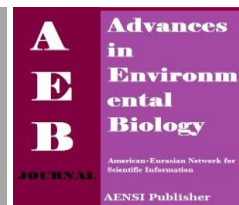




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# Factors Affecting Self-Efficacy Towards Academic Performance: A Study on Polytechnic Students in Malaysia

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### ABSTRACT

The main motivation behind this research is to presents the factors that influence self-efficacy toward academic performance among students of two Polytechnic institutes. The self-efficacy is a key concept in social cognitive theory that leads students' perception about their own ability to successfully solve a task or to learn an activity or to perform behaviors at desired levels. Early research evidence shows that there are factors that influence self-efficacy, namely; mastery experience, vicarious experience, verbal persuasion and psychology arousal. The data for this study was gathered using a questionnaire survey through probability sampling. Few statistical technics like mean, standard division, correlation and regression have been employed. This study was found that there is significant relation between self-efficacy and academic performance. Besides, the factors such as mastery experience, vicarious experience, verbal persuasion and psychology arousal totally influenced self-efficacy.

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## INTRODUCTION

Education is now universally recognized to be prime key of moral, cultural, political and socio-economic development of a nation. The nations, which have taken major initiatives in education, made revolutionary advances and performed miracles in the last two decades [27]. Nowadays, most of the peoples are competing each other in order to success in their academic field respectively. However, there are some factors which are influence the academic performance such as self-efficacy. Self-efficacy beliefs vary between individuals, fluctuate under different circumstances, and can change over the time. Besides, it also contributes to the performance either in the academic, job field and many more. In fact, the connections between self-efficacy and academic performance are especially of interest to educators [30]. According to Klassen *et al.*, [14], self-efficacy for self-regulation reflects an individual's beliefs in his or her capabilities to use a variety of learning strategies, resist distractions, complete schoolwork, and participate in class learning, and has been found to influence academic achievement. Besides, according to Yusuf [33], in 1977, Albert Bandura initiated the conception of perceived self-efficacy which influences and modifies human behavior.

Furthermore, students that were able to initiate their study activities with self-efficacy and develop applicable self-learning strategies are more likely to progress and achieve better because non self-regulated students are not really involved in learning process and consequently they might be subjected to any kind of shallow knowledge and low academic achievement [36]. Other than that, the causal effect of self-efficacy on academic achievements is among of the important issues that have been raised in educational research. The causality effect of self-efficacy becomes more interesting when researchers are try to find out whether mastery, verbal emotional, psychological are the primary causes of developing self-efficacy.

Thus, Bandura [10] suggested that four categories of experience or influential factor that are used in the development of self-efficacy: mastery experience, vicarious experience, verbal persuasion, and physiological arousal. According to the researcher, the most influential is mastery experience, or interpreted result of one's previous performance. Students engage in tasks and activities, interpret the results of their actions, use these interpretations to develop beliefs about their capability to engage in subsequent tasks or activities, and act in concert with the beliefs created. Besides, vicarious experience, or modeling, refers to the positive influences to efficacy beliefs of observing how other people succeed [7]. According to Zhu *et al.*, [35], empirically tested

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these propositions with middle school students and reported significant correlations between mastery experiences, vicarious experiences, verbal persuasions, physiological arousal, and self-efficacy, providing support for the validity of self-efficacy theory.

Realized the fact that self-efficacy affected the academic performance, this research has been made to study about the relationship between self-efficacy and academic performance and as well as factor influenced the self-efficacy. Besides, academic achievement has been variously defined as level of proficiency attained in academic work or as formally acquired knowledge in school subjects which is often represented by percentage of marks obtained by students in examinations [15]. This research has been executed among the Mechanical engineering students from first year and final year at Polytechnic Tuanku Syed Sirajuddin, Arau, Perlis (PTSS) and Polytechnic SeberangPerai (PSP).

#### *Motivation behind the research:*

Polytechnics Tuanku Syed Sirajuddin and Polytechnic SeberangPrai are the public colleges which are offered various types of courses. One of the courses offered was Diploma in Mechanical engineering. Basically, most of the students hard to score the good result instead of majority gained the moderate result or low result. Most of this problem occurred because they thought that engineering field is difficult since a lot of calculation and technical skills should be existed. According to Concannon & Barrow [12], most of the students who did not performed in academic field due to lack of self-efficacy or instead of they were not concern about self-efficacy at all. In fact, according to Marra, & Bogue [18], self-efficacy can influence the academic performance. They did a research and found that self-efficacy of engineering students is lower at the beginning of study and gets higher as they progress over the years.

Realizing the fact that self-efficacy is influential the academic performance, thus the factors influenced self-efficacy should be identified. Usually, students are easy to get influence by friends, get involved in the emotional control, psychological arousal and etc. According to Bandura [6], there are direct experiences/mastery experience and indirect experiences/vicarious experience provided by social or models, verbal persuasion, and individuals' physical and emotional situations among the students. The most effective of these on self-efficacy beliefs are direct experiences. While a person can develop a strong belief in self-efficacy with having success as a result of his own experiences, in opposite his failures may effect these beliefs negatively. Efficacy beliefs related with past experiences' consequences, affect the success or failure status in the future and consequently affect the academic motivation. Basically, students with high self-efficacy beliefs, become more willing in learning activities comparing with students with low self- efficacy. Self-efficacy is known to provide individuals acquire new knowledge and to develop their skills for a better life or for their own purposes in PTSS and PSP

Therefore, by identifying the factors influenced the self-efficacy, it can help students to increase their self-efficacy thus able to enhance the academic performance. For the meantime, academic performance can be measured through cumulative grade pointer average (CGPA).

As mention earlier, the main purpose of the research is to find-out the factors influenced self-efficacy and relationship to the academic performance among the Polytechnic student, and the specific objectives are the following:

1. To identify the relationship between self-efficacy and academic performance.
2. To determine the relationship between self-efficacy and Mastery experiences.
3. To examine the relationship between self-efficacy and Vicarious experiences.
4. To find out the relationship between self-efficacy and Verbal persuasion.
5. To measure the relationship between self-efficacy and Psychology arousal.
6. To evaluate academic year as a moderator.

#### *Literature Review:*

According to Schunk [24], self-efficacy will help the people to instill the ability to successfully solve a task, to learn an activity, or to perform behaviors at designated levels and as well as able to influences students' choice of effort, persistence, tasks, and achievement. Therefore, in order to ensure the students have a good self-efficacy, the source of self-efficacy should be identified. Besides, according to Bandura [6], there were several factors that influenced self-efficacy such as mastery experience, vicarious experience, verbal persuasion and psychology arousal.

Bandura [2] introduced the construct of self-efficacy. In later years 1986, 1997, he situated it within a social cognitive theory and an agentive perspective [22]. In social cognitive theory human functioning is viewed in a transactional way. Internal personal factors in cognitive, affective and biological embodiment; behavior; and environmental events all act as interacting determinants that affect one another in a reciprocal manner. Human agency refers to an individual's capacities to generate and direct actions for specific purposes, emphasizing the important role of intentionality in purposive behavior [9]. Within social cognitive theory great value is attached to self-reflection as a human capability [4,7]. Early study [18] shows that self-efficacy of engineering students is

lower at the beginning of study and gets higher as they progress over the years. Thus, this study is an extent to which the study by Marra & Bogue [17] can support their findings.

In addition, Self-reflection is a form of self-referent thinking with which people evaluate and modify their own thoughts and behaviour. These self-referent thoughts include perceptions of self-efficacy, that is, 'beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments' [11]. Self-efficacy as a belief of personal competence acts upon human behaviour in different ways. Bandura [2] assumed that self-efficacy affects the choices people make, their ways of acting, the effort they spend, their perseverance and elasticity. Apart from affecting human behavior, self-efficacy beliefs also influence people's thoughts and feelings. Individuals with a weak notion of self-efficacy are inclined to think that tasks seem more difficult than they actually are. These thoughts are a breeding ground for feelings of failure and depression, tension and helplessness. A strong notion of self-efficacy, on the other hand, creates feelings of tranquility and challenge in the face of difficult tasks. Bandura [7] used these arguments to state that self-efficacy plays a key role within human agency.

#### *Factors influence self-efficacy:*

Self-efficacy theory based on Bandura's Social Cognitive Learning Theory is considered with regard to the teacher, it emphasizes the knowledge, skill and attitudes necessary for fulfilling the responsibilities and tasks required for a teacher. However it is not sufficient to explain teacher efficacy only with efficiency. In other words, self-efficacy is not a passive ability about the self, it is an active ability where the self-regulation mechanisms and motives are intertwined with. That theory also had been use to many researchers to examine the self-efficacy among students at the universities. For example, Zimmerman [36] used that theory to measure mathematical self-efficacy among the college students whereas Bandura [7] also used this theory to evaluate creative self-efficacy.

Other than that, Bandura [7] suggested that four categories of experience are used in the development of self-efficacy: mastery experience, vicarious experience, verbal persuasion, and physiological arousal. Basically, mastery experience is interpreted result of one's previous performance. Students engage in tasks and activities, interpret the results of their actions, use these interpretations to develop beliefs about their capability to engage in subsequent tasks or activities, and act in concert with the beliefs created. Other than that, vicarious experience, or modeling, refers to the positive influences to efficacy beliefs of observing how other people succeed [7]. According to [35] empirically tested these propositions with middle school students and reported significant correlations between mastery experiences, vicarious experiences, verbal persuasions, physiological arousal, and self-efficacy, providing support for the validity of self-efficacy theory.

Bandura [7] proposed that when a person possesses the requisite skills for a task, high self-efficacy will promote improved utilization of existing cognitive resources than otherwise. People with high self-efficacy are more focused on task requirements and less distracted by performance anxiety and off-task cognitions [19]. Greater task focus should enable individuals with high self-efficacy to accurately interpret information. In contrast, individuals with low self-efficacy may doubt their ability to accurately interpret information and feedback. Furthermore, academic self-efficacy moderates the relationship between students' information seeking and academic performance such that the relationship is stronger when self-efficacy is high than when self-efficacy is low.

Moreover, Bandura [7] posited that self-efficacy is formed by how people interpret information from four sources. The most powerful source is the interpreted result of one's past performance, or mastery experience. As individuals engage in tasks and activities, they interpret the results from these experiences and form conceptions about how capable they are in engaging in subsequent related tasks and activities. Students who view their past accomplishments in a positive light are likely to experience a boost in their self-efficacy. Experiences viewed as unsuccessful are likely to have the opposite effect [20]. Self-efficacy is also influenced by the observation of others' activities. These vicarious experiences are thought to be most influential when individuals are uncertain of the standards by which proficiency in an activity is measured. Social models, particularly those individuals perceived as similar such as classmates, often act as a point of comparison as students form conceptions of their own academic capability [24]. A third source of self-efficacy comes from the verbal and social persuasions that individuals receive from influential others such as teachers, parents, and peers. Encouraging feedback and judgments bolster students' self-efficacy to perform a task, whereas deflating messages undermine it. Bandura [4] argued that these deflating messages might actually be more effective in lowering self-efficacy than encouraging messages are at raising it. The fourth hypothesized source comes from individuals' physiological and affective states such as anxiety, stress, and fatigue. Interpretations of these states often serve as indicators of students' competence [7].

Other than that, Bandura [7] hypothesizes that people take risks and challenge themselves because they believe themselves capable of coping with the situation, and have feelings of self-efficacy. Self-efficacy refers to an individual's "belief in one's capabilities to organize and execute the courses of action required to produce

given attainments". Those with high self-efficacy are more likely to set themselves challenging goals, expend effort, and persist in the face of adversity for longer [5].

Furthermore, self-efficacy beliefs are formulated by processing information derived from direct domain-specific engagement (enactive mastery experiences), and to a lesser degree verbal persuasion, vicarious experiences, and physiological states [7]. Hence, sports participants high in self-efficacy may be less likely to fear failure, and more likely to set themselves difficult goals and take calculated, as opposed to reckless risks examined the relationships between self-efficacy, sensation seeking and risk taking among male high risk sports participants including skiers, rock climbers, kayakers and stunt flyers. Participants were categorized into 'extreme' and 'high' risk taking groups depending upon their sport-specific behaviors.

Meanwhile, the concept of self-efficacy with theoretical and practical implications for organizational behavior and human resource management is influenced by individual differences. It arises from the gradual acquisition of complex cognitive, social, linguistic, and/or physical skills through experience [3]. Individuals appear to evaluate information about their capabilities and then regulate their choices and efforts accordingly. Individuals may judge their capabilities in comparison with others. Bandura [4,7] suggests that expectations of personal efficacy derive from four sources of information which are performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. On the other hand, Self-efficacy is assumed to have three components which are consists of magnitude (the levels of task difficulty that people believe they can attain), strength (the conviction regarding magnitude), and generality (the degree to which the expectation is generalized across situations). In assessing these components, the purpose is to discover the type of questions that will best explain and predict someone's dispositions, intentions, and actions. Self-efficacy is a dynamic construct that changes over time as new information and experiences are acquired. It has been found that perceived task ability significantly affects performance even after controlling for other variables. Self-efficacy is also purported to improve skills [13]. Individuals with moderate to high self-efficacy tend to engage more frequently in task-related activities and persist longer in coping efforts. This leads to more mastery experiences, which in turn enhance self-efficacy.

#### *Mastery experience:*

The most influential is mastery experience, or interpreted result of one's previous performance [7]. Students engage in tasks and activities, interpret the results of their actions, use these interpretations to develop beliefs about their capability to engage in subsequent tasks or activities, and act in concert with the beliefs created. It is the single greatest contributor to students' confidence. If students have been successful at a particular skill in the past, they will probably believe that they will be successful at the skill in the future. The old adage, "Nothing breeds success like success" certainly is true when it comes to developing self-efficacy.

Students bring a wide variety of past experiences with them when they enter your classroom. Some of those experiences have been positive, others have not. How students interpret their past successes and failures can have a dramatic impact on their self-efficacy. If students believe their success in a particular area is the result of the skills they developed (their ability), they are much more likely to be confident about future success in that area. On the other hand, if students attribute their success solely to hard work, they may not necessarily expect future success, since they may not choose or even want to work equally hard on future assignments. Or they may believe they do not have the necessary skills to succeed in the future regardless of how hard they work. Although we, as teachers, know how much effort one puts into a task has a direct effect on the quality of the completed task, students often do not see the relationship. As late as eighth grade, students report that the amount of effort they put into a subject is less important than their ability. Our highest achieving students may also believe that if they must work hard at something, they may not have high ability or be skillful in that area.

A pattern often exists for students who do not do well. Students who explain their poor performance as a lack of effort demonstrate higher self-efficacy than those who explain it as low ability. Students who have not done well, but believe that all they must do to succeed is work harder may still be very confident about their skills. Enactive mastery experiences are authentic successes in dealing with a particular situation [7]. These mastery experiences are the most powerful source of creating a strong sense of efficacy because they provide students authentic evidence that they have the capability to succeed at the task. Students interpret the results of their activities and use these interpretations to develop beliefs about their capability to perform in subsequent tasks or activities. These interpreted results of one's own performances create a sense of self-efficacy.

In general, successes built a strong sense of self-efficacy and failures lower it, especially when failures occur before a robust sense of efficacy is developed [7]. This robust sense of self-efficacy is not created by easy success; it requires experience in overcoming obstacles and difficult situations through maintained effort and persistence [17].

#### *Vicarious Experiences:*

The second source of creating self-efficacy is through observational experiences provided by social models [7], the so-called vicarious experiences. Students obtain information about their own capabilities by observing

others, especially peers who offer suitable possibilities for comparison. An increase of self-efficacy through observational experiences can easily be enfeebled by following failures [24]. Though this vicarious source of information has a weaker effect than does performance-based information, people with little mastery experience or those who are uncertain about their capacities, are more sensitive to it [7].

When a student sees another student accomplish a task, the vicarious experience of observing a model can also have a strong influence on self-efficacy. By observing others like themselves perform tasks, individuals make judgments about their own capabilities. If a student sees a friend publish a poem, he might believe he can also have one published. A third grader observing other third graders learn multiplication tables is likely to believe that he can also learn them. The more students relate to the model being observed, the more likely the model's performance will have an impact on them. Unlike the self-efficacy beliefs derived from past experience, self-efficacy information gleaned through observation is less stable. Once strong self-efficacy is developed from one's own personal successes, an occasional failure may not have negative effects; however, self-efficacy based on observing others succeed will diminish rapidly if observers subsequently have unsuccessful experiences of their own. Self-modeling, where students observe themselves succeed, is also a powerful influence. Watching video tapes of successful performances or viewing photographs of past accomplishments can increase student confidence.

#### *Verbal Persuasion:*

This social persuasion is the third source that helps students developing beliefs of self-efficacy. Persuasive communication and evaluative feedback is most effective when people who provide this information are viewed by students as knowledgeable and reliable, and the information is realistic. Positive persuasory feedback heightens self-efficacy, but verbal persuasion alone is limited in its power to create a strong and abiding sense of self-efficacy [24]. Although verbal persuasion such as this can be important, it does not contribute as much as an individual's own experiences or vicarious experiences. The short-term effects of persuasion need to be coupled with actual successes.

#### *Physiological Arousal:*

There is a fourth source of efficacy information that people draw from their physiological, emotional and mood states. Symptoms and feelings such as anxiety, stress reactions, tension and excitement can be interpreted as signals of failure and debility. A positive mood state strengthens someone's self-efficacy, a dejected mood state enfeebles it. People rely in part on these states in assessing their capacities by perceiving and interpreting this information [22]. As people have the capacity to modify their own thinking and feeling, students with a high sense of self-efficacy can view a state of tension as energizing in the face of a performance; whereas those who have self-doubts interpret their tension as weakness. Self-efficacy information that arises from these four sources does not influence self-efficacy directly, for it is cognitively appraised [2,4]. The final sources upon which self-efficacy beliefs are based are physiological arousal. Sweaty hands or a dry mouth are often interpreted as signs of nervousness. Students may feel that such signs indicate they are not capable of succeeding at a particular task. Conversely, students may be aware of feeling relaxed before confronting a new situation and develop a higher sense of efficacy toward the task they face.

#### *Self-efficacy of engineering students:*

Self-efficacy is one of the concepts under the Social learning theory by Bandura [4]. Self-efficacy refers to a person's belief in his ability to successfully accomplish a specific task. Self-efficacy found to be different between males and females in some situations but not others. A study on students in business administration by [10] show that there is gender difference in self-efficacy for certain subjects. Girls were found to have greater self-efficacy in statistics while boys tend to have higher self-efficacy in computing and marketing. Busch however, did not find evidence to support gender difference in self-efficacy where mathematics is concerned. In the engineering discipline, Concannon & Barrow [12] also did not find gender difference in self-efficacy. This is similar to the finding where mathematics is concerned for the business administration students. Other than that, the low self-efficacy could be due to their current level of study which is equivalent to the beginning of the degree programme. A study by Marra, & Bogue [18] shows that self-efficacy of engineering students is lower at the beginning of study and gets higher as they progress over the years.

#### *Academic achievement:*

Self-efficacy is best conceived as a differentiated set of self-beliefs specific to different areas of functioning (e.g., social self-efficacy, academic self-efficacy); and is therefore considered a domain specific concept as no person can feel competent at all tasks [7]. The concept of self-efficacy as domain- or task-specific has been proven to be a better predictor of actual behavior [4,7] than a general self-efficacy concept. Across these different domains of functioning, self-efficacy beliefs influence the courses of action people choose to pursue, how much effort they put into given endeavors, how long they will persevere in the face of obstacles and

failures, their resilience to adversity, whether their thought patterns are self-hindering or self-aiding, how much stress and depression they experience in coping with taxing environmental demands, and the level of accomplishments they realize [21].

Academic self-efficacy has been defined “as personal judgments of one’s capabilities to organize and execute courses of action to attain designated types of educational performances” [36]. Academic self-efficacy has been reported to promote academic achievement directly and also indirectly by increasing academic aspirations and prosocial behavior [7].

Besides, academic achievement has been variously defined: as level of proficiency attained in academic work or as formally acquired knowledge in school subjects which is often represented by percentage of marks obtained by students in examinations [15]. Researches have shown that besides being the criteria of promotion into the next class, academic achievement is an index of all future success in life. Superior achievers in the academic world generally tend to maintain their level, of achievement in the occupational field also. Moreover, Reis *et al.* [23] reported that academic achievement also has a significant effect on self-evaluation of learners. To reach the goal of excellence in the academic sphere, and to optimize academic achievement to a maximum, a review of correlates of academic achievement and its implications for educationists and policy makers would be meaningful. There is an overwhelming evidence establishing intelligence as the most significant predictor of academic achievement.

#### *Academic performance:*

Academic performance refers to standardized test scores, grades, and overall academic ability and performance outcomes [1]. Besides, it is an index of all future success in life. Superior achievers in the academic world generally tend to maintain their level, of achievement in the occupational field also [27]. Academic performance is influenced by a multitude of factors. For example, attitude leads to achievement and aptitude is needed for successful performance. Academic performance is a result of intellectual capability and motivation as well [29]. Based on replicable findings from several studies Witt-Rose [30] states that gender and attitude influence academic performance to some extent through their mediating effects on an individual’s self-efficacy beliefs.

Furthermore, the relationship between gender and self-efficacy also influence the academic performance [28]. Through the previous study, that boys and men tend to be more confident than girls and women in academic areas related to mathematics, science, and technology despite the fact that achievement differences in these areas either are diminishing or have disappeared. Conversely, in areas related to language arts, male and female students exhibit similar confidence despite the fact that the achievement of girls typically is higher [31]. Moreover, academic variables, such as study hours, study skills, and absenteeism, were the only statistically significant contributors to performance [30].

Finally, this section focuses on the past literature on the self-efficacy and academic performance that relate with this study. A lot of research has been done in the past to regarding all those elements. Basically, different researcher will come out with their own understanding, however the key point of those particular elements still the same. From that literature review, we can see numerous types point of view. Basically, in terms of self-efficacy we can summarize that this study focus on the power of self-efficacy and the factors influenced the self-efficacy such as mastery experience, vicarious experience, verbal persuasion and psychology arousal.

#### *Methodology:*

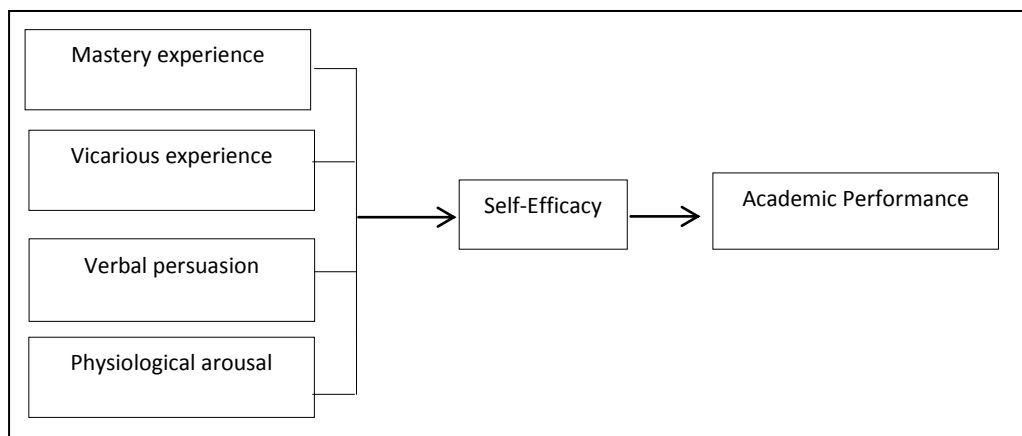
The population for this study was comprised of Diploma Mechanical Engineering students at PTSS and PSP. They were chosen according to random sampling so that everybody has equal chance to be taken as a respondent. The total population were 215 (N=215). However, according to the table of population proposed by Uma Sekaran [26], the sample should be taken is 187 divided in each strata respectively such as semester 2 is 36 and semester 6 is 63 from PTSS whereas semester 2 from PSP also 36 and semester 6 is 52. Hence, the total numbers of population was key-in into the online random generator and then take the number from 1 to 36 for 40 samples, 1 to 52 for 60 samples and 1 to 63 for 75 samples follow the name list and pick up as respondents. Hence, everybody get the chance to be picked up as respondents. The respondents were given the questionnaire manually and asked them to return back after completed.

Basically, the sample for this study was determined using probability sampling. A probability sampling method is any method of sampling that utilizes some form of random selection. In order to have a random selection method, it must set up some process or procedure that assures that the different units in the population have equal probabilities of being chosen. Since this study involved with two different Polytechnics and different semester, stratified sampling from probability sampling had been used. Stratification is the process of dividing members of the population into homogeneous subgroups before sampling. Thus, the population was divided into subgroup or a stratum such as semester 2 is 40 persons and semester 6 is 75 persons at PTSS. On the other hand, at PSP students from semester 2 is also 40 and semester 6 is 60 persons. According to the table of population

proposed by Uma Sekaran (2009), the sample should be taken from the total respondents is 63 from 75 persons, 36 from 40 persons and 52 from 60 person. Thus, total respondents were 187.

#### Research Framework:

A conceptual framework is combination between self-efficacy and factors influenced affected academic performance. This instrument was developed by Schwarzer & Jerusalem [25] will guides this research, determines what variables to measure, formulate an instrument, and finds statistical relationship between independent and dependant variables.



**Fig. 1-1:** Framework of self-efficacy towards academic performance (*adapted from: Becker, [8]*).

Self-efficacy is reflected to the academic performance that can measure through cumulative grade average points (CGPA). The proposed model for current research is shown in Figure 1-1. The conceptual framework shows that there are four factors influenced the self-efficacy which is mastery experience, vicarious experience, verbal persuasion, and physiological arousal. According to Bandura [6], the most influential is mastery experience, or interpreted result of one's previous performance. Students engage in tasks and activities, interpret the results of their actions, use these interpretations to develop beliefs about their capability to engage in subsequent tasks or activities, and act in concert with the beliefs created. Other than that, vicarious experience, or modeling, refers to the positive influences to efficacy beliefs of observing how other people succeed [7].

In an educational context, self-efficacy is the confidence that one has in one's ability to perform tasks that affect one's learning processes [18]. One's self-efficacy beliefs influence his/her thought patterns and emotional reactions. While low self-efficacy fosters stress and depression, high self-efficacy helps to create feelings of serenity in approaching difficult tasks and activities. Self-efficacy beliefs, hence, become strong determinants and predictors of the level of accomplishment that individuals finally attain [32].

General self-efficacy refers to the capability to cope with, and effectively solve, a wide variety of difficult and unexpected generalized problems in life which require substantial effort to achieve a goal. Specific self-efficacy because the items are specifically linked to academic issues such as time management, schedule conflicts, managing money, homework, attendance, and grades [8]. Basically, General self-efficacy aims at a more global and stable sense of personal competence to act effectively in a wide range of stressful or new situations [16]. Students rating these items highly feel that they can resolve their life problems, even when they are opposed by others or must find unique ways to get what they want.

#### Findings:

Since the instrument was adapted from previous researcher [8], the instrument has been tested for its reliability using Cronbach's alpha. The Cronbach's alpha for the items are tabulated as in the Table 3-2 below.

**Table 3-2:** Reliability Statistics.

Variables	Cronbach's Alpha
Total Questionnaires	0.935
Self-Efficacy	0.876
Mastery experience	0.647
Vicarious experience	0.788
Verbal persuasion	0.677
Psychological arousal	0.705

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. Moreover, provide the following rules of thumb: The rules of thumb as

follow can be used “ $\alpha > .9$  – Excellent,  $\alpha > .8$  – Good,  $\alpha > .7$  – Acceptable,  $\alpha > .6$  – Questionable,  $\alpha > .5$  – Poor, and  $\alpha < .5$  – Unacceptable”. Thus the above instrument is reliable and can be used for this survey.

Among the respondents, 52.4% (N=98) respondents from PTSS and 47.6% (N=89) from PSP. It is shows that most of the respondents were male with 80.7% (N=151) respondents whereas 19.3% or 36 respondents were female. In general, researchers report that men tend to be more confident than women in academic areas related to mathematics, science, and technology. Conversely, in areas related to language arts, male and female students exhibit similar confidence despite the fact that the achievement of girls typically is higher [24]. The age of respondents is between 18 years to more than 26 years old. The table shows that majority of the respondents in the age of 21-23 years old with 65.2% (N=122) whereas the minimum number of respondent is from the age of >26 years old with 0.5% (N=1). According to data, majority of the respondents have the average result of 3.00 to 3.49 with 50.4% (N=70), followed by 2.50 to 2.99 with 38.8% (N=54). The majority of respondent were Malay which is 94.2% (N=160) followed by India 11.2% (N=21), and the rest were 3.2% (N=6). The majority of respondent were Malay which is 94.2% (N=160) followed by India 11.2% (N=21), and the rest were 3.2% (N=6). The majority of respondent were Islam since most of the respondents were Malay which is 85.6% (N=160) followed by Hindu 10.2% (N=21), and the rest were 3.7% (N=7) for Buddha and others is 0.5%.

#### *Evaluating Research Objective:*

Basically the strength between four variables can be measured using Bivariate Correlations procedure as well as to determine the relationship of independent and dependant variables. It is meant that the listed hypotheses of this research can be tested and we can determine the strength of those relationship between two variables by using this method. There are five hypotheses to be developed in this study. The Pearson correlation measures the degree and direction of the linear relationship between two variables.

#### *Objective One:*

There is a statistically significant positive relationship between self-efficacy and academic performance. According to table 4-38 below, it shows the positive relationship between self-efficacy and academic performance (CGPA) even though the Pearson correlation is 0.212 but it still had a positive correlation. Referring to the result, Pearson coefficient,  $r = .212$ ; the significant level or  $p$  is 0.004 ( $p < 0.005$ ). Thus, hypothesis 1 ( $H_1$ ) has been **accepted**. It is mean that there is significant positive relationship between self-efficacy and academic performance.

#### *Objective Two:*

There is a statistically significant positive relationship between self-efficacy and Mastery experience. According to the previous result of linear regression, it shows the positive relationship between self-efficacy and Mastery experience. In addition, the result of Pearson Correlation that has been tested as shown in table 4-39 also shows the positive. Pearson coefficient,  $r = .669$  which is high value; the significant level or  $p$  is 0.000 ( $p < 0.005$ ). Thus, hypothesis 2 ( $H_2$ ) has been **accepted**. It is mean that there is significant positive relationship between self-efficacy and Mastery experience.

#### *Objective Three:*

There is a significant relationship between self-efficacy and Vicarious experience. The previous result of linear regression shows the significant relationship between self-efficacy and Vicarious experience. Besides, the result of Pearson Correlation shown in table 4-40 also shows the good relation. Pearson coefficient,  $r = .677$  and the significant level or  $p$  is 0.000 ( $p < 0.005$ ). Thus, hypothesis 3 ( $H_3$ ) has been **accepted**. It is mean that there is significant positive relationship between self-efficacy and Vicarious experience.

#### *Objective Four:*

There is a positive relationship between Self-efficacy and Verbal persuasion. The result from linear regression analysis in table 4-29 shows the positive relationship between self-efficacy and Verbal persuasion. Moreover, the result of Pearson Correlation shown in table 4-41 also shows the great relation. Pearson coefficient,  $r = .785$  which is the most strong influenced and the significant level or  $p$  is 0.000 ( $p < 0.005$ ). Thus, hypothesis 4 ( $H_4$ ) has been **accepted**. It is mean that there is positive relationship between self-efficacy and Verbal persuasion.

#### *Objective Five:*

There is significant relationship between Self-efficacy and Psychology arousal. According to the previous result of linear regression in table 4-29, it shows the significant relationship between self-efficacy and Mastery experience. Moreover, the result of Pearson Correlation shown in table 4-42 also shows the positive relationship. Pearson coefficient,  $r = .689$ ; the significant level or  $p$  is 0.000 ( $p < 0.005$ ). Thus, hypothesis 5 ( $H_5$ ) has been **accepted**. It is mean that there is significant relationship between self-efficacy and Psychology arousal.



*Objective Six:*

There are positive relationship between academic year and academic performance. The table 4-43 below is the model summary that shows the result of academic year and academic performance that has been analysed via regression model. It shows that the value of R is 0.033 which is the correlation of academic year and academic performance. Considering all inter correlation between independent variables against dependent variables, the R square value is 0.001. This explained that variables had been tested in this study have represented only 0.1% of variables influence the dependent variable. In addition, according to the result of Pearson Correlation that has been tested as shown in table 4-44, it shows that there is correlation between academic year and academic performance but very weak with Pearson correlation is 0.033. Thus, hypothesis 6 ( $H_6$ ) still can be **accepted**.

The summary of findings will discuss on attributes that factor influence the self-efficacy of the Mechanical Engineering students at PTSS and PSP. This research was involved 80.75% of male students whilst 19.25% female students. The total respondents that had been involved were 187. There is significant relationship between independent variables (4 factors influenced) and mediator (Self-efficacy) in this research. According to Schunk [24], a vicarious experience was the most influential when individuals are uncertain of the standards by which proficiency in an activity is measured. Social models, particularly those individuals perceived as similar such as classmates, often act as a point of comparison as students form conceptions of their own academic capability. However, through this study, the findings show that the most influential factor was verbal persuasion with the significant value is 79%. A verbal and social persuasion is the third source of self-efficacy that individuals receive from influential others such as teachers, parents, and peers. Encouraging feedback and judgments bolster students' self-efficacy to perform a task, whereas deflating messages undermine it. Bandura [4] argued that these deflating messages might actually be more effective in lowering self-efficacy than encouraging messages are at raising it. Then, it followed by psychology arousal, vicarious experience and mastery experience with significant value is 69%, 68% and 67% respectively.

Furthermore, according to the hypothesis, it shows that all of those were accepted. Basically, self-efficacy and academic performance (CGPA) had a positive relationship but it was not too strong correlation. However, it was still positive relationship. Referring to the result, Pearson coefficient,  $r = .212$ ; the significant level or p is 0.004 ( $p < 0.005$ ). In addition, Pearson chi-square also shows significant relationship between Self-efficacy and academic year in this research when the value of it was 8.144 with  $p = .017$  which mean lower than alpha level of significance of .05 ( $p\text{-value} > 0.05$ ).

Moreover, according to the regression findings regarding influenced self-efficacy, it shows that value of R was 0.824 which is the correlation of the four (4) independent variables (mastery experience, vicarious experience, verbal persuasion and psychology arousal) with the dependent variable. Considering all inter correlation between four independent variables against dependent variables, the R square value is 0.679. This explained that the four variables that being tested in this study have represented 67.9% of total variables influence the dependent variable. In addition, according to the result of Pearson Correlation that has been tested for the relationship between self-efficacy and academic year, it shows that there was a weak with Pearson correlation is 0.033.

Other than that, according to the cross-tabulation result between CGPA and gender, it shows that value of Pearson chi-square was 0.422 with  $p = .810$  which mean higher than alpha level of significance of .05 ( $p\text{-value} > 0.05$ ). Thus, initially it is shows that there is no significant relationship between CGPA and gender in this research. In addition, the result same goes to cross-tabulation between self-efficacy and gender when the result shows that Pearson chi-square has a value 0.005 with  $p = .941$  which mean greater than alpha level of significance of .05 ( $p\text{-value} > 0.05$ ). Hence, there is no significant relationship.

*Conclusion:*

The survey instrument was adapted from (Becker, 2009) where the original survey from Schwarzer & Jerusalem [25] was being used to determine generalized self-efficacy among the PTSS and PSP students. The instrument was chosen because it can analyse the factor influenced self-efficacy and also self-efficacy itself. The items for mastery experience refer to the individuals engage in tasks and activities, they interpret the results from these experiences and form conceptions about how capable they are in engaging in subsequent related tasks and activities. Students who view their past accomplishments in a positive light are likely to experience a boost in their self-efficacy. Experiences viewed as unsuccessful are likely to have the opposite effect. Mastery experience is also influenced by the observation of others' activities.

Furthermore, the items for vicarious experience was social models, particularly those individuals perceived as similar such as classmates, often act as a point of comparison as students form conceptions of their own academic capability [24]. On top of that, verbal persuasions was cope with individuals receive from influential others such as teachers, parents, and peers. Encouraging feedback and judgments bolster students' self-efficacy

to perform a task, whereas deflating messages undermine it. Bandura [4] argued that these deflating messages might actually be more effective in lowering self-efficacy than encouraging messages are at raising it.

Moreover, the items for the fourth source come from individuals' physiological and affective states such as anxiety, stress, and fatigue. Interpretations of these states often serve as indicators of students' competence [7].

Generally, for overall study, it was achieved the objectives. Through this research, it was identified the relationship between self-efficacy and academic performance despite the fact the correlation was not too strong but it still had a positive relationship. Second, the relationship between self-efficacy and Mastery experiences had been determined. Third, the relationship between self-efficacy and Vicarious experiences had been examined. Fourth, the relationship between self-efficacy and Verbal persuasion was had been found out. Fifth, the relationship between self-efficacy and Psychology arousal had been measured and the last one was academic year as had been evaluated as a moderator. All the result shows the positive relation between each other. The best relationship was between self-efficacy and factors influenced which are also supported by literature review and the previous researchers' findings.

Other than that, analysis from cross-tabulation shows there was no significant relationship between self-efficacy and gender and also between academic performance (CGPA) and gender. Besides, the result also shows that there is no significant result between academic year and academic performance as said by Marra, &Bogue [18] which is self-efficacy of engineering students is lower at the beginning of study and gets higher as they progress over the years. Besides, this research also was answered the research questions. Basically, there is a positive relationship between self-efficacy and academic performance according to the result obtained from this research. Moreover, mastery experiences, vicarious experiences, verbal persuasion and psychology arousal influenced self-efficacy according to the positive significant result by regression and cross-tabulation. Moreover, academic year can be a moderator but the relationship between was too low.

In short, this research shows that Mechanical engineering students need to give exposure regarding self-efficacy since it can influence the academic performance. At the same time, this research also shows the factors that can influence self-efficacy like mastery experiences, vicarious experiences, verbal persuasion and psychology arousal. Thus, in order to instil self-efficacy to the students, it must know how to influences them.

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