

Motivational Goal Orientation and Self-Efficacy Beliefs of Computer Science Undergraduate Students in Thailand

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Abstract: - The learners' self efficacy and motivational goal orientation have been proved to be a predictor of students' behavior. This survey study explored the relationship among students' motivational goal orientation and self-efficacy beliefs. Data was collected from 193 computer science undergraduate students in Thailand. The results of Pearson Correlation analysis showed that there was a negative relationship between students' adoption of mastery approach orientation and students' beliefs that self-efficacy is born and unchanging, on the other hands students who adopted performance avoidance and performance approach orientation have a positive relationship. The results also showed that students who adopted mastery approach believed that self-efficacy is collaborative and can be developed. This study seems to be helpful to teachers who have an important role in shaping students' self-efficacy in computer science.

Key-Words: - Motivational goal orientation, Self-efficacy, Self-efficacy beliefs, Undergraduate student, Computer science, Thailand

1 Introduction

Computer science, a software development in practical [1], is a vital major for improving countries and quality of peoples' life. Computer and technology has a strongly effect on education, both teaching and learning. In Thailand, both public and private universities offer computer science education in bachelor and master degrees and doctorates. The Thai undergraduate computer science students have to study for four years. Even though students' interest in computer science is continuously increasing, the recently research conducted by Papastergiou [2] about the high school students' perception in computer science has found that there are gender differences in computer science education. Students perceived that computer science is the masculine subjects. He has also indicated that girls identify computer science with its traditional subjects (hardware, algorithms and programming) more than boys do. Conversely, boys view computer science as more human- and application-oriented than girls do. In fact the labor market demand for computer scientist will not abate. As the U.S. News & World Report in May 2010 [3] which examined the Labor Department's job growth projections for 2008-2018, they reported that computer software engineering and computer system analyst are the best jobs which earn the high incomes.

There are many factors that influence students' academic achievements. This study addresses undergraduate computer science students' self- efficacy

and motivational goal orientations. According to Bandura's social cognitive theory [4-5], self-efficacy is defined as the person's beliefs or expectations about his/her capabilities to learn or perform action at designated levels. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes [6]. In academic domain, students would have efficacy judgments of their capabilities, skills, and knowledge to master school-related tasks, but also have outcome expectations about what grades they might receive on the tasks. Self-efficacy and expectation outcomes are related. Students with high in both are confident and assured in their performance, show high levels of effort, persist, and have high cognitive engagement in academic tasks. Students high in efficacy but low in outcome expectations are likely to study hard and be engaged but also many protest and lobby for changes in the grading system. They may leave the environment by dropping out, not because of low self-efficacy but rather because they perceive no contingency between their learning and the outcomes. Students low in self-efficacy and outcome expectations may show resignation and apathy and unwillingness or inability to exert much effort. Students who have low efficacy but high outcome expectations believe that they cannot do the task but are aware. They tend to evaluate themselves negatively and blame

themselves for failure [7, Ch.4, pp.140-141]. Self-efficacy has been found to be a strong predictor of students' achievement.

The goal orientation, mastery approach, performance approach and performance avoidance goal orientations related to students' performance in specified courses [8]. Goal orientation may be thought of as students' reasons for engaging in academic tasks [9]. Mastery goals orient the student toward learning and understanding, developing new skills and a focus on self-improvement using self-referenced standards. In contrast, performance goal represents a concern with demonstrating ability, obtaining recognition of high ability, protecting self-worth and a focus on comparative standards relative to other students and attempting to be best or surpass others. The performance avoidance goal orientation represents a concern with avoiding looking stupid [8]. Previous research has also found that students may hold multiple goals at the same time [10 -11]. Students who hold the multiple goals (high mastery and high performance approach) did not perform significantly better than students with only high mastery or high performance approach goals. The research has also found that students who adopted the single goal orientation which is high mastery demonstrated higher levels of academic achievement than students with a performance approach single goal orientation [10]. Prior research [12] has studied the relationship between students' self-efficacy and goal orientation and found that self-efficacy was related to students' adoption of mastery goals.

Based on the previous theoretical and empirical literature on students' motivational goal orientation and self-efficacy, our investigation was designed to answer the question: what is the relationship between students' motivational goal orientation and self-efficacy beliefs of computer science undergraduate students?

2 Method

2.1 Participants

Participants were 201 undergraduate students enrolled in the computer science department, faculty of science at a private university in Thailand. The sample was 93 freshmen, 51 sophomores, 28 juniors and 29 seniors. Of the sample, 69.9% were male and 30.1% were female.

2.2 Instruments

Participants completed a survey questionnaire developed to assess the aspects of student motivation and self-efficacy. The first part of the questionnaire was about students' demography. The second part contained 18 items with motivational goal orientations, each six

items was about adoption of mastery approach, performance approach and performance avoidance goal orientations. The last part contained 20 items measuring students' self-efficacy which was adapted from Tait-McCutcheon [13]. This part included three types of students' self-efficacy, computer science self-efficacy is born and unchanging, computer science self-efficacy is collaborative and computer science self-efficacy can be developed. The second and third section of the instrument used a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

2.3 Analysis

As our purpose was to explore the relationship between students' motivational goal orientation and self-efficacy beliefs of computer science undergraduate students, we used Pearson's correlation for test any possible relationship between two factors as mentioned. We accepted the correlation which was significant at 0.01 level (2-tailed). We grouped the items in the motivational goal orientation part into three groups, which were 1) performance avoidance orientation, 2) mastery approach orientation and 3) performance approach orientation. We also grouped the items in the students' self-efficacy part into three groups, which are 1) computer self-efficacy is born and unchanging, 2) computer self-efficacy is collaborative and 3) computer self-efficacy can be developed. The questionnaires were analyzed using the Statistical Package for Social Science (SPSS 17.0). Cronbach's alpha, the most common measure of scale reliability, was calculated separately for each part of a questionnaire.

3 Results

To answer the research question we calculated the correlations among all variables which are shown in Table 1. Alpha value for the instrumental goal orientation and self-efficacy beliefs were .871 and .827, respectively. Result indicated that students' perceptions that computer self-efficacy is born and unchanging was positively related to students' adoption of performance avoidance orientation ($r = .530, p < .01$) and students' adoption of performance approach orientation ($r = .292, p < .01$) but negatively related to students' adoption of mastery approach orientation ($r = -.331, p < .01$). The result also indicated that students' perceptions that computer self-efficacy is collaborative was positively related to students' adoption of mastery approach orientation ($r = .322, p < .01$) and students' adoption of performance approach orientation ($r = .197, p < .01$). The students' perceptions the computer self-efficacy can be developed was related to the students' adoption

of mastery approach orientation ($r = .245, p < .01$). There was no significant association between computer self-efficacy is collaborative and performance avoidance orientation, computer self-efficacy can be

developed and performance avoidance orientation, and computer self-efficacy can be developed and performance approach orientation.

Table 1
Relationship between motivational goal orientation and students' self-efficacy

		Performance avoidance orientation	Mastery approach orientation	Performance approach orientation
Performance avoidance orientation	Pearson Correlation	1	.000	.000
	Sig. (2-tailed)		1.000	1.000
	N	194	194	194
Mastery approach orientation	Pearson Correlation	.000	1	.000
	Sig. (2-tailed)	1.000		1.000
	N	194	194	194
Performance approach orientation	Pearson Correlation	.000	.000	1
	Sig. (2-tailed)	1.000	1.000	
	N	194	194	194
Computer self-effiacy is born and unchanging	Pearson Correlation	.530**	-.331**	.292**
	Sig. (2-tailed)	.000	.000	.000
	N	190	190	190
Computer self-efficacy is collaborative	Pearson Correlation	.036	.322**	.197**
	Sig. (2-tailed)	.621	.000	.006
	N	190	190	190
Computer self-efficacy can be developed	Pearson Correlation	.073	.245**	.126
	Sig. (2-tailed)	.317	.001	.083
	N	190	190	190

** . Correlation is significant at the 0.01 level (2-tailed).

4 Discussion

The motivational goal orientation and self-efficacy are the important factors for students to engage in academic task. As Hsieh [12, pp.468] noted that when students are faced with academic demands, the way they approach academic tasks and view themselves can play a significant role in their academic success. In our study, computer science students who adopted mastery approach orientation believe that one's capability to

perform academic task is not born, the ability to learn can be developed. According to the previous study students who adopted mastery goal orientation tended to have high self-efficacy in academic task. Students, with high self-efficacy, tend to participate more readily, work harder, pursue challenging goals, spend much effort toward fulfilling identified goals, and persist longer in the face of difficulty [14, pp. 457]. Consistent with previous research, researchers have concluded that

mastery goals are associated with positive patterns of learning, achievement, and self-efficacy [12, pp.458]. Our findings also report that the higher levels of performance avoidance and performance approach adoption are, the higher levels of beliefs that one's ability is born and unchanging. Especially students who adopted performance avoidance have higher belief that one's ability cannot be changed than performance approach students. Consistent with prior research, students low in self-efficacy, one's ability cannot be changed, are more likely to adopt performance avoidance and performance approach goal. On the other hands, students high in self-efficacy, one's ability can be developed, are more likely to adopt mastery approach orientation [15]. Therefore, students not only need to have the ability and acquire the skills to perform successfully on academic tasks, they also need to develop a strong belief that they are capable of completing tasks successfully [12, pp.457]. This study seems to be helpful to teachers who have an important role in shaping students' self-efficacy in computer science. However, future studies should include other variables, such as GPA, gender to control for the possible effects of prior achievement.

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