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Assessing Online Learning Ability From a Social Exchange Perspective: A Survey of Virtual Teams Within Business Organizations

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Drawing on social exchange theory, this study proposes a model by postulating critical antecedents and mediators as the key drivers of online learning ability. In the model, online learning ability is affected indirectly by trust via 3 mediators simultaneously, including team commitment, task conflict, and relationship conflict, whereas trust is impacted directly by expressiveness interdependence, outcome interdependence, and task interdependence. Empirical testing of this model, by investigating the personnel of virtual teams from information technology organizations, confirms the applicability of social exchange theory in understanding online learning ability. This study contributes to the virtual team learning literature by extending social exchange theory to the rarely explored area of online learning ability of organizational teams and validating idiosyncratic drivers of online learning ability. Last, this article provides managerial implications and limitations of the research.

1. INTRODUCTION

Work in organizations is increasingly becoming structured in online teams ranging from a few members to few dozens. For example, the Yahoo! Internet portal was originally developed by 13 software engineers, split into several small teams of one to three members (Schilling, 2008). Online teams (or virtual teams) are considered the groups that communicate and work synchronously or asynchronously through such technologies as e-mail, bulletin boards, video conferencing, automated workflow, electronic voting, and collaborative writing at different physical locations (Coleman, 1997). The life span of a team ranges from few days to years, depending

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on its type, such as functional, lightweight, heavyweight, or autonomous types (Schilling, 2008). The challenge for online teams in business organizations is to become online learning teams, because online learning teams are able to respond quickly to environmental changes (e.g., Lainema & Lainema, 2008; Minetou, Chen, & Liu, 2008; Zaharias & Poylymenakou, 2009). The people performing in the online learning teams are able to react and learn efficiently in a collective manner (Simons, Germans, & Ruijters, 2003). Thus, online learning ability is important for organizations in providing increased value when the organizations are under great pressure to create advantageous synergies with the resources under their control.

Learning of online teams can be defined as the collective acquisition, creation, integration, and sharing of information and knowledge by online teams (Mebane, Porcelli, Iannone, Attanasio, & Francescato, 2008; Zellmer-Bruhn & Gibson, 2006). Conveying general business knowledge across an entire online team and making the link between individual performance and team success visible may indeed form a huge challenge for learning of online teams (Jacko, Salvendy, & Sainfort, 2002; Lainema & Lainema, 2008). There has been a substantial increase in research that considers learning of online teams as a critical approach for organizational performance (e.g., Chen & Macredie, 2004; Van der Vegt & Bunderson, 2005). Online teams combine the expertise and talent of many people via Internet and can thus exceed the limits of personal performance (Lainema & Lainema, 2008; Nielsen, Dirckinck-Holmfeld, & Danielsen, 2003). Particularly, online teams naturally integrate performance and online learning, and their online learning is cumulated into a collective action rather than the sum of all individual learning (Simons et al., 2003).

Successful learning of online teams depends on the continuous growing of individuals' online learning ability, which strengthens the competitive advantage of a team through their capability of learning critical information and knowledge (e.g., Hamade, Artail, & Jaber, 2006). Nevertheless, online learning ability arises from online employees working collaboratively through close social relationships to achieve practical outcomes and building know-how in the process (Schar, Schierz, Stoll, & Krueger, 1997; Senge, 1997). One of the most widely researched and generally supported theories of such close relationships among online team members is social exchange theory (Eby, Butts, Lockwood, & Simon, 2004). Online learning ability can be well explained through social exchange behavior of online team members, because social exchange behavior contributes key complementarity to social reciprocity of learning of an online team. Social exchange may motivate people in online teams to learn more so that they would have something valuable to exchange with other team members. In other words, social exchange behavior highlights the importance of social reinforcement on the online learning ability of team members given that social exchange mechanisms encourage highly interdependent relationships in exchanging necessary resources, information, or knowledge (Moore & Cunningham, 1999). Unfortunately, little is known about how the social exchange is applied in online learning ability.

Due to the aforementioned literature's deficiency in online learning ability from a social exchange aspect, two research questions of interest in this study are derived: First, how can the social exchange theory be appropriately applied

to understanding online learning ability? Second, what critical antecedents and mediators drive online learning ability and how? Exploring these research questions is important because an improved understanding of the questions can help management reinforce its determinants of online learning ability with effective methods or solutions.

This study differs from previous research in two critical ways. First, even though social exchange theory emphasizes the importance of reciprocating a social relationship, social interdependence built on a reciprocating basis has rarely been integrated into social exchange theory in previous research. For that reason, this study is one of the first to examine the influence of social interdependence on online learning ability, which is based on social exchange theory. Second, this study is one of the few to examine online learning ability by empirically testing a model with a survey of interactive virtual teams in business organizations. Previous research has indicated that work in organizations is increasingly becoming structured in teams supported by information technology (IT; Lainema & Lainema, 2008). Even though team learning research has been historically conducted within the context of personal, face-to-face social relationships, there is increasing evidence that people apply IT to perform learning of a team, which is comparable to that in face-to-face settings (Griffith, Sawyer, & Neale, 2003).

The IT in this learning context of a virtual team refers to tools such as e-mail, Usenet news, discussion boards, listservs, and group support system, which facilitate online learning ability quite well. Although IT is widely acknowledged as a social medium that connects people in general and builds their social relationship, little is known about whether the social exchange theory can be workable in understanding online learning ability in the scope of virtual teams. To sum up, this study differs from much of previous research by evaluating the online learning ability using virtual teams for empirical confirmations.

2. RESEARCH MODEL AND HYPOTHESES' DEVELOPMENT

This study proposes a research model based on social exchange theory, as shown in Figure 1, explaining the formation of online learning ability. In the proposed model, trust is affected by three dimensions of social interdependence (expressiveness, outcome, and task), whereas online learning ability is indirectly driven by trust via the simultaneous effects of three mediators: team commitment, task conflict, and relationship conflict. The model from a social exchange perspective indicates that team commitment and task conflict serve to strengthen social relationships and actions during online learning of a team, whereas relationship conflict tends to weaken them. Social exchange theory is unique in that it considers the fact that the conflicts are not always positive or negative influences in organizations. On one hand, task conflict can be incurred by participating in a social relationship so as to boost online learning ability. On the other hand, relationship conflict can lead online team members to believe that their social relationship is no longer meeting their needs and can be a catalyst for relationship termination (Eby et al., 2004), weakening online learning ability. The aspect of conflicts represents an important departure from traditional social-psychological research on social

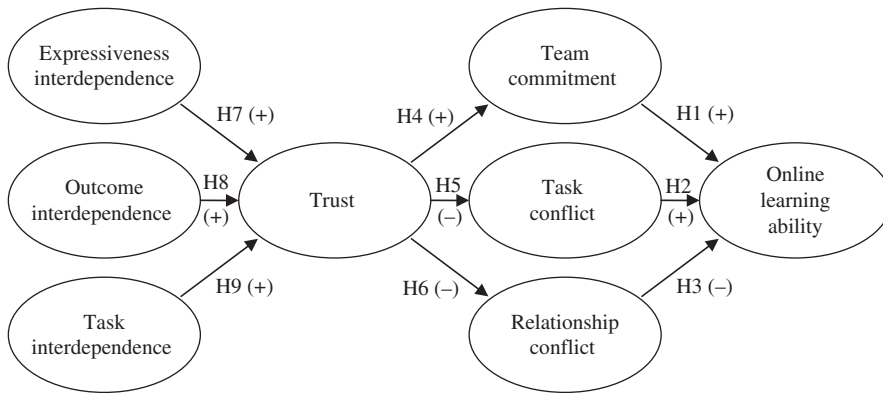


FIGURE 1 Research framework.

relationships (or networking), which unwittingly pathologize and obscure conflict issues instead of viewing them as a natural part of the relationships. Nevertheless, the details and rationale about the hypotheses in the proposed model based on social exchange theory are provided in Figure 1.

Social exchange refers to voluntary actions of individuals motivated by the potential returns they are expected to bring and typically do bring from others (Moore & Cunningham, 1999). Social exchange theory indicates that rational self-interest drives people's collective actions (e.g., online learning and support of a team) via social interactions (Sinclair & Tetrick, 1995). The theory can be extended to individuals' relationships under team behavior because individuals form an anthropomorphic ascription of dispositional traits to their team by personifying the team (Eisenberger, Huntington, Hutchison, & Sowa, 1986). Thus, online team members are likely to perceive themselves as being in social exchange relationships with their teams.

Similar to the role of organizational commitment suggesting that people evaluate social interactions in which they are involved in terms of rewards and costs (Tyler & Lind, 1992), team commitment in this study is based on individuals' affective evaluation of the advantages of their performing team collaboration and interaction from an exchange aspect (e.g., Sinclair & Tetrick, 1995). Whether individuals remain dedicated to their online learning in the team or not counts heavily on their judgments regarding the advantages of their continuous collaboration in the team (e.g., Gay, Stefanone, Grace-Martin, & Hembrooke, 2001), leading to a positive association between team commitment and online learning ability. Thus, the first hypothesis is derived:

H1: Team commitment is positively related to online learning ability.

Even though conflict is the disagreement in a relationship characterized by mutual interference or blocking behavior with stress and tension, it is an inevitable and essential element of interteam exchange relationships (Moore & Cunningham, 1999). Great emphasis in previous research has been put on two kinds of conflict

(viz., task conflict and relationship conflict) and their outcomes, such as online team performance and decision-making effectiveness (Jehn & Chatman, 2000).

Task conflict appears when online team members offer different views and opinions concerning the team tasks being performed and an interpretation of task-related information (Yang & Mossholder, 2004). Task conflict helps strengthen online learning ability, as such conflict generates disagreements among team members about how the specific aspects of tasks are to be accomplished, particularly in regard to procedural, policy, and resource allocation issues (Yang & Mossholder, 2004), and it provides a great online learning opportunity for team members to enhance their ability during online collaboration. Task conflict encourages understanding the team issues being examined in the form of “constructive controversy” and consequently team effectiveness (Jehn & Chatman, 2000; Yang & Mossholder, 2004).

Relationship conflict represents in contrast perceived frustration about personal differences such as interpersonal style, attitudes and preferences, and personality (De Dreu & Van Vianen, 2001). Relationship conflict weakens online learning ability, because such conflict, which generates strong affective clashes and frictions over personal values mannerisms (Yang & Mossholder, 2004), discourages the online collaboration of team members, subsequently bringing about decreased online learning ability.

Similar to the conflict literature suggesting the benefit of task conflict and the detriment of relationship conflict to organizational groups (Yang & Mossholder, 2004), this study proposes two brand-new hypotheses regarding online learning ability:

H2: Task conflict is positively related to online learning ability.

H3: Relationship conflict is negatively related to online learning ability.

Trust is an essential element in social exchange behavior, and it involves online team members having faith in or depending on other members to fulfill their obligations (Mayer, Davis, & Schoorman, 1995). Previous research has argued that there is no other single variable that so thoroughly affects interpersonal and intergroup behavior (Golembiewski & McConkie, 1975), strongly suggesting its key mediating role in the online learning formation of a team. Trust is necessary for members to reduce the risk of opportunistic behavior and to develop a long-term orientation and determination toward online collaboration of a team (Ganesan, 1994), resulting in strengthened team commitment. Indeed, social exchange requires an individual to trust others to discharge his or her own obligations, as there is no way to assure or force the others to reciprocate (Moore & Cunningham, 1999). Thus, team members trusting their coworkers are more likely than those without trust to be involved in depth with firm dedication to online collaboration and actions, generating strong team commitment. This is described as the following hypothesis.

H4: Trust is positively related to team commitment.

The concept of trust is the critical juncture to understanding social interactions among online team members (Hébert, 1996). Given that trust represents the team members' confidence that their coworkers are ready to perform actions that will result in positive outcomes or outputs for the online team, individuals having strong trust in their coworkers are likely to foster courtesy toward or have a common consensus with their coworkers, relieving the conflict in the online team. In other words, the social interactions among online team members cannot yield positive exchanges of team-related matters unless trust is established (Hébert, 1996).

The presence of trust supports the effective resolution of disagreements among online team members (Hébert, 1996). If social interactions are characterized by strong trust, then team members are likely to maintain cordial relations (Anderson & Narus, 1990), and therefore task discrepancy or communication dissonance only occurs slightly, suggesting relationship and task conflicts are both reduced. This perspective is consistent with the position that trust increases tolerance for the short-term inequality inevitable in social interactions and thereby reduces the potential for frequent conflict, whether task-based or relationship-based (e.g., Madhok, 1995). Therefore, the relationship between trust and conflict is hypothesized:

H5: Trust is negatively related to task conflict.

H6: Trust is negatively related to relationship conflict.

2.1. Team Interdependence and Trust

The main online learning tenet of a team is achieving higher levels of online learning through the intellectual efforts of all the team members together (Rassuli & Manzer, 2005). This is accomplished primarily through positive social interdependence and individual accountability (Cottell & Millis, 1993; Slavin, 1992), supporting the important roles of team interdependence and trust in the learning formation of an online team. Particularly, in online collaboration the individuals' need to reciprocate for benefits received to continue receiving them serves as the starting point for social exchange (Moore & Cunningham, 1999). This exchange of benefits makes online team members in social interactions interdependent and subsequently establishes trust mutually (Moore & Cunningham, 1999).

The interdependence in work teams stems from several sources, including role differentiation, distribution of skills and resources, the way team goals are defined and achieved, and the way team effectiveness is rewarded and feedback is given (Van der Vegt, Emans, & Van de Vliert, 1999). Task and outcome interdependence are considered two basic forms of interdependence that operate simultaneously within a team (Neubert, Taggar, & Cady, 2006). However, given that these two forms of interdependence reflect only instrumental traits, it is necessary to extend the scope of the interdependence to expressive traits that display affective interactions among online team members, suggesting the necessary inclusion of additional expressiveness interdependence. The coverage in both instrumental and expressive traits of the interdependence is important and has been partially supported in, for example, the field of social networking, which discusses two broad areas: instrumental and expressive ties (e.g., Lin, 2008).

Thus, this study proposes that trust is influenced by three dimensions of team interdependence: expressiveness, outcome, and task interdependence.

Whereas expressiveness interdependence represents the degree to which online team members care about mutual affective dependence such as friendships and a sense of identity and personal belonging towards an online team (e.g., Lin, 2008), task interdependence represents the degree to which online team members count on and interact with one another via Internet to perform their work (Neubert et al., 2006). Accordingly, outcome interdependence represents the degree to which online team members are presented with team goals and are provided with appropriate team response and rewards (Neubert et al., 2006). This interdependence has been discussed in issues related to team potency and effectiveness in many previous studies (e.g., Sbea & Guzzo, 1987; Van der Vegt et al., 1999), suggesting its necessity in the formation of online learning ability.

Trust is boosted by interdependence, because of the three reasons, respectively. First, expressiveness interdependence, which strengthens social expressive bonds and social support (or emotional support), helps strengthen individuals' connections to their online team members. Second, outcome interdependence, which lifts work-related feedback bonds (e.g., increased rewards), helps individuals experience about share and share alike in their online team. Finally, task interdependence, which enhances work-related advice bonds (e.g., reduced workloads), helps raise individuals' reliability to the members. Collectively, trust is enlarged when different dimensions of interdependence are reinforced, leading to the following hypotheses:

H7: Expressiveness interdependence is positively related to trust.

H8: Outcome interdependence is positively related to trust.

H9: Task interdependence is positively related to trust.

3. METHOD

3.1. Subjects and Procedures

The subjects surveyed in this study are made up of professionals on virtual teams within Taiwan's IT industry. The members of virtual teams were recruited, because such teams, in which online members collaborate with one another, have become a very popular mode of teamwork in today's modern world. Using professionals with working experience on virtual teams, rather than those without experience for the teams, helps facilitate improved external validity for team learning issues.

Fifty large firms in Taiwan's computer and communication industry were initially chosen from Taiwan's business directory and then were asked to provide assistance for our survey. Nineteen firms agreed to provide us with the assistance for our survey. Note that the sample companies are not randomly chosen, because they must meet the criteria of their applying virtual teams in their organizations before our survey. Nevertheless, the companies chosen herein are appropriate representative samples. Further confirmed by the 19 firms, their virtual teams rely on e-mail, chat tools, online conferences, instant messaging, or other online systems

Table 1: Sample Characteristics

<i>Characteristic</i>	<i>n^a (%)</i>
Gender	
Male	232 (53.09%)
Female	205 (46.91%)
Age	
Younger than 20 years old	1 (0.23%)
20–29 years old	184 (42.11%)
30–39 years old	202 (46.22%)
40 years old or older	50 (11.44%)
Education	
High school or under	36 (8.24%)
University	335 (76.66%)
Graduate school	66 (15.10%)
Position level	
Management level	75 (17.16%)
Nonmanagement level	362 (82.84%)
Department	
Research & development	71 (16.25%)
Human resource / training	32 (7.32%)
Finance / accounting	56 (12.81%)
Production	134 (30.66%)
Sales / service	74 (16.93%)
Others	70 (16.03%)
Tenure	
1 year or less	32 (7.32%)
1–5 years	143 (32.72%)
6–10 years	116 (26.54%)
11–15 years	71 (16.25%)
16–20 years	59 (13.50%)
21 years or more	16 (3.67%)
Internet application on the job	
Less than 1 year	56 (12.81%)
1 year or more and less than 2 years	41 (9.38%)
2 years or more and less than 3 years	38 (8.70%)
3 years or more	302 (69.11%)

^a*N* = 437.

to accomplish their teamwork and team collaboration. Of the 569 questionnaires distributed to the subjects, 437 usable questionnaires were collected for a response rate of 76.80%. Table 1 presents the characteristics of the sample.

This study measures the constructs utilized herein by using scale items drawn and modified from existing literature. The following steps are employed to choose scale items. First, the items from existing literature were translated and modified into Chinese. Second, the items in Chinese were then refined or further extended by a focus group of five people, including three graduate students and two professors familiar with organizational behavior and human resource management. During repeat participant feedback from the members of the focus group, some items were reworded or newly developed, whereas others that were less relevant to the context were eliminated. Third, the measurements were tried via two pilot

tests before the actual survey. Pilot test respondents were excluded in the subsequent survey. The pilot test data were subjected to exploratory factor analysis and reliability analysis to identify items that loaded poorly on their hypothesized scales, which were then further refined. This process of instrument refinement led to considerable improvement in content validity and scale reliability. Fourth, the tips suggested by Reynolds, Diamantopoulos, and Schlegelmilch (1993) were utilized in comparing our English version questionnaire to the Chinese one. A high degree of correspondence between the two questionnaires assures that the translation process did not substantially introduce artificial translation biases.

Appendix A lists the measurement items, which were all measured using 5-point Likert scales. Online learning ability is measured with three items modified from Edmondson (1999), whereas team commitment with four items is modified from Wayne, Shore, and Liden (1997). Online learning ability in this study is defined as people's ability to learn state-of-the-art information and knowledge in online teams. A sample item is, "In our online team, I frequently seek new online information to learn important changes in the job." This item clearly measures online team members' ability to learn up-to-date information and knowledge. Team commitment in this study is referred as individuals' affective attachment to their online team collaboration. A sample item is, "I talk up to my friends that online collaboration is a good way to work in my team." This item clearly measures individuals' commitment toward their online team collaboration. Task conflict with four items and relationship conflict with four items are both modified from Jehn (1995). Trust with four items is modified from Yilmaz and Hunt (2001). Expressiveness interdependence with three items is modified from Lin (2007), whereas outcome interdependence with four items and task interdependence with another four items are modified from Van der Vegt, Emans, and van de Vliert (1998). Collectively, these constructs were modified from previous literature by being embedded with the features related to virtual teams.

4. DATA ANALYSIS AND TEST RESULTS

The survey data were analyzed using a two-step structural equation modeling (SEM) approach (Anderson & Gerbing, 1988) with the software of SAS. Note that the SEM with a sample size of 100 to 200 subjects is likely to lead to unstable final models (Hatcher, 1994). Previous literature strongly recommends that the study with small samples clearly acknowledge the potential unreliability of the final model (Hatcher, 1994). Because our sample size (i.e., 437 subjects) is much larger than that of 200 subjects, it is quite good for SEM analysis. Test results from each stage of analysis are presented in the following.

4.1. Measurement Model

Confirmatory factor analysis (CFA) was first performed on all items corresponding to the eight constructs measured in Likert-type scales. The overall goodness-of-fit indices in CFA shown in Table 2 indicate that most fits of the measurement model

Table 2: Standardized Loadings and Reliabilities

<i>Construct</i>	<i>Indicators^a</i>	<i>Standardized Loading</i>	<i>AVE</i>	<i>Cronbach's α</i>
Online learning ability	TL1	0.69 ($t = 14.88$)	0.51	0.76
	TL2	0.77 ($t = 16.84$)		
	TL3	0.70 ($t = 15.13$)		
Team commitment	TEC1	0.80 ($t = 19.43$)	0.66	0.89
	TEC2	0.84 ($t = 20.92$)		
	TEC3	0.80 ($t = 19.44$)		
	TEC4	0.81 ($t = 20.00$)		
Task conflict	TC1	0.86 ($t = 21.52$)	0.73	0.89
	TC2	0.87 ($t = 21.86$)		
	TC3	0.84 ($t = 20.82$)		
Relationship conflict	RC1	0.78 ($t = 18.78$)	0.66	0.89
	RC2	0.81 ($t = 19.75$)		
	RC3	0.84 ($t = 20.72$)		
	RC4	0.83 ($t = 20.49$)		
Trust	TR1	0.83 ($t = 20.56$)	0.68	0.89
	TR2	0.84 ($t = 20.90$)		
	TR3	0.82 ($t = 20.36$)		
	TR4	0.81 ($t = 19.82$)		
Expressiveness interdependence	EI1	0.64 ($t = 13.72$)	0.58	0.79
	EI2	0.77 ($t = 17.26$)		
	EI3	0.85 ($t = 19.45$)		
Outcome interdependence	OI1	0.76 ($t = 18.00$)	0.64	0.88
	OI2	0.80 ($t = 19.38$)		
	OI3	0.84 ($t = 20.72$)		
	OI4	0.81 ($t = 19.76$)		
Task interdependence	TI1	0.88 ($t = 22.13$)	0.70	0.87
	TI2	0.89 ($t = 22.40$)		
	TI3	0.73 ($t = 17.17$)		

Note. Goodness-of-fit indices ($N = 437$): $\chi^2(322) = 644.99$, $p < .001$; nonnormed fit index = 0.95; normed fit index = 0.92; comparative fit index = 0.96; goodness-of-fit index = 0.90; adjusted goodness-of-fit index = 0.88; root mean square residual = 0.03; root mean square error of approximation = 0.05. AVE = average variance extracted.

^aIndicators remained after confirmatory factor analysis purification. A few indicators are excluded from this measurement model due to their insignificance.

are satisfactory. More specifically, the normalized chi-square (chi-square/degrees of freedom) of the CFA model was smaller than the recommended value of 3.0. Even though the adjusted goodness-of-fit index was slightly lower than the recommended value of 0.9, the comparative fit index, the goodness-of-fit index, the non-normed fit index, and the normed fit index all exceeded 0.90. Moreover, the root mean square residual was smaller than 0.05, and the root mean square error of approximation was smaller than 0.08 (Bentler & Bonnett, 1980). These figures strongly reveal that the hypothesized CFA model in this study fits well with the empirical data. The correlation matrix for this CFA model is listed in Appendix B. Note that any respecification or modification related to our research framework is not considered in our study because such respecification for a research framework brings on questionable data-drive modification.

Convergent validity was obtained by meeting the three conditions below (Fornell & Larcker, 1981). First, all factor loadings were statistically significant at $p < .001$ as shown in Table 2. Second, the average variance extracted for all constructs exceeded 0.50, suggesting that the overall hypothesized items capture sufficient variance in the underlying construct than that attributable to the measurement error. Third, the reliabilities for each construct exceeded 0.70 as presented in Table 2, satisfying the general requirement of reliability for research instruments. Overall, the empirical data collected met all three of these conditions to assure convergent validity.

Discriminant validity was assessed herein by chi-square difference tests, and its advantage is simultaneous pairwise comparisons for the constructs based on the Bonferroni method. Controlling for the experiment-wise error rate by setting the overall significance level to .001, the Bonferroni method indicated that the critical value of the chi-square difference should be 17.09. Chi-square difference statistics for all pairs of constructs exceeded this critical value of 17.09 (see Table 3), thereby

Table 3: Chi-Square Difference Tests for Examining Discriminant Validity

Construct Pair	$\chi^2_{322} = 644.99$ (Unconstrained Model)	
	χ^2_{323} (Constrained Model)	χ^2 Difference
(Online learning ability, Team commitment)	849.98	204.99***
(Online learning ability, Task conflict)	966.20	321.21***
(Online learning ability, Relationship conflict)	973.92	328.93***
(Online learning ability, Trust)	831.32	186.33***
(Online learning ability, Expressiveness interdependence)	840.99	196.00***
(Online learning ability, Outcome interdependence)	851.78	206.79***
(Online learning ability, Task interdependence)	871.62	226.63***
(Team commitment, Task conflict)	1,398.85	753.86***
(Team commitment, Relationship conflict)	1,578.79	933.80***
(Team commitment, Trust)	1,179.57	534.58***
(Team commitment, Expressiveness interdependence)	884.72	239.73***
(Team commitment, Task interdependence)	977.24	332.25***
(Team commitment, Outcome interdependence)	1,115.13	470.14***
(Task conflict, Relationship conflict)	1,204.02	559.03***
(Task conflict, Trust)	1,651.83	1,006.84***
(Task conflict, Expressiveness interdependence)	986.99	342.00***
(Task conflict, Task interdependence)	1,399.99	755.00***
(Task conflict, Outcome interdependence)	1,360.12	715.13***
(Relationship conflict, Trust)	1,576.12	931.13***
(Relationship conflict, Expressiveness interdependence)	986.21	341.22***
(Relationship conflict, Task interdependence)	1,524.56	879.57***
(Relationship conflict, Outcome interdependence)	1,314.93	669.94***
(Trust, Expressiveness interdependence)	861.33	216.34***
(Trust, Task interdependence)	1,152.83	507.84***
(Trust, Outcome interdependence)	1,212.25	567.26***
(Expressiveness interdependence, Task interdependence)	907.91	262.92***
(Expressiveness interdependence, Outcome interdependence)	948.67	303.68***
(Task interdependence, Outcome interdependence)	1,132.77	487.78***

***Significant at the .001 overall significance level by using the Bonferroni method.

assuring discriminant validity for our data sample. Note that the significance in the test results herein is desired (Hatcher, 1994), which means the significant difference between every two constructs, because discriminant validity describes the degree to which the operationalization is dissimilar to (diverges from) other operationalizations that it theoretically is supposed to be dissimilar to (Hatcher, 1994).

4.2. Structural Model

The CFA model was transformed to a structural model that reflects the model paths described in our research framework for the purposes of testing the hypotheses. Table 4 presents the test results of this analysis. Eight out of our nine hypothesized associations were validated at the $p < .01$ significance level or better. Online learning ability is significantly related to team commitment and task conflict with standardized path coefficients of 0.58 ($p < .001$) and 0.17 ($p < .001$), respectively, supporting H1 and H2. However, the relationship between relationship conflict and online learning ability is insignificant, and thus H3 is not supported.

Trust is significantly related to team commitment, task conflict, and relationship conflict with standardized path coefficients of 0.66 ($p < .001$), -0.11 ($p < .01$), and -0.16 ($p < .001$), respectively, supporting H4, H5, and H6. Finally, trust is significantly related to expressiveness, outcome, and task interdependence with standardized path coefficients of 0.30 ($p < .001$), 0.45 ($p < .001$), and 0.10 ($p < .01$), respectively, supporting H7, H8, and H9.

Unsupported H3 suggests that relationship conflict does not necessarily bring on either a negative or positive influence on perceived learning of a team given the fixed task conflict. This phenomenon occurs, perhaps because learning of a team is more self-motivated behavior rather than passive behavior that is heavily driven by other people, resulting in an insignificant association between relationship conflict (i.e., interpersonal conflict that is related with particular persons) and online learning ability. However, the unexpected results for the unsupported hypothesis

Table 4: Path Coefficients and *t* Value

<i>Hypothesis</i>	<i>Standardized Coefficient</i>	<i>t Value</i>
H1: Team commitment → Online learning ability	0.58***	9.16
H2: Task conflict → Online learning ability	0.17***	3.39
H3: Relationship conflict → Online learning ability	-0.06	-1.26
H4: Trust → Team commitment	0.66***	12.08
H5: Trust → Task conflict	-0.11**	-2.14
H6: Trust → Relationship conflict	-0.16***	-2.95
H7: Expressiveness interdependence → Trust	0.30***	5.48
H8: Outcome interdependence → Trust	0.45***	7.60
H9: Task interdependence → Trust	0.10**	1.96

** $p < .01$. *** $p < .001$.

may warrant further study, so that the precise cause behind the unsupported hypothesis would not be misinterpreted.

5. DISCUSSION

This study provides an illustrative example of how social exchange theory can be applied to studying online learning ability and its antecedents. Based on the test results herein, online learning ability is positively and directly influenced by team commitment and task conflict, suggesting that individuals' identification toward their teamwork and official (job-related) contacts among them are something management should be watching for. Online team members who do not recognize their own teamwork or who are subdued to performing the team task without providing varied opinions for the team are unlikely to upgrade their online learning ability. Online team leaders who think of employees' obedience without any arguments as the first priority can be very much mistaken, because they are likely to miss a great opportunity for strengthening their online learning ability through obtaining a variety of constructive opinions from their online team members.

The exclusive mediating role of trust—which significantly influences team commitment, task conflict, and relationship conflict—suggests that management should periodically survey the level of trust perceived by online team members as a critical checkpoint in order to have the online learning ability under control. It is understandable that online team members without trust are likely to doubt the feasibility of their online collaboration, eventually impairing online learning of the team. However, it would be a myth to say that trust does not bring any side effects. Given that trust facilitates increased team commitment and reduced task conflict according to the test results of this study, it is the former that is good for online learning ability rather than the latter. In other words, it could be a threat to online learning ability if trust becomes too strong to generate an appropriate task conflict for improving online learning of the team. At any rate, management should avoid extreme measures to cultivate trust that do not fit the needs of the team.

The significant effects to trust from the three dimensions of interdependence are very inspiring for management attempting to establish a trusting culture among its teams. First, because the value created by expressiveness represents the affective bonds and positive benefits that arise from feeling valued, respected, and treated well (Molm, Schaefer, & Collett, 2007), management should cultivate expressiveness interdependence by conveying appreciation for individuals' dedications and by showing honor to the online team members and expressing care over the sentimental relationship with them.

Second, because outcome interdependence represents the degree to which significant outcomes (e.g., goals and rewards) individuals receive count heavily on the performance of their coworkers, management should promote the reciprocal consequences of online team sharing and exchanging from the point of view of generating compensatory benefits such as team-based awards, credits, or bonuses so that online team members can continue attaching importance to the outcome interdependence and thus establish sufficient trust.

Third, given that task interdependence represents the interconnections between tasks such that the accomplishment of an individual's work depends on the completion of his or her coworkers' work, management wanting to facilitate task interdependence should encourage online team members to periodically examine task-based processes or workflows at the individual level (rather than the team level for outcome interdependence) and exchange potential solutions between the members for refining obsolete team operations due to environmental changes.

In summary, the findings of this study lend support to the literature that attempts to explain how the lack of social exchange in workplaces can lead to negative outcomes for trust and ultimately online learning ability. Management should create an optimistic online team climate with appropriate policies or measures as previous suggested to inspire trust, team commitment, and task conflict to reinforce online learning ability in the long run.

6. LIMITATIONS

The results of this study should be interpreted in light of their limitations. The first limitation relates to the cross-sectional survey used in this study. The cross-sectional nature of it limits our ability to achieve causal inferences from the data. Longitudinal studies are needed in this area of research. The second limitation is the way this study operationalizes conflict into two dimensions: task conflict and relationship conflict. There are clearly other social conflict mechanisms (e.g., cultural, ethnic, and process conflicts) that warrant an investigation.

The third limitation of this study is the possibility of common method bias, given that the constructs of this study were measured perceptually using Likert scales. To test for this bias, a Harmon's single factor test (Podsakoff & Organ, 1986) was performed herein. In this test, if a substantial amount of common method variance is present in the data sample, then either a single factor will emerge from the factor analysis or one general factor will account for the majority of the covariance in the independent and dependent variables. An exploratory factor analysis of all items for the eight constructs in Table 2 has revealed eight factors explaining 15.13%, 14.51%, 14.22%, 14.04%, 11.64%, 11.32%, 9.59%, and 9.55% of the total variance, respectively. These values reveal that the variances are properly distributed among the proposed factors, showing that common method bias was unlikely a significant threat in our data sample.

Given our theoretical focus on social exchange theory, we have limited our consideration of behavioral predictors to those suggested by the theory. However, future researchers are advised to consider other additional predictors beyond social exchange theory and compare their explanatory ability to those examined in this study.

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APPENDIX A

Measurement Items

Online learning ability (1: *Strongly Disagree*; 5: *Strongly Agree*)

- OL1. In our online team, I frequently seek new online information to learn important changes in the job.
- OL2. In our online team, I regularly take time to figure out ways to improve the team's work processes.
- OL3. Overall, my learning ability in online collaboration is good.

Team commitment (1: *Strongly Disagree*; 5: *Strongly Agree*)

- TEC1. I am willing to put in a great deal of effort beyond that normally expected in order to make the online collaboration with my coworkers successful.
- TEC2. I really care about the online collaboration with my coworkers.
- TEC3. I talk up to my friends that online collaboration is a good way to work in my team.
- TEC4. I am proud to tell others that I am part of our team's online collaboration.

Task conflict (1: *Strongly Disagree*; 5: *Strongly Agree*)

- TC1. The members of our online team often disagree with one another about opinions regarding the tasks being done.
- TC2. The members of our online team frequently have serious arguments about new ideas of tasks.

TC3. The members of our online team have conflicts with one another due to the tasks being assigned.

TC4. The members of our online team usually have great differences of opinion in carrying out tasks.

Relationship conflict (1: *Never happen*; 5: *Frequently happen*)

RC1. How often does the interpersonal friction happen in your online team?

RC2. How often do personality conflicts happen in your online team?

RC3. How often does the relationship tension among members happen in your online team?

RC4. How often does emotional conflict among members happen in your online team?

Trust (1: *Strongly Disagree*; 5: *Strongly Agree*)

TR1. I consider my online coworkers as people who(m) can be trusted.

TR2. I consider my online coworkers as people who(m) can be counted on to do what is right.

TR3. I consider my online coworkers as people who(m) are always faithful.

TR4. I consider my online coworkers as people who(m) I have great confidence in.

Expressiveness interdependence (1: *Strongly Disagree*; 5: *Strongly Agree*)

EI1. I am well acquainted personally with my online coworkers.

EI2. I talk about things beyond work with my online coworkers.

EI3. My online coworkers and I exchange views related to personal matters.

Outcome interdependence (1: *Strongly Disagree*; 5: *Strongly Agree*)

OI1. It benefits me when my online coworkers attain their goals.

OI2. The things my online coworkers want to accomplish and the things I want to accomplish are compatible.

OI3. It is advantageous for me when my online coworkers succeed in their jobs.

OI4. When my online coworkers succeed in their jobs, it works out positively for me.

Task interdependence (1: *Strongly Disagree*; 5: *Strongly Agree*)

TI1. My online coworkers depend on me for online information (or online advice).

TI2. My online coworkers depend on my online support (or online help).

TI3. I depend on my online coworkers for providing online files (or online messages) I need.

TI4. I depend on my online coworkers for doing my work well.

APPENDIX B

Table B1: Correlation Matrix

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	
A1	1.00	0.55	0.48	0.27	0.26	0.29	0.32	0.19	0.15	0.17	0.03	0.04	-0.06	-0.05	0.30	0.32	0.26	0.34	0.27	0.21	0.25	0.29	0.28	0.26	0.26	0.33	0.30	0.26	
A2		1.00	0.53	0.32	0.37	0.41	0.37	0.11	0.13	0.14	0.03	0.07	0.00	0.01	0.36	0.39	0.34	0.37	0.36	0.28	0.31	0.32	0.34	0.33	0.33	0.29	0.29	0.32	
A3			1.00	0.33	0.29	0.31	0.37	0.01	0.00	-0.01	-0.06	-0.01	-0.07	-0.06	0.38	0.39	0.39	0.40	0.40	0.26	0.27	0.36	0.33	0.37	0.34	0.36	0.31	0.33	
A4				1.00	0.71	0.59	0.62	0.02	-0.03	-0.01	-0.04	0.00	-0.10	-0.07	0.35	0.38	0.42	0.40	0.43	0.24	0.33	0.48	0.48	0.50	0.50	0.37	0.39	0.40	
A5					1.00	0.67	0.65	0.03	0.02	0.02	-0.01	-0.01	-0.07	-0.02	0.39	0.43	0.44	0.43	0.27	0.35	0.41	0.51	0.44	0.45	0.45	0.33	0.37	0.39	
A6						1.00	0.70	0.04	0.08	0.01	0.00	0.01	-0.08	-0.06	0.32	0.38	0.37	0.39	0.35	0.17	0.28	0.39	0.43	0.42	0.48	0.31	0.38	0.40	
A7							1.00	0.07	0.12	0.07	0.03	0.06	-0.09	-0.01	0.39	0.41	0.44	0.43	0.22	0.34	0.44	0.48	0.48	0.45	0.35	0.38	0.39		
A8								1.00	0.75	0.72	0.36	0.34	0.37	0.33	-0.10	-0.06	-0.18	-0.12	-0.04	0.02	0.03	0.09	0.04	0.01	0.01	0.18	0.24	0.10	
A9									1.00	0.73	0.36	0.39	0.33	0.34	-0.07	-0.06	-0.16	-0.08	0.02	0.04	0.04	0.05	0.00	-0.04	-0.03	0.15	0.20	0.08	
A10										1.00	0.35	0.34	0.38	0.37	-0.09	-0.08	-0.17	-0.10	0.01	0.04	0.06	0.10	0.05	0.00	-0.02	0.15	0.23	0.12	
A11											1.00	0.72	0.63	0.60	-0.04	-0.11	-0.06	-0.04	-0.02	-0.01	0.05	0.02	0.02	0.05	0.00	-0.04	0.10	0.10	0.08
A12												1.00	0.63	0.66	-0.08	-0.05	-0.12	-0.06	-0.04	0.02	0.05	0.02	0.05	-0.05	0.01	0.12	0.15	0.11	
A13													1.00	0.75	-0.14	-0.11	-0.20	-0.17	-0.13	-0.02	-0.03	-0.01	-0.02	-0.11	-0.02	0.08	0.09	0.07	
A14														1.00	-0.13	-0.13	-0.15	-0.14	-0.09	-0.04	-0.01	-0.06	-0.04	-0.12	-0.03	0.03	0.04	0.03	
A15															1.00	0.73	0.69	0.65	0.48	0.25	0.35	0.33	0.35	0.36	0.38	0.25	0.23	0.29	
A16																1.00	0.66	0.67	0.45	0.27	0.35	0.38	0.43	0.44	0.41	0.32	0.31	0.34	
A17																	1.00	0.68	0.48	0.25	0.36	0.34	0.39	0.38	0.40	0.29	0.25	0.29	
A18																		1.00	0.68	0.45	0.26	0.30	0.40	0.46	0.42	0.41	0.28	0.26	0.28
A19																			1.00	0.46	0.50	0.33	0.38	0.38	0.35	0.35	0.26	0.29	
A20																				1.00	0.69	0.20	0.24	0.17	0.24	0.22	0.19	0.15	
A21																					1.00	0.27	0.32	0.28	0.33	0.24	0.21	0.25	
A22																						1.00	0.62	0.64	0.59	0.33	0.35	0.41	
A23																							1.00	0.65	0.63	0.38	0.38	0.40	
A24																								1.00	1.00	0.70	0.33	0.30	0.37
A25																									1.00	1.00	0.28	0.30	0.36
A26																										1.00	0.79	0.64	
A27																											1.00	0.64	
A28																												1.00	

Note. Online learning ability = A1-A3; Team commitment = A4-A7; Task conflict = A8-A10; Relationship conflict = A11-A14; Trust = A15-A18; Expressiveness interdependence = A19-A21; Outcome interdependence = A22-A25; Task interdependence = A26-A28.