

# **IS Learning: The Impact of Gender and Team Emotional Intelligence**

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## **ABSTRACT**

In university settings, dysfunction in teamwork often challenges problem-based learning in IS projects. Researchers of IS Education have largely overlooked Team Emotional Intelligence (TEI), which offers a collective cognitive skill that may benefit the student learning experience. Hypothesized are four dimensions of emotional intelligence (EI) that influence perceived effectiveness in IS learning teams. This paper proposes a model that explains how these four dimensions influence perceived team effectiveness and how gender affects this relationship. A survey administered to 384 students resulting in 94 IS learning teams produced regression (and moderated regression) results showing that gender, along with two TEI dimensions (awareness and management of one's own emotion) predict team effectiveness. Significant results suggest gender differences in the relationship between a team member's awareness of his or her own emotions, management of others' emotions, and team effectiveness. These findings suggest IS educators should focus on targeted interventions that may help to foster the development of emotionally intelligent IS learning teams. Most prominently, gender plays an important role for emotional intelligence competencies, where differences exist in awareness of one's own emotions and management of others' emotions among student learning teams.

**Keywords:** Problem based learning (PBL), Interpersonal skills, Cooperative learning, Team projects, Soft skills

## **1. INTRODUCTION**

Just as organizations increasingly require their employees to work in teams to solve business problems, university IS programs require students to work in teams to enhance their learning (Colbeck, Campbell, & Bjorklund, 2000; Baldwin, Bedell, & Johnson, 1997). Students working in teams learn leadership, problem-solving, communication, and negotiation skills that will transfer to a work context (Hansen, 2006). In a team settings, "cognition is almost always collaborative" (Levine, Resnick, & Higgins, 1993, p. 599). In highly specialized and complex IS environments, learning teams often must exert significant effort to develop a common understanding. Emotional capability can enhance cognitive abilities and outcomes as well as academic achievement (Schunk, 1991). IS programs have determined that IS students should not only be technically competent, but also prepared to work effectively in teams and foster collaborative skills necessary in the workplace (Figl, 2010).

In team-based learning, students satisfy a need to belong while negotiating and mastering course content (Sweet & Pelton-Sweet, 2008). Problem-based learning offers a teaching model fit for IS team projects where the essential component introduces the content in the context of complex real-problems. Consequently, team projects especially benefit students in IS courses that require them to apply knowledge to abstruse or unstructured tasks (e.g. Wells, 2002). However, social loafing, unbalanced workloads, team

conflict, and communication breakdowns challenge team processes (Liden, Wayne, Jaworski, & Bennett, 2004; Hansen, 2006; Aggarwal & O'Brien, 2008). Conflict can particularly affect teams as they approach a critical decision, because the fear of making the wrong decision can be intense. A wrong answer may ignite frustration and confusion. Students who feel responsible for their teams' errors may be upset, and this experience can influence their future behavior and compromise learning (e.g. Sweet & Pelton-Sweet, 2008). Yet, few scholars have examined emotional awareness and management in IS learning teams.

The goal of learning teams is for students to learn while working on a project, problem, collaborative assignment, or task (Fransen, Weinberger, & Kirschner, 2013). Many learning teams never function as a team, and students end up working in subgroups or individually to complete their team project work. In these cases, the team approach wastes time and frustrates, but it doesn't teach teamwork. The strength or weakness of the teams' taskwork skills impacts how their application and development skills can influence their performance (Chan, Jiang, & Klein, 2008). Consequently, interpersonal skills and a teamwork setting can impact students.

Student teamwork has become an integral part of problem-based learning within the IS curriculum (Rawlings, White, & Stephens, 2005; Smith, Smarkusky, & Corrigan, 2008; Kamis & Kahn, 2009). TEI is an emergent collective human ability that enhances student team interactions. TEI is

the ability to increase one’s awareness and management of behavior that contributes to positive consequence (Jordan & Lawrence, 2009). TEI leverages the human ability to recognize, use, and manage emotions to enable better performance in the areas of team effectiveness, interpersonal outcomes, and even decision making (Bay & McKeage, 2006; Clark, 2010; Joseph & Newman, 2010). Remarkably, teams that “practice behavioral intelligence will notice that it affects the team’s collective EI, thus enabling [them to have] greater awareness of their behaviors and to manage themselves more effectively” (Mulqueen, 2012, “Improving the Emotional Intelligence of Teams,” para 4). When cognition and emotion link with the aim of improving human interaction, TEI provides substantial benefit to students (e.g. Mayer & Salovey, 1997).

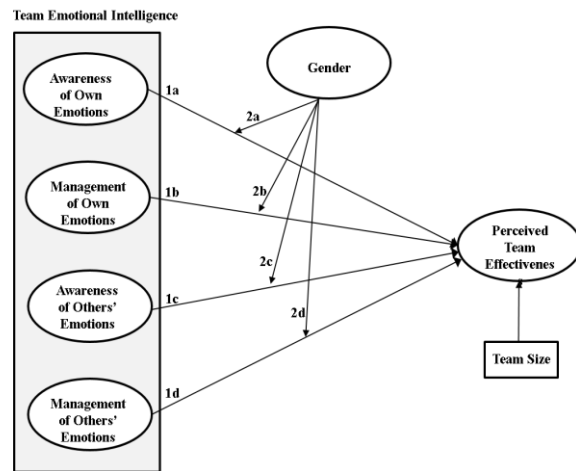
Many IS companies utilize the team structure for task work. According to recent estimates, more than 80 percent of Fortune 500 companies utilize some type of team in their workplace (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). Teams working well together are a major factor for performance in the workplace (Tannenbaum, Mathieu, Salas, & Cohen, 2012). Teams when compared to individuals often are better equipped to solve complex, knowledge-intensive problems (Faraj & Sproull, 2000; Maruping & Magni, 2012). Consequently, higher education institutions seek to prepare IS students for real-world team processes and to strengthen their ability to function within the team structure (Figl, 2010; Kruck & Teer, 2009). The effectiveness of this preparation depends on learning teams developing as a team. However, scholars have largely overlooked TEI as a crucial social cognitive skill that can be harnessed and developed.

Companies find that teams with a high degree of collective EI become truly effective and productive entities. As information technology becomes more complex, IS companies increasingly seek high-performance teams to increase their bottom line. High-performance teams who consistently show high levels of collaboration and innovation produce superior results (Musselwhite, 2012). Therefore, collaborative skills will be essential to students’ success in their chosen careers after graduation. Assigning students to teamwork doesn’t necessarily create the benefit it should (Hunsaker, Pavett, & Hunsaker, 2011; Fransen et al., 2013). This paper suggests how IS educators who employ the four TEI dimensions can improve the efficacy of the team approach to learning.

Research shows that engaging students in teams does not in itself result in higher achievement (Johnson & Johnson, 1990; Brandyberry & Bakke, 2006). Moreover, Brandyberry & Bakke suggest IS student project teams’ negative behavior interactions can result in less than optimal project outcomes. Students bring meaning to the learning environment based on their experiences in social settings and based on their gender, replete with expectations of gender-appropriate behaviors (Ingleton, 1995). A key aspect of the influence of the TEI dimensions on perceived team effectiveness manifests from differences across gender. A thorough understanding of the four TEI dimensions’ impact on team effectiveness requires understanding how those dimensions interact with gender in teams. The TEI dimensions may facilitate identification of potential strategies and interventions for learning team effectiveness.

The IS context provides a rich observation of the artifacts, events, and situations that can illuminate factors (Johns, 2006) such as the team learning experience. When context makes a difference in outcomes, EI tends to have more importance (Cherniss, 2010). Therefore, the IS environment can play a key role in explaining student behaviors and outcomes related to learning teams. This research study addresses these specific questions: 1) What are the salient TEI predictors of perceived team effectiveness? and 2) Does gender affect the influence of TEI factors on perceived team effectiveness in the IS learning team environment? The theoretical model in Figure 1 depicts the relationship of the constructs. This research model focuses on the effect of each TEI dimension and its influence on perceived team effectiveness across gender.

This paper begins with a review of background literature on learning teams, and then develops hypotheses about the relationships of interest. The next section describes the methods and results. The final section discusses the results and contributions, the limitations, implications for education and research, as well as suggestions for future research.



**Figure 1 Research Model**

## 2. BACKGROUND LITERATURE

### 2.1 Learning Teams

A broad search of the academic literature concerning EI and university student learning has shown sustained research interest in this topic. The largest of studies have been concerned with the measurement of students’ EI skills, all of which concluded that EI skills should be incorporated into university education in order to prepare students for success in the workplace (Cropley & Cropley 2000; Tucker, Sojka, Barone, & McCarthy., 2000; Van der Zee, Thijs, & Schakel, 2002; Puffer 2010; Zhao & Zhao 2011). The second, and by far the smaller, group of articles concern the actual integration of EI skills into courses (Myers & Tucker 2005; Bay & McKeage 2006). More recently, a number of articles focus on EI team dynamics and integrated cognitions within student learning (Barczak, Lassk & Mulki, 2010; Cook, Visser, Myburgh, & Njoroge, 2011).

Early research studies such as Boyatzis, Stubbs, & Taylor (2002) have shown that MBA students can develop cognitive and EI competencies. Myers & Tucker (2005) demonstrated the use of EI theory and awareness in a business school curriculum. Additional EI research assessed the efficacy of an ability-based measurement of EI as a predictor of self-managed work team satisfaction of undergraduate business students (Rozell & Scroggins, 2010).

In recent research findings, Puffer (2010) found that EI is a salient predictor of college students' career decision-making. This research exposed important gender differences and EI competency differences that impact career decision factors. Moreover, Zhao & Zhao (2011) has examined a 3Q integration model to integrate emotion (EQ, their term for EI), intelligence (IQ) and creativity (CQ) on student productivity described as time efficiency and error occurrence in Web design and development. Their significant findings show that a) the 3Q integration model enabled students to continuously improve their time efficiency and error reduction in designing and developing a series of web applications and b) gender differences did not moderate the relationship.

EI's ability to promote team trust in student teams further supports the importance of EI (Barczak et al., 2010). Trust, in turn, fosters a collaborative culture which enhances the creativity of the team. The benefits of creativity enable student teams to solve problems and leverage opportunities through the integration of divergent thoughts and perspectives. Therefore, EI demonstrates promise to understand the collective cognitive nature for deeper insights into IS student learning context which in turn can impact teamwork effectiveness.

Positive emotional reactions set the tone for teams and predict positive outcomes. Prior literature has found correlation with academic success (Barchard, 2003; Parker, Summerfeldt, Hogan, & Majeski, 2004; Brackett & Mayer, 2003; Brackett, Rivers, & Salovey, 2011), higher average team performance (Jordan, Ashkanasy, Härtel, & Hooper, 2002), greater degree of emotional resilience in accounting students (Cook et al., 2011), and a more pronounced EI relationship between student team members' EI and their communication effectiveness. Thus, TEI is a viable collective mechanism to improve team effectiveness.

Several studies provide support for EI at the team level (Druskat & Wolff, 2001; Jordan & Troth, 2004; Humphrey, Curran, Morris, Farrell, & Woods, 2007). Humphrey et al.'s critical review of EI and education suggests that future research should first establish reliable validation of the processes that occur in the learning of EI. The increased demand for teamwork in business has fostered collaboration between business and universities and colleges to increase students' exposure to teamwork. IS learning teams provide an appropriate context in which to study teamwork behaviors. Most promising, previous EI scholars emphasize that students can improve EI, unlike the relatively stable IQ (Goleman, 1995; Cherniss, Goleman, Emmerling, Cowan, & Adler, 1998).

Scholars consider learning teams that collaborate and share common intentions of achieving deep learning and conceptual knowledge to be effective (Graesser, Chipman, Leeming, & Biedenbach, 2009; Seethamraju, 2011;

Borredon, Deffayet & Backer, 2011). As teams form, norming evolves to facilitate shared mental models. Individuals' behavioral norms transfer to team dynamics and affect the team's guiding operational principles. Norming is one of the important initial steps in the process of team development (Riebe, Roepen, Santarelli, & Marchioro, 2010). As teams begin to perform, they begin to set norms. These team-level norms facilitate the creation of the team's structural relationship, cohesive interaction, and shared understanding. While other team development phases affect outcomes, TEI skills ideally come into play most prominently in the norming phase.

Ideally, at the time of the norming phase, the team is working well together, has organized a way of communicating, and has a consensus focused behavior and a conflict resolution strategy, all of which influence a team's effectiveness. Consequently, team effectiveness not only depends on team formation but also on factors such as task characteristics, shared intentions, decision-making strategies, and importantly, team member characteristics and abilities. Prior literature has shown evidence that emotionally competent group norms relate team outcomes (Koman & Wolff, 2008).

Students build teamwork skills through working on team projects of any kind, gaining realistic experience in team dynamics, collaboration, team decision making, and communication, while enhancing each team member's discipline-specific knowledge (Winter, Waner, & Neal-Mansfield, 2008; Staggers, Garcia, & Nagelhout, 2008; Chen & Chong, 2011). However, this process requires students to work in teams often before they get good at it; if IS educators prepared students better they could be more equipped for work teams. Researchers describe unprepared students (Ettington & Camp, 2002; Hansen, 2006) as having within their teams poor communication, conflict, and unbalanced participation (Cox & Brobrowski, 2000; Goltz, Hietapelto, Reinsch, & Tyrell, 2008), as well as egocentric behavior (Chen & Chong, 2011).

## **2.2 Team Effectiveness**

The extent to which individuals recognize and control their own emotions, and manage the emotions of others, can have a pervasive influence on team outcomes. Team norms facilitate their ability to collaborate and interact in a collective manner. Norms become the guiding principles that facilitate the expectation that others' behavior is cohesive and not opportunistic (Riebe et al., 2010). Conflict and misunderstandings among team members with different goals and perspectives can potentially be overcome if EI exists within teams. For example, a team can support the shared understanding of reciprocity and adopt shared principles, enabling the team members to recognize, manage, and interact with their emotions and others' to benefit the team as a whole.

Effectiveness in teams does not emerge from individual effort (Klimoski & Jones, 1995). Team effectiveness emerges through the interpersonal dynamics of the team, the level of trust, and levels of compatibility between team members. The quality of team learning and the individual student learning primarily characterize teams' effectiveness (Fransen et al., 2013). Student team effectiveness can vary,

depending on the context and the types of teams being studied (Guzzo & Dickson, 1996). Kellett, Humphrey, & Sleeth (2009) found that for individuals working on an assigned group goal, perception of the group's collective efficacy, rather than self-efficacy, had a direct influence on performance. Bunderson & Sutcliffe's (2003) study of student management teams showed that learning has positive consequences for team effectiveness.

A well-functioning learning team is more than a group of students coming together to work on an assignment. Despite the students' goal of teamwork, they may work independently and pool their work, have limited communication, and spend a significant amount of time on personal, and assignment project work conflict. In contrast, when students determine who will do what, interact to meet their established goals, and share collective beliefs their teamwork becomes effective. IS learning teams benefit from developed TEI skills that will improve their emotional reaction to team dysfunction. The students' sense of how well their team functioned is measured by their reports of team effectiveness.

Trust, identity, and efficacy reinforce TEI, leading to increased participation. Moreover, cooperation and collaboration results in better decisions, more creative solutions to problems and overall higher productivity (Druskat & Wolff, 2001). Therefore, the significance of a team's effectiveness indicates the degree to which the team output meets a certain level of quality or quantity (team performance), in addition to carrying out work to enhance the capability of the team members to work together and contribute to its goals (e.g. Van den Bossche, Gijsselaers, Segers, Woltjer, & Kirschner, 2011).

### **2.3 Team Emotional Intelligence**

Only a few studies examine emotion's effects on team effectiveness (Wolff, Druskat, Koman, & Messer, 2006; Turner & Lloyd-Walker, 2008; Quoidbach & Hansenne, 2009). Teamwork, social activity, and emotion play an important role in team effectiveness. Many emotions emanate from social interactions (Kemper, 1978), which makes emotion a pervasive influence that's fundamental to team functioning (Druskat & Wolff, 2001).

Four dimensions manifest the behavior of TEI. AWR (awareness of own emotions) is reflected in the ability to discuss and disclose emotions. AWRO (awareness of others' emotions) is reflected in the ability to read faces and body language. MGT (management of own emotions) is the ability to delay or withhold strong emotional reactions. MGTO (management of others' emotions) involves the ability to positively influence others' emotions (Jordan & Lawrence, 2009). TEI provides a model to demonstrate emotion processing abilities that together can contribute to improving social interactions. Fredrickson & Joiner (2002) emphasize the role of positive emotions in broadening an individual's capacity to learn from simulation games and learning outcomes. They found that positive emotions enhance optimistic thinking, leading to more creative problem-solving capacities. Prior literature found positive links between EI and job satisfaction (Grandey, 2000), job performance (Daus & Ashkanasy, 2005; Quoidbach & Hansenne, 2009), team performance (Bell, 2007; Laszlo,

& Johnsen, 2009) and project success (Turner & Lloyd-Walker, 2008). Therefore, each TEI dimension was hypothesized to will influence students' perception of team effectiveness.

Hypothesis 1a: Awareness of one's own emotion will influence perceived team effectiveness. (AWR)

Hypothesis 1b: Management of one's own emotion will influence perceived team effectiveness. (MGT)

Hypothesis 1c: Awareness of other's emotion will influence perceived team effectiveness. (AWRO)

Hypothesis 1d: Management of other's emotion will influence perceived team effectiveness. (MGTO)

### **2.4 Gender**

Vast amounts of literature examine the effects of gender and team effectiveness (Jordan, Pate, & Clark, 2006; Kaenzig, Hyatt, & Anderson, 2007). Gender has profound influence on one's interaction with others (Morris, Venkatesh, & Ackerman, 2005). However, prior research on gender's effect on learning team outcomes paints a complex picture. Kaenzig et al., (2007) found that gender significantly impacts school educational experiences in group project learning in a college of business course. Likewise, Hazari, Tai, & Sadler (2007) found in their study of introductory university physics courses that students' gender affects the selection of the right pedagogy. He & Freeman (2010) examined the effects of gender on the development of student computer self-efficacy. Interestingly, female students felt less confident with computers and more anxious about using computers when compared to male students. Gilligan (1982) supported the idea that, in general, issues of separation drive males while issues of connection drive females in forming attitudes toward formal learning experiences. Such psychological differences involve emotions and provide a foundation to further understand the role of gender differences in learning team effectiveness.

Research has shown that females in formal learning situations may experience fear, self-doubt, inability to accommodate novelty, a lack of confidence, and feelings of alienation (Gallos, 1995). Brazelton (1998) found male students in accounting classes were more likely to participate in class interactions and dominate class discussions than female students. This dominance-related behavior implies a stronger interpersonal aspect in males. Yet, Eagly & Johnson (1990) research finds that females were significantly more interpersonally oriented than males. Though females may be more interpersonally oriented, Bevelander & Page (2011) findings suggest when it comes to a matter of risk taking, females exclude each other and prefer to network with males implicating behaviors among MBA students.

Joshi & Roh (2009) suggest that better gender balance can lead to the better team outcomes. Moreover, recent evidence has suggested that group collaboration, enhanced by interaction and communication in teams with greater numbers of females, improves group processes, which in turn, facilitates increased collective intelligence (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Though males

and females may have equivalent cognitive abilities and academic performance, they assimilate knowledge differently (Belensky, Clinchy, Goldberger, & Tarule, 1986) and tend to have different learning styles (Gallos, 1993; Hazari et al., 2007). The prior literature has shown varying outcomes related to gender differences across team learning, learning attitudes, and cognition. Yet, students' TEI behavior may vary as a function of gender. Therefore, hypothesized are the relationships between each TEI dimension will be different for male and female students.

Hypothesis 2a: The relationship between awareness of one's emotion own and perceived team effectiveness will differ as function of gender (AWR).

Hypothesis 2b: The relationship between management of one's emotion own and perceived team effectiveness will differ as function of gender (MGT).

Hypothesis 2c: The relationship between awareness of other's emotion perceived team effectiveness will differ as function of gender (AWRO).

Hypothesis 2d: The relationship between management of other's emotion perceived team effectiveness will differ as function of gender (MGTO).

**3. METHOD**

**3.1 Participants**

This study used a sample of IS undergraduate and graduate students from a major university in the South. All students were part of an introductory enterprise resource planning (ERP) course where experiential learning and collaboration were integral to the coursework. The student teams had members of both genders who were primarily junior, senior, and graduate students. The students assigned themselves to their teams according to their own preferences. Their teamwork interactions began at the start of the semester course. The course included a variety of ERP team assignments throughout the semester, representing a wide range of task complexity and task duration. Team members worked together in planning, researching, and making decisions for their assignments. For example, students utilized an ERP simulation game where each team member had a particular role with specific tasks to accomplish within the team. Teams had to manage a make-to-stock manufacturing company producing up to six products. Dynamic team decisions and collaborations were an important aspect of the ERP simulation game. The student teams competed against each other to maximize profit for each team's company. Each team worked closely to complete a final class project and presentation that represented a major portion of their course grade.

For this paper, an online survey questionnaire was administered to each member of the student team at the end of the semester. Students were informed of the study purpose and were asked to provide their responses about their team as it related to their class team assignments and projects. Participation was voluntary. IS faculty designated the

amount of class credit students would receive for their participation in the research study.

Responses were collected across four semesters, resulting in 387 observations. After removing four incomplete responses, 383 observations were analyzed representing 94 teams. Females accounted for 33 percent of the respondents, and 67 percent were males. The age of the respondents ranged from 19 to 58 years with a mean of 24 years (SD = .50). The students were Seniors (50 percent), Juniors (24 percent), Graduate (25 percent), and other (1 percent). Team size ranged from three to six members, with about 49 percent of participants assigned to teams of four, 36 percent of participants assigned to teams of five and 14 percent of participants assigned to teams of three. Table 1 summarized the demographics about the sample.

Item	Frequency	Percentage
Gender		
Male	253	67%
Female	127	33%
Age		
18-25	308	80%
26-33	60	16%
34-41	9	2%
Over 42	6	2%
Majors		
Information Systems	126	33%
Accounting	84	22%
Marketing/Media	22	6%
Business Management	33	9%
Finance	25	7%
Economics	5	1%
Sales/Retail	1	0%
Supply Chain or Transportation & Logistics	57	15%
Other	30	8%
Classification		
Sophomore	1	1%
Junior	93	24%
Senior	192	50%
Graduate	97	25%

**Table 1 Demographics**

**3.2 Materials and Procedure**

All constructs included in this study were operationalized with published scales that have demonstrated good psychometric properties in earlier studies. The items were Likert-type 7-point scales with one indicating total disagreement and seven indicating complete agreement with the statements. Jordan & Lawrence (2009), WEIP-Short Version (WEIP-S) instrument was used to measure the TEI (see Appendix 1). This short version (16 items) of the self-report WEIP-S reflects perceptions vital to emotional team interactions. The instrument provides items to examine these abilities to reveal how each contributes to better performance within a team context. The four-dimensional scale measures: a) awareness of one's own emotions (AWR), b) management of one's own emotions (MGT), c) awareness of others' emotions (AWRO), and d) management of others' emotions (MGTO). Four items measure responses for each dimension. The survey asked participants for their instructor's name, course name, section number, team number (used as an

identifier to aggregate team members), and number of members in the team, in addition to age, gender, classification, and major.

Perceived team effectiveness was measured using a wide-range approach to effectiveness. The construct encompasses the degree to which the team output meets quality standards (team performance), but also the degree to which the teamwork processes enhance the capability of its members to work together in the future (team viability), and the degree to which teams' work contributes to the growth of the team members' learning (Van den Bossche et al., 2011). Three questions were used to measure team effectiveness from the "Team Learning Beliefs & Behaviors – Questionnaire" (Van den Bossche, Gijssels, Segers, & Kirschner, 2006). Team size was measured by counting the team members who listed the same instructor, course, section, and team number. Teams were excluded with fewer than three members from analysis. Kozlowski & Ilgen (2006) note that scholars can distinguish dyads from teams made up of three or more people. In their view, many two-person teams exhibit the same basic work processes underlying team effectiveness as larger teams. However, they acknowledge teams composed of "three or more individuals enable coalitions and related interpersonal interaction complexities that are absent in dyads" (Kozlowski & Ilgen, 2006, p. 79).

**3.3 Reliability and Validity Analysis**

Table 2 presents the Cronbach alpha levels of all variables at both the individual and team level. The Cronbach alpha levels are all greater than .74, and thus comfortably demonstrate internal consistency of measurement. Cronbach's alpha values for TEI constructs are awareness of one's own emotions (AWR) = .96, management of one's own emotions (MGT) = .87, awareness of others' emotions (AWRO) = .95, management of others' emotions (MGTO) = .97, and perceived team effectiveness (TMEF) = .95. These results provide evidence of reliability (Nunnally, 1978; Peterson, 1994).

Table 2 also shows the descriptive results for the means, standard deviations, and intercorrelations of the variables present in the research model. Significant correlations were found among the constructs of interest.

Variable	Scale range	Cronbach Alpha (indiv. level)	Cronbach Alpha (team level)	Correlations						M	SD	
				1	2	3	4	5	6			
1. AWR	1-7	0.95	0.96	-							5.48	0.93
3. MGT	1-7	0.87	0.87	.536**	-						6.20	0.47
2. AWRO	1-7	0.93	0.95	.635**	.569**	-					5.29	0.83
4. MGTO	1-7	0.93	0.97	.691**	.680**	.763**	-				5.57	0.82
5. TMEF	1-7	0.89	0.95	.502**	.574**	.406**	.548**	-			5.50	1.00
6. TMSIZE	3-5	n/a	n/a	.067	.004	-.058	.587	-.065	-		4.00	0.71

\*\* : Correlation is significant at the 0.05 level (2-tailed).

Note. Analysis performed at the team level (N=94) except where indicated

**Table 2 Descriptive Results and Correlation Matrix (Team-level analysis)**

**3.4 Convergent and Discriminant Validity (factor loadings)**

The measurement model was analyzed using a factor analysis with a Varimax rotation (see Table 3). The factors

loaded on to their respective constructs, which affirmed convergent validity and unidimensionality of the constructs. All multi-item measures used in the study were evaluated for reliability.

All item responses were evaluated for each team. Missing data values were eliminated from the sample. Four observations were deleted due to incomplete independent and dependent data values.

	AWR	AWRO	MGT	MGTO	TMEF
AWR_1	<b>0.821</b>	0.142	0.286	0.236	0.191
AWR_2	<b>0.838</b>	0.140	0.258	0.251	0.174
AWR_3	<b>0.797</b>	0.298	0.144	0.248	0.130
AWR_4	<b>0.841</b>	0.282	0.138	0.218	0.113
AWRO_1	0.224	<b>0.844</b>	0.173	0.189	0.030
AWRO_2	0.258	<b>0.810</b>	0.215	0.269	0.061
AWRO_3	0.181	<b>0.813</b>	0.224	0.300	0.063
AWRO_4	0.148	<b>0.795</b>	0.180	0.293	0.084
MGT_1	0.138	0.136	<b>0.778</b>	0.164	0.093
MGT_2	0.203	0.207	<b>0.747</b>	0.115	0.224
MGT_3	0.198	0.179	<b>0.805</b>	0.208	0.131
MGT_4	0.178	0.217	<b>0.760</b>	0.193	0.227
MGTO_1	0.226	0.277	0.184	<b>0.781</b>	0.167
MGTO_2	0.238	0.277	0.218	<b>0.798</b>	0.123
MGTO_3	0.256	0.278	0.186	<b>0.804</b>	0.107
MGTO_4	0.243	0.273	0.189	<b>0.822</b>	0.072
TMEF_1	0.113	0.034	0.180	0.062	<b>0.866</b>
TMEF_2	0.108	0.034	0.193	0.108	<b>0.897</b>
TMEF_3	0.208	0.105	0.143	0.158	<b>0.861</b>

Rotation Method: Varimax with Kaiser Normalization

**Table 3 Factor Loading**

**3.5 Aggregation Analysis**

To justify aggregation into group scores for the independent and dependent variables, the interrater reliability (index of agreement) was estimated (James, Demaree, & Wolf, 1984). Values between zero and one indicate within-group agreement of the Rwg (j) index, and generally, a value of .70 or higher reflects a moderate interpretation of agreement within a team (Bliese, 2000; LeBreton & Senter, 2008). Additional measures of reliability, the Intraclass correlation ICC (1) and ICC (2) were computed to evaluate the team-level reliability properties (James, 1982; Bliese, 2000). ICC (1) is used to determine whether group membership affects the outcome variable (Bliese, 2000). An ICC (1) value of .10 indicates that group membership predicts 10 percent of the variability in the dependent variable. ICC (2) provides an estimate of the reliability of the group means (James, 1982; McGraw & Wong, 1996). Both measures, ICC (1) and ICC (2), are related to each other as a function of group size (Bliese, 2000).

Results of the justification for aggregating individual EI and performance to the team level revealed high levels of within-team agreement. Moderate values observed for ICC

(1) and ICC (2) show, respectively, the variance in individual level responses by group membership and provide estimates of the group means. Thus, the measures shown in Table 4 provide sufficient interrater agreement and interrater reliability indices for team level analysis. Teams of two were not included in the analysis. Team size was a control variable, and its impact on team performance was not significant.

	ICC(1)	ICC(2)	Rwg(j)
AWR	0.15***	0.40***	0.79
AWRO	0.10***	0.31***	0.85
MGT	0.83**	0.26**	0.93
MGTO	0.11*	0.33*	0.87
TMEF	0.50**	0.80**	0.89

\*\*\* p < .0001, \*\* p < .01, \* p < .05

**Table 4 Interrater Agreement and Reliability indices**

**4. Results**

SPSS 19 was the statistical tool used to perform the analysis. To address the first research question, multiple regression analysis was used to test whether the TEI factors significantly predicted perceived team effectiveness. Table 5 shows the results of the regression model for the team level of analysis. The model tested the direct relationships of each TEI factor on the perceived team effectiveness (n=94). The results of the regression indicated the two predictors explained 40.2 8 percent of the variance (R<sup>2</sup>=.402, F (5, 88) =11.842, p<.05).

Results show MGT (β= .34, p < .05) and MGTO (β=.29, p< .05) significantly predicted perceived team effectiveness. These results support hypotheses H1b and H1d. MGT showed a semi-partial correlation indicating a 24 percent unique effect, and MGTO showed a semi-partial correlation of 16 percent unique effect. The TEI factors AWR and AWRO factors in addition to team size were not significant (n.s). Thus, H1a and H1c are not supported. Management of one’s own emotions and management others’ emotions emerge as the predictive effect for the team level analysis. An inspection was performed for multicollinearity. The variance inflation factors for each observed factor were well within the accepted threshold of VIF values up to 10 (Hair, Black, Babin & Anderson, 2010).

To address the second research question, moderated regression was used to test whether the relationship between the TEI factors on perceived team depends on gender. First, the independent variables were mean centered to reduce multicollinearity. Cohen, Cohen, West, & Aiken (2003) recommend centering continuous predictors in a moderated regression model. This approach provides meaningful interpretations of each first-order regression coefficient of predictors and minimizes the threat of multicollinearity. Interaction terms were created for each of the four TEI variables and gender. Finally, a two-step moderated regression was performed by regressing first the dependent variable on the centered independent variables and categorical variable, gender (n=383). The next step added the interaction terms and gender into the model.

Explanatory Variables	B	β	ρ	Semi-partial	
				VIF	corr
Constant	-0.87				
Awareness of Own emotion (AWR)	0.21	0.19	0.12	2.14	0.13
Management of Own emotion (MGT)	0.71	0.34	0.00**	1.98	0.24
Awareness of Others' emotion (AWRO)	-0.18	-0.14	0.30	2.58	-0.09
Management of Others' emotion (MGTO)	0.42	0.29	0.05**	3.37	0.16
Team size (Tmsize)	-0.13	-0.10	0.25	1.03	-0.10

Note. R<sup>2</sup> = .402; adjusted R<sup>2</sup> = .368; F(5, 88) = 11.842, p < .05

**Table 5 Regression Model – Team Level**

Variables	Model 1			Model 2		
	B	β	ρ	B	β	ρ
Constant	-0.12			-0.13		
Awareness of own emotion (AWR)	0.22	0.25	0.00**	0.35	0.41	0.00**
Management of own emotion (MGT)	0.45	0.30	0.00**	0.56	0.38	0.00**
Awareness of other's emotion (AWRO)	-0.11	-0.11	0.07	-0.01	-0.01	0.93
Management of other's emotion (MGTO)	0.10	0.10	0.13	-0.10	-0.10	0.39
Gender (G)	0.13	0.05	0.24	0.15	0.06	0.17
AWR*G				-0.23	0.03**	
MGT*G				-0.12	0.56	
AWRO*G				-0.16	0.23	
MGTO*G				0.31	0.04**	
F	23.64**			14.41**		
R <sup>2</sup>	0.24			0.26		
Δ R <sup>2</sup>	0.24			0.02		

Note. Cohen’s *f*<sup>2</sup>-statistic = [R<sup>2</sup><sub>AB</sub>-R<sup>2</sup><sub>A</sub>] / [1-R<sup>2</sup><sub>AB</sub>] (1988), where R<sup>2</sup><sub>A</sub> is the variance accounted for by a set of one or more independent variables A, and R<sup>2</sup><sub>AB</sub> is the combined variance accounted for by A and another set of one or more independent variables B. *f*<sup>2</sup> of 0.02, 0.15, and 0.35 are termed small, medium, and large effect sizes, respectively. \*\* ρ < 0.05.

**Table 6 Moderated Regression Results**

Perceived team effectiveness was regressed on gender and the four dimensions of TEI as predictor variables. Model 1 (see Table 6) shows the results of the perceived team effectiveness regressed the four TEI dimensions. The main effects show statistically significant factors AWR (β= .25, ρ < .05) and MGT (β = .30, ρ < .05). Model 2 (see Table 6) results show moderated gender effects when the interaction terms are entered into the model. Gender interaction effects are significant for the TEI factors AWR (β = .557, ρ < .05) and MGTO (β=.310, ρ < .05). The models show that gender elevates the R2 from 24 percent to 26 percent (with an increase of 1.9 percent, and *f*<sup>2</sup> = .027), indicating a small effect size, which is nonetheless similar to those achieved in prior studies on moderators (Chin, Marcolin, & Newsted, 2003). Thus, results supported hypotheses 2a and 2d respectively, showing positive and statistically significant beta coefficients for awareness of one’s emotion and management of others’ emotions. Hypothesis 2b and 2c are not supported for TEI factors AWRO and MGT.

Figure 2 shows that female members of teams with low MGTO perceive their teams' effectiveness as greater than males with low MGTO perceive it to be. As a teams' MGTO increases from low to high, male students exhibit a stronger impact on team effectiveness perceptions than do female students. As demonstrated in Figure 3, teams with low AWR perceived team effectiveness as lower than females on the same team. As the AWR goes from low to high, female students have a stronger impact on team effectiveness perceptions than males.

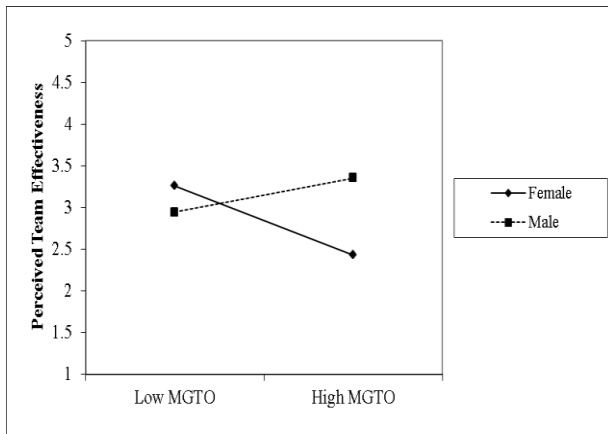


Figure 2 Interaction Effect between MGTO and Gender

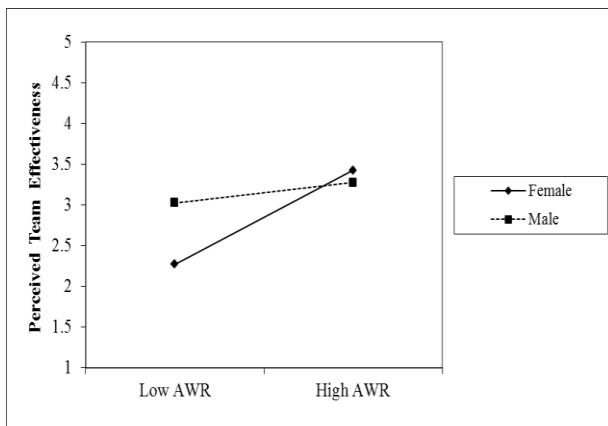


Figure 3 Interaction Effect between AWR and Gender

### 5.1 Discussion

The results of this study present a distinctive and complex examination of TEI abilities and gender within IS learning teams. Based on the findings, gender explains incremental variance of perceived team effectiveness which in turn affects teams' AWR and MGTO. Furthermore, a team member's management of his or her own emotions and others' most strongly predict IS learning teams' effectiveness perceptions. These factors convey behaviors that suggest students' team interactions exhibit control over one's actions. Within the team environment, students are able to delay emotional reactions, evaluate, and then express them in a more considerable manner (Jordan & Lawrence, 2009).

Self-regulation of emotions within the IS learning team environment proves key to perceived effectiveness.

Students who manage others' emotions encourage positive emotional behavior and thereby boost working relationships among the team members. These results suggest that when team members demonstrate enthusiasm and a sense of keenness, this results in positive interactions that can defuse team dysfunction. This important aspect of student teams working together influences their effectiveness perceptions.

The MGT and MGTO variables exhibited a relatively strong correlation. This close relationship represents a strong predictor of perceived effectiveness (Hair et al. 2010). Critical EI factors therefore impact the IS learning team environment. The results indicate a greater extent in which IS learning teams can manage their emotions and social interaction in a team environment. Student teams that regulate their collective emotional behavior deal with situations productively within the team environment. The findings in this study suggest that gender differences exist across two TEI dimensions within IS learning teams.

The AWR and MGTO factors exhibit dissimilarities along gender lines. The interaction of gender and awareness of one's own emotion implies that females tend to recognize and freely express their emotions in team learning differently than males. This explanation echoes prior literature that suggests females use emotion more often and more appropriately than males (Joseph & Newman, 2010). Furthermore, collective intelligence behavior correlates with the quality of a team's social interactions and the presence of females in the group, rather than with the TEI of the individuals in the group (Woolley et al., 2010). Their finding suggests that female students' emotional self-awareness changes the strength of the response when emotional triggers support effective communication and interaction within teams.

Secondly, the interaction effect between MGTO and gender shows that male students with higher MGTO exhibit a stronger impact on team effectiveness perceptions than do female students. Research suggests that males guide conversation more than females and influence interpersonal aspects of learning more than females in general in the learning environment (Brazelton, 1998; Dovidio, Brown, Heltman, Ellyson, & Keating, 1988). Especially with respect to conversation, Dovidio et al., (1988) find that men display more social dominance-related behavior while speaking such as chin thrusts, gesturing, and direct eye contact, while women smile more, whether speaking or listening. More importantly, context influences gender's role in team learning. This study advances our understanding of how this context matters in the IS learning team environment.

### 5.2 Implications for Education

The implications of the findings presented in this study are important for practice. This evidence-based research can help universities enhance the preparedness of students to become more productive and successful. TEI represents significant social cognitive skills that when embedded in pedagogy by faculty can foster greater interpersonal communication skills as a means to improve the learning team environment. Thus, implementing coursework that emphasizes TEI abilities may help students become higher-performing in their chosen



careers. In addition, establishing an emotionally safe learning environment has potential to strengthen students' confidence, risk-taking abilities, emotional growth, and academic success.

In higher education, the Information Systems discipline in particular can benefit from these conclusions to gain insights into the design and development of EI interventions and strategies for improved IS learning team effectiveness. A search of the literature revealed very few examples of theoretically sound interventions aimed at increasing TEI through education. However, these examples of EI learning interventions demonstrate benefit for student teams. For example, Jaeger (2003) used EI training with graduate students in five sections of a general management business course. EI concepts were integrated throughout the course. Additional assignments incorporated into the course to facilitate EI conceptual knowledge included: a) required readings—Goleman's (1998) working with EI, b) case studies, and c) a group project. In the EI curriculum, 83.9 percent of participants had a positive change score as compared to 58 percent in the non-EI sections (Jaeger, 2003). All outcomes were positively and strongly correlated with academic performance.

A multi-year pilot program (2007-2010) presented a more sustained effort, to train and develop EI by incorporating content in EI competencies in the MBA curriculum at Indiana University East (Joyner & Mann, 2011). In this study, fifty-five students from the program participated in pre- and post- testing with an EI assessment (EQ-i). Curriculum changes were developed around key EI goals: a) orientation to the EI concepts, b) focus on deeper understanding of personal traits and preferences, c) learning to increase EI effectiveness, and d) self-analysis of the EI assessment results. Outcomes showed that students scored significantly higher on EI competencies following the intervention and made significant improvements in GPA over time.

In a recent study, Pool & Qualter (2012) examined whether it is possible to improve levels of emotional intelligence in university students through a teaching intervention. The EI teaching intervention included mini-lectures, case studies, role-play, group tasks and discussion, and an off-campus activity. All four subscales of the invention model (using and managing own emotions, identifying and understanding own emotions, dealing with emotions in others, and perceiving emotion) showed significant improvement.

The implication of prior studies, and this study, establishes how increased awareness of student team emotions can help build relational bonds among students that can result in high-performing learning teams. Additionally, the application of EI teaching interventions will better prepare students to read emotional cues and manage their response in workplace situations. The TEI behaviors learned can enable better decision making, collaboration, innovation, and enhanced knowledge exchange in future students' job role and team interactions.

### **5.3 Implications for Research**

The research findings presented herein contribute to an emergent body of literature to suggest TEI is an important

aspect of individual differences among learning teams that can contribute to learning effectiveness. This study provides a more granular examination of the influence of four TEI factors on learning team effectiveness which has not been empirically investigated. Additionally, this research draws attention to the student teams and gender roles in the IS learning context.

Understanding the different factors that influence TEI abilities can provide the foundation on which to build theory and validate other measures to explain the dynamics of learning team effectiveness. Also, observing TEI abilities in different contexts and team types can advance understanding situational boundary conditions. Future research should explore pre- and post-TEI abilities to understand the extent to which learning interventions increase or decrease TEI abilities, thereby helping IS educators to recognize and integrate TEI pedagogy into their courses.

### **5.4 Conclusions**

In summary, this study contributes to understanding the ways in which TEI abilities influence outcomes and substantiates the theoretical framework of team effectiveness developed by Tannenbaum, Beard, & Salas (1992). This research serves as an initial contribution in IS literature to further explain TEI behaviors in the context IS learning teams. The research findings address the need to advance the understanding of TEI abilities and unique differences across gender. Surprisingly, male behavior appears to show dominance when male students outnumber the female students. IS learning is an important context that harnesses TEI abilities to improve learning outcomes. Though limitations exist, this research helps to diminish ambiguities that likely can help clarify TEI abilities in teams, particularly for IS learning teams. These evidence-based conclusions in this research will lead future IS researchers to examine TEI and its value as a complement to other team-based learning approaches.

### **5.5 Limitations and Suggestions for Future Research**

This article advances understanding of TEI as an important ability for IS learning team effectiveness. The findings in this study follow prior research by suggesting TEI behaviors differ based on gender. In particular, relevant literature has shown females have more complex knowledge (Ciarrochi, Hynes, & Crittenden, 2005) and greater ability to perceive nonverbal emotion cues (Hall, 1984; McClure, 2000) which could contribute to higher TEI scores in females (Joseph & Newman, 2010). Future research may investigate gender composition among teams to understand the impact on TEI skills and performance. Additionally, comparative analysis across different types of learning teams may shed light on team dynamics and task orientation.

Though this study advances understanding of TEI on IS learning team effectiveness, some limitations exist. Common-method bias threatens this paper because a single person can exhibit the independent and the dependent variable. Also, the fact that all team members would see others' ratings of themselves might have influenced individuals to give inflated ratings. Future studies should address these issues by using an objective rating of team effectiveness. Though this paper analyzed a sufficient number of teams to create useful results, increasing the

number of team types may provide more diverse behavior that researchers might examine to gain greater insights into the team effectiveness outcome.

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**Appendix 1**

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**Scale items used in the study - Team Emotional Intelligence (P. J. Jordan & Lawrence, 2009)**

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*Awareness of Own Emotions (AWR)*

1. I can explain the emotions I feel to team members.
2. I can discuss the emotions I feel with other team members.
3. If I feel down, I can tell team members what will make me feel better.
4. I can talk to other members of the team about the emotions I experience.

*Management of Own Emotions (MGT)*

5. I respect the opinion of team members, even if I think they are wrong.
6. When I am frustrated with fellow team members, I can overcome my frustration.
7. When deciding on a dispute, I try to see all sides of a disagreement before I come to a conclusion.
8. I give a fair hearing to fellow team members' ideas.

*Awareness of Others' Emotions (AWRO)*

9. I can read fellow team members' 'true' feelings, even if they try to hide them.
10. I am able to describe accurately the way others in the team are feeling.
11. When I talk to a team member I can gauge their true feelings from their body language.
12. I can tell when team members don't mean what they say.

*Management of Others' Emotions (MGTO)*

13. My enthusiasm can be contagious for members of a team.
14. I am able to cheer team members up when they are feeling down.
15. I can get fellow team members to share my keenness for a project.
16. I can provide the 'spark' to get fellow team members enthusiastic.



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