# INVESTIGATING FACTORS INFLUENCING STUDENTS' LEARNING IN A TEAM TEACHING SETTING

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Abstract. Team teaching factors, including mission clarity, affiliation, innovativeness, and fairness, are examined to determine how they influence student learning in a team-taught course. The study involved 184 college students enrolled in an Introduction to Computers course delivered in a team-taught format in a large university located in the United States. The collaborative teaching design followed a traditional team teaching approach with an instructor team teaching the same course collaboratively. Students enrolled in the team-taught course filled out an online survey targeted at identifying key factors that influence student-based outcomes (satisfaction and competency) in the course. Results showed that instructor team mission clarity, affiliation, and fairness are significantly related to students' satisfaction while instructor team mission clarity and fairness are significantly related to students' competency.

**Keywords:** team teaching, mission clarity, affiliation, fairness, competency, satisfaction.

#### 1. INTRODUCTION

Team teaching is an instructional approach where two or more teachers cooperate and share the responsibilities for planning, teaching, and evaluating a group of students (Buckley, 2000; Tornyay, 1971). A number of advantages and disadvantages of team teaching settings have been identified based on studies that have focused on perspectives of the faculty or students. Several studies focusing on faculty perspectives have indicated that students benefit from the diversity of perspectives and expertise and that the setting can provide an opportunity for innovation and growth (Crossman and Behrens, 1992; Tis-

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dell and Eisen, 2000; Wöllner and Ginsborg, 2011). Weaknesses identified with team teaching include the lack of continuity in content, poor communication between team teachers, reduced rapport with students, and the difference in teaching styles (Crossman and Behrens, 1992) as well as the lack of commitment to the principle of team teaching (Wöllner and Ginsborg, 2011). From the students' perspective, a variety of perspectives (Little and Hoel, 2011; Neumann, et al., 2007) and confidence building and encouragement have been identified as key advantages of team teaching while lack, of course, coordination, lack of continuity in content, and faculty transitions (Neumann, et al., 2007) and the need for teachers to agree on the purpose of team teaching (Wöllner and Ginsborg, 2011) have been identified as disadvantages or areas for improvement.

Most education research on team teaching has focused on the teacher perceptions of the process (e.g., Wöllner and Ginsborg, 2011; Strohl, et. al., 2014) or teacher behavior (e.g., Sagliano, Sagliano, and Stewart, 1998). Recently, researchers have begun to examine how collaboration impacts students in a team-taught setting from a student perspective (Wöllner and Ginsborg, 2011; Neumann, et al., 2007). This research seeks to expand the field's understanding of the student perspective on team teaching, specifically exploring the influence of teacher team dynamics on the student outcomes of satisfaction and competency. The rest of this paper presents the measurement development, data analysis and results, and discussion of the findings.

Based on a systematic review of existing education and management literature and intensive interviews with 10 team-taught course students, we identify key factors related to the instructor-team that have significant impacts on student-based outcomes. We assess the in-

structor team from four aspects: (1) mission clarity, (2) affiliation, (3) innovativeness, and (4) fairness. We measure two student-based outcomes: (1) satisfaction and (2) competency.

#### 2. MATERIALS AND METHODS

The measures of the six constructs were developed based on prior research from social and cognitive studies. According to sociologists, social engagement is principally influenced by institutional structures (Coleman, 1988). When considering factors which influence knowledge sharing within teams, Bock et al. (2005) identifies three organizational climate factors, fairness, innovativeness, and affiliation. Xue, Sankar, and Mbarika (2005) identify a fourth climate factor for evaluating the dynamics of teams, mission clarity. The current study seeks to examine how these four factors, as measures of the learning climate in a team teaching setting, influence student outcomes. Specifically, we adopt measures used in team dynamics in knowledge worker settings for use in a team teaching setting to see how these factors influence student perceived satisfaction and competency. The four learning climate dimensions focus on student perceptions of the team teaching setting, including mission clarity, fairness, innovativeness, and affiliation. Two measures are used to measure student outcomes, specifically satisfaction and competency. All of the constructs include reflective items. The items were evaluated by a five-point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree." Appendix A shows the measurement items. Below we develop the posited relationships, considering first the two student outcome measures.

Two measures that provide a sense of students' state of mind regarding their experiences within the classroom are satisfaction and competency. In previous research, satisfaction is a measure that is often used to provide an overall perspective on the learning experience (Hativa, 1998; Ribera, et al., 2012). In addition to gaining insight into a student's overall satisfaction of a course, understanding what impacts a student's perception, of course, mastery is important (Ginsberg, 2007; Pascarella, 2006). Why is perceived competency important? Studies in social cognitive theory suggest that individuals with high levels of perceived self-efficacy or competency will perform at higher levels while those with low levels of perceived competency will tend

to quit prematurely and fail to complete the tasks (Bandura 1977, 1997). These two outcome measures are described in more detail below

Satisfaction refers to a positive affective state ensuing from the assessment of the structures, processes, and outcomes associated with a student's class experience. This concept is similar to job satisfaction which is defined as the "positive emotional state resulting from the appraisal of one's job or job experiences," (Organ, 1990) as well as athlete satisfaction which is defined as "a positive affective state produced by a judgment of the structures, processes, and outcomes associated with the athletic experience" (Chelladurai and Riemer, 1997). The four items for satisfaction were adapted from Osmonbekov and Bernard (2013). A sample item was "Overall, I am personally satisfied with this course."

Competency refers to the perception of one's ability to perform the required tasks effectively. This concept is closely related to the perception of personal mastery or self-efficacy, where an individual is confident in their ability to perform expected tasks effectively (Wang and Netemeyer, 2002). The definition is consistent with the psychological empowerment construct's competence facet (Aryee and Chen, 2006). The scale for competency included four items and was adapted from Osmonbekov and Bernard (2013). A sample item was "I am able to do what it takes to get a better grade for this course."

Mission clarity refers to the perception that the goals and mission of the team have been clearly defined and understood. The clarity of mission has been shown to be an important factor in the success of teams developing as fundamental learning units (Som, et al. 2012; Laise, 2004) and in project teams (Ofori, 2013). Wöllner and Ginsborg (2011) noted that a key area for team teacher improvement from the perspective of students was that teachers within a team should agree on the purpose of team teaching, specifically have a clearer understanding of what team teaching is. A related but distinctly different concept, teaching clarity, refers to the perceived level of transparency in instruction and objectives (Hativa, Barak, and Simhi, 2001; Ribera et al., 2012). Teaching clarity has been shown to have a positive relationship with student satisfaction (Hativa, 1998) and student comprehension of material (Chesebro and McCroskey, 2001). In team teaching, clarity of purpose or mission of the team teaching responsibilities and goals is important. Mission clarity, which focuses on the students' perception of whether the members of the teaching team are in sync with each other regarding the team's mission, was measured using three items adapted from Xue, Sankar, and Mbarika (2005). A sample item was "Instructors are clear what their team is supposed to accomplish for this course." The authors contend that mission clarity will have a positive relationship with student satisfaction and perceived competency:

H1a: Instructor team's mission clarity positively associates with students' competency.

H1b: Instructor team's mission clarity positively associates with students' satisfaction.

Affiliation refers to the perception of a sense of togetherness among the members of a team, reflected in the respectful and positive behavior exhibited by the members in their efforts to assist each other and work together. Neumann, et al., (2007) found that students in team-taught classes cited lack, of course, coordination, lack of continuity in content, and faculty transitions as negative aspects of team-taught courses (26%, 40%, and 43% respectively). Such findings would suggest that the level of affiliation among team teaching members would influence students' satisfaction. Studies examining knowledge sharing and team performance have reported that affiliation is positively associated with team performance (Lee, 2005; Bock, et. al., 2005). These results suggest that perceived affiliation should also influence student competency. The affiliation was measured using four items adapted from Bock, et. al., 2005. A sample item was "Instructors in this course's teaching team cooperate well with each other." Accordingly, we hypothesize,

H2a: Instructor team's affiliation positively associates with students' competency.

H2b: Instructor team's affiliation positively associates with students' satisfaction.

Innovativeness refers to the perception of a tolerant climate that supports change and creativity, including taking risks in trying new initiatives even when one has little or no prior experience. Such a climate supports the free flow of information between instructors within a team as well as between instructors and students within a classroom. The willingness to change one's leadership practices in light of new understandings has been shown to impact the success of learning organizations (Silins and Mulford, 2002). The four items used in the innovativeness measure were adapted from Bock, et. al., 2005. A sample item was

"Instructors encourage suggesting ideas for new opportunities." Therefore, we advance the following hypotheses:

H3a: Instructor team's innovativeness positively associates with students' competency.

H3b: Instructor team's innovativeness positively associates with students' satisfaction.

Fairness refers to the perception of a classroom climate that is founded on teaching practices that are equitable and free of arbitrary or capricious actions. Neumann, et al., (2007) also found that there was a strong correlation between a student's expectation of low marks relative to the amount of studying they did and their overall satisfaction. Expectancy theory of motivation emphasizes individual perceptions of the organizational environment and the interactions that occur as a result of those expectations" (Isaac, Zerbe, and Pitt, 2001; Chen and Fang, 2008). The fundamental basis of this theory is that individuals will be motivated to work when they believe that that work will lead to the desired outcome. In the case of a learning environment, students who perceive the classroom climate is fair should increase work effort which should enhance their competency. Therefore, we posit the following hypotheses:

H4a: Instructor team's fairness positively associates with students' competency.

H4b: Instructor team's fairness positively associates with students' satisfaction.

Students in an introductory computer course team taught at a large university in the southeastern United States were requested to participate in this study. The course was led by a team of faculty members who were considered equal in status and shared responsibilities throughout the semester, although the level of responsibility varied throughout the term. Prior to the beginning of the semester, the faculty developed the syllabus and assignments together. While each faculty member led specific classes based on expertise, there were times when the faculty team participated in the same class session. The faculty team co-led the class during the first week and last week of the course. Throughout the semester, instructors not leading a given topic would make appearances as needed at the beginning of class time to respond to student questions, to provide additional guidance to specific assignments, or to highlight current events especially relevant to the course objectives. Additionally, there was an application-based component of the course that ran throughout the semester which was coordinated by one faculty member but students could seek assistance from any faculty team member. In addition, the faculty team worked together throughout the semester to respond to student questions during office hours and via email. The faculty team also met multiple times throughout the semester to discuss the status of the course, the students' response to assignments, and areas for improvement.

An online survey was developed to measure the theoretical constructs. At the end of the semester, 184 students enrolled in the team-taught course filled out an online survey targeted at identifying key factors that influence student-based outcomes (satisfaction and competency) in the course. The average age of the respondents was 19.22. Among those students, 55 were male (29.9%) and 129 were female (70.1%).

#### 3. RESULTS

To determine internal consistency ensuring that all the items measure the same construct, reliability analysis using Cronbach's alpha values was conducted. The value of Cronbach's alpha for each construct was high as shown in Table 1, ranging from 0.875

for innovativeness and fairness constructs to 0.958 for the satisfaction construct. Since the reliability scores of all of the constructs exceed the recommended cutoff of 0.70, the reliability of the instrument is considered acceptable (Nunnally, 1978), indicating the items were stable, dependable, and predictable.

**Table 1.** Analysis of Measurement Reliability: Cronbach's Alpha

Construct	Cronbach's alpha value			
Mission clarity	.925			
(MC)				
Affiliation (A)	.911			
Innovativeness (I)	.875			
Fairness (F)	.875			
Competency (C)	.946			
Satisfaction (S)	.958			

Since all construct items were adopted from previous research, confirmatory factor analysis was used to evaluate the validity of these construct instruments. Table 2 provides the results of the confirmatory factor analysis. The results show that all six of the scales (mission clarity, affiliation, innovativeness, fairness, competency, and satisfaction) produce reliabilities >.70. Furthermore, all 22 items loaded significantly on the appropriate factor.

Table 2. Confirmatory Factor Analysis Results

MC1. Instructors understand the team teaching mission for this course.  MC2. Instructors understand the purpose of this hybrid course.  MC3. Instructors are clear what their team is supposed to accomplish for this course.  A1. Instructors in this course's teaching team keep close ties with each other.  A2. Instructors in this course's teaching team consider other instructors' standpoint highly.  A3. Instructors in this course's teaching team display a strong degree of teamwork.  A4. Instructors in this course's teaching team cooperate well with each other.  I1. Instructors encourage suggesting ideas for new opportunities.  I2. Instructors value taking risks even if that turns out to be a failure.  I3. Instructors have adapted the course during the semester based on students' feedback on new learning activities.  I4. Instructors actively seek new methods to improve learning.  F1. I can trust my instructors' evaluation to be good.  F2. Objectives which are given to mi are reasonable.  F3. My instructors don't show favoritism to anyone.  C1. I can meet the needs of my instructors.  C2. I am able to do what it takes to get better grade for this course.  C3. I am able to respond to the needs of my instructors.  C4. I am able to respond to the needs of my instructors.  C5. I feel fairly well satisfied with this course.  S67  S70 verall, I am personally satisfied with this course.  S80  S91  S94  S95  S96  S97  S97  S97  S97  S97  S97  S97	Construct Items	MC	A	I	F	С	S
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Instructors.   .091						.041	
Instructors.  C4. I am able to respond to the needs of my instructors.  S1. I feel real enjoyment in taking this course.  S2. I feel fairly well satisfied with this course.  S3. Overall, I am personally satisfied with this course.  931	C3. I am able to do whatever is necessary to satisfy my					901	
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S2. I feel fairly well satisfied with this course896 S3. Overall, I am personally satisfied with this course931						.850	
S3. Overall, I am personally satisfied with this course							
S4. Overall, the quality of this course is high.							
	S4. Overall, the quality of this course is high.						.860

Table 3. Linear regression results

	Competency	Satisfaction
Age	05	09
Gender	13**	11*
Mission	.44**	.24**
Clarity	.44	.24**
Affiliation	.03	.36**
Innovativeness	.04	08
Fairness	.36**	.27**
$\mathbb{R}^2$	.62	.55

<sup>\*\*</sup> p<0.01; \* p<0.05

Next, linear regression was conducted to determine the impact of the factors on the student outcomes. Two regressions were carried out, one with student competency as the dependent variable and the other with student satisfaction as the dependent variable. As shown in Table 3, the path coefficients of instructor team's mission clarity are 0.44 (p<0.01) on student competency and 0.24 (p<0.01) on student satisfaction. Thus, instructor team's mission clarity positively associates with students' competency and students' satisfaction, providing support to H1a and H1b. The path coefficients of instructor team's affiliation are 0.03 (p>0.05) on student competency and 0.36 (p<.01) on student satisfaction. Thus, H2a is not supported, while H2b is supported. The instructor team's innovativeness is not found to associate with either students' competency or satisfaction. The path coefficients of instructor team's innovativeness are 0.04 (p>0.05) on student competency and -0.08 (p>0.05) on student satisfaction. Hence, neither H3a nor H3b is supported. Finally, the instructor team's fairness is positively associated with students' competency (b=0.36, p<0.01) and students' satisfaction (b=0.27, p<0.01), supporting both H4a and H4b. In addition, we control for the effects of age and gender (1=male, 2=female). While age has no effects on both student competency and satisfaction, gender is found to negatively relate to both student competency (b=-0.13, p<0.01) and satisfaction (b=-0.11, p<0.01)p<0.05). This suggests that male students tend to have higher levels of competency and satisfaction than female students in this study.

#### 4. DISCUSSIONS

The main purpose of this study was to assess the influence of the team dynamics within an instructor team on the student outcomes of satisfaction and competency. Our

findings suggest that the learning climate established by instructors co-teaching a course has an impact on students' perceptions of their own competencies as well as the level of satisfaction they have with the course. Specifically, an instructor team's clarity of mission significantly influences students' perception of the competency and satisfaction. This result suggests that, when there is uncertainty among the instructor team members of what the team is supposed to accomplish, that student learning outcomes will suffer. Affiliation within an instructor team is associated positively with student satisfaction but is not associated with student competency. While perceived competency is not influenced by affiliation, this result still highlights the importance of faculty working closely together in a respectful and supportive manner when co-teaching a course to provide a learning climate conducive for supporting a positive learning experience. One of the advantages of team teaching identified by instructors is that the setting often offers an opportunity for faculty to try innovative techniques. The results of this study, however, do not suggest that students perceive innovation as positively influencing their satisfaction or competency. While prior research hasn't examined the concept of fairness within a team teaching environment, this study suggests that, as in traditional lone-teacher settings, students perceive fairness as being positively associated with student competency and satisfaction. Finally, the results indicate that age is not related to student outcomes while gender is. Specifically, males tend to have a higher perceived level of satisfaction and competency than female students in this study. This result is in accord with a recent meta-analysis examining gender differences in academic selfefficacy, where males exhibited higher selfefficacy in computer related concepts (Huang, 2013). Further research needs to be conducted to understand what factors influence the difference between male and female students' perceptions of competency and satisfaction.

This paper contributes to the advancement of theory: by investigating the impact of four dimensions of teaching teaching (mission clarity, affiliation, innovativeness, and fairness) on student learning and by examining both competency and satisfaction of student learning in a team-taught course setting. Previous research has not considered the students' perception of these four dimensions of a learning climate on students' perceived competency and satisfaction.

#### 5. CONCLUSIONS

This study's focus has been to evaluate the measures of team teaching climate on the student learning outcomes of competency and satisfaction. The findings reveal the significance that mission clarity, affiliation, and fairness have on students' perception of their satisfaction. Further, the findings indicate the significance that mission clarity and fairness have on students' perception of their competency. Understanding how mission clarity, affiliation, innovativeness, and fairness influence students' satisfaction and competency can assist faculty in developing teaching strategies that improve student learning.

There are several limitations to this study. First, this research focuses only on an instructor team's influence on satisfaction and competency in a team-taught setting and doesn't consider student factors which could influence satisfaction and competency, such as motivation and work ethic. Additional factors to consider in future studies include the impact of technology used within the course and faculty feedback on student outcomes. Further, examining student perceptions of learning outcomes relative to more quantitative measures, such as overall course grade, would provide an objective dimension of assessment. Including an objective learning outcome measure rather than a subjective student perception of learning may result in a different level of explained variance. Finally, the study focuses only on student perceptions in a team-taught course. Future research should examine the differences in student outcomes of team -taught courses compared to conventional, single-instructor led courses to assess the effectiveness of team teaching.

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### **Conflict of interests**

Authors declare no conflict of interest.

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## **APPENDIX: SURVEY**

MC	9	Strongly-	Disagree□	Neutral□	Agree	Strongly
		Disagree	-			Agree
	Instructors understand the team teaching mission for this course.¤	Δĭα	ı	□¤	□□□	□□□
	Instructors understand the purpose of this hybrid- course.   □	۵	Dα	□¤	□□□	۵
	Instructors are clear what their team is supposed to accomplish for this course. □	۵	۵	□¤		۵
A¤	A	Strongly- Disagree	Disagree	Neutral	Agree	Strongly Agree:
	Instructors in this course's teaching team keep- close ties with each other.□	□□□	۵	□¤	۵	۵
	Instructors in this course's teaching team consider other instructors' standpoint highly.	۵	۵	Π¤	۵	۵۵
•••••	Instructors in this course's teaching team display a strong degree of teamwork.□	۵a	۵	□¤	۵	۵
	Instructors in this course's teaching team- cooperate well with each other.	۵	۵	□¤	۵	۵
Iα		Strongly- Disagree	Disagree	Neutral	Agree	Strongly Agree:
	Instructors encourage suggesting ideas for new opportunities.□	ďα	ı	□□□	□□	Ĭ
	Instructors value taking risks even if that turns out to be a failure.□	۵	۵	□¤	Π¤	۵
	Instructors have adapted the course during the semester based on students' feedback on new learning activities.	П¤	۵	□¤	۵	□□□
	Instructors actively seek new methods to improve- learning.□	۵	ı	□¤		ت
F¤		Strongly- Disagree	Disagree≎	Neutral	Agree□	Strongly Agree
	I can trust my instructors' evaluation to be good.□	וֹם	□□□	Dα	□□	□□□
	Objectives which are given to me are reasonable.	□□□	□□□	□□□	□□□	□□
	My instructors don't show favoritism to anyone.□	□□	Dα	۵	Π¤	۵
C¤		Strongly- Disagree	Disagree	Neutral	Agree	Strongly Agree:
	I can meet the needs of my instructors.□	۵	DΩ	□□		۵
	I am able to do what it takes to get better grade for this course.□	۵	۵	Π¤	۵	۵
	I am able to do whatever is necessary to satisfy my instructors.□	۵	ı	□□□	□□	۵
	I-am-able to respond to the needs of my instructors.□	□□□	۵	□□□		۵
S¤		Strongly- Disagree:	Disagree□	Neutral	Agree□	Strongly Agree:
	I feel real enjoyment in taking this course.□	ıΩ	□□□	Π¤		ıΩ
	I feel fairly well satisfied with this course.□	□□□	Dα	Π¤		
	Overall, I am personally satisfied with this course.	۵	DΩ		۵	۵
	Overall, the quality of this course is high.	۵	۵	Dα	Dα	□□