

## Relationship between Students' Emotional Intelligence, Social Bond, and Interactions in Online Learning

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### ABSTRACT

The purpose of the study was to investigate the relationship between students' emotional intelligence, social bond, and their interactions in an online learning environment. The research setting in this study was a 100% online master's degree program within a university located in the Midwest of the United States. Eighty-four students participated in the study. Using canonical correlation analysis, statistically significant relationships were found between students' emotional intelligence, social bond, and the interactions that occurred naturally in the educational setting. The results showed that students' ability to perceive emotion by facial expression was negatively related to the number of text and audio messages sent during synchronous interaction. Additionally, the ability of students to perceive emotion was positively related to peer bonding. Lastly, students' bond to their online program was associated with management type interaction during synchronous discussion sessions. Several implications for online learning practitioners and researchers are discussed.

### Keyword

Emotional intelligence, Social bond, Online interactions

### Introduction

Interaction is a critical factor in the quality of online learning (Berge, 1997; Fredericksen et al., 2000; Garrison, Anderson, & Archer, 2001; Marks et al., 2005; Swan, 2001; Vrasidas & McIsaac, 1999). Interaction in online learning environments has been found to have a close positive relationship with students' higher order thinking (Garrison, Anderson, & Archer, 2001) and cognitive learning outcomes (Berge, 1997). Interaction between people, defined as dialogue, facilitates deep and reflective learning for the purpose of achieving learning goals in social learning environments (Berge, 2002; Mayers, 2006), which functions as a decisive factor in decreasing transactional distance (Moore, 1997).

Given that emotion, cognition, and behavior are highly interdependent (Cornelius, 1996; Planalp & Fitness, 1999), students' interaction can be understood in an emotional dimension as well as a cognitive dimension. Emotion has received attention as a critical element of social interaction in the communication field (Andersen & Guerrero, 1998; Bureson & Planalp, 2000; Planalp & Fitness, 1999). In the field of education, emotions have been found to affect students' cognitive learning as well as teachers' instructional behavior (Pekrun et al., 2007). Consequently, emotional intelligence has been discussed as one of the important intelligences and competencies to promote and regulate personal intellectual growth and social relational growth (Mayer & Salovey, 1997). While the definitions and constructs of emotional intelligence are varied, emotional intelligence is defined as a set of abilities which involves operating emotional information that represent emotional signals (Mayer et al., 2004). If emotional intelligence is a critical competency for understanding student learning experiences, then students' emotional intelligence might be one of the areas to be investigated to better understand students' online learning experiences.

The emotional dimension of interaction should be explored along with the social dimension. Given that positive and constructive interactions can be achieved by respectful and active participants (Moore, 1997), students' emotional and social relationships are believed to promote interaction (Holmberg, 1991). While many scholars have stressed the social dimension of interaction (Berge, 1997, 2002; Garrison, Anderson, & Archer, 2001; Holmberg, 1991; Lave & Wenger, 1991; Moore, 1983, 1997; Wagner, 1994), there have been few attempts to extend our understanding of interactions in online learning along emotional and social dimensions.

Social bonding theory can be applied to understanding the emotional and social dimension of students' interactions. Social bond theory was initially proposed to understand an individual's antisocial behaviors such as delinquency or crime in sociology (Hirschi, 1969). Later, social bond theory was applied to explain social and emotional learning (Newmann et al., 1992; Wehlage et al., 1989; Zins et al., 2004) in K-12 school environments. Student participation and engagement in school activities are used to represent social and emotional learning (Wehlage et al., 1989). Some

studies have found positive relationships between student social bonding and school effectiveness including academic achievement and school engagement (Leibold, 2000; Newmann et al., 1992; Pryor, 1994; Wehlage et al., 1989). From this theoretical perspective, positive interactions between instructors and peers can reinforce their emotional and social bonding as well as their attachment to their online learning program, which leads them to be motivated to accept and implement norms and values of social agents (Catalano & Hawkins, 1996; Hirschi, 1969; Wehlage et al., 1989).

Based on the literature, this study proposed a conceptual framework to represent emotional and social learning for understanding online interactions (see Figure 1). There are three dimensions in the conceptual framework. One is students' emotional ability to perceive, use, understand, and manage emotions, which represents an individual's emotional intelligence. A second dimension is the degree to which students are emotionally and socially attached to their online program, their instructor, and their peers, which represents their social-psychological attachment. The third dimension is the online interactions that student have, which represents their cognitive and behavioral involvement in an online learning environment.

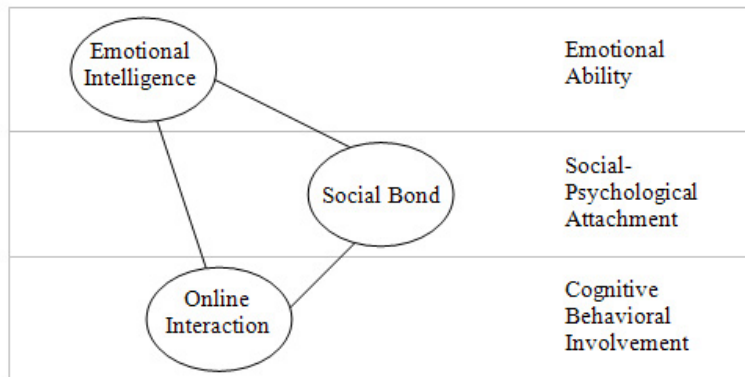


Figure 1. Conceptual Framework for Emotional Intelligence, Social Bond, and Interactions in Online Learning

### Purpose of the study

The purpose of this study was to investigate the relationship between students' emotional intelligence and their interactions in both synchronous and asynchronous online learning environments. The main focus of the investigation was the extent of the relationship between the three dimensions of emotional intelligence, social bond, and interaction.

### Research questions

In order to investigate the problem, the following research questions were addressed.

- What is the relationship between students' emotional intelligence and their degree of social bond in online learning environments? What is the most important variable in the relationship?
- What is the relationship between students' emotional intelligence and interactions in online learning environments? What is the most important variable in the relationship?
- What is the relationship between students' degree of social bond and interactions in online learning environments? What is the most important variable in the relationship?

### Method

The study used an ex post facto design and correlational analysis to discover the statistical relationships between students' emotional intelligence and the interactions that occurred naturally in an online learning environment.

## Research participants

The target population of this study was graduate students enrolled in an online master's degree program in a university located in the Midwest region of the United States. Eighty-one students out of a total of 188 enrolled students agreed to participate in the study. The students' online learning system utilized Moodle for the asynchronous interactions and Elluminate for the synchronous interactions.

## Data sources

In order to measure emotional intelligence, the Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer, Salovey & Caruso, 2001; MSCEIT V2.0) was administered to the 81 participants. The test contains 141 items and consists of four branches, which include Perceiving Emotion (EI-B1), Using Emotion (EI-B2), Understanding Emotion (EI-B3), and Managing Emotion (EI-B4). Each branch uses two different tasks to measure each construct: Perceiving Emotion [Face task (EI-A) and Pictures task (EI-E)], Using Emotion [Facilitation task (EI-B) and Sensation task (EI-F)], Understanding Emotion [Changes task (EI-C) and Blends task (EI-G)], Managing Emotion [Emotional Management task (EI-D) and Social Management task (EI-H)]. The MSCEIT has high construct validity and moderate content validity, predictive validity, and external validity (McEnrue & Groves, 2006). Additionally, MSCEIT has been found to have high reliability (Lopes et al., 2003).

In order to measure social bond, the Social Bonding Scales (SBS) from the Wisconsin Youth Survey (Wehlage et al., 1989) was administered with a slight revision for the adult participants of online courses. Factor analysis was conducted in order to identify common factors that underlie the social bond variable. The factor analysis showed that nine items did not represent the three distinct social bond factors. After the nine items were removed from the scales, the remaining 16 items were found to produce three very distinct factors in terms of bond to peer, bond to instructor, and bond to program. These 16 items were then used to measure social bond to peer, instructor, and program for the current study. The 16 items of the revised Social Bond Scale had a high reliability for peer ( $\alpha=.680$ ), instructor ( $\alpha=.885$ ), and program ( $\alpha=.822$ ), which are higher than the 0.60 required for Cronbach's  $\alpha$ .

For this study, the interaction variable is operationalized as students' amount of messages and types of messages in their synchronous and asynchronous communication (Bannan-Ritland, 2002; Kearsley, 2000). Text and audio interaction data were collected from ten synchronous and asynchronous sessions archived in Elluminate and Moodle. The amount of interaction was determined by the number of text messages (MT), the number of audio messages (MA), the length of the text messages (WT), and the length of the audio messages (WA). The number of words was counted for the length of the text messages (WT) and the length of the audio messages (WA). As for types of interaction data, content analysis of messages was conducted to classify the types of messages that students posted. Students' messages were coded into three types: Work, social, and management (Yoon, 2006). Work type interaction contains messages for goal-directed activities as students complete tasks and elaborate their ideas in discussions. Social type interaction includes messages to share their personal experience and to build social relationships with other people. Management type interaction includes individuals' management of tasks, such as scheduling meetings, addressing workload, and reporting problems in order to complete tasks. In order to increase reliability of the coding, two individuals were hired for the data coding. Consistent agreement among coders was 63% during the initial coding and increased to 94.8% through comparison and discussion.

## Data analysis

Canonical correlational analysis was conducted using SAS 9.1 to identify the relationship between the emotional intelligence variables, the social bond variables, and the interaction variables. Because Canonical correlational analysis examines the relationship between pairs of variables (Rencher, 2002), three canonical correlation analyses were performed. Emotional intelligence, social bonding, and interaction are considered latent variables, each with a set of measured indicator variables. In emotional intelligence, four branch scores, including perceiving emotion, using emotion, understanding emotion, and managing emotion, became the indicator variables. Additionally, eight task score variables under the four branch scores were also considered as indicator variables. For social bonding, bonding to peers, bonding to online program, and bonding to instructor became the indicator variables. For interaction, the number of messages and the number of words were the indicator variables for the amount of interaction. For the types of interaction, the number of work type of interaction, the number of social type of

interaction, and the number of management type of interaction were the indicator variables. The age variable was controlled in the associations of interaction with emotional intelligence. The gender variable was controlled in the associations of emotional intelligence with social bond and interaction.

## Results

The participant ages ranged from 24 to 63 ( $M=40.5$   $SD=10$ ). The majority of the participants were female (74%), native English speakers (92%), and Caucasian (87%). The participants represent the population in the program because the population was also primarily female (67.5%), Caucasian (74.8%), and their ages ranged from 22 to 63 ( $M=38.33$   $SD=9.12$ ).

### Relationship between emotional intelligence and interaction

The results showed a negative relationship between emotional intelligence and the amount of interaction in synchronous interaction. Among the variables, students' ability to perceive emotion by facial expression and the number of text and audio messages in synchronous interaction were found to be contributing variables in the negative association. No relationship was found in asynchronous interactions. The results showed no significant canonical correlation between students' emotional intelligence and types of interactions both in synchronous and asynchronous online learning environment.

After examining the Pearson partial correlation, canonical correlation analysis was conducted to further examine the relationship between the two sets of research variables. Two indicator variables in the managing emotion branch were excluded in the canonical correlation analysis because they do not have Pearson partial correlation with any interaction variables, which may weaken the canonical correlation between the latent variables. As shown in Table 1, the first canonical correlation between emotional intelligence and the amount of messages in synchronous interaction was found to be statistically significant ( $r=.506$ ,  $p=.048$ ,  $\alpha=.05$ ). The squared canonical correlation for the first dimension was .256, which represents the amount of shared variance between the amount of interaction canonical variable and the emotional intelligence canonical variable.

Table 1. Canonical Partial Correlations between EI and the Amount of Interaction

#	Canonical Correlation	Squared Canonical ( $R^2$ )	Eigenvalues of $\text{Inv}(E)^*H = \text{CanRs}q/(1-\text{CanRs}q)$		Test of $H_0$			
			Eigenvalue	Cumulative	F	DF 1	DF 2	Sig.
1	.506	.256	.335	.602	1.54	24	238.43	.048*
2	.354	.126	.144	.853	1.04	15	190.88	.419
3	.251	.063	.067	.970	.73	8	140.00	.662
4	.129	.067	.017	1.000	.40	3	71.00	.753

Note. Significance level \* $p<.05$

Further interpretation was conducted to determine the relative importance of each of the variables in the canonical correlation. Table 2 shows the relative importance of each individual variable to the first canonical correlation. The first canonical variable for the emotional intelligence variables had a weighted difference of EI-A (-.964), EI-E (.453), EI-F (-.258), EI-G (.401), EI-C (-.212), and EI-B (.164), with more emphasis on EI-A. The canonical cross-loading of the variable EI-A (.410) also had the highest correlation with the canonical variable of the amount of interaction variable and the same sign as the canonical weight. Some of the remaining variables appear to have high weights. However, their contribution was not worthy to consider, since their canonical cross-loadings were lower than .30 and their squared multiple correlations indicate that they have no predictable power for the canonical correlation.

The first canonical variable for the amount of interaction variables had a weighted difference of MT (1.333), WA (-.957), MA (.581), and WT (-.119), with more emphasis on the variables of MT, WA, and MA. However, while the canonical cross-loading of the variable MT was .318, the canonical cross-loading of the variable WA was a mere .093 with a sign opposite from its canonical weight. This result might indicate that the variable WA is not actually important in the canonical correlation. Rather, MA looks to be the important variable in the canonical correlation in

that its value of cross-loading is .339. This result is consistent in the squaring of multiple correlations. The squared multiple correlations show that the first canonical variable of the amount of interaction has some predictive power for the number of messages in the synchronous text interaction (.101) and the number of messages in the synchronous audio interaction (.115).

*Table 2. Relative Importance of Variables for the First Canonical Correlation between EI and the Amount of Interaction*

Variate/ Variables	Canonical Weights	Canonical Cross- Loading	Squared Multiple Correlations	Redundancy Index
Dependent				.068
MT	1.333	.318	.101	
WT	-.957	.093	.009	
MA	.581	.339	.115	
WA	-.119	.215	.046	
Independent				.044
EI-A	-.964	-.410	.168	
EI-E	.453	.004	.000	
EI-B	.164	-.080	.006	
EI-F	-.258	-.272	.074	
EI-C	-.212	-.092	.008	
EI-G	.401	.082	.007	

### Relationship between social bond and interaction

The results showed a positive relationship between students' social bond and the types of interaction in synchronous text interaction. This relationship was not found in asynchronous interactions and synchronous audio interaction. The results showed no significant canonical correlation between students' social bond and the amount of interactions both in synchronous and asynchronous online learning environment. Table 3 displays the canonical partial correlations between the social bond variables and the types of interaction variables. The first canonical correlation between social bond and types of messages in synchronous text interaction was found to be statistically significant ( $r=.407$ ,  $p=.037$ ). The squared canonical correlation for the first dimension was .165.

*Table 3. Canonical Partial Correlations between Social Bond and the Types of Interaction*

#	Canonical Correlation	Squared Canonical (R <sup>2</sup> )	Eigenvalues of Inv(E)*H = CanRsqr/(1-CanRsqr)		Test of H <sub>0</sub>			
			Eigenvalue	Cumulative	F	DF 1	DF 2	Sig.
1	.407	.165	.198	.755	2.05	9	175.38	.037*
2	.241	.058	.061	.989	1.16	4	145.00	.331
3	.055	.003	.003	1.000	.22	1	70.00	.639

*Note.* Significance level \* $p<.05$

Further interpretation was conducted to determine the relative importance of each of the variables in the canonical correlation. Table 4 shows the relative importance of each individual variable to the first canonical correlation.

*Table 4. Relative Importance of Variables for the First Canonical Correlation between Social Bond and Types of Interaction*

Variate/ Variables	Canonical Weights	Canonical Cross- Loading	Squared Multiple Correlations	Redundancy Index
Dependent				.076
Social	-1.034	-.005	.000	
Work	.808	.114	.013	
Management	.966	.319	.102	
Independent				.038
Peer	.296	.243	.059	
Instructor	-.246	.151	.023	
Program	.970	.383	.147	

The first canonical variable for types of interaction variables had a weighted difference of social type (-1.034), work type (.808), and management type (.966). All the variables seem to have an important contribution to the correlation. However, the canonical cross-loadings of the social type variable ( $r=-.005$ ) and the management type variable ( $r=.114$ ) were very small. Rather, the management type variable had the highest cross-loading ( $r=.319$ ). This indicates that the management type variable was the most important variable in the canonical correlation, while the contribution of social type and work type variables to the relationship was small. Moreover, the squared multiple correlations show that the first canonical variable of types of interaction has some predictive power for management type interaction in the synchronous text interaction (.102). There was no predictable power for social type (.000) and work type (.013) interaction in the synchronous text interaction.

The first canonical variable for the social bond variables had a weighted difference of bond to peer (.296), bond to instructor (-.246), and bond to online program (.970), with greater emphasis on bond to program. The canonical cross-loading of the bond to program (.383) also had the highest correlation with the canonical variable of the social bond variable and the same sign as the canonical weight. Some of the remaining variables appear to have high weights. However, their contribution was not worthy to consider, since their canonical cross-loadings were lower than .30 and their squared multiple correlations indicate that they have less predictable power for the canonical correlation.

### Relationship between emotional intelligence and social bond

No statistically significant canonical correlations between the emotional intelligence variables and the social bond variables were found. Four branch score variables, including EI-B1 (Perceiving Emotion), EI-B2 (Using Emotion), EI-B3 (Understanding Emotion), and EI-B4 (Managing Emotion) were input as a set of the emotional intelligence variables. For the social bond variables, peer, instructor, and program variables were input. Gender variable was also input as a control variable.

Seeing that there was no significant canonical correlation between the emotional intelligence variables and social bond variables, the Pearson partial correlations were further analyzed to determine the correlation between the task scores of emotional intelligence and social bond variables. According to the Pearson partial correlation, bond to peer was the only variable to be associated with the four emotional intelligence variables. Another canonical correlation analysis was conducted to further examine the relationship between the emotional intelligence variables and the bond to peer variable. Multiple regression analysis could be used to examine this one-dimensional relationship but canonical correlation analysis was used since canonical correlation also has an ability to do univariate multiple regression analysis and produce the same result as multiple regression analysis.

Table 5 shows the canonical partial correlation between the four emotional intelligence variables and the bond to peer variable. One canonical correlation was derived because the smaller set had one variable. The canonical correlation was found to be statistically significant ( $r=.349$ ,  $p=.039$ ) at the .05 alpha level. The squared canonical correlation for the first dimension was .129. This squared canonical correlation equals to  $R^2$  in univariate multiple regression analysis.

Table 5. Canonical Partial Correlations between EI and the Bond to Peer

#	Canonical Correlation	Squared Canonical ( $R^2$ )	Eigenvalues of $\text{Inv}(E)^*H = \text{CanRs}q/(1-\text{CanRs}q)$		Test of $H_0$			
			Eigenvalue	Cumulative	F	DF 1	DF 2	Sig.
1	.349	.129	.147	1.00	2.66	4	72	.039*

Note. Significance level \* $p<.05$

Further interpretation involves determining the relative importance of each of the variables in deriving the canonical relationships. Table 6 shows the relative importance of each individual variable to the significant canonical correlation.

The canonical variable for the emotional intelligence variable had a weighted difference of EI-B1 (.964), EI-B2 (-.317), EI-B3 (.332), and EI-B4 (.600). EI-B1 and EI-B4 appear to be important variables in the correlation. However, while the canonical cross-loading of the variable EI-B1 was .310, the cross-loading of the EI-B4 was not greater than .30. Moreover, the squared multiple correlations also indicate that EI-B1 has greater predictable power of the canonical correlation.

*Table 6. Relative Importance of Variables for the First Canonical Correlation between EI and the Bond to Peer*

Variate/ Variables	Canonical Weights	Canonical Cross- Loading	Squared Multiple Correlations	Redundancy Index
Dependent Peer	1.000	.359	.129	.129
Independent EI-B1	.964	.310	.096	.040
EI-B2	-.317	.145	.021	
EI-B3	.332	.039	.002	
EI-B4	.600	.200	.040	

In sum, there was a negative association between students' emotional intelligence and the amount of interaction in the synchronous online environment. Students' ability to perceive emotion by facial expressions and the number of text and audio messages were found to be critical factors in the relationship. Also, there was a positive relationship between students' social bond and their types of interactions in the synchronous online environment. Students' bonding to their online program and their management type interaction were found to be contributing variables in the association. Lastly, emotional intelligence with more emphasis on the ability to perceive emotion had a positive relationship with the bond to peer variable.

## Conclusions and discussion

*Conclusion 1: Students who have higher emotional intelligence have a greater degree of social bond in online learning. Specifically, individuals with a higher ability to perceive emotion tend to be more attached to peers in online learning environments.*

The results indicate that students who have higher ability to perceive emotions have a greater sense of bond to their online learning peers. Previous literature supports the conclusion about the relationship between emotional intelligence and social bond in online learning. In traditional in-person relationships, students with a high ability to perceive emotions of self and others' have better relationships with friends (Brackett et al., 2004). This positive relationship was found in the online learning environment in this study.

It was interesting that, while students' ability to perceive emotion was found to be associated with their emotional attachment to peers, the other emotional abilities (i.e., understanding emotion, using emotion, and managing emotion) were found to have an insignificant contribution to the relationship. In traditional school settings, the ability to manage emotion was found to be associated with students' social relationship with friends and school membership (Lopes et al., 2003; Zins et al., 2004). However, this relationship was not found in this study.

These inconsistent results may indicate the limited function of emotional intelligence in online learning environments. As Mayer et al. (2004) discussed, the four emotional abilities (i.e., perceiving emotion, using emotion, understanding emotion, and managing emotion) represent a hierarchy. In other words, they argued that individuals should be able to perceive their and others' emotions in order to use, understand, and manage their emotion. The insignificant contribution of the other three emotional abilities in the relationship may result from this hierarchy of emotional abilities in online learning environments. Expressing one's emotion or the ability to perceive others' emotions in online environments is challenging (Wang & Reeves, 2007). Since emotional information processing in the emotion system (i.e., perceiving emotion) is challenged in online environments due to the limited emotional cues, the other emotional abilities (i.e., using emotion, understanding emotion, and managing emotion) may be challenged to help develop social bonds. The combination of the limited environmental characteristic of online learning and hierarchical representation of emotional abilities may reduce the association of using emotion, understanding emotion, and managing emotion with social bonding.

Another discussion point is the different nature of social bond in online learning environments. Even though social bond to peers was found to be an important variable, bond to instructor and bond to program were found to have little contribution to the relationship between emotional intelligence and social bond. This result may be due to the different qualities of bond. Wehlage et al. (1989) developed the social bond and school membership concept based on students' attachment, commitment, involvement, and belief in schooling. While bonding to peers is based on their emotional attachment to peers, bonding to program seems to be based more on students' belief and trust in the online program in terms of learning and professional development. This belief and trust of the program may be independent from their emotional ability, which may reduce the association of their bonding to their online program with their emotional intelligence.

The insignificant relationship of bond to instructor with emotional intelligence may be because bond to instructor is based more on rational commitment rather than emotional attachment. Wehlage et al. (1989) clarified that commitment is different from attachment in that commitment emphasizes the rational side of school membership, while attachment is the emotional aspect of school membership. Students commit to synchronous class participation, asynchronous discussions, and assignments in their online learning in order to achieve learning goals. Their commitment to the course activities affects instructors' evaluation of their academic performance. So, they would commit to the course regardless of their emotional intelligence in order to earn good grades from the instructor. Students' bond to instructor may be based on this commitment-oriented bonding, which may reduce the association of students' bond to instructor with their emotional intelligence.

*Conclusion 2: The inability to perceive emotions by facial expression brings a greater amount of interaction in synchronous online discussions. Students who cannot perceive emotions are willing to chat and talk, although not necessarily related to topics, during synchronous online classes.*

This study provides an interesting finding that there is a negative relationship between students' ability to perceive emotions by facial expression and their amount of synchronous online interaction. This may appear contradictory to studies in traditional classroom environments. Literature has shown that those who have higher emotional intelligence would have higher academic achievement in traditional classrooms (Brackett et al., 2004; O'Connor & Little, 2003; Trinidad & Johnson, 2001). Furthermore, Wang and Tucker (2001) found a strong positive correlation between students' interactions in synchronous online environments and their academic achievement. These studies may suggest that individuals with a higher emotional intelligence may have higher levels of interaction and consequently higher academic achievement. However, in this study, emotional intelligence had a negative association with the amount of interaction in a synchronous online learning environment.

The limited environmental capacity to perceive emotions in online learning may bring greater emotional distance to students who have low ability to perceive emotions. Online learning environments have limited capacity to express one's self and perceive others' facial communication (Wang & Reeves, 2007), while traditional classroom environments provide students a greater opportunity to identify non verbal cues such as facial expressions. It is not easy to perceive emotions in an online learning environment due to the emphasis on text-based communication, which does not require facial expression. It may be more challenging for individuals with a lower ability to perceive emotion to understand others' feelings in online environments. For them, interactions by text typing and talking on the microphone may become alternative ways to overcome their inability to perceive emotion so that they are able to reach out to others. For individuals with a higher ability to perceive emotion, even several interactions may help them understand so that they do not feel they need further interactions.

Additionally, no relationship was found between emotional intelligence and types of interactions both in synchronous and asynchronous interactions. Students with higher emotional intelligence may have more social, work, and management type interaction, because emotional intelligence has been found to be positively associated with social relationship (Lopes et al., 2003; Mayer et al., 1999) and academic achievement in traditional classroom learning environment (O'Connor & Little, 2003; Trinidad & Johnson, 2002). However, this hypothesis was not supported in the current study.

*Conclusion 3: Students who have stronger online program bonding have more management type interactions in synchronous discussions. Students' belief regarding the online program legitimacy and efficacy may help them manage and facilitate discussions during synchronous sessions.*



Literature in the field of online learning and school membership supports the conclusion of a positive relationship between social bond and interaction. Sense of belonging and community has been discussed as one of the important factors that affect students' participation, engagement, and attitude in online learning (Harasim, 2000; McInerney & Roberts, 2004; Pools, 2000). The literature on school membership and effectiveness distinguished such emotional sense of belonging into bond to peer, teachers, and school and found their positive relationships with academic achievement and school engagement in traditional school environments (Newmann et al., 1992; Pryor, 1994; Wehlage et al., 1989). Considering the studies in both fields, it can be concluded that students' social bonds are also associated with their online learning interactions.

In this study, students who had a higher degree of bonding to their online program had more management type of interactions during the synchronous sessions. This may indicate that adult online learners' motivation to interact may result more from their professional interests and success in the online program than from their emotional attachment to peers and instructors. Adult online learners may have less need for peer acceptance and peer socializing. Most of them were employed and had family obligations. The purpose of their online learning was more focused on earning a degree, not necessarily on making friends through the online program. Thus, their interaction patterns during synchronous discussions may result from their belief and bonding to the online program, not merely attachment to peers and instructors.

Lastly, while management type interaction was found to be important, work type interaction was also found to be insignificant in the relationship. Since students are attached to the online program, they may want to perform well in the program so they tend to manage their learning by scheduling, facilitating, reinforcing group members, seeking for help, providing help, and conforming to the ways of online learning. Additionally, students' work type interaction may be associated more with their prior knowledge in the subject matter and experience in the professions. Actually, all the types of interactions had significant and positive correlation with the age variable. After controlling the age variable, no relationship was found between work type interaction and student social bond. Even though the age variable does not represent students' experience and knowledge, it may also mean that the older students, who may have more experience in the field of the subject, would tend to share their experience and knowledge and to work actively in the synchronous discussion regardless of their bonding.

## **Recommendations**

Several recommendations are discussed in this section. First, the area of emotion has remained under-explored in understanding students' interaction in online learning. This study brings awareness to the relationships between emotional intelligence, social bond, and interactions as emotional and social learning to the field of online learning. Interactions have been rarely discussed from an emotional dimension in the field of online learning. In fact, there are no empirical studies that investigate the role of emotional intelligence and social bond in students' interactions in online learning environments. This study tried to provide a different lens in understanding online interaction by adopting an emotional-oriented perspective. Interaction is a defining factor in transactional distance between students and instructors in online learning environments (Moore, 1997). The more students have positive interactions with peers and instructors, the less they would have transactional distance between them (Moore, 1983, 1997). The inability to perceive emotions by facial expression may result in greater transactional distance (Moore, 1983), so students with a low ability to perceive emotions may have more interactions as found in this study. Transactional distance can be extended to students' emotional distance functioned by interactions. Studies to examine online interaction from an emotional dimension can complement cognitive-oriented understanding of interactions in the field of online learning.

Second, another implication is to be aware of differences of emotional intelligence styles in different learning environments when conducting future studies. Online learning environments are different from traditional face-to-face learning settings. Even within online learning, synchronous online learning environments are different from asynchronous online learning settings. Results found in traditional face-to-face learning environments cannot be applied to online learning environments without evidence of empirical studies in online learning environments. For example, Fabio and Palazzeschi (2008) found that emotional intelligence and self-efficacy have a positive relationship in traditional school settings. Even though their study had a different design by using Bar-On's (2004) model and was focused on high school teacher's self-efficacy, the result showed a positive association between emotional intelligence and self-efficacy. Knowlton (2005) argued that embarrassment and low self-efficacy might

cause inactivity in asynchronous online discussions. Therefore, it might be possible to interpret that students with higher emotional intelligence may have higher self-efficacy and consequently have active interaction in asynchronous online discussions. However, this positive relationship between emotional intelligence and online interactions was not found, rather negative association was found in synchronous online interactions the current study. Hence, understanding the role of emotional intelligence in understanding students' interactions in online learning environments should start with an awareness of different styles of emotional intelligence in different learning environments. Moreover, it is suggested to use other emotional intelligence models in future studies, since they may give different results in understanding the relationship between emotional intelligence, social bond, and interactions in online learning environments.

Third, future studies can examine what environmental cues can be used in order for students to express self emotions and perceive others' emotions in synchronous learning environments. As Beaudoin (2002) discussed when students are quiet or have inactive typing, it may not mean that they are not listening or learning during synchronous sessions. Moreover, given the limited number of environmental cues in online learning, it is not easy to see whether students understand, are confused, or are bored during synchronous sessions. This limited ability to perceive others' emotions may affect interactions. If there are any effective environmental cues by which students could easily perceive others' emotions, their interactions and social relationship in online learning might be enhanced, and eventually the student online learning experience might be improved.

Finally, future studies should explore a more rigorous research design for asynchronous online environments to control courses, instructors, and classes that may affect the relationship to investigate the relationship between emotional intelligence, social bond, and interactions. In this study, no relationship was found in asynchronous interaction. This result might be because of different structures between synchronous sessions and asynchronous discussion. In synchronous sessions the instructor mainly talks. Students did not have any obligation or requirement to talk or chat, even though they can type anytime as they want. However, postings in asynchronous discussion were required and structured by assignments. Course structure has been found to influence students' interaction in asynchronous interaction (Vrasidas & McIsaac, 1999). This may indicate that students' amount of interaction is associated with course structure in asynchronous settings regardless of emotional intelligence or social bond. The influence of course structures, instructors, and cohorts may reduce the power to detect the association in asynchronous online interactions. More rigorous research design may produce different results for asynchronous interactions.

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