

# Exploring the Impact Variables of Team Learning

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**Abstract**—This research focuses on the dilemma of students' group learning in class and tries to find its solution. The factors of team leadership style, group rewards/punishments justice, team heterogeneity are used to explore the impact on team self-efficacy and learning effectiveness. Through advertising management courses, the students' responses of these research variables are examined in the beginning, middle and end term. The results can be applied in the course design for student group learning.

**Index Terms**—team leadership style, group rewards/punishments justice, team self-efficacy, learning effectiveness.

## I. INTRODUCTION

The topic of teamwork is always an important issue no matter in teaching area of student learning or in research the working type of business. Many companies such as Google or Facebook develop the teamwork method to collect multiple suggestions or new vision of problem solving by the discussion or communication from various members of team. This can also provide a suitable environment for innovation.

Besides the working, for the teaching area, teamwork or collaboration learning can provide the students to develop the competitiveness of abilities of cooperation and coordination in social work in the future. In education, students are often divided into groups to enhance their abilities to cooperate and coordinate during work. Some courses such as advertising management divide students into learning groups because of the nature of the learning materials and the link between teamwork and industrial needs. However, problems can occur in student grouping, such as resentment against group work by students who are unable to adapt to their classes, teacher intervention in students' task assignments, and fairness involved in said task assignment. The present studies [1], [2] explored the effect of the forms and factors of team learning on learning effectiveness, from which suggestions were made regarding course design choices involving team learning in order to improve students' learning effectiveness.

Problems concerning student grouping as a teaching approach include the negative effects of teacher interventions on students' self-directed learning ability in a group setting, direct requests to remove specific students

from a group despite feedback from the individuals involved, and students' rejection of their assigned grouping. In the present study, these problems were separately described and their corresponding research variables inferred.

Teachers typically intervene in student teamwork when a conflict of opinion occurs between students and a peaceful resolution is desired. When no student in a group wishes to take the lead, active intervention by teachers is also desirable. Teacher interventions rarely occur in groups with aggressive leaders. Therefore, leadership style plays a crucial role in the outcomes of team learning. This was conceptualized as a variable in the present study.

Students often isolate noncontributing teammates without openly complaining to them, but they may also request that teachers remove said teammates from their groups after they finish their reports. This is caused by disagreement among teammates regarding fairness in their task assignment; those who perceive the task assignment process as unfair may exclude the teammates with the lowest perceived workload to increase their scores. This problem was generalized as group rewards/punishments justice in the present study. When students in a group perceive the scores they earn in correspondence with their task assignment as fair, they are unlikely to consider direct exclusion of their teammates.

Most students that reject grouping have chosen to attend an elective course alone and exhibit low interpersonal skills. Incorporating these students in a team leads to team heterogeneity. By contrast, groups with students that have interacted with each other frequently exhibit lower team heterogeneity.

This study incorporated "leadership style," and "group rewards/punishments justice" as the factors affecting team learning efficacy; "learning effectiveness" was regarded as the dependent variable. The next section describes the theoretical basis for and related studies regarding these variables.

This article is organized as following: first the literature review is present. Four variables of team leadership style, group rewards/punishments justice, team self-efficacy, learning effectiveness are demonstrated as dependent and independent variables to develop the hypothesis proposed. Secondly, the measurements of these four variables are proposed in research method. Measurement procedure and participations are also proposed in this section. Thirdly, the analysis results which include the regression analysis of

testing the casual relationship of hypotheses of these four variables are shown. Finally, the conclusions are made.

## II. LITERATURE REVIEW

### A. Leadership Style vs. Team Self-Efficacy

Leadership is an influential power that enables systematic integration, guidance, encouragement, and influence of team members, thereby strengthening a team to achieve a common goal [1], [2]. Using leadership behavior theory, Creech [3] divided leadership styles into two categories, namely consideration and initiating structures. Leaders that prioritize initiating structures define task details and specify scopes of progress and tasks to subordinates in order to achieve organization goals [4]. This study primarily focused on the problem resulting from team members who are unable to make significant progress and require intervention by aggressive leaders. In other words, the student team lacks leaders strong in initiating. Therefore, the levels of initiating among student teams were measured according to the definition by Creech [3].

Leaders with an initiating leadership style determine work details, work progress, and work assignment during the process of achieving an organizational objective [3], [4]. Team self-efficacy refers to the confidence that team members possess in accomplishing their tasks. According to Consiglio et al. [5] and Richter et al. [6], specific task settings and high specified scopes of progress raise team members' confidence in accomplishing their tasks.

H1: Leadership with a more initiating structure leads to higher team self-efficacy.

### B. Effect of Group Rewards/Punishments Justice on Team Self-Efficacy

Group rewards/punishments justice refers to team members' perceived fairness of final rewards and punishments corresponding to the tasks they were assigned to [7], [8]. When task assignment is unfair, and team members with lower task input receive the same or larger rewards (herein, scores) than those with higher task input, the perceived reward fairness is lowered [7], [8]. When team members perceive their task assignment as fair, their confidence in accomplishing their tasks is improved, thus promoting team self-efficacy.

H2: Higher group rewards/punishments justice leads to higher team self-efficacy.

### C. Effect of Team Self-Efficacy on Learning Effectiveness

Confidence that team members possess in accomplishing their tasks constitutes team self-efficacy, which enhances learning effectiveness [9], [10].

H3: Higher team self-efficacy leads to higher learning effectiveness.

## III. METHOD

### A. Variable Measurement

#### 1) Leadership style

The measurements of leadership style are based on Creech [3] and Renko et al. [1]. The questionnaires are

measured by Likert five scales from "very agreement" to "very disagreement". The reliability of Cronbach's  $\alpha$  is 0.917.

#### 2) Group rewards/punishments justice

The questionnaires of group rewards/punishments justice are based on Martinko et al. [11]. And we use Likert five scales from "very agreement" to "very disagreement" to measure this variable. The reliability of Cronbach's  $\alpha$  is 0.954.

#### 3) Team self-efficacy

The questionnaire design of team self-efficacy is based on Mittal et al. [12] and Consiglio et al. [13]. Likert five scales from "very agreement" to "very disagreement" to be used to measure this variable. The reliability of Cronbach's  $\alpha$  is 0.965.

#### 4) Learning effectiveness

Learning effectiveness was measured according to the course objectives determined in the present study, namely to understand the theories of advertisement, to comprehend the operational modes of advertisements through an analysis of their contents, and to practice advertisement operations.

Regarding the subcategories, course learning effectiveness was measured using the course learning effectiveness scale devised by Huang [14], and assignment outcomes were assessed in scores according to the midterm and end-of-term results for team planning and advertising film production. The reliability of Cronbach's  $\alpha$  is 0.899.

### B. Measurement Procedure

The variables were measured at the start, midterm, and end of the course. The students' understanding of knowledge pertaining to advertisement before the beginning of the course was measured two weeks after the course began to provide a comparison point for determining the learning effectiveness of the course. At the midterm, the first measurement of learning effectiveness (i.e., course learning effectiveness and assignment outcomes) was conducted in regard to leadership styles, perceived reward fairness, and team heterogeneity. At the end of the course, the second measurement of the variables was performed. The data measured at the three points were compared to clarify the effect of team learning on learning effectiveness.

### C. Participants

The participants were junior and senior university students enrolled in advanced elective courses; hence, they had already taken courses in subjects such as marketing management, marketing operations, and basic marketing theories (e.g., 4P strategy and SWOT analysis). Because advertisements belong to the promotion category of the 4P strategy, the relationship between advertisements and the other 3Ps (i.e., price, product, and place) must be clarified.

The course employed in this study was a professional elective course on marketing modules in the Department of Enterprise Management. Therefore, the participants were assumed to have a certain level of interest in marketing and advertisement. Student grouping was applied throughout the course to explore the effect of team learning on learning effectiveness.

#### D. Analysis Method

The regression analysis is used to test the causal relations among leadership style, group rewards/punishments justice, team self-efficacy and learning effectiveness. The analysis model can be demonstrated as

$$f_{tse}(x) = Y_{tse} = \alpha_0 + \beta_1 LS + \beta_2 GRPJ + \varepsilon_{tse} \quad (1)$$

In equation (1),  $Y_{tse}$  is the dependent variables, team self-efficacy.  $LS$  and  $GRPJ$  are respectively the independent variables, leadership style and group rewards/punishments justice.  $\alpha_0$  is the constant value and  $\varepsilon_{tse}$  is the error term. The equation (1) is to describe the relationships among leadership style and group rewards/punishments justice to team self-efficacy. Because this research also discusses the impact of team self-efficacy to learning effectiveness. Thus, we need to use another regression equation to put the learning effectiveness as the dependent variable and team self-efficacy as independent variable.

$$g_{LE}(z) = G_{LE} = \pi_0 + \lambda_1 TSE + \varepsilon_{LE} \quad (2)$$

In equation (2),  $G_{LE}$  is the dependent variables, learning effectiveness.  $TSE$  is the independent variables, team self-efficacy.  $\pi_0$  is the constant value and  $\varepsilon_{LE}$  is the error term. Equation (2) is demonstrated the relationships of team self-efficacy to learning effectiveness.

Then the  $n$  sample size is collect to test the causal relations among leadership style, group rewards/punishments justice, team self-efficacy and learning effectiveness. It can use the matrix form to demonstrate the regression equation. Equation (3) shows the relations of leadership style ( $LS$ ) and Group Rewards/Punishments Justice ( $GRPJ$ ) to team self-efficacy ( $Y_{tse}$ ) from equation (1)

$$\begin{bmatrix} Y_{tse1} \\ Y_{tse2} \\ Y_{tse n} \end{bmatrix} = \begin{bmatrix} 1 & LS_1 & GRPJ_1 \\ 1 & LS_2 & GRPJ_2 \\ 1 & LS_n & GRPJ_n \end{bmatrix} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \end{bmatrix} + \begin{bmatrix} \varepsilon_{tse1} \\ \varepsilon_{tse2} \\ \varepsilon_{tse3} \end{bmatrix} \quad (3)$$

There are also  $n$  sample sizes to test the impact of team self-efficacy ( $TSE$ ) to learning effectiveness ( $G_{LE}$ ). It can also use matrix equation to demonstrate in equation (4).

$$\begin{bmatrix} G_{LE1} \\ G_{LE2} \\ G_{LEn} \end{bmatrix} = \begin{bmatrix} 1 & TSE_1 \\ 1 & TSE_2 \\ 1 & TSE_n \end{bmatrix} \begin{bmatrix} \pi_0 \\ \lambda_1 \end{bmatrix} + \begin{bmatrix} \varepsilon_{LE1} \\ \varepsilon_{LE2} \\ \varepsilon_{LE3} \end{bmatrix} \quad (4)$$

#### IV. THE RESULT OF ANALYSIS

According to the regression analysis, team leadership style ( $\beta=0.228$ ,  $P<.05$ ) is used to predict team self-efficacy, it shows significant in model 1 ( $F=9.562$ ,  $P<.05$ ). Thus, the hypothesis 1 is supported. In model 2, the group rewards/punishments justice ( $\beta=0.864$ ,  $P<.000$ ) is used to predict team self-efficacy, it shows significant in model 2 ( $F=82.433$ ,  $P<.000$ ). Thus, the hypothesis 2 is supported. But if the dependent variables of team leadership style and group rewards/punishments justice are both used to predict team self-efficacy (Model 3), only group rewards/punishments justice significantly ( $\beta=0.804$ ,  $P<.000$ ) influence team self-efficacy. Thus, group rewards/punishments justice is more powerful to predict team self-efficacy.

To use team self-efficacy as a dependent variable to predict learning effectiveness ( $\beta=0.390$ ,  $P<.000$ ), it shows significant in model 1 ( $F=5.011$ ,  $P<.05$ ). Thus, the hypothesis 3 is supported.

TABLE I: THE RESULTS OF REGRESSION ANALYSIS

Independent variable	team self-efficacy			learning effectiveness
dependent variable	Model1	Model2	Model3	
constant	4.277***	18.426*	1.469***	3.276***
Team leadership style	0.228*	--	0.129	--
group rewards/punishments justice	--	0.864***	0.804***	--
team self-efficacy	--	--	--	0.390***
$R^2$	0.255	0.737	0.760	0.152
F value	9.562**	82.433***	42.640***	5.011*
VIF	1.000	1.000	1.279	1.000

\*p-value<0.05, \*\* p-value<0.01, \*\*\* p-value<0.00

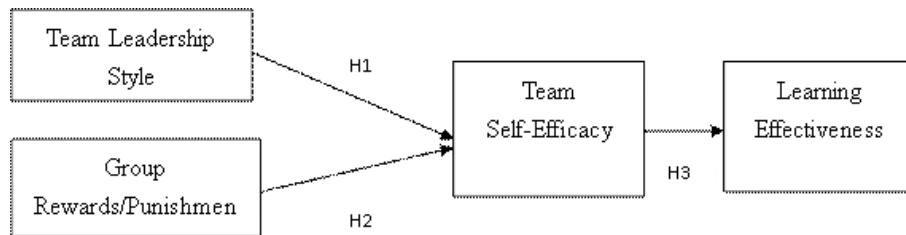


Figure 1. Magnetization as a function of applied field.

## V. CONCLUSION

We conduct the survey to collect the data of students from the end of their team learning process. The results show leadership with a more initiating structure leads to higher team self-efficacy. It means if there is a leader in the learning group to prioritize initiating structures define task details and specify scopes of progress and tasks to subordinates in order to achieve organization goals, then it can achieve the higher team self-efficacy than which there is no specific leader.

It also finds that higher group rewards/punishments justice can lead to higher team self-efficacy. Thus, if team members perceive their task assignment as fair, then their confidence in accomplishing their tasks is improved, thus promoting team self-efficacy. For application in teaching approach, the teacher can keep the balance of group rewards/punishments justice to increase team self-efficacy. Therefore, some rule or teach skill can be created to help achieving fair group rewards/punishments.

In this research, it finds if we both use "group rewards/punishments justice" and "team leadership style" to forecast the influence of team self-efficacy, it shows only "group rewards/punishments justice" can cause different level of team self-efficacy. Thus, the fair of group rewards/punishments is more important than team leadership style when predicting team self-efficacy.

Finally, higher team self-efficacy can lead to higher learning effectiveness. This result approves that using teamwork as a teaching approach can help student learning. The more self-efficacy of the team can achieve higher learning effectiveness.

In the future, other teamwork style can be used to find different type of leadership cause different influence of team self-efficacy. And other independent variables can be tried to find different results of students' learning effectiveness.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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