

Classroom Motivational Climate in Online and Face-to-Face Undergraduate Courses: The Interplay of Gender and Course Format

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Abstract

In this study, the role of gender and course format in college students' perceptions of classroom motivational climate (i.e., sense of classroom community and perceived classroom goal structure) was examined. Participants were 722 college students from a variety of majors at a comprehensive Midwest American university. Female students felt a stronger sense of community and perceived lower levels of performance–approach goal structure in online classes than their male counterparts experienced. Male students perceived the face-to-face classes as being more communal and less performance–approach oriented than the females did. Further, both male and female students perceived a stronger mastery–approach classroom goal structure in face-to-face than in online classes. These findings suggest that instructors should consider the roles of gender and course format in designing instruction and creating motivational learning environments.

Highlights

- Gender effect differs in perceptions of online and face-to-face motivational climate.
- More females than males felt that online classes were more communal and less performance-oriented.
- More males than females felt that face-to-face courses were more communal and less performance-based.
- Online classes were perceived as less mastery-oriented than face-to-face courses by both male and female students.
- Gender and course format are important factors in motivational curriculum design and instruction.

Résumé

Dans cette étude, on a examiné le rôle des genres et du type de présentation d'un cours chez des étudiants de niveau collégial au niveau des perceptions du climat motivationnel de la classe (c'est-à-dire, le sens de communauté de la classe et la structure de but de la classe perçue). Les participants étaient 722 étudiants issus d'une variété de majeures dans une université polyvalente du Midwest américain. Les étudiants de sexe féminin ont ressenti un sentiment plus fort de communauté et ont perçu l'approche centrée sur la performance de la structure de but dans les classes en ligne à des niveaux inférieurs que leurs homologues de sexe masculin. Les étudiants de sexe masculin ont perçu les classes en face-à-

face comme étant plus communautaires et moins centrées sur la performance que les étudiants de sexe féminin. En outre, à la fois les étudiants de sexe masculin et de sexe féminin ont perçu une plus forte approche centrée sur la réussite de la structure de but de la classe dans les classes en face-à-face plutôt que dans les classes en ligne. Ces résultats suggèrent que les instructeurs devraient prendre en considération le rôle des genres et du type de présentation d'un cours dans la conception de l'enseignement et dans la création d'environnements d'apprentissage motivationnel.

Faits saillants

- L'effet du genre diffère dans les perceptions du climat motivationnel en ligne et en face-à-face.
- Plus de femmes que d'hommes ont estimé que des cours en ligne étaient plus communautaires et moins centrés sur la performance.
- Plus d'hommes que de femmes ont estimé que des cours en face-à-face étaient plus communautaires et moins axés sur la performance.
- Les classes en ligne ont été perçues comme moins centrées sur la réussite que les cours en face-à-face à la fois par les étudiants de sexe masculin et de sexe féminin.
- Le genre et le type de présentation d'un cours sont des facteurs importants dans la conception des programmes d'études motivationnels et dans l'enseignement.

Introduction

With increasing use of the Internet and the growing number of college students taking online classes, higher education is faced with new opportunities and challenges in online learning. Although some students choose online courses because they require the accessibility that online courses offer, online learning has recently garnered attention due to its perceived advantages over face-to-face classes (Daymont, Blau, & Campbell, 2011). First, online learning does not require students to sit in a classroom; this circumstance saves students travel time and money which could be a big help during challenging economic times. Second, most online learning is asynchronous in nature, thus providing flexibility to students to log into course sites and complete assignments according to their personal schedules. This opportunity can be very appealing to students who may have to work and have no way of attending a face-to-face class. Third, online classes provide a unique platform for students to have their voices heard when they might be too introverted or shy to speak up in face-to-face classes (Daymont et al., 2011). On the other hand, online classes generate other challenges, for example, higher dropout rates, stronger feelings of isolation, higher failing rates, and lower levels of academic engagement and social interaction than occur in face-to-face classes. Each of these challenges may be associated with student perceptions of classroom motivational climate (McInerney & Roberts, 2004; Overbaugh & Nickel, 2010; Pigliapoco & Bogliolo, 2008).

Classroom motivational climate is a dynamic and complex context involving physical and psychological factors that contribute to student success. In the present study, the term classroom motivational climate refers to the motivational aspects of the classroom environment. These aspects exist within the multidimensional classroom and include cognitive, affective, and social, and motivational components. A classroom climate that motivates student learning and effort is likely to result in greater participation, enhanced learning, and higher course satisfaction than other climates do (Jung, Choi, Lim, & Leem, 2002). In research examining the motivational climate conducive to student learning, two major indicators have been identified: classroom goal structure (the goals that instructors set for the class) and sense of community (students' perceptions of belonging and respect). Both indicators have been reported to have a significant impact on students' adoption of effective self-regulated learning approaches such as achievement goals, use of learning strategies, and academic achievement (Ames, 1992; Ames & Archer, 1988).

In this study, perceived classroom motivational climate is viewed as students' interpretation and reflection of motivational functions and influences. Based on current literature, two primary indicators of classroom motivational climate, namely, classroom goal structure and sense of community were included in this study. Given that students' perceptions inform their success in a course (Pulkka & Niemivirta, 2013), it is important to understand students' perceptions of classroom motivational climate.

Dai and Sternberg (2004) asserted that motivation is "indicated by the intensity (or energy), direction, or persistence of a goal-directed behavior or action" (p. 11). Because motivation is often defined as being goal-driven, this study focused on achievement goals that are valued and encouraged at the classroom level (i.e., classroom goal structure) (Meece, Anderman, & Anderman, 2006) and the extent to which the goals are shared and valued among class members (i.e., sense of classroom community) (Cho, Bang, Mathew, Bridges, & Watson, 2010). Generally, classroom goal structures are thought to be heavily influenced by instructors who may design and facilitate learning activities that promote either mastery or performance. These classroom-level goals have been correlated with variables such as student goals and achievement (Raccanello & De Bernardi, 2013). Generally, instructors play an important role in setting goals in a course, and discrepancies between student and instructor perceptions of goals have been noted (Vilma, 2012). In addition, students' individual achievement goal orientations may influence their perceptions of teacher-imposed classroom goal structures, and these perceptions may conflict with one another (Negru & Damian, 2010).

Although previous studies have documented differences in students' experiences of the classroom learning environment such as a sense of classroom community in online versus face-to-face courses (Drouin & Vartanian, 2010; Rovai & Jordan, 2004), it is unclear whether the differences are consistent across gender. Further, research on classroom goal structures has been conducted primarily in face-to-face classroom settings (Wolters, 2004).

2.1.1. Classroom goal structure

Although setting appropriately specific and proximal goals is a necessary step to student success, students' tendency to adopt process goals, outcome goals, or both is affected by the motivational climate in a given classroom. For instance, Maehr and Midgley (1991) suggested that the importance of students' subjective perceptions makes the classroom climate a "psychological environment" as well as a physical space (p. 405). Travers, Bohnert, and Randall (2013) further explained that "motivational climate involves a perception of how the environment evaluates one's achievement" (p. 424). Morgan and Kingston (2010) described motivational climate "as a situationally induced psychological environment directing goals of action" (p. 73).

Classroom goal structure refers to goal-related messages or expectations that are conveyed to students regarding the meaning of academic success (Meece et al., 2006). Achievement goal theorists have identified two types of classroom goal structures: mastery goal structure and performance goal structure. In a mastery goal-oriented classroom, students'

understanding and improvement are emphasized while mistakes are viewed as a natural process of learning (Ames, 1992; Midgley et al., 2000). On the other hand, a performance goal-oriented classroom tends to promote competition among students through normative social comparisons (Ames, 1992; Midgley et al., 2000). Substantial research has shown that students' perceptions of classroom goal structures have a significant impact on academic motivation and achievement (Wolters, 2004). In general, classrooms perceived as promoting mastery goal structures are associated with positive learning outcomes, while classrooms perceived as promoting performance goals are associated with negative outcomes (Urda, 2004).

2.1.2. Sense of classroom community

Like classroom goal structure, a sense of classroom community has been conceptualized as a critical indicator of classroom motivational climate (Reio, Marcus, & Sanders-Reio, 2009). McMillan and Chavis (1986) and McMillan (1996) conceptualized the sense of community construct as involving four dimensions: a sense or spirit of belonging; influence or trust among members; integration of needs or exchange resulting in mutual benefit, and shared emotional connections or the creation of artifacts that represent "the transcendent values of the communities" (McMillan, 1996, p. 322). While classroom goal structure indicates the nature of goals stressed in a given climate, sense of classroom community refers to the extent to which the goals are shared and valued among class members as mutual responsibilities and respectful social relationships (Cho, Hathcoat, Bridges, Mathew, & Bang, in press). Students with a strong sense of classroom community feel that they matter to each other, possess shared goals and expectations, and are committed to the goal attainment (Cho et al., 2014; Rovai, 2002). Building a sense of community within a classroom setting has significant implications for student satisfaction and learning (Rovai, 2002). Other studies have shown that students' sense of classroom community is associated with adaptive patterns of student motivation and engagement (Summers, Achacoso, Svinicki, Turner, & Harris, 2002; Summers, Bush, Turner, Svinicki, & Achacoso, 2003).

2.2. Course delivery format: Online versus face-to-face

Students tend to perceive and respond differently to classroom climate depending on the delivery format of a course and whether the course is a face-to-face or an online course. While some studies have reported that online learners tend to experience a lack of social interaction and feel isolated (Rovai, Wighting, & Liu, 2005; Shen, Nuankhieo, Huang, Amelung, & Laffey, 2008) which may result in low sense of community (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000), Vavala et al. (2010) found that students in face-to-face classes reported higher levels of sense of community than online students, particularly in terms of connectedness and interdependence with peers and the course instructor. However, Overbaugh and Nickel (2010) found no real differences in students' perceptions of an academic sense of community. These results suggest that significant differences in student perceptions of classroom motivational climate based on course format may not necessarily exist. Alternatively, variables such as gender may serve as a moderator. The study reported in this paper contributed to this line of research focusing on the potential moderating role of gender in students' perception of sense of classroom community across the two course delivery formats.

2.3. Gender role in perceived classroom motivational climate

While gender has been often found to affect the learning process (Hyde & Durik, 2005), the literature has been inconclusive about gender role in students' perceptions of classroom motivational climate in online versus face-to-face classes. Rovai (2005) discussed the well-documented differences in communication styles between men and women that may contribute to the construction of different types of community. For instance, women have been found to be more likely to prioritize intimacy in their social interactions, while men have been found to be more likely to value dominance. These differing priorities have appeared to result in different types of communication and different types of communal groups. Varying community structures have also been perceived differently by group members depending on individual differences. For example, in a study of evenly divided male and female graduate online students, Rovai (2001) found that, while sense of community increased as the course progressed, female students demonstrated higher levels of sense of community and communication that nurtured connectivity than did their male colleagues who tended to employ more independent communication styles.

Rovai (2001, 2005) has suggested that female adult online learners tend to experience higher levels of sense of community in online learning environments than male online learners. However, it is unclear whether such gender effect is present in perceived classroom goal structure. The gender effect in Rovai's studies (2001, 2005), together with previous literature on gender effects in online effort expenditure (Yang, Cho, Mathew, & Worth, 2011) and help-seeking (Cao & Yang, 2013), suggest that further research on gender role in online learning is required.

Given that many females have been socialized to promote pro-social values that are likely to cultivate intimacy (Hyde & Durik, 2005; Rovai & Wighting, 2005), they may have also acquired greater skills and commitments conducive to creating and nurturing a positive online culture despite the lack of nonverbal cues in the online setting. Males, however, may feel less equipped to provide comparable contributions to the online climate, or they may value an intimate learning community to the same extent (Rovai & Wighting, 2005). In summary, gender may affect the perceptions of learners' sense of community in online learning environments which may then inform their behaviors and subsequent learning

outcomes (Shea, Li, Swan, & Pickett, 2005; Smith, 2008). Clarifying the impact of gender in students' perceptions of classroom motivational climate in online versus face-to-face classes is an area requiring further research.

The aim of the study reported in this paper was to explore the interplay of course delivery format and gender in online versus face-to-face classes. Study findings would be valuable to online college instructors interested in learning about gender differences in the two settings in order to enhance classroom motivational climate. Perceived classroom motivational climate includes three variables: 1) sense of classroom community, 2) mastery goal structure, 3) performance goal structure.

Three questions were explored in the study:

1. Are there significant differences across course delivery format (face-to-face versus online courses) in college students' perceptions of classroom motivational climate?
2. Are there significant gender differences in college students' perceptions of classroom motivational climate?
3. Are there significant interaction effects between gender and course delivery format on college students' perceptions of classroom motivational climate?

3. Method

3.1 Participants

IRB guidelines were strictly followed in the data collection process. A total of 722 undergraduate students (64% male and 35% female) from seven colleges at a comprehensive university in the Midwestern area U.S.A. voluntarily participated in the study. Among them, 144 students (20%) were enrolled in online classes and 571 students (80%) in face-to-face classes. The ratio of participants enrolled in online versus face-to-face courses in the sample proportionately represented the online and face-to-face course enrollment numbers at the university. The main differences between the two course delivery formats lie in the channels of communication through which learning and social interactions between peers and with the instructor occur. Most online courses offered at this university utilize an online course management system named *Desire to Learn* (D2L).

The students enrolled in the online courses considered in this study were expected to engage in asynchronous and/or synchronous online discussions and complete course assignments through D2L as well as communicate with an instructor via email and D2L discussion forums. Students enrolled in face-to-face courses met in classroom settings where they interacted with peers and instructors at regularly scheduled times. To ensure equivalent quality of student learning regardless of the delivery format, program and curriculum planning committees from the colleges responsible for the courses reviewed and approved all course syllabi. A professional development center for faculty is available at this university and offers workshops on a wide range of topics relevant to online and face-to-face teaching settings. Recognizing that there are variations in how courses are designed and implemented across instructors, we focused on how motivational aspects of classroom environment are generally perceived by college students in the two different course delivery formats (online and face-to-face courses).

Participants were from a wide range of majors. The average age of the participants was 22 years ($SD = 4.44$). Of the participants, 124 students (17.2%) were freshmen, 137 (19.0%) were sophomores, 166 (23.0%) were juniors, and 292 (40.4%) were seniors. Three participants did not indicate age and, hence, there were three missing values. We did not find any significance in the participants' experience level and their perceptions of classroom motivational climate. The sample was predominantly White (79.6%). Other ethnic backgrounds included Native American (7.2%), African American (3.9%), Asian American (3.2%), and Hispanic (2.5%). Table 1 displays the demographic characteristics of the sample.

Table 1. *Sample Characteristics*

		Online	Face-to-Face
Gender			
	male	n = 100	n = 363
	female	n = 44	n = 208

Classification			
	Freshman	9.00%	19.20%
	Sophomore	18.80%	19.00%
	Junior	22.90%	23.20%
	Senior	49.30%	38.60%
Ethnicity			
	White	81.70%	78.70%
	Native American	6.90%	6.70%
	African American	5.10%	3.90%
	Asian American	1.70%	3.70%
	Hispanic	1.10%	3.40%
	Others	3.40%	3.60%
Campus Residents		24.10%	38.50%
Traditional Students		67.40%	92.60%
Employed		61.70%	49.80%
College			
	Agricultural Sciences and Natural Resources	3.40%	6.40%

	Arts & Sciences	28.20%	34.20%
	Center for Veterinary Health Sciences	0%	0.70%
	Education	23.20%	10.90%
	Engineering, Architecture and Technology	7.30%	11.20%
	Human Environmental Sciences	28.80%	28%
	School of Business	9.00%	8.60%

3.2 Measures

Participants were asked to complete a self-report survey and provide demographic information including age, program status, ethnicity, gender. They were also asked to indicate the course delivery format of the class. A seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7) was used for measures of perceived sense of community and classroom goal structure.

3.2.1. Perceived sense of community

Student perception of classroom community was measured by the Integrated Measure of Classroom Sense of Community that Cho, Hathcoat, Bridges, Mathew, and Bang (2014) developed and validated for both online and face-to-face learning environments. This measure is designed to capture context-specific and context-general characteristics of sense of community by incorporating two existing complimentary measures of sense of community: 1) the Perceived Sense of Community Scale (PSCS) (Chertok, 1990) and 2) the Post-Secondary Classroom Community Scale (Bush, Svinicki, Achacoso, & Kim, 2004). The overall instrument contains four subscales with a total of 22 items. Sample items include the following: "Students in this class know that they can depend on each other should they need help," "Interactions with my instructor are generally positive," and "Students in this class share common values."

Measurement invariance across face-to-face and online courses was obtained, indicating that the factor structure of this measure is comparable for the two course delivery methods. Such evidence is critical in conducting a study that compares potential differences across different contexts. A composite score of the measure was used in the present study, and the internal consistency reliability coefficient was .95.

3.2.2. Perceived classroom goal structure

The Perception of Classroom Goal Structures subscale of the Patterns of Adaptive Learning Scale (Midgley et al., 2000) was used to assess the extent to which students perceive the classroom to be mastery-focused or performance-focused. The mastery goal structure scale contains six items such as, "In this class, trying hard is very important." The performance goal structure scale includes three items. The following is one of the three items, "In this class, getting good grades is the main goal." The internal consistency coefficients for the subscales were .87 for mastery goal structure and .70 for performance goal structure.

3.3 Procedure

The researchers contacted online and face-to-face course instructors via email during the middle of the semester (weeks 11 and 14). A student recruitment letter was sent to online instructors who responded and approved student participation. The flyer provided a link to the information sheet that included a brief introduction to the study and the

survey of the study. For face-to-face course instructors who responded and approved participant recruitment, two modes of survey administration (paper-based or online survey) were available. Depending on the instructors' preference and/or scheduling considerations, students were given either online or paper-based surveys. Data collection lasted about three weeks. No difference was found between the two formats of the survey in terms of final results regarding gender and course delivery format in relation to classroom motivational climate.

4. Results

A 2 x 2 multivariate analysis of variance (MANOVA) (Stevens, 2009) was conducted to investigate the main and interaction effects of gender and course delivery format on students' perception of classroom motivational climate (i.e., sense of community, perceived mastery goal structure, and perceived performance goal structure) using SPSS version 21. The Box's M test of the assumption of homogeneity of covariance resulted in a fail-to-reject decision [Box's M = 32.73, $F(18, 118103.36) = 1.79$, $p > .01$], indicating that the homogeneity assumption across groups was met. A two-way MANOVA revealed a significant multivariate interaction effect of course delivery format and gender on students' perceptions of the classroom motivational climate (Wilks' $\lambda = .98$, $F(3,709) = 4.28$, $p < .01$, partial $\eta^2 = .018$). Power to detect the effect was .864. These findings confirmed that course delivery format and gender jointly influence students' perception of classroom motivational climate.

Table 2. *Means (standard deviations) of the main variables in the study (N = 722)*

Classroom Motivational Climate	Gender			
	Male (n = 463)		Female (n = 252)	
	Online (n = 100)	Face-to-Face (n = 363)	Online (n = 44)	Face-to-Face (n = 208)
Sense of Community	4.20(.93)	5.08(1.01)	4.45(.83)	4.93(.90)
Class Mastery Goal Structure	4.67 (1.22)	5.24(1.12)	4.79(1.08)	5.22(1.17)
Class Performance Goal Structure	5.21(1.23)	4.77(1.30)	4.76(1.18)	5.05(1.19)

Note. The discrepancy between the sample size and the total number of female and male participants is due to the missing values. Response rates: gender = 99.3%, course delivery formats = 99.7%, sense of community = 100%, class mastery goal structure = 100%, class performance goal structure = 100%.

Univariate analyses of variance conducted on each dependent variable to determine the source of the effect revealed that there were significant interaction effects between course delivery format and gender on college students' perceptions of classroom performance goal structure ($F(1,711) = 8.43$, $p < .01$, partial $\eta^2 = .012$, power = .826) and sense of classroom community ($F(1,711) = 4.40$, $p < .05$, partial $\eta^2 = .006$, power = .554) (see Table 2). In contrast, there was no interaction effect between gender and course delivery formats on classroom mastery structure. Additionally, the results revealed significant main effects of course delivery formats on sense of community ($F(1,711) = 49.81$, $p < .001$, partial $\eta^2 = .065$, power = 1.000) and perceived mastery goal structure ($F(1,711) = 18.85$, $p < .001$, partial $\eta^2 = .026$, power = .991). Students perceived a greater sense of classroom community and a higher level of mastery goal structure in face-to-face classes ($M = 5.00$, $SD = .04$) than in online classes ($M = 4.32$, $SD = .09$). Gender did not show significant main effects but demonstrated significant interaction effects with course delivery formats.

Table 3. *Summary of the MANOVA results*

Dependent Variable	Source	SS	df	MS	F

Sense of community	Course Format	45.83	1	45.83	49.81**
	Gender	.29	1	.29	.32
	Course Format x Gender	4.05	1	4.05	4.40*
	Error	654.25	711	.92	
Mastery Goal Structure	Course Format	24.78	1	24.78	18.85**
	Gender	.26	1	.26	.19
	Course Format x Gender	.46	1	.46	.35
	Error	934.53	711	1.31	
Performance Goal Structure	Course Format	.48	1	.48	.31
	Gender	.70	1	.70	.45
	Course Format x Gender	13.22	1	13.22	8.43*
	Error	1115.18	711	1.57	

Note: * $p < .05$, ** $p < .01$. f2f = Face-to-Face, SS = Sum of Squares, MS = Mean Square

Table 1 presents the means and standard deviations of female and male students' perceived classroom motivational climate in online and face-to-face classes. Graphic displays of the interactions between gender and course delivery format for sense of community and performance goal structure are shown in Figure 1 and Figure 2. In online classes, female students showed a stronger sense of classroom community ($M = 4.45$, $SD = .83$) and less performance goal structure ($M = 4.76$, $SD = 1.18$) than their male counterparts. However, in face-to-face classes, male students felt a stronger sense of classroom community ($M = 5.08$, $SD = 1.01$) and less performance goal structure ($M = 4.77$, $SD = 1.30$) than their female counterparts.

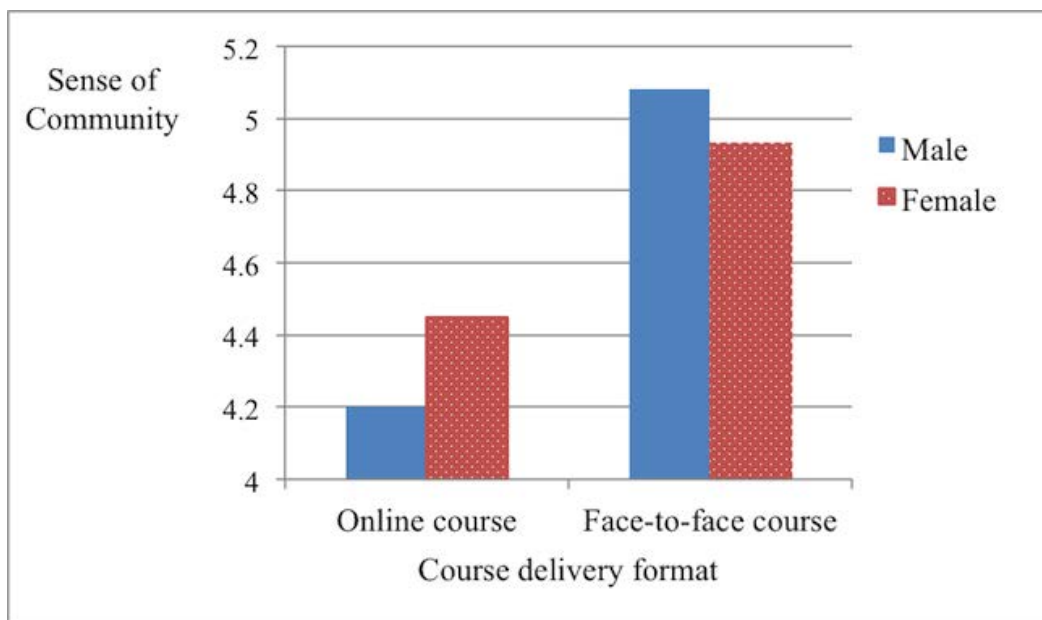


Figure 1: Interaction effect between course delivery format and gender on sense of classroom community

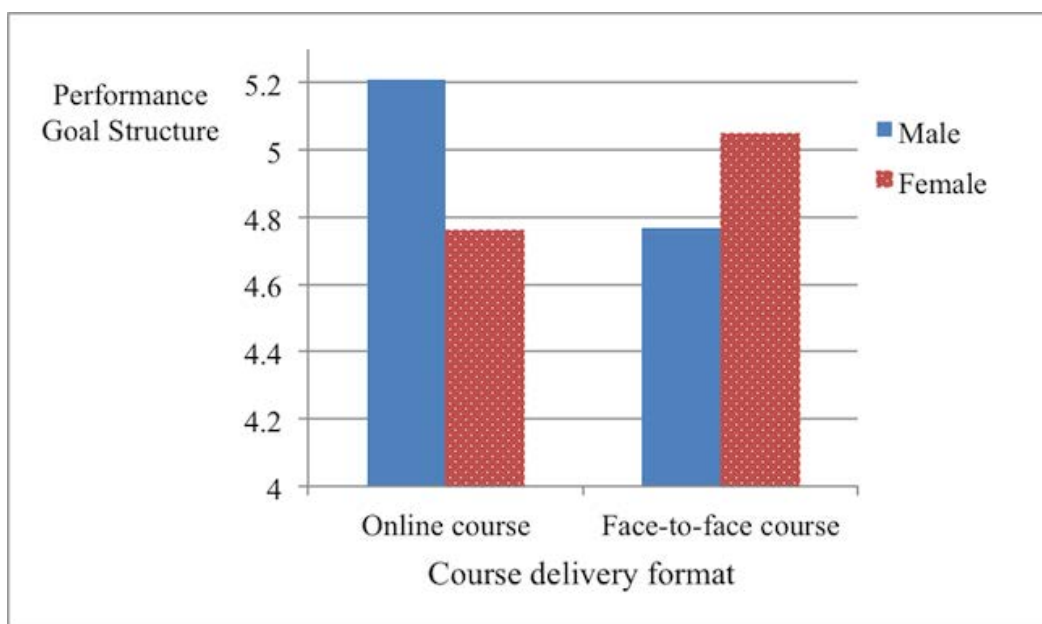


Figure 2: Interaction effect between course delivery format and gender on classroom performance goal structure

5. Discussion

Students' perceptions of the motivational learning environment in online versus face-to-face class settings were examined in this study. Specifically, we investigated the main and interactional effects of gender and course delivery format on students' perceived motivational learning environment including sense of community, perceived classroom mastery-approach goal structure, and perceived performance-approach goal structure.

Findings showed a significant interaction effect between course delivery format and gender on students' perceived classroom motivational climate, suggesting that the effects of gender and course delivery format on how students perceive classroom motivational climate are not simply additive. Rather, more complex joint roles between the two variables are indicated. Female students felt a stronger sense of community and perceived lower levels of performance-approach goal structure in online classes than their male counterparts did, whereas, male students perceived the face-to-face classes as being more communal and less performance-approach oriented than the females did.

It is intriguing that while there was no significant main effect of gender across all indicators of classroom motivational climate, gender did play an important role in student perceptions of classroom motivational environment by interacting with course delivery format. This finding indicates that considering either gender or course delivery format alone in investigations to understand student perceptions of the classroom learning environment could be misleading. The

possible difficulty arises from the fact that there was a significant gender effect within a particular context of online or face-to-face course. The gender effects were opposite in the two course delivery formats, which might have cancelled out gender effects across different learning contexts. For example, female and male students did not differ significantly in their overall sense of classroom community when course delivery format was not taken into account. However, female students reported a lower sense of classroom community in face-to-face courses. Given these findings, college instructors teaching online should consider both course delivery format and gender factors in course design and pedagogy to make online courses more motivating.

The finding regarding female students' lower sense of classroom community in a classroom setting seems plausible given the historic gender bias against female students in classrooms and evidence of how they may lose their voice in the learning environment (Banks, 1989; Banks & Banks, 2009; Jones, 1989; Sadker, 2000). By contrast, males tend to receive much more attention and encouragement from their teachers and peers than females in face-to-face settings (Sadker & Sadker, 2010; Serbin, O'Leary, Kent, & Tonick, 1973). As a consequence, male students may tend to feel more connected in face-to-face classes than their female counterparts which, in turn, may lead to a stronger sense of classroom community than what female students experience.

On the other hand, female students felt a stronger sense of classroom community in online courses than male students. This finding resonates with other studies in which women reported a greater sense of community in online learning environments than in other settings (Rovai, Wighting, & Liu, 2005; Shea et al., 2005). The differential gender difference across online and face-to-face courses may be due to the social expectations of gender role in the learning process, particularly among adult learners. As female students tend to be more relationship orientated, they may have greater skill and commitment in creating and nurturing a positive online culture despite a lack of nonverbal cues. Historically, females have been socialized to behave in pro-social ways. Males, however, tend to feel less equipped to provide comparable contributions to the online climate because males tend to be less concerned with social connectivity (Rose & Rudolph, 2006; Sadker & Sadker, 2010). As a result, males may feel less connected in online learning environments than females do. This finding suggests that, while female students tend to need more attention and support in face-to-face classes, male students may need more scaffolding and attention in online courses in order to feel connected. To improve gender equity in students' sense of community in online courses, instructional differentiation that engages both female and male students is recommended. Instructors in online situations should be encouraged to make classes engaging and interactional, provide specialized attention to students (Moore, 2001), and show up frequently to provide a high level of attention to student needs (Lewis & Abdul-Hamid, 2006).

The interaction effect of gender and course delivery format on perceived classroom performance goal structure suggests that male students perceived higher levels of performance goal structure in online courses than females, while female students perceived the face-to-face courses as more performance goal oriented than their male counterparts did. The varying gender effect across the two course delivery formats seems explicable considering the different gender dynamics in online versus face-to-face courses. As female students may be likely to gain less attention and feedback from instructors and their fellow classmates in face-to-face classes due to gender bias (Sadker & Sadker, 2010), they may have the urge to outperform their fellow students to compensate for their invisibility. At the same time, partly because students are known by names and performance instead of gender and individual appearance, there tend to be fewer nonverbal cues of gender bias in an online class than a face-to-face class. Palloff and Pratt (1999) concluded that online classes present a bias-free environment for instructors and students because students cannot tell the gender or physical characteristics of each other and their teachers. As a result, males do not receive the same attention or acknowledgement they do in face-to-face classes which may push them to outperform their peers to gain attention and recognition. More studies are warranted before a final conclusion on the effects of gender bias in online classes can be reached.

The differential gender effect across the two learning contexts on students' perceptions of performance goal structure highlights the need for instructional differentiation based on course delivery formats. To keep female and male students equally motivated in online and face-to-face courses, instructors need to be aware of the gender bias. In short, male students may require more attention and support in online classes while female students may require greater attention in face-to-face courses.

Interestingly, while there was no gender effect, course delivery format was a significant factor in students' perceptions of classroom mastery-approach goal structure: college students, regardless of gender, considered face-to-face courses as more mastery goal structured than online courses. This finding is important in relation to existing concerns about online courses and their motivational effect and contributes to the literature that explores potential causes of the higher dropout rates (Lynch, 2001; Sapp & Simon, 2005) and lower performance (Flanagan, 2012) in online courses over face-to-face courses. For example, Pigliapoco and Bogliolo's (2008) recent study examining course delivery format effect indicated that online students reported engaging in fewer interactions with other classmates. As class mastery goal structure plays a critical role in student achievement, retention, and positive feelings about self and school (Ames & Archer, 1998; Lyke & Kelaher Young, 2006; Meece et al., 2006; Mucherah, 2008; Pintrich, 2000), designing online courses in ways to encourage student understanding and improvement instead of competition and comparison has become a compelling issue. Given the increasing prevalence of online learning (Parsad & Lewis, 2008; Tallent-Runnels, et al., 2006), instructors need to improve their practice of course design to facilitate perceptions of mastery-approach goal structure among learners and

enhance student motivation. With more hurdles to student interaction, decreased verbal and non-verbal cues, new concepts which tend to be more accessible in face-to-face classes than in virtual settings, creating a motivational mastery-goal environment in an online course is challenging.

6. Limitations and Future Directions

Although our study provides valuable information on gender role in students' perceptions of classroom motivational climate for online as well as face-to-face settings, several limitations need to be considered. First, although the sample represented the population of the participating institution, our study used convenience sampling, and the sample was solicited from only one university. Hence, the study should be replicated at other higher education institutions in order to determine if it is appropriate to generalize the interplay of gender and course delivery format on college students' perceptions in their motivational learning environment. Second, although the online to face-to-face participant ratio represented the student composition at the university, face-to-face class participants outnumbered the online students. Therefore, caution needs to be exercised when extending the results of this study beyond the context of the study. It is possible that other factors may have contributed to the statistical significance. The complexity of both course delivery formats makes it unlikely that differences can be fully accounted for by gender differences alone. Future studies involving qualitative methods including interviews, focus groups, or even open-ended survey questions are recommended.

This study is a step forward in understanding the role of gender in students' perceptions of classroom motivational climate in online classes as compared to face-to-face classes. The significant interaction effect of students' gender and course delivery format on their motivational perceptions of the learning environment suggests the importance of instructional and curricula differentiation of online from face-to-face courses, particularly in relation to gender. To create an optimal learning climate where students are motivated, online instructors need to factor in differences due to gender. This way, female and male students will experience a strong sense of community, a high level of mastery goal, and low performance goal structures.

While previous research shows the multidimensionality of classroom community (Cho et al., 2010; McMillan & Chavis, 1986), more efforts are needed to delineate the potential effects of gender on particular components of classroom community in online versus face-to-face classes. Future research on individual and contextual differences in students' perceptions of their learning settings, including social interaction, shared goals, and other dimensions of classroom community (Cho et al., 2014) is suggested. The relatively higher dropout rates and lower student learning engagement indicators in online courses (Angelino, Williams, & Natvig, 2007; Tyler-Smith, 2006) are already reflected in the literature. This study adds to our understanding of lower levels of mastery goal structure and learning motivation as perceived by students in online courses in contrast with students in face-to-face courses. As educators, perhaps we should ask ourselves this question: What factors contribute to the gaps between online and face-to-face courses? As online learning becomes more prevalent (Parsad & Lewis, 2008; Tallent-Runnels et al., 2006), meeting the needs of learners who cannot meet physically in classroom settings and examining those factors that are detrimental to high quality online learning are essential. Future research on factors that influence a mastery-approach class goal structure is required. Interviews with students from different course delivery formats would be beneficial. Additionally, future research into the mechanisms underlying students' perceptions of motivational learning environments and how both male and female students develop positive motivational perceptions of online classes is appropriate. Finally, based on the findings of this study, which highlight the interplay between gender and course delivery format in undergraduate students' perceptions of their learning environments, as well as other findings that show a link between class goal structure and student learning outcomes (Ames & Archer, 1988; Anderman, 1999, 2003; Meece et al., 2006; Mucherah, 2008; Pintrich, 2000), models of motivational learning environments may be constructed and tested. In particular, future studies may test an empirical model in which the direct and indirect effects of course delivery format, gender, motivational climate are considered.

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