

## How do Members Interact in Small Teams? Results from a Study in a Simulation Game

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### Abstract

This study was conducted to explore the nature of interactions between team members. Member behaviour was observed in small teams with simple goals using *Salad Bowl*, a simulation game. First, an instrument was developed with statements containing expressions such as *objective* and *commitment* to capture the players' experiences. Then, it was translated into the Thai language and tested for meaning and validity. Finally, it was administered to 175 participants at the end of their games, and its data was processed and tested for internal reliability. Two factors of team interactions, goal orientation and emotive actions, were extracted after factor analysis and were named after scrutiny of the statements. A regression analysis showed that goal orientation had almost twice the positive impact on emotive actions, as did emotive actions on goal orientation. Extensions of these findings in future research and in use for other team domains were also discussed.

Keywords: communication, emotive actions, goal orientation, interactions, simulation game, taskwork, teamwork

### Introduction

Individuals work with each other to achieve a goal of common interest and value. Teamwork is the formal organisation and engagement of individuals in interconnected actions to achieve that goal (Salas, Shuffler, Thayer, Bedwell, & Lazzara, 2015). Team interactions are important because they solve problems where an individual cannot, and create value because joint efforts produce more and faster. A game is an interactive and dynamic environment where team members' behaviour could be observed, closely. The simulation game is a source and an opportunity to test and develop theories in contextual knowledge. Lessons learnt from games could also be used to improve the educational game design and other learning environments, and to build policy decisions and social systems (Kriz, 2017).

The objective of this study was to explore the nature of interactions between the team members in a simulation game. The teams would be of small size, and have simple goals and short lives as their characteristics in the game. The study would extract factors of team interactions, and apply statistical techniques to understand the findings in future research and in applications for other team domains.

#### *Team tasks, interactions, and outcomes*

Crawford and Lepine (2013) concluded from their meta-analytical findings that *transition, action, and interpersonal processes* affected *team performance, member satisfaction, cohesion, and teamwork process*. They offered a distinction between *taskwork* (actions and interactions between team members, using tools and techniques) and *teamwork* (alignment, coordination, cohesion, ties and connections between members). The complexity of team interactions could be avoided by enhancing the members' understanding of task work and teamwork, which would lead to a better flow of communication, coordination, and assistance. Studying 27 teams and their 178 members across 16 weeks, Guchaita, Leib, and Tews (2016) found that *shared teamwork knowledge affected team performance and team satisfaction*, whereas shared task work knowledge did not. They defined *shared task work knowledge* as the knowledge of tasks, processes, and team goals, while *shared teamwork knowledge* was the members' understanding of their interactions, roles, communications, and interdependencies. Team effectiveness could be affected by members' *team learning behaviours* such as curiosity, feedback, and perception of and response to errors. Thus, *team learning* was a mediator between *shared teamwork knowledge* and the team effectiveness measures of *team performance* and *team satisfaction*.

Collaboration is the strongest input in team effectiveness because it enhanced the positive effect of *trust* and depressed the negative effect of *task conflict* on team performance. Group trust *facilitated coordination*,

*cooperation, and sharing of information between members, and therefore, was especially vital during periods of high interdependence. Although developing trust and reducing conflict may improve team performance, it would be more prudent and effective to develop collaborative skills in the team (Chiocchio, Forgues, Paradis, & Iordanova, 2011). Interprofessional collaboration between health professionals helped them discharge their social responsibilities towards their patients. It impacted their healthcare environment and enhanced the positive and optimal outcomes of their patients, considerably. Shared decisions and responsibilities, accountability, communication, and education were the key elements of collaboration. From a survey of nearly 2,000 students in different health professional disciplines in three different Universities, Hojat et al. (2015) found that interprofessional collaboration was composed of two factors, viz., working relationships and accountability. Women scored more than men in all the three University samples, with statistically significant differences that showed women were more oriented towards collaboration than men.*

The principal conditions within a team are its *composition, context, and culture*. They affect its principal processes, significantly and are the bases for emergent team states like *cooperation, conflict, coordination, communication, coaching, and cognition* (Salas et al., 2015). Each team has a unique environment in which its members strived to meet its organisational needs, to manage performance and communicate, and to solve its problems. The quality of teamwork, i.e. of members' interactions, affected team performance, significantly and positively, and would be determined by its *communications, coordination, agreed efforts, engagement, and support* between members (Qin, Hsu & Stern, 2015).

Hu and Liden (2015) conceptualized *team effectiveness* in terms of inter-related team elements of *performance, organisation citizenship behaviour, and voluntary turnover*. They found that *prosocial motivation* ('the desire to exert efforts to benefit others') affected the elements of team effectiveness, indirectly and significantly, through *team cooperation, team performance, and team viability*. Prosocial motivation, when supported by *task interdependence*, had a direct effect on *team cooperation and team performance*, and an indirect effect on *organisational citizenship behaviour and voluntary turnover*. Working with others could achieve faster and better results earned due to less time, cost, and effort. In academic settings, learning could be faster and smoother, as Betta (2016) showed in his team-based learning exercise covering 149 students. They learnt to work together and to solve problems from their colleagues. Their interactions increased their engagement with the topic of study and their interdependence with others. Thus, emotions originated and produced a variety of actions.

## Method

### *Participants*

The participants in the study were graduate students, university teachers, and international professionals in simulation and gaming (S&G) of both genders and between the age of 18 and 72 years. They were registered either as guests or speakers at the 8th and 9th international conferences in 2016 and 2017 of The Thai Simulation and Gaming Association (Thai Sim) held in Chonburi and Bangkok, Thailand, respectively. They were aware of S&G, were present at both conference events, and had volunteered to play in the game. They comprised a convenient sample because they were easily accessible to the authors at both conference venues.

### *Instrument*

We developed an instrument that captured the essence of team members' experiences in a simulation game. First, we considered expressions descriptive of interactions between team members, such as *objective, communication, decisions, commitment, excitement, enjoyment, discussions, consent, attachment, cohesion, skill, emotion, analysis, creativity, problem-based learning, role clarity, social loafing, and task design*. Then, a questionnaire of 22 statements was made and verified by experts. Next, we did a pilot study to check for irrelevance and ambiguity of language and pruned the list to 14 statements. A shorter instrument was also deemed necessary to elicit responses from participants at the end of a hectic game. Finally, it was translated into the Thai language by three teachers who translated it back to English to test the veracity of the first translation. This rigorous exercise established the validity of the instrument. This questionnaire was then verified by three experts who attested to its content validity.

### *Game process and data collection*

*Salad Bowl*, the simulation game, had the features and conditions necessary for this study. It would be played by teams who would attend to simple goals within a short period of 20-25 minutes. It was designed, developed, and facilitated by the first two authors at Chonburi and Bangkok. The participants were first organised randomly into

small teams of 5-6 members each, who were then seated separately from other teams in a large auditorium that served as the game room. Each team was given a set of jigsaw puzzle-like pieces, a large flipchart, and a glue stick (Image 1). The first author explained the game process and rules in a PowerPoint presentation in English, and the second author, almost simultaneously, explained its contents to the game players in Thai. Not many instructions were given, leaving it to the players' curiosity and imagination to ascertain the nature of the problem in the game. The players were prohibited from speaking to each other within and across the teams, thus introducing a small element of difficulty in the game.



Image 1. Salad Bowl game in progress

After all teams finished their tasks, they displayed their completed work and their names, with great pride, on their respective flipcharts which were photographed by camerapersons. To recognise the best performances, the three fastest teams who completed their puzzles, fully and correctly, received token prizes. To firmly embed their learning, players described their experiences and perspectives on a variety of team and interactional issues, viz., *analytical skills, creativity, experiential learning, problem-based learning, role clarity, social loafing, system thinking, task design, and uncertainty*. Finally, the study instrument was administered to each participant at the end of the game for data collection.

## Results

Although 175 participants played Salad Bowl, completed instruments were received from only 149 participants in Chonburi ( $N=50, M=4.60, SD=.58$ ) and Bangkok ( $N=99, M=4.38, SD=.78$ ), respectively. The corrected item-total correlation figure for statement #13 was 0.00, and therefore, that statement was not considered for further data process and analysis. The remaining 13 statements were subjected to exploratory factor analysis under principal component analysis with varimax rotation using SPSS 21.0. Two factors were extracted after three iterations of rotations, with each factor having an eigenvalue greater than one (Table 1). The extraction explained 46 percent of the variance, and the statement loadings ranged from .49 to .76.

Table 1: Team interactions: Descriptive statistics and loadings of statements and factors

	M	SD	Goal orientation	Emotive actions
Goal orientation				
8. A team can work better if their members know that they have only one goal.	4.64	.55	.72	
1. Each member worked for the success of his team.	4.69	.53	.68	
12. Our members had positive attitudes toward the ultimate goal.	4.65	.53	.66	
14. We put in a lot of effort to take decisions, quickly.	4.61	.60	.65	
7. I was able to contribute to the overall objective of the team.	4.35	.67	.58	
4. We had no difficulty to understand the goal.	4.22	.72	.56	
2. I discovered the purpose and use of communication in a tea	4.39	.67	.49	
Emotive actions				
5. The presence of competition excited me.	4.44	.74		.76
11. All team members enjoyed the tasks.	4.51	.68		.67
9. Our team members sought views and suggestions from each other.	4.03	1.16		.65
6. Our good decisions came from discussions and common consent.	4.36	.82		.62
3. Working with others is better than working alone.	4.63	.61		.56
10. I felt attached to our team members.	4.42	.68		.54
Eigenvalues		3.23		2.87
Percentage of total variance		24.87		22.05

The study was deemed reliable due to the high value of Cronbach  $\alpha$  of .85. The sampling was deemed adequate for its sample size and correlations between statements as variables because the KMO measure of .87 was generated at a significance of .00 from the factor analysis exercise. After a study of their respective statements, the factors were named *goal orientation* and *emotive actions*, choosing names that summarized the meaning of the statements for each factor, giving due weightage to the statement loadings. For example, the factor, *goal orientation* had ‘A team can work better if their members know that they have only one goal’ as one of its statements, and the factor, *emotive actions* had ‘The presence of competition excited me’ and ‘All team members enjoyed the tasks’ as its statements.

To understand the relationship between the factors, the Pearson product-moment correlation coefficient ( $r$ ) between the two factors was computed, and found to be .62 ( $p < .001$ ). In the regression analysis, the independent variable predicted 38% ( $R^2 = .38$ ,  $F(1,177) = 91.46$ ,  $p < .001$ ) of the variance. Goal orientation significantly predicted emotive actions ( $\beta = .82$ ,  $p < .001$ ), much more than emotive actions did on goal orientation ( $\beta = .47$ ,  $p < .001$ ).

## Discussion

Our exploratory study of team interactions in a simulation game produced two factors, *goal orientation* and *emotive actions*. As the teams were small and were engaged in simple goals, the study avoided the issues of larger teams with difficult tasks or problems. The short life of the game and of the team controlled for the effects of age, gender, and capability of the members in their interactions and perceptions. Therefore, findings can be extended, selectively, to other fields of research and application.

The results corresponded to previous research findings as follows. A closer examination of the statements that comprised the *goal orientation* factor had *goal* (Salas et al., 2015), *objective*, *success* (Crawford & Lepine, 2013; Hu & Liden, 2015), and *decisions* (Hojat et al., 2015), as key descriptors and elements. The *emotive actions* factor had elements such as *engagement* (Qin et al., 2015; Betta, 2016), *enjoyment* and *attachment* (Crawford & Lepine, 2013), and *working with others* (Hojat et al., 2015). *Communication* and *discussions* (Chiocchio et al., 2011; Salas et al., 2015; Qin et al., 2015) were seen in both factors.

The high positive correlation coefficient between the factors showed their strong linkage between tasks and effects, especially in communication and discussions. Our regression analysis revealed a fresh insight of team interactions. The coefficient (.82) for *goal orientation* as independent variable against *emotive actions* as the dependent variable was twice that (0.47) of *emotive actions* as the independent variable on *goal orientation* as the dependent variable. Thus, *goal orientation* would impact *emotive actions* more strongly than *emotive actions* would impact *goal orientation*. Therefore, a highly emotionally charged team environment may be cohesive and cooperative, but may not be goal-oriented, and therefore, fail to achieve its ends. On the contrary, a team committed to its end-objective would generate the emotional energy necessary for team performance and take decisions, effectively. *Goal orientation* appears to have cognitive roots, while *emotive actions* appear to have an affective base.

### Factor: Goal orientation

After an extensive review of 88 empirical studies, De Shon and Gillespie (2005) found that goal orientation was defined in terms of *goals*, *traits*, *quasi-traits*, *mental frameworks*, and *beliefs*. Its dimensions were described in terms such as *mastery*, *learned helplessness*, *performance*, *work avoidance*, *performance-approach*, and *performance-avoid goal orientations*. Faced with such a wide variety of definitions, they doubted the veracity of the assessment of *goal orientation*. In their motivated action theory, they defined goal orientation as ‘a label used to describe the pattern of cognition and action that results from pursuing a mastery-approach, performance-approach, or performance-avoid goal at a particular point in time in a specific achievement situation’.

Innovation is seen to be an aspirational process driven by passion, curiosity, and motivation by research personnel frequently affected by the uncertainty of results, risk of failure, and fall in morale. Alexander and Knippenberg (2014) proposed that researchers could succeed if they accepted their failures to be learning stages, experiments, and opportunities for new approaches. They would need to focus their efforts on smaller goals, such as milestones, which offered better chances of completion. Thus, their confidence and success in innovative work would depend on their *learning goal orientation* and *performance prove orientation*, i.e., dispositions towards learning and ability.

*Team identification* and *team learning orientation* were emergent states that overcame problems caused by conflicting members' interests despite a common goal. Even when members had strong differences between them, the teams performed well due to their strong cohesion implied by *team identification* and *team learning orientation* that united the members in their quest for their common goal (Crawford & Lepine, 2013). Pearsall and Venkataramani (2015) pointed out that such emergent states would develop only after interactions, and surmised that members with strong *goal orientations* in cohesive teams would reach their goals only if they were engaged in communications and planning exercises (Qin et al., 2015; Salas et al., 2015).

Dull, Schleifer, and Mcmillan (2015) studied 521 university students across 16 weeks and found differences in learning approaches and motives. They discovered four motivation goal clusters, viz., *multiple-goal*, *mastery*, *performance*, and *low motivation*. Students' deep interest, persistence, and intrinsic motivation were supported by their search for meaning and stemmed from *deep approach motives* due to their *mastery goal orientation*. Their memorization behaviour came from *surface approach motives* due to *performance goal orientation*. Therefore, goal orientation was not a monolithic, unitary construct; instead, students' goals were motivational patterns or goal combinations based on their learning outcomes, irrespective of age and gender. Students in the *low motivation* cluster performed poorly, even though they were as capable as the others, suggesting that a strong goal orientation was necessary for achieving success. Based on a study of 356 players in an all-day business simulation game, *goal orientation* was found to be the strongest factor in the construct of *team cohesion*, along with the other two factors, *open communication* and *mutual understanding* (Dumblekar & Dhar, 2017). The three factors were so highly and positively correlated that none could be achieved without the presence of the other factors. Thus, *goal orientation* produced *team cohesion* in the presence of exchange of information and opinions (*open communication*) in an emotional state (*mutual understanding*).

#### *Factor: Emotive actions*

Emotions and their recognition were critical to team performance because they conveyed members' intentions and perceptions between themselves, and connected and coordinated their tasks. Members' consistent emotional behaviour may be either akin to a *cultural trait* or may be borrowed and adapted from other members' behaviour, almost akin to a *groupthink phenomenon*. Elfenbein, Polzer, and Ambady (2007) showed that the accuracy of emotion recognition was a valuable team skill that could enhance the quality of *coordination*, *interdependence* and *team performance* (Betta, 2016).

Emotional intelligence (EI) is the recognition and regulation of one's own and others' emotions, while emotional self-efficacy is one's belief in one's EI. From a survey of 1,085 students, Pool and Qualter (2012) developed the Emotional Self-efficacy Scale and extracted factors that covered the use, management, identification, and understanding of own emotions, and the perception of and dealing with others' emotions through facial expressions and body language. As an emotion was an affective reaction by an individual to other persons or events, it could change her mood, and prepare and shape her behaviour for a response. Thus, it had implications for her *decision making*, *creativity*, *motivation*, *leadership*, and *other interactions* (Robbins, Judge, & Vohra, 2012). Intense workplace feelings like anger, happiness, envy, relief, guilt, and gratitude were discrete emotions directed at specific events or things and do not last long. They affect the individual's attitudes, actions, relationships, and behaviour, and others' responses as outcomes (Totterdell & Niven, 2014).

Emotions drive human behaviour and action. From two studies of 1,682 respondents, DeFrance and Hollenstein (2017) determined that individuals employed *distraction*, *rumination*, *reappraisal*, *suppression*, *engagement*, and *arousal control* as strategies to regulate emotion. They also identified and categorized users as *average*, *suppression propensity*, *engagement propensity*, and *multi-strategy* profiles in terms of their strategy usage. Emotional awareness was a potential moderator of emotional behaviour and could influence the nature of emotional regulation and the choice of regulation strategy.

## Conclusion

Our exploratory study showed that small team interactions were made of two strongly and positively correlated factors, viz., goal orientation and emotive actions (similar to Crawford & Lepine's (2013) *taskwork* and *teamwork*, respectively). As the simulation game had little complexity, the two factors may be some of the simplest and minutest factors of team interactions. *Goal orientation* was found to affect *emotive actions* more than *emotive actions* would affect *goal orientation*. The statements in the scale showed that *decisions*, *communication*,

*excitement, enjoyment, and attachment to other members* were dimensions of team interactions. Emotions were an individual's reactions, such as anger and guilt, to her colleagues and her environment, and would direct her creativity, decisions, and performance in her team. The nature of the goal defined the team processes and shaped the tasks and interactions between its members. Therefore, members with goal clarity and orientation would generate the emotional energy and actions to produce useful team interactions.

#### *Implications for further research*

The game had a simple task process; therefore, the teams did not have a hierarchy. To observe and understand the behaviour of members, supervisors, and leaders in attending to and completing difficult tasks, researchers need to add more roles and tasks in the game. They may then discover member traits, task features, and organisational contexts that affect team interactions under such conditions.

Two avenues of research in larger teams using simulation games may be pursued. One may explore members' interactions in team dimensions such as *common philosophy, the scope of practice, conflict resolution, change management, leadership, and team evolution* (Brown, Hutchison, Ryan, Thorpe, & Markle, 2015). Leadership is an important role in teams with diverse member interests leading to conflicts, which may not be present in small teams or in teams with simple goals. Therefore, the other avenue may cover the tensions and paradoxes of leaders and members on interactional issues such as *team boundaries, culture, interdependence, cohesion, and diversity* (Johnson, 2016).

#### *Recommendations for use*

This study showed that small teams with simple goals have members who are emotionally driven to interact and produce cohesive performance and effectiveness. The typical large organisation is composed of discrete and overlapping teams and layers of authority. Therefore, its teams need constant supervision due to complex processes and difficult communications. For effective team interactions leading to faster team results, we recommend that organisations may use small teams with simple goals, tasks and self-regulatory mechanisms.

For effective team interactions, learning and development efforts must focus on *goal orientation* because it affects team interactions (and therefore, team outcomes) much more than *emotive actions* could do. Learning goal orientation (LGO) builds talent and creates skills due to the effect of challenging situations, experiential learning, and other mechanisms (De Geest & Brown, 2011). To shape leadership and other skills, we recommend that LGO development programs should address top managers before their introduction to their employees, with the onus on the learners to identify and assess their goals.

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