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The Relationship between Study Anxiety and Academic Performance among Engineering Students

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Abstract

Anxiety is one of the major predictors of academic performance. Students with anxiety disorder display a passive attitude in their studies such as lack of interest in learning, poor performance in exams, and on assignments. This research observes the relationship between study anxiety level and students' academic performance. The test to find out a significant correlation of anxiety and academic performance was carried out among engineering students. A total 205 males and females student participated in this test. They were second year students from four engineering faculties at Universiti Malaysia Pahang (UMP). The study anxiety level was measured using State Trait Anxiety Inventory (STAI). Meanwhile, students' academic performance was measured using Grade Point Average (GPA). The results showed that there was a significant correlation of high level anxiety and low academic performance among engineering students, with significant correlation ($p=0.000$) and the correlation coefficient is small with $r=-.264$. Large of sample size required to strengthen the coefficient correlation was suggested for further research.

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Keywords: Study anxiety; Academic performance; Student

1. Introduction

Anxiety is a subjective feeling of tension, apprehension, nervousness, and worry associated with arousal of the nervous system (Spielberger, 1983). The high level of anxiety causes a persons normal life being difficult such as interfered activities and social life. Anxiety is one of the wide varieties of emotional and behaviour disorders (Rachel and Chidsey, 2005). Students with anxiety disorder exhibit a passive attitude in their studies such as lack of interest in learning, poor performance in exams, and do poorly on assignments. The anxiety's psychological symptoms among students include feeling nervous before a tutorial class, panicking, going blank during a test, feeling helpless while doing assignments, or lack interest in a difficult subject whereas the physiological symptoms include sweaty palms, cold, nervousness, panic, fast pace of breathing, racing heartbeat, or an upset stomach (Ruffins, 2007). The prevalence of anxiety among university students has been acknowledgement by students and educators. However, study anxiety is a real phenomena, the importance of study anxiety is particularly related to the sources of anxiety and how to handle them.

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Anxiety while studying is a major predictor of academic performance (McCraty, 2007 and McCraty, *et al.*, 2000) and various studies have demonstrated that it has a detrimental effect. Little is known that there exist a possible association between high level of anxiety and low academic performance among students. Researchers revealed that high levels of anxiety influence on the decrease of working memory, distraction, and reasoning in students (Aronen *et al.*, 2005). Tobias in Ibrahim (1996) has been recognised that anxiety plays significant role in student's learning and academic performance, moreover anxiety has been known to have both facilitating and debilitating effects on academic achievement. Researchers have been looking at the correlation of anxiety and the effect of academic performance among school students, they found that among high school students with higher level of anxiety have lower academic performance (McCraty, 2007) and greater anxiety would be associated with poorer academic achievement (Luigi *et al.*, 2007).

Students with high level of anxiety have a reduced memory span, lose concentration, and lack confidence, and poor reasoning power. The element can be described as anger and regret in engineering students when feel anxiety in difficult situations related with their study. Generally, high level of anxiety was more closely associated with lower performance among low ability students (Sena *et al.*, 2007). However, this research considers identifying the correlation of study anxiety and academic performance in the university level. The rest of this paper is organized as follows. Section 2 describes definition of anxiety, and study anxiety upon academic performance. Section 3 describes the research method. Section 4 describes the result and discussion. The conclusion of this work is described in section 5.

2. Anxiety

Definition of anxiety was presented to describe of anxiety relate with students' experience during study, namely study anxiety, and study anxiety effect on academic performance display theories consider with relationship of anxiety and performance. These were explained below

2.1. Definition of Anxiety

Anxiety is one of the psychophysiology difficulties (Callahan, 2001). The symptoms can be psychological physical or environmental challenges. There are various forms of anxiety which includes excessive worrying, a sense of fear, restlessness, overly emotional responses, and negative thinking. Some people when anxious they appear to be clam, but the brain never stops thinking. This will get so bad as well as interrupt the quality of life. Experts have many definitions to describe anxiety. Breuer (1999) mentioned that all anxiety disorders are defined by the dual characteristics of excessive emotional fear and physiologic hyper arousals. Sarason in Harris *et al.* (2003) defined that anxiety is a basic human emotion consisting of apprehension and uncertainty that typically appears when an individual perceives an occurrence as being a threat to the ego or self-esteem. In its conceptualization, individuals with high levels of anxiety generally hold heightened levels of trait anxiety, but in evaluative situations, the state of anxiety also elevates. Definition of anxiety by Spielberger's (1995) is emotional state consisting of feeling, tension, apprehension, and its effects on the nervous system. These are differentiated in state and trait anxiety. State anxiety is transitory emotional state reflective of one's interpretation of a particular stressful situation at a particular period of time or at that moment feeling. However trait anxiety is the enduring personality characteristic which refers to relatively stable individual differences that characterizes people's anxiety or general feeling of anxiety (Spielberger, 1983). Spielberger's theory of anxiety has led to understanding the concept of anxiety. A person who has a certain level of anxiety has been found to be a facilitative tool for an individual to perform ineffectively. The combination of feeling anxiety can lead to interference with performance through mind blocking, attention resources, more cognitive interference, worries and fears induced by anxiety.

According to the previous study about anxiety among students, the study anxiety is a specific-situation that refers to anxiety conditions that are experienced during study process and could be disturbance of academic performance. Study anxiety has two dimensions include physiological arousal and cognitive anxiety.

2.2. Study Anxiety upon Academic Performance

The anxiety perspective and academic performance is adopted from Catastrophe theory which explains about the relationship of anxiety and performance in terms of sport performance. It is important to understand the theory and the influence of anxiety upon performance. Martin in Robb (2005) proposed that cognitive anxiety would have negative correlation with performance and physiological anxiety have curvilinear relationship with performance. The cognitive anxiety is the component that most strongly affects performance (Ingugiro, 1999; Robb, 2005). According to Fazey and Hardy (1988) cites cognitive anxiety has a positive relationship with performance when physiological arousal is low. Researcher demonstrated that students with higher level of anxiety tend to obtain lower marks in their end-of-semester examination (Hamzah, 2007). Researcher has been conducted to see the correlation of anxiety and the influence of academic achievement, student with high anxiety levels would have lower academic achievement among high school students (McCraty, 2007). Others expressed the opinion that the high level of anxiety will be associated with low academic performance (Luigi et al., 2007, and Sena et al., 2007). Similarity result find, a fair number of previous studies have found a significant relationship between academic achievement and anxiety (Diaz et al. in El-Anzi, 2005), a positive relationship between high degrees of academic achievement and low anxiety (El-Anzi, 2005). Figure 1 displays theoretical model of study anxiety upon academic performance as follows

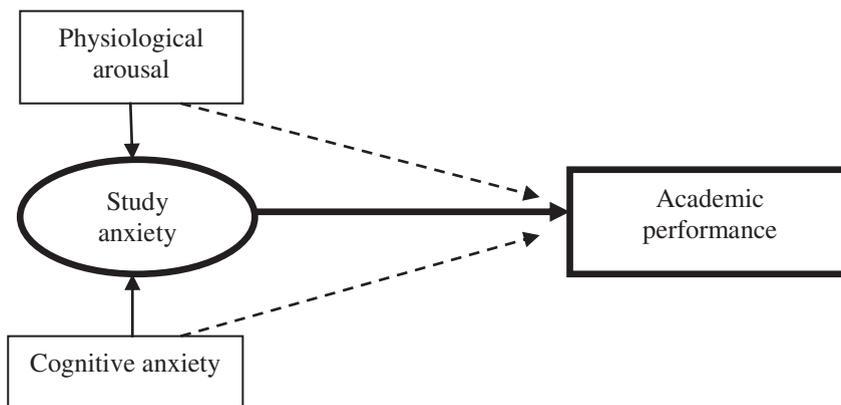


Figure 1: Theoretical model of study anxiety upon academic performance

University students have a responsibility to maintain their optimal academic performance. Anxiety among students are created by insensible teaching or an over demanding syllabus. This then pushes students towards the surface approach as a coping strategy, stress and anxiety due to personal or family related problems also leads to a feeling of anxiety (Mayya *et al.*, 2004). It is common for students to perform poorly when they experience pressure with their tasks and when they experience high level of anxiety during their studies. There are many sources of created anxiety during study, according to Guerrero (1990) anxiety sources can be interpreted on difference age level, social class, high activity, greater familiarity, gender, and culture ecosystem. Under certain circumstances, actually anxiety can help us to evaluate and mobilize resources in order to improve performance in some tasks. Therefore, study anxiety should be taken seriously. This relationship also could possibly lead to reaction of anxiety that interferes with students' performance through blocks of memory, concentration, attention resources, or cognitive interference from the worries and fears induced by anxiety during their study.

The anxiety is measured by state and trait (STAI) instrument, which means that high scores of state and trait determines high level in cognitive anxiety (Spielberger, 1983). Academic performance is a significant issue in the university. Previous studies observed that academic performance are influenced by personal efforts, time management, peer interaction, environment, campus facilities, completion of assignments, class attendance, tutorial services, study groups, and teaching style (Sansgiry *et al.*, 2006). However, Carroll and Garavalia (2004) explained that successful academic performance depends on effective studying and motivational strategies. Psychophysiology difficulties do also affect the performance of students academic (Stephen, 2001; McCraty, 2007; Gomes, 2002), Poor academic performance is defined by diagnosis of learning disability or students who failed multiple academic subjects (Janet *et al.*, 1987). Learning difficulties will create students' anxiety of feeling discomfort, which means that feeling anxious in the classroom does not improve learning. Besides, Soler in (2005) observed that students who

felt satisfied and had low levels of anxiety achieved a higher academic performance. Therefore, anxiety has been regarded as the most significant factors in determining students' achievement in academic performance.

3. Method

3.1. Participants

The population in this study are engineering undergraduate at Universiti Malaysia Pahang. Students who have low academic performance received test to measure their anxiety level. A total 205 students with low academic performance were participating in this test, Students receive STAI for measuring anxiety level. Sample in this study was the low students' academic performance with GPA < 2.51 and high level of anxiety with STAI > 80.

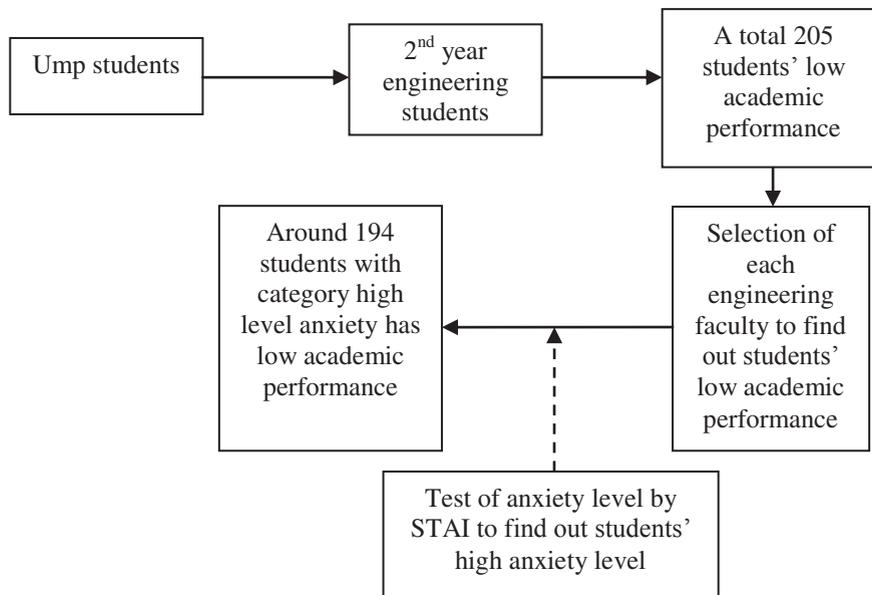


Figure 2: Sample selection procedure

3.2. Measurement

The instrument was validated for reliability and validity test. Nunnally (1978) recommends that instruments used in basic research have a reliability value of about 0.70 is better. Validity test interpreted by inter correlation of items according to (Sekaran, 2003) should be ≥ 0.30 . The questionnaire was confirmed of reliability (Cronbach's Alpha yielded 0.934).

State Trait Anxiety Inventory (STAI)

This instrument has forty items of questions with two subscales: The S-Anxiety scale (STAI Form Y-1) consists of twenty statements that evaluate how respondents' feel about anxiety currently, at this moment". The standard test form is to the write on each item-statement that best describes the intensity of their feelings: (1) not at all; (2) somewhat; (3) moderately so; (4) very much so. In responding to the T-anxiety scale (STAI Form Y-2) consists of twenty statements that assess how people "generally feel" about anxiety with four point scale: (1) almost never; (2) sometimes; (3) often; (4) almost always. The STAI is documented of reliability and validity test which had yielded 0.923. An example of state question "I am presently worrying over possible misfortunes" the question was assessed four points with very much so. An example of trait question "I worry too much over something that really doesn't matter" the question was assessed on four points with almost always. High score reflect high level of anxiety. The instruments was established for reliability and validity test (Spielberger, 1983).

Grade Point Average (GPA)

Grade Point Average (GPA) is to measure students' academic performance, this was found from faculty's document. The classification found from any university in Malaysia to justify the academic performance level includes low is ≤ 2.50 ; moderate is within the range $2.50 < \text{GPA} < 3.67$; high is ≥ 3.67 . The interpretation of STAI and GPA level are presented in Table 1 as follows.

Table 1: Interpretation of STAI and GPA level

<i>STAI's score</i>	<i>GPA</i>	<i>Interpretation</i>
80 > STAI	2.50 > GPA	Low
80 < STAI	2.50 < GPA	High

3.3. Procedure

The test aimed to find the relationship of study anxiety and academic performance among engineering students. Immediately participants giving a test, testing also aims to select trainees who have been identified in high anxiety and low academic performance were to participate in this training. The participants came to the lab and fill in the questionnaire include the S-Anxiety scale (STAI Form Y-1) and T-Anxiety scale (STAI Form Y-1). The STAI has 40 items of question and took approximately 20 minutes to complete. The students first read and answered if they had problems the researcher will guide students to answer the questions. This test was based on the faculty, after two weeks who have high levels of anxiety and low academic performance were offered to participate in this study. Result of the test was used to find out correlation between anxiety and academic performance.

3.4. Data Analysis

The relationship of high level anxiety upon academic performance was examined by Pearson correlation. The correlation measured for normal distribution of data. The significant coefficient and coefficient of correlation are examined to find out the results.

4. Results and Discussion

The results presents for demographic of participants, also results and discussion. The finding show significant correlation of high study anxiety and low academic performance. The findings display below

4.1 Demographic of participants

A total 205 student were invited to test their anxiety level that was aimed to examine the relationship of study anxiety and academic performance. Students from the second year of study were randomly selected for the study. The participant's age ranged from 18 to 26 and they were from diverse ethnic and socioeconomic backgrounds as indicated by self report. A total 109 female students were achieving low academic performance and 96 male students with low academic performance. Students from four faculties were involved in the tests with 84 students from Faculty of Chemical and Natural Resources Engineering (FCNRE), 46 students Faculty of Civil Engineering and Earth Resources (FCEER), Faculty of Mechanical Engineering (FME) yield 19 students, and Faculty of Electrical and Electronic Engineering (FEEE) was 56 students. The demography profile of participants is presented in Table 1as follows

Table 1: Demographic of Participants

<i>Demographic info</i>	<i>Frequency</i>	<i>Percentage</i>
Gender		
1. Male	96	46.8%
2. Female	109	53.2%
Faculty		
1. FCNRE	84	41%
2. FCEER	46	22.4%
3. FME	19	9.3%
4. FEE	56	27.2%
Age		
1. 18 – 20	70	34.2%
2. 21 – 23	120	58.5%
3. 24 – 26	15	7.3%

4.2 The Relationship of Study Anxiety and Academic Performance

The Pearson correlation examines the relationship between study anxiety and academic performance. The result show mean and standard deviation of STAI ($M=95.53$; $SD=12.008$) and GPA ($M=2.18$; $SD=0.250$), a significant correlation ($p=0.000$), the correlation coefficient is small with $r=-.264$, and finally the sample size yield $n=205$. Study anxiety is negatively related to academic performance with a Person correlation coefficient was small. Nonetheless, the result proven that students who have high anxiety levels achieve low academic performance with anxiety level > 95 and academic performance < 2.50 . Therefore, it can be concluded that there is a significant relationship between high level anxiety and low academic performance among engineering students.

Consistently result with previous studies found a negative correlation between high levels of anxiety and low academic performance (Soler, 2005 and McCraty, 2007). In otherwise, El-Anzi (2005) describes a positive relationship between high degrees of academic achievement and low anxiety. Small of coefficient correlation is linked with the small of sample size yield seventy participants. Others expressed the opinion that the high level of anxiety will be associated with low academic performance (Luigi et al., 2007, and Sena et al., 2007). The finding support with McCraty (2000) where anxiety plays significant role in student's learning and academic performance, moreover it was revealed that a high facilitating achievement anxiety was related to low debilitating achievement anxiety. Similar statement cites to support the finding a fair number of engineering students that there are many situations which it is appropriate and reasonable to counter with some anxiety. That they may not find jobs in the future, express these feelings with ambivalence, confusion, lack of confidence and worry (Ercan et al., 2008). Researchers generally agree that high level anxiety will construct of low academic performance. Table 4 present the finding as follows

Table 4: Results of Correlation between Anxiety and Academic Performance

<i>Measures</i>	<i>Mean</i>	<i>SD</i>	<i>r</i>	<i>p</i>
STAI	95.53	12.008		
GPA	2.18	0.250		
STAI-GPA			-0.264	0.000

Note. $p < 0.01$.

5. Conclusion

Previous studies demonstrated that students with higher level of anxiety tend to obtain lower marks in their end-of-semester examination. Anxiety while studying is a major predictor of academic performance (McCraty, 2007 and McCraty, *et al.*, 2000) and various studies have demonstrated that it has a detrimental effect. Engineering student has many situations which it is appropriate and reasonable to counter with some anxiety. Therefore, study anxiety should be investigated for engineering students. The result shows a significant correlation between study anxiety and academic performance. Students who have high level anxiety achieve low academic performance. These findings support previous research that high level of anxiety brings about lower academic performance (Sena et al., 2007 and Luigi et al., 2007). High anxiety also predicts that student has low ability to study. High score of STAI indicates that students who have a higher score in anxiety achieve low GPA. For further research it is suggested found large of sample size to strengthen the coefficient correlation.

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