilbo, Ritter, Mathew and Elliott (2016), reported that of 15 variables identified from previous studies, sense of community was rated as the most influential factor for retaining female students within a construction program.

Although the previously mentioned Bigelow et al. (2016) study did not measure Sense of Community, the research did allude to the potential benefits for smaller communities operating within a larger student population. This concept is represented in the literature as early as the 19th century with German sociologist Ferdinand Tönnies and French Social Scientist Émile Durkheim. As noted by Adair-Totef (1995), in a letter to a fellow researcher, Tönnies set out to create a "community of [philosophy] scholars" based on trust, community, and friendship (page 63). Later that century, through his seminal book titled Gemeinschaft und Gesellschaft (1887), translated as Community and Society, Tönnies distinguished between a "traditional and unchanging" community versus an "arbitrary" and ever-changing society (Adair-Totef, 1995, page 59). The smaller community is set apart from the larger society. Though criticized for asserting his own romantic memories of growing up in a small rural German community and oversimplifying the sociological theory (Fisher, 2017), Tönnies explored the dichotomous relationship of community versus society across several themes including personal characteristics. For instance, "if society was individualistic, community was commonality, shared enjoyments, shared possessions, shared friends, and common enemies" (1995, page 61). Tönnies found that smaller communities tended to be more cohesive, connected and familiar than the larger society (Tönnies, [1887] 1957). Similarly, in The Division of Labor in Society, Durkheim ([1893] 1984) presented the concept of Mechanical Solidarity in which "smaller units of people, or communities, were automatically bonded by their in-group similarities" (Fisher, 2017, p. 226).

The construction industry and the profession of construction management lack diversity, especially when compared to the actual workforce by gender, race, and ethnicity as reported by the United States Bureau of Labor Statistics (2018a). In addition to accessing a larger pool of employment candidates, increasing diversity could hold many benefits for construction firms including increased creativity and improved problem solving. In order to meet industry needs, undergraduate CM programs need to understand the role that sense of community plays in supporting underrepresented populations. By measuring, analyzing, and monitoring reported sense of community, undergraduate CM programs will better understand underrepresented populations and be able to identify areas of concern. These tools will support CM programs as implementation measures to increase diversity in the student population.

Methods

A descriptive survey methodology was used for this study, employing a previously validated survey instrument by Community Science (2018). The SCI-2 survey instrument included twenty-four questions, each with a four point Likert scale response. Because the researchers sought to measure community within the CM program, respondents were instructed to consider the construction management program only when completing the survey instrument. Demographic data for each respondent was also collected. The demographic factors included degree program, age, year in school, gender, race, and if the respondent was a first-generation college student.

Community at the departmental level is referred to as a "curricular area learning community" (Lenning & Ebbers, 1999, p. 26). Lenning and Ebbers also identify "student type" learning communities (p. 44) within the curricular community. Student communities within a construction management program would include student organizations such as the National Association of Women in Construction Student Chapter (NAWIC) and special interest underrepresented student groups by race or nationality. Respondents were instructed to consider the CM program, the curricular learning community, when completing the survey instrument.

Previous studies identified in the literature review indicated that smaller communities would be more connected and cohesive than larger communities or society as a whole. These findings guided the decision to employ a directional hypothesis for this study. While the students were asked to report community at the curricular level, the authors anticipated a positive influence for underrepresented groups based on their student (female, non-white) learning community. The researchers acknowledge that it may appear counterintuitive to assume that underrepresented populations would report a higher sense of community than the dominant demographic groups (males /white students). This is especially true in light of continued concerns over racial injustice and sexual discrimination/harassment in society and the workplace.

The study was granted approval by the Institutional Review Board and administered during the spring semester 2018. The available population of CM students was approximately 180. A purposeful sampling (Leedy & Ormrod, 2005) technique was employed to collect data from all grade levels, freshman through seniors. Based on a comprehensive list of courses offered in the CM program, courses were grouped by their common rank (freshman level course, sophomore level course, etc.) and then two courses per rank were randomly selected to participate in the study. Printed copies of the survey instrument were administered by the researchers in the classroom. Following data collection the responses were coded for analysis. Responses were excluded if any part of the SCI-II survey was incomplete. Descriptive statistics were used to describe the nature of the data and to look for trends and possible relationships. Due to the ordinal nature of the data collected through the Likert scale responses, a nonparametric Mann Whitney U test was used to look for differences between groups. The threshold for significance testing was set at .10 because of the exploratory nature of the study (investigating differences between population means) and the low level of risk associated with making a Type1 error (rejecting a null hypothesis that is true).

The researchers acknowledge that the inferential scope of the study is limited because the data was obtained at a single institution. However, because this is an emerging field of study, the lessons learned will support future large scale data collection efforts and serve other institutions as they conduct similar investigations. The results will also provide initial benchmarks for reported sense of community values. The researchers also acknowledge significant differences in the number of responses when comparing different demographic groups. While this is unfortunate, the participation rates of women and minorities surveyed for this study were consistent with the previously reported levels of industry participation in the U.S. and should not impact the ability of the test statistic to detect differences between groups.

Results

A total of 111 students participated in the study. The response totals represent approximately 62% of the undergraduate CM population. Of the 111 responses, 8 were excluded for missing data (demographic data or one of the sense of community measures), reducing the responses available for analysis to 103. Of the 103 CM students with complete data sets, 96 were male (93.2%) and 7 were female (6.8%). The respondents included 91 white students (88.3%) and 12 non-white students (11.7%). Of the non-white students, seven identified as African American, one as Asian, and four self-reported as Latino. Students across all grade levels were represented including 16 (15.5%) freshman, 22 (21.4%) sophomores, 33 (32.0%) juniors, and 32 (31.1%) seniors.

Table 1 presents the mean sense of community scores for the demographic groups in question. These totals were based on 24 Likert scale questions from the SCI-2 instrument. Responses were coded as 0

at the low end of the scale to 3 at the high end giving a maximum possible sense of community score of 72.

Table 1

Cumulative Sense of Community Scores by Gender and Race (out of 72 points)

Category	N	Score	Standard Deviation
All Responses	103	42.7	11.012
Men	96	42.16	10.719
Women	7	50.14	13.158
White Students	91	42.84	11.497
Non-White Students	12	41.67	6.457

Table 1 shows that the cumulative SOC scores are higher for females than for males (7.9 points, 18.9%) and lower for non-white students than white students (1.17 points, 2.8%). The Mann-Whitney test was used to investigate differences between groups. The results are presented in Table 2.

Table 2

Significance Test – Sense of Community by Gender and Race

Groups	Mann-Whitney U	Z Score	Sig. 1-tailed
Males & Females	225.5	-1.449	.0735*
White Students & Non-White Students	510.5	-.365	.3575

The results of the Mann-Whitney U test support H1 that women in the construction management program will report a higher sense of community than men ($U = 225.5$, $z = -1.449$, $p < .10$). The results of Mann-Whitney U test reject H2 that non-white students will report a higher sense of community than white students ($U = 510.5$, $Z = -.365$, ns).

Analysis and Conclusions

In order to assist CM program leaders in fostering a more inclusive environment and ultimately improving diversity within the construction industry, this study sought to understand Sense of Community in a mid-western CM program. The primary research question asked if there were significant differences in Sense of Community for CM students based on gender and race. Because prior research had suggested that smaller communities were closer-knit, shared common values, and were more cohesive than their larger counterparts, the researchers chose directional hypotheses stating that SoC for females and non-whites would be higher than males and whites in the white, male dominated CM major. While the research found that females had a statistically higher cumulative SoC than their male counterparts, the same was not true of minority students in a white-dominated major.

While it may be counterintuitive, the fact that women reported higher SoC than men within the CM program is consistent with the literature presented. The results in regards to racial minorities, however, may point to a cause for concern or at least an opportunity for improvement. Not only was there no difference between non-white and white students, the mean scores for cumulative SoC were

actually lower for non-white students. It is worth noting that there was an active NAWIC chapter at the institution, but no construction-related minority student organizations. Additional studies are needed to further understand the observed phenomenon.

The researchers recommend three additional follow up studies. First, a larger study involving multiple institutions is necessary to understand if these results represent the population of all U.S. CM majors. The researchers would then be able to compare additional demographics such as institution and program size, location, and diversity. Second, it is the hope of these researchers that all CM programs will begin to examine their SoC or other form of inclusivity measure to improve diversity. If CM programs record their initial SoC results as a baseline they could measure the impact of diversity and inclusion initiatives. Programs with lower SoC amongst females and minorities may choose to start a National Association of Women in Construction (NAWIC), National Association of Black Women in Construction, or National Association of Minority Contractors student chapter. The CM programs could then measure their SoC a year or two after the student chapter implementation to check on their progress. Third, different levels of the university could be examined as the communities. For example, all students within an institution could complete the SCI-2 instrument with the institution as the community rather than the CM program. Similar to the second area of suggested research above, institutions would be able to identify a baseline diversity and inclusion index, create SoC improving initiatives, and monitor future progress.

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