



A Gender-Based Analysis of Conflict Management Styles for Construction Management Students

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The increased use of collaborative project delivery systems in the construction industry requires more cooperation and shared management of the construction process to achieve project success. This growth in collaborative systems also requires project representatives to effectively manage conflict. Project failures utilizing collaborative methods are frequently attributed to an inability or unwillingness of project representatives to successfully and collaboratively resolve conflict. Previous research suggests that women are more likely to use a collaborative conflict management style than men and that the inclusion of women in construction management (CM) roles can aid project efficiency and reduce negative conflict. Determining whether female CM students are better suited for collaborative project delivery systems could help add to the growing evidence that increasing workforce diversity in CM is beneficial to the industry. Researchers at Central Washington University's (CWU) CM program employed the Thomas-Kilmann Conflict Instrument (TKI) to compare the differences in conflict management styles between male and female CM students. A series of independent samples *t*-tests determined how conflict management styles differed between the male and female students. Two conflict management styles showed statistically significant differences including Competing ($t[69] = 1.981, p < 0.05$) and Accommodating ($t[69] = -2.551, p < 0.01$). However, no statistically significant difference was indicated for the Collaborating, Avoiding, and Accommodating conflict management styles. Another set of independent samples *t*-tests were utilized to determine if differences existed between male and female CM students along the two axes of the TKI graph. It was shown that statistically significant differences exist regarding Cooperativeness ($t[69] = -2.329, p < 0.05$). There was no statistically significant difference regarding Assertiveness. These results indicate that although female CM students are not necessarily more collaborative than their male peers, they are stronger in some attributes required for collaboration and exhibit conflict management behaviors that are complementary to their male counterparts. Due to the increased need for a diversity of collaborative behavior, harnessing and pooling these differences has the potential to benefit the construction industry.

Introduction

Influencers within the construction industry are demanding more collaborative working environments. Collaborative methods such as Construction Management at Risk, Design/Build, Lean Construction, and Integrated Project Delivery (IPD) now account for most construction contracts.¹ However, the use of these increasingly collaborative project delivery systems does not ensure collaboration. For example, although Lean Construction proponents frequently employ

the principles of IPD, success does not occur on every project. The reasons for failures are considerable, but one commonly cited cause is the inability of the construction managers, on these projects, to manage conflict in a cooperative manner or adjust their mindsets to operate within a collaborative framework. Although individuals with strong records of success on previous projects are often selected to manage these collaborative projects, they are often unable to collaborate well due to the noncooperative habits ingrained in them from years of previous experience.¹⁴ Post suggested that one of the primary factors for this uncollaborative behavior was the adoption of a 'masculine' approach to project management which considers collaborative behavior to be indicative of weakness.¹⁴ As these convictions revealed themselves on projects through non-cooperative behavior, expectations were diminished, and distrust ensued. Consequently, this distrust among project participants eventually led to poor communication, unproductive conflict, and reduced performance. Many members of the construction industry recognize this dilemma, which is attributed to an unwillingness on the part of the project participants to behave in a collaborative manner and are eager to discover methods to encourage increased collaboration.

Background

Collaborative project delivery systems now account for more than 50 percent of all construction projects compared to just 10-15 percent twenty-five years ago.¹⁴ However, the use of these collaborative project delivery systems does not ensure long term, sustainable collaboration. Increasingly, the amount of litigation in the area of Design-Build indicates that there is an underlying difficulty in establishing true collaborations within the context of contractually organized and controlled delivery methods. Despite the integration of more collaborative contracts into projects, successful collaboration has not always been achieved. To further complicate the issue, in addition to the typical uncooperative construction managers that continue to manage the same way that they were conditioned through other methods, there is evidence that the construction industry tends to attract inherently uncooperative individuals.¹⁴ In the end, a successful collaborative project needs more than just a properly written contract or enhanced technology. It requires the project participants to act in a collaborative manner during conflicts, negotiations, and operational exercises. Therefore, entrants as well as veterans in the construction industry are required to be adept at collaboratively managing conflict collaboratively in an IPD project. However, mindsets are not easily altered without some impetus to make the change. The introduction of individuals into the industry that are more inclined to act collaboratively could act as a catalyst for change.

Purpose of the Study

Gender diversity has been connected to increased profits across multiple industries.⁸ These findings have led to the creation of the value-in-diversity perspective, which contends that a diverse workforce has a distinct benefit to business.⁸ However, these benefits are not limited to increased earnings.⁸ For example, there is evidence that the inclusion of women in CM may decrease conflict and increase collaboration. Brahnman, et al.'s study suggests that women may possess more effective conflict resolution attributes than their male counterparts.² Men were typically found to be more avoidant of conflict than women.^{2,5} As avoidance is considered more disruptive in the conflict resolution process than collaboration is helpful, the inclusion of women

in CM roles may reduce non-productive conflict. Additionally, several studies suggest that any increase in women in the construction industry may have the potential to decrease conflict and reduce aggressive behavior simply by being present during conflicts due to the perceived influence of stereotypical gender roles.^{6,13} Gender roles are theoretical constructs of learned patterns of behavior which encompass a set of norms which are socially appropriate for a certain gender within a specific culture.¹² The ‘masculine’ behavioral norms typically displayed by males tend to escalate tension in situations of conflict.¹³ These ‘masculine’ behaviors also often increase individual aggression during conflict.³ However, it has been suggested that female presence during conflict situations can diffuse potential arguments and increase agreement between parties due to their less threatening and aggressive archetypes.^{6,18,15} Therefore, this research project was undertaken with the goal of comparing the conflict management styles preferred by female CM students to those of male CM students at CWU using the TKI. Determining the cooperative characteristics that female students possess that their male counterparts lack is a good starting point to promote more collaborative attitudes among construction participants within the construction industry.

Literature Review

A large amount of literature has been devoted to the topic of conflict in the construction industry. It is widely known that construction projects are prone to disputes among stakeholders, including owners, engineers, designers, and contractors.^{11,16,19} Research suggests that these conflicts can become very costly and time-consuming when they are not addressed in a prompt manner and have the potential to negatively affect project schedule performance and success.^{11,19,21,22} Due to the high potential costs of conflict in construction and the deleterious effects that conflict can have on project outcomes, the topic has been widely suggested as an area of future study.^{4,16,22}

Conflict Management Styles

The TKI is a method to determine an individual’s preferred behavior in conflict situations. Conflict situations are the situations in which two individual’s concerns appear to be contradictory. In these situations, an individual’s behavior can be plotted along two simple dimensions: (1) Assertiveness, defined as the magnitude to which a person endeavors to satisfy their own concerns, and (2) Cooperativeness, defined as the point to which a person attempts to gratify the other individual’s concerns. These two basic dimensions of behavior can be used to determine which of the five conflict management styles an individual uses when dealing with conflict. These five conflict-handling modes are shown in Figure 1.

All five styles are appropriate in specific situations and each represents a set of useful social skills. For example, the adage that “two heads are better than one” (Collaborating) is frequently considered to be valuable when solving complex problems. However, the opposite style, “Leave well enough alone” (Avoiding) is also often considered valuable, depending on the situation. The same could be said in regard to “Kill your enemies with kindness” (Accommodating), “Split the difference” (Compromising), or “Might makes right” (Competing). All styles have their place and usefulness at specific times. The practicality of a conflict management style varies with the needs of the specific conflict situation.



Figure 1: Thomas-Kilmann Conflict-Management Styles¹⁰

Following is a brief description of the modes and the psychology behind each.⁷

Competing is assertive and uncooperative. An individual pursues their own concerns at the other person's expense. This is a power-oriented mode, in which one uses whatever power seems appropriate to win one's own position.

Accommodating is unassertive and cooperative. This is the opposite of Competing. When Accommodating, an individual neglects their own concerns to satisfy the concerns of the other person.

Avoiding is unassertive and uncooperative. The individual does not immediately pursue their own concerns or those of the other person. Avoiding might take the form of diplomatically sidestepping an issue, postponing an issue until a better time, or simply withdrawing from a threatening situation.

Collaborating is both assertive and cooperative. This is the opposite of Avoiding. Collaborating involves an attempt to work with the other person to find some solution which fully satisfies the concerns of both persons.

Compromising is intermediate in both Assertiveness and Cooperativeness. The objective is to find an expedient, mutually acceptable solution which partially satisfies both parties.

Each person can use all five conflict management styles and no one person can justifiably be categorized as having a single inflexible style of managing conflict. However, any individual employs some styles better than others and therefore, is inclined to rely upon those styles more habitually than others, whether because of temperament or experience in using them. The challenge for IPD participants whose predisposition is to be "Competing" or "Avoiding" is to learn how to acclimate to more cooperative styles because the situation of an IPD project requires cooperation for success.¹

Conflict Management Styles Across Genders

Close to 40 years of research on conflict styles across genders indicates that men and women manage conflict differently. Most of these studies have measured conflict management propensities in terms of the five styles of conflict management styles discussed above. Early studies of the topic in the 1980s suggested that women tended to be more Accommodating, Compromising, and Avoiding.²⁰ Similarly, several conflict management style studies across genders in the early 2000s by Holt and Devore found that males were more Competing, and females were more Compromising, per self-reported data from the TKI.⁹ A 2005 study of students in an undergraduate Information Systems program found that female students were more likely to employ a collaborative conflict resolution style, and determined that females were less avoidant of conflict overall.² More recent studies have continued to support the theory that males and females manage conflict differently, although the specifics of these differences have not been entirely consistent with earlier research. For example, the results of Prause and Mujtaba's study suggesting that males are more dominating and use more competitive methods than females does not align with the results of Gbadamosi, et al.'s study of post-graduate students in a Malaysian university which indicated that female students used a competitive style more than male students^{17,5}. However, Gbadamosi, et al.'s study was consistent with Brahnam, et al.'s 2005 study regarding the tendency for male students to be more avoidant of conflict overall.^{2,5} Therefore, although there appear to be some inconsistencies regarding exactly how males and females differ in conflict management, research consistently reinforces the suggestion that differences between genders exists.

Methodology

This quantitative, descriptive study identified the conflict management styles of the CWU CM male and female students when they entered the CM program during their junior year at CWU and then compared their respective conflict management styles across gender. The researchers used this analysis to detect differences in the male and female conflict management styles while enrolled in CWU's four-year, campus based, American Council for Construction Education (ACCE) accredited CM program. The results of the TKI were evaluated through a series of statistical analyses. TKI paper-based questionnaires were distributed to 50 junior-level males and 21 junior-level females over a five-year period from the winter of 2014 to the spring of 2019.

The TKI scores were tallied and documented in order to determine each student's conflict management style during their junior year and to determine whether the construction management females and males, as distinct separate groups, preferred one conflict management style over another. To accomplish this effort, five independent samples two-tailed *t*-tests were performed for each TKI conflict management style. First, the scores for the 50 junior males were compared against the tallied scores of the 21 junior females for the "Competing" dimension from the TKI. Following that comparison, each of the other four dimensions were evaluated similarly.

Results

The results of the paired samples *t*-test as shown in Table 1 determined that the male Competing percentile scores ($M = 65.14$) were significantly different from the female Competing raw scores

($M = 51.05$), ($t[69] = 1.981$, $p < 0.05$). Results shown in Table 1 indicate that there was a statistically significant difference between male and female Competing percentile scores.

Table 1: *Paired Samples t-test Comparing “Competing” Means of Male and Females.*

t-Test: Two-Sample Assuming Equal Variances

Competing

	<i>Male</i>	<i>Female</i>
Mean	65.14	51.05
Variance	604.20	1101.35
Observations	50.00	21.00
Pooled Variance	748.30	
Hypothesized Mean Difference	0.00	
df	69.00	
t Stat	1.981	
P(T<=t) one-tail	0.03	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.05	
t Critical two-tail	1.99	

The results of the paired samples *t*-test shown in Table 2 indicated that the male Collaborating percentile scores ($M = 38.00$) were not significantly different than the female Collaborating percentile scores ($M = 34.76$), ($t[69] = 0.48$, $p > 0.05$) and that there was no statistically significant difference.

Table 2: *Paired Samples t-test Comparing “Collaborating” Means of Males and Females.*

t-Test: Two-Sample Assuming Equal Variances

Collaborating

	<i>Male</i>	<i>Female</i>
Mean	38.00	34.76
Variance	677.63	694.49
Observations	50.00	21.00
Pooled Variance	682.52	
Hypothesized Mean Difference	0.00	
df	69.00	
t Stat	0.48	
P(T<=t) one-tail	0.32	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.64	
t Critical two-tail	1.99	

The results of the paired samples *t*-test shown in Table 3 indicate that the male Compromising percentile scores ($M = 43.82$) were not significantly different than female Compromising

percentile scores ($M = 49.14$), ($t[69] = -0.85$, $p > 0.05$) and that there was no statistically significant difference.

Table 3: *Paired Samples t-test Comparing “Compromising” Means of Males and Females.*

t-Test: Two-Sample Assuming Equal Variances

Compromising

	<i>Male</i>	<i>Female</i>
Mean	43.82	49.14
Variance	615.42	499.63
Observations	50.00	21.00
Pooled Variance	581.85	
Hypothesized Mean Difference	0.00	
df	69.00	
t Stat	-0.85	
P(T<=t) one-tail	0.20	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.40	
t Critical two-tail	1.99	

The results of the paired samples *t*-test in Table 4 indicate the male Avoiding percentile scores ($M = 58.60$) were not significantly different than female Avoiding percentile scores ($M = 53.43$), ($t[69] = 0.76$, $p > 0.05$) and that there was no statistically significant difference.

Table 4: *Paired Samples t-test Comparing “Avoiding” Means of Males and Females.*

t-Test: Two-Sample Assuming Equal Variances

Avoiding

	<i>Male</i>	<i>Female</i>
Mean	58.60	53.43
Variance	669.84	726.36
Observations	50.00	21.00
Pooled Variance	686.22	
Hypothesized Mean Difference	0.00	
df	69.00	
t Stat	0.76	
P(T<=t) one-tail	0.23	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.45	
t Critical two-tail	1.99	

The results of the paired samples *t*-test in Table 5 indicate the male Accommodating percentile scores ($M = 41.72$) were significantly different than female Accommodating percentile scores ($M = 59.95$), ($t[69] = -2.551$, $p < 0.01$) and that there was a statistically significant difference.

Table 5: *Paired Samples t-test Comparing “Accommodating” Means of Males and Females.*

t-Test: Two-Sample Assuming Equal Variances

Accommodating

	<i>Male</i>	<i>Female</i>
Mean	41.72	59.95
Variance	778.29	699.85
Observations	50.00	21.00
Pooled Variance	755.55	
Hypothesized Mean Difference	0.00	
df	69.00	
t Stat	-2.551	
P(T<=t) one-tail	0.01	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.01	
t Critical two-tail	1.99	

Using coordinate geometry, a graph was developed with a two-dimensional axis resembling the orientation of the TKI chart previously shown in Figure 1. The collective results of the styles

were plotted against a Cartesian coordinate graph and centroids were located to determine which quadrant the collective males and females were located. Figure 2 shows the associated polygons and centroids for the males (red) and females (blue). The male and female centroids were analyzed using independent samples two-tailed *t*-tests to compare the x- and y-coordinate centroids of the two groups. The Compromising means were proportionately distributed to the other four conflict management styles for ease of understanding on a two-dimensional format.

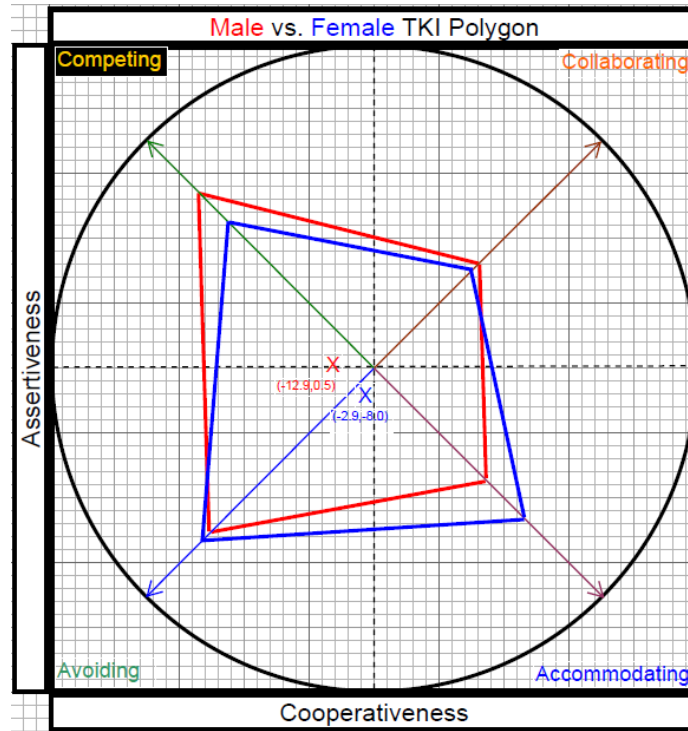


Figure 2: Cartesian Coordinate Graph for Conflict Styles Centroids

The mean values of each conflict management style for each collective male and female group were plotted on the Cartesian Coordinate Graph (Figure 2) using 45-degree vectors starting from the (0.0, 0.0) coordinates. In Figure 2, a 45-degree vector was plotted in Quadrant 1 (Competing) and the male Competing mean ($M = 78.36$) was located on that vector. Using right triangle trigonometry ($a^2 + b^2 = c^2$), the x,y (-55.41, 55.41) coordinates were identified. Next, the female Competing mean ($M = 63.89$) coordinates were identified (-45.18, 45.18). Following the Competing vector, another 45 degree vector was plotted into Quadrant 2 (Collaborating) and the male Collaborating mean ($M = 46.19$) x,y coordinates were located on that vector (32.66, 32.66) followed by the female mean ($M = 43.10$) which yielded (30.48, 30.48) coordinates. Quadrant 3 (Accommodating) male mean ($M = 50.19$) yielded (35.49, -35.49) coordinates while the female mean ($M = 66.08$) yielded (46.72, -46.72) coordinates. Finally, Quadrant 4 (Avoiding) male mean ($M = 72.55$) yielded (-51.30, -51.30) coordinates while the female mean ($M = 74.73$) yielded (-52.84, -52.84) coordinates. Once these coordinates were identified, each point was connected to create the polygons.

In addition, the polygons' respective centroids were determined for each male and female student. When all of the centroids were averaged within each male and female group, it was

determined that the centroid's x,y coordinates for all males collectively was (-12.93, 0.52) and the centroid's x,y coordinates for all females collectively was (-2.86, -7.97) as presented on Figure 2.

A paired samples *t*-test was then conducted to determine whether there was a significant difference between the male and female centroid means consisting of two different population sets. Therefore, a two-tailed test was appropriate. The results of the paired samples *t*-test shown in Table 6 indicate that the male centroid x-coordinate (Cooperativeness) mean ($M_x = -12.93$) was significantly different than the female centroid x-coordinate mean ($M_x = -2.86$), ($t[69] = -2.329, p < 0.05$).

Table 6: *Paired t-test Comparing Centroid X-Coordinate Means of Males and Female.*

t-Test: Two-Sample Assuming Equal Variances

X-Axis - Cooperativeness

	<i>Male</i>	<i>Female</i>
Mean	-12.93	-2.858571429
Variance	273.9987796	282.7939629
Observations	50	21
Pooled Variance	276.5481081	
Hypothesized Mean Difference	0	
df	69	
t Stat	-2.329009212	
P(T<=t) one-tail	0.011396794	
t Critical one-tail	1.667238549	
P(T<=t) two-tail	0.022793588	
t Critical two-tail	1.994945415	

The results of the paired samples *t*-test on Table 7 indicate that the male centroid y-coordinate (Assertiveness) mean ($M_y = 0.52$) was not significantly different than the female centroid y-coordinate mean ($M_y = -7.97$), ($t[69] = 1.633, p > 0.05$).

Table 7: *Paired t-test Comparing Centroid Y-Coordinate Means of Males & Females.*

t-Test: Two-Sample Assuming Equal Variances

Y-Axis - Assertiveness

	<i>Male</i>	<i>Female</i>
Mean	0.5232	-7.969047619
Variance	339.5393161	548.539019
Observations	50	21
Pooled Variance	400.1189401	
Hypothesized Mean Difference	0	
df	69	
t Stat	1.632651792	
P(T<=t) one-tail	0.05354895	
t Critical one-tail	1.667238549	
P(T<=t) two-tail	0.1070979	
t Critical two-tail	1.994945415	

Conclusions and Future Work

Results of this study indicate that, although no one group appears to be more collaborative than the other, important distinctions in how male and female students manage conflict do exist. For example, although at first glance the results of the paired samples *t*-test shown in Table 2 appear to indicate that the male Collaborating percentile scores ($M = 38.00$) were not significantly different than the female Collaborating percentile scores ($M = 34.76$), ($t[69] = 0.48, p > 0.05$), one must take into account that the Collaborative conflict management style is associated with both a high level of Cooperativeness (*x*-axis) and Assertiveness (*y*-axis), as shown in Figure 2. Therefore, an increase in Cooperativeness or Assertiveness has the potential to increase overall collaboration. The results of the paired samples two tailed *t*-tests from the male and female centroid analysis indicated the conflict management styles of the CM students at CWU were significantly different regarding Cooperativeness. However, the results of the paired samples *t*-test in Table 7 indicated the male centroid *y*-coordinate (Assertiveness) mean ($M_y = 0.52$) was not significantly different than the female centroid *y*-coordinate mean ($M_y = -7.97$), ($t[69] = 1.633, p > 0.05$). Therefore, although female CM students may not differ significantly in their propensity to use a collaborative style overall, they do appear to offer a more cooperative approach to conflict management while not being significantly different than their male counterparts regarding Assertiveness. As Assertiveness was previously defined as the magnitude to which a person endeavors to satisfy their own concerns, and Cooperativeness is the point to which a person attempts to gratify the other person's concerns, it appears that female CM students may be better adapted to work towards solutions that meet the needs of others without sacrificing their own needs.

The study found two other significant differences between male and female CM student conflict management styles. The results of the paired samples *t*-test in Table 5 for Accommodating indicated that male Accommodating percentile scores ($M = 41.72$) were significantly lower than

female Accommodating percentile scores ($M = 59.95$), meaning that the female students were more likely to use an Accommodating style than their male counterparts. Additionally, the results of the paired samples t -test as shown in Table 1 determined that the male Competing percentile scores ($M = 65.14$) were significantly higher than the female Competing raw scores ($M = 51.05$), which indicates that female students are less likely to use a Competing conflict management style than their male counterparts. These differences complement the less Accommodating and more competitive styles of their male counterparts. Harnessing and pooling these complimentary styles could benefit the construction industry's need for increased collaboration.

The results of the independent samples two tailed t -tests from the male and female centroid analysis raises another potential concern. Although the female CM students were more cooperative than their male counterparts, their collective centroid still lands on the uncooperative side of the ledger. These results suggest that the construction industry may attract uncooperative people, regardless of their gender, as suggested in Martin and Plugge's article.¹⁴

The study sample was limited to undergraduate junior-level students enrolled full-time in the CM program at CWU. The research did not attempt to evaluate the entire university population, nor did it attempt to examine student populations at any other post-secondary institution. Furthermore, the research did not use any other demographic other than the gender binary to compare students. There was no attempt to group students based upon age, race, class, nationality or any other characteristic.

The difference in male Assertiveness mean ($M_y = 0.52$) and female Assertiveness mean ($M_y = -7.97$), may be due to random chance. However, it is also possible that the lack of establishing a statistically significant difference is due to the small sample size of the female's population ($n = 21$). Recommendations for future research include evaluating additional students in other CM programs to assess a larger sample population. This would provide a more accurate assessment of conflict management trends across genders among students in CM programs. Future research projects could also consider characteristics of the CM students other than gender, such as grade point average, or the discipline (heavy civil versus general) within the CM program in which the student is enrolled in order to determine whether these attributes have any influence on conflict management styles.

Finally, a follow-up study of the current participants after working in the construction industry for four or five years would provide insight into whether the differences across gender were enduring. With the solid relationships developed between the CWU researchers and the associated alumni, it is feasible that these participants would be willing to complete another TKI. Follow-up research of this kind could attempt to determine how alumni of both genders are impacting collaboration in the industry and if their conflict management styles changed with increasing industry experience.

Summary

Conflict is a part of everyday life. The way an individual manages and resolves conflict is known as their conflict management style. Depending on the situation, scenario, and

environment, certain styles may be preferred over others. The rising use of collaborative project delivery systems in the construction industry, such as IPD, is leading to increased collaboration between project partners, thus increasing the need for construction industry affiliates to adopt a more collaborative conflict management style.²¹ To meet these new industry demands, CM education programs across the United States are exploring methods to prepare students for the collaborative industry evolution. Many programs are focusing on implementing technological advances that have become common on IPD projects, such as Building Information Modeling, cloud-based communication methods, etc. while others are focusing on educating students in the content and nuances of IPD contracts. Both aforementioned educational efforts are appropriate for facilitating collaboration, however as Kanagy and Kraybill¹⁴ assert, in addition to technology and structure, culture is also an integral component of society. Each construction project functions as its own mini society, so cultural impetuses should also be advanced by construction management educators. As alluded to earlier, very little has been accomplished regarding the “culture” arena in IPD construction education. One potential tactic for addressing this issue is to allow students the opportunity to learn from one another. As discussed above, our results indicate that female CM students are not only stronger than male CM students in some attributes required for collaboration, but they also exhibit conflict management behaviors that are different, yet complementary to their male counterparts. Therefore, increasing diversity into the classroom can allow both genders an opportunity to learn from one another with the recognition that they each have something to teach each other regarding collaboration.

Therefore, an increase in gender diversity in the construction industry has the potential to increase Cooperativeness in times of conflict during construction projects, and this can also help fill in the gaps of collaborative behavior between genders. This idea may prove to be especially advantageous considering the evidence suggesting the industry attracts uncooperative people, regardless of gender.¹⁴ Allowing students to experience and learn from diverse conflict management styles can better prepare them to work in diverse teams in support of the collaborative industry evolution before they enter the industry.

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