

## Perfection of Learning Environments Among High, Average and Low Academic Achieving Students

DOI: 10.15804/tner.2020.61.3.06

### Abstract

Academic achievement varies according to the perception of learning environments (LE). The current study aimed to investigate how the perception of LE differs according to level of academic achievement. 1,106 Thai undergraduate students replied to a survey. Analyzing the data with One-way analysis of variance differences were found in perception of the LE in terms of task orientation and instructor feedback. Average-achieving students perceived task orientation higher than high and low-achieving students. High-achieving students perceived instructor feedback the most. This study provides insights into each type of LE applied in the classroom and suggests how individual academic achievers can be suitably enhanced.

**Key words:** *academic achieving students, autonomy support, cooperation, investigation, learning environment, task orientation.*

### Introduction

A classroom learning environment (CLE) significantly influences student learning outcomes. Recently, many researchers have been focused on this topic both in Western countries and Asia. Yang (2015) examined junior high school students in China and found that where the CLE includes investigation, teacher support can foster students' achievement in Mathematics. Rita and Martin-Dunlop's (2011)

finding also demonstrated that the CLEs (i.e., teacher support, investigation) were linked with US students' academic achievement. CLEs also boost motivation, course satisfaction (Ji et al., 2017; Radovan & Makovec, 2015), attitudes and self-esteem (Chionh & Fraser, 2009). A CLE refers to generating interaction between instructors and students, and amongst students in a particular classroom. It can also be referred to in other terms: the condition, situation, environment and psycho-social environment of the classroom (Malik & Rizvi, 2018).

Differences in students' perception of CLEs have been found for students with different levels of academic achievement (Ahmed et al., 2018; Malik & Rizvi, 2018). Cosmovici et al. (2009), investigating middle school students, claimed that students who attained highest and lowest grade levels were likely to perceive CLEs less favourably, compared with middle-grade level students. By contrast, Ahmed et al. (2018) found that higher-achieving students had a more favourable perception of CLEs than lower-achieving students. As evidence is conflicting, the purpose of this study is to compare the perception of CLEs by students of differing levels of academic achievement. The specific research questions were as follow:

- Which aspect of the learning environments do students perceive most highly?
- Does the perception of learning environments differ for low, middle and high achieving students?

## **Conceptual framework**

The current study concentrates on five aspects of CLEs, including task orientation, support of autonomy, cooperation, investigation, and instructor feedback. These five aspects have been recognized as important CLEs for enhancing students' learning in higher education (Lu et al., 2014).

### **Task orientation**

A task-oriented environment has been found to be strongly associated with achievement outcomes (Chionh & Fraser, 2009). Students were found to have increased their attention span and patience with distractions in order to succeed in their academic tasks, and learn new skills (Mullola, Hintsanen, & Keltikangas-Järvinen, 2015). Task orientation also increases students' motivation and self-regulation in science learning (Velayutham & Aldridge, 2013). Students were found to understand and recognize the significance of setting goals (e.g., planned activities, amount of work done) in achieving the goals. In post-secondary

education, individual differences were found in the relationship between task orientation and academic outcomes. Task orientation affected students' grade point average (GPA) positively in the case of students who had higher intelligence, but did not affect students with lower intelligence (Oliver, Guerin, & Gottfried, 2007). Task orientation refers to the persistence in an activity to succeed, no matter what obstacles they are faced with (Oliver et al., 2007).

### **Autonomy support**

Autonomy support in classrooms is defined as providing students with the opportunities to make choices in tasks or activities, and offering them the freedom to ask questions and share their ideas (Greene et al., 2004). Supporting autonomy is related to motivation beliefs; this environment offers students the chance to use decision-making skills, and enhances self-concept, self-regulation in terms of controlling their behavior, and responsibility (Wang & Holcombe, 2010). Students' autonomy has been found to differ according to their levels of academic achievement (Wang, 2012). Autonomy support has been found to impact students' sense of task value, expectancy, and academic self-concept in high achieving students, but not for those who are of a lower academic level (Wang, 2012). Higher achieving students needed less steering from instructors and used decision-making skills. Lower achievers were felt to need more structured guidance from instructors. Some evidence identified that autonomy did not affect students' academic achievement (Malik & Rizvi, 2018).

### **Cooperation**

A major goal of learning in universities around the world is the ability to work in teams (Lee, Kim, & Byun, 2017). Cooperative learning has become a popular CLE and highly influences students' learning in higher education. Students who engaged in a group to achieve goals were likely to get higher test scores (Tsay & Brady, 2010). Using cooperative learning with post-secondary students can foster students' academic performance (Hsiung, 2012) and knowledge retention (Tran, 2014). Moreover, spending a large part of their learning time in a cooperative environment can improve student homework and performance on unit tests (Hsiung, 2012). Research in secondary schools demonstrated that structured cooperative learning increased the academic achievement of all types of students (i.e., low-, average-, and high-achieving students; Yaduvanshi & Singh, 2019). The students were likely to acquire knowledge, and understanding, and be able to apply it in some cognitive domains. In some evidence, however, there was little difference in the perceived value of group work between lower and higher achieving students (Healy, Doran, & McCutcheon, 2018). Students with higher academic ability were

more likely to use leadership skills in cooperative learning, compared with students with other ability levels (Healy et al., 2018).

### **Investigation**

Investigation is defined as “skills and processes of inquiry and their use in problem-solving and investigations are emphasized,” (Velayutham & Aldridge, 2013, p. 513). Students who participated in an environment using investigation were able to control their effort and motivation in learning (Velayutham & Aldridge, 2013), and it also boosted their academic achievement (Yang, 2015). Students also retained more content knowledge from using their ideas and inquiries in solving problems (Velayutham & Aldridge, 2013). However, a study in Pakistani context found that investigation negatively affected academic achievement (Malik & Rizvi, 2018). Students did not receive good results in this environment.

### **Instructor feedback**

Generally, instructors providing feedback are considered to be a benefit for students’ learning (Mulliner & Tucker, 2015). Feedback enables students to understand more about their misunderstandings (Lane et al., 2018) and poor skills (Gang, 2018), and to navigate their next steps of learning (Brown, Peterson, & Yao, 2016). Feedback has also been found to promote students’ GPA, academic self-efficacy, and self-regulation (Brown et al., 2016). However, perception of the quality of feedback depended on students’ level of achievement. Higher achieving students perceived teacher feedback more highly than lower-achieving students (Sichinga et al., 2014). Pitt, Bearman, and Esterhazy (2020), however, pointed out that students with lower grades may gain more benefit from feedback.

## **Methodology of Research**

### **Participants**

The participants included 1,106 undergraduate students in six universities in Thailand. They were selected through the method of convenience sampling. The students studied in various year levels and majors. To compare students’ academic achievement, they were divided into three groups: high-average- and low-achieving students on the basis of their GPA. High-achieving students had GPAs above 3.49 points. Average-achieving students had GPAs between 2.50 and 3.49. For the last group, low-achieving students had GPAs below 2.50. Table 1 shows descriptive statistics for gender and academic achievement.

**Table 1.** Descriptive statistics for gender and academic achievement levels

	High-achieving students (n)	Average-achieving students (n)	Low-achieving students (n)	Total (N)
Male	46	239	120	405
Female	145	483	73	701
Total	191	722	193	1,106

### Instrument and Procedures

We adapted the survey from the What Is Happening In This Class? questionnaire (Aldridge, Fraser, & Huang, 1999) in terms of task orientation (6 items), cooperation (7 items) and investigation (7 items). Alpha reliability coefficients were 0.77, 0.87 and 0.84, respectively. The items on autonomy support were adapted from the Survey of classroom goals structures (Blackburn, 1998). Four items relate to providing independence to students to ask questions, share their opinions, and choose assignments ( $\alpha = .73$ ). Instructor feedback was represented in three items ( $\alpha = .72$ ), taken from Xu (2011). All of the constructs used a five-point Likert scale, with values as follows: 5 = always, 4 = often, 3 = sometimes, 2 = seldom, and 1 = never. The instrument reliability was calculated using Exploratory factor analysis and Cronbach's alpha, the results of which were acceptable. The back translate method was utilized in the study to write the items in the Thai version.

The researcher was given permission to do this research and collect data from the universities by university ethical committees. The data were gathered by face-to-face survey. Students were informed that they would be anonymous in the survey and that they could refuse to provide answers without it having any effect on their studies. The respondents replied to the questions on their own with paper and pencil. They spent fifteen to thirty minutes to complete the copies of the survey.

### Data Analysis

The data were checked for missing values, outliers, normality and homogeneity of variance as a first step. One-way analysis of variance (ANOVA) was used to compare survey results with students' academic achievement. A post-Hoc Tukey test was used to compare academic achievement differences between groups.

## Results of Research

Descriptive data showed that cooperative learning in the CLEs was perceived by students most highly ( $\bar{X} = 4.141, SD = .557$ ). Autonomy support, by contrast, was perceived lowest ( $\bar{X} = 3.888, SD = .590$ ). The perception values for all the constructs were above 3.5. Table 2 shows means and standard deviations of the constructs in the scale, divided by different levels of academic achievement groups.

**Table 2.** Descriptive statistics for the constructs divided by academic achievement groups

Construct	High-achieving students		Average-achieving students		Low-achieving students		Total	
	M	SD	M	SD	M	SD	M	SD
Task orientation	4.041	.482	4.082	.481	3.870	.540	4.038	.498
Autonomy support	3.856	.608	3.901	.595	3.872	.550	3.888	.590
Cooperation	4.132	.532	4.160	.557	4.081	.579	4.141	.557
Investigation	3.728	.565	3.757	.555	3.671	.520	3.737	.551
Instructor feedback	4.154	.606	4.027	.638	3.895	.643	4.026	.637

The ANOVA indicated that there was a significant difference between the groups on task orientation ( $F(2, 1, 104) = 14.223, p = .000$ ) and instructor feedback ( $F(2, 1, 103) = 8.024, p = .000$ ). On the other hand, no significant differences were identified for autonomy support, cooperation and investigation. Table 3 shows the relation between each aspect of the CLEs and students’ academic achievement levels.

Post hoc comparison using the Tukey test revealed that high- ( $p = .002$ ) and average- ( $p = .000$ ) achieving students perceived task orientation more highly than low-achieving students. For instructor feedback, high-achieving students significantly differed from average- ( $p = .038$ ) and low-achieving students ( $p = .000$ ). There was also a significant difference between average- and low-achieving students ( $p = .027$ ).

**Table 3.** Differences in learning environments based on academic achievement levels

Construct	Variance	SS	df	MS	F-ratio
Task orientation	Between Groups	6.879	2	3.439	14.223***
	Within Groups	266.972	1,104	.242	
	Total	273.851	1,106		

Construct	Variance	SS	df	MS	F-ratio
Autonomy support	Between Groups	.364	2	.182	.523
	Within Groups	383.996	1,104	.348	
	Total	384.360	1,106		
Cooperation	Between Groups	.959	2	.479	1.548
	Within Groups	341.937	1,104	.310	
	Total	342.895	1,106		
Investigation	Between Groups	1.131	2	.565	1.864
	Within Groups	334.733	1,104	.303	
	Total	335.864	1,106		
Instructor feed-back	Between Groups	6.440	2	3.220	8.024***
	Within Groups	442.595	1,103	.401	
	Total	449.035	1,105		

\*\*\* .001

## **Discussion**

Prior studies have shown inconsistent results for the perception of CLEs by high-, average-, and low-achieving students. The aim of the present study was to investigate how perceptions of CLEs differ by students of different levels of academic achievement. The CLEs included task orientation, autonomy support, cooperation, investigation, and instructor feedback. The data were collected from undergraduate students in Thailand and analyzed through ANOVA.

In response to the first research question it was found that students perceived cooperative learning most highly, compared with other aspects of learning environments. Zakaria et al. (2013) explained that students preferred cooperative learning because it offered students the opportunity to discuss and share their ideas and to ask their friends questions without anxiousness. Moreover, students also enjoyed working in groups. However, Herrmann (2013) argued that some students were frustrated with cooperative learning because instructors spent less time teaching and they had to deal with peer interaction, which led to greater misconceptions.

For the second research question, results of the ANOVA revealed a distinction in perception of CLEs according to level of academic achievement. There were differences in terms of task orientation and instructor feedback among different academic achievers. This result was not in accordance with findings in Malik &

Rizvi's (2018) study in secondary school. They found that there were no differences of perception on learning environment aspects by levels of academic achievement.

When we consider differences in perception of task-orientation, Oliver et al.'s (2007) study identified that task orientation impacted only on the GPA of students of higher intelligence while our study found that average-achieving students perceived task-orientation significantly higher than high and low-achieving students. Ji et al. (2017) suggested that task orientation led students to recognize the significance and benefits of assigned activities and that it was also involved with students' setting goals so as to succeed in specific tasks or activities (Ji et al., 2017). DiFrancesca, Nietfeld, and Cao (2016), however, claimed that the number of high- and low- achieving students who set goals for learning outcomes did not differ, which may help to explain our results. The average academic achievers may perceive the importance of assigned activities the highest because they want to have a high level of academic achievement. Cosmovici et al. (2009) identified that students who attained highest and lowest grade levels were less likely to perceive learning environments, compared with those of average-grade students.

Pertaining to the instructor feedback, high-achieving students perceived it most highly. This result is in line with a study in the secondary school (Malik & Rizvi, 2018). Their findings revealed that high achievers had higher scores for perceived teacher support than achievers of other levels. Since teacher support is a crucial factor in learning environments that support the enjoyment of education and intrinsic goal-orientation (Radovan & Makovec, 2015), an effect for instructor feedback was found in this study.

## **Conclusions, implications, and limitations**

This study provides insights into types of CLE that are perceived to enhance particular individual academic achievement. Instructors should consider and offer a suitable environment for students. In light of these results, task orientation and instructor feedback seem to be an essential environment in the classroom. Instructors should consider motivating students to set goals to accomplish the course outcome and tasks. Specifically, instructors should clearly explain the usefulness of setting learning goals to lower-achieving students and guide them to succeed in their intentions (Ji et al., 2017). In the same way, providing feedback can help students to understand the content and mistakes more. Instructors may consider suitable types of feedback to apply to individual students and instructors should be

sure that the feedback provided is beneficial and helps students grow or improve in their learning.

Even though the study used a large sample size, there are some limitations which should be taken into account in future investigations. First, the study relied on self-reports, which is a subjective measure. Therefore, to gain a deeper knowledge, future research should include other methods of data collection such as experiments, interviews, or observations. The second limitation concerns the sample which included students of different academic majors and years as an overall view of higher education. Future studies may specify a specific academic major (e.g., Mathematics, Business Studies, Engineering) or year group. The third limitation was asking for perspectives of CLE from the students only. To understand more about these issues, the next study should ask for perspectives of both students and instructors. Lastly, other learning environments may be affected by variation in academic achievement, such as innovation in teaching, and competition among students.

### Acknowledgements

Our thanks to the Petchra Pra Jom klao Ph.D. Research scholarship, King Mongkut's University of Technology Thonburi, Thailand for funding this research.

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