

A Study of the Attitude, Self-efficacy, Effort and Academic Achievement of CityU Students towards Research Methods and Statistics

Lilian K.Y. Li

Abstract

The present research aims to study the relationship between social science students' attitude towards research methods and statistics, self-efficacy, effort and academic achievement. Self-administered questionnaire was chosen as the primary data collection method and a sample of 153 students from Department of Applied Social Studies in the City University of Hong Kong were invited to complete the survey. After analyzing the data collected, Pearson's correlation coefficient reflected that there was a positive correlation between all the four variables – attitude towards research methods and statistics, self-efficacy, effort and academic achievement. Also, a multiple regression analysis was conducted to estimate the prediction power of attitude and self-efficacy on effort. The result showed that both attitude and self-efficacy could significantly predict effort. However, when another multiple regression analysis was conducted to estimate the prediction power of attitude, self-efficacy and effort on academic achievement, it was found that effort failed to predict academic achievement. To conclude, in the present study, effort could only be regarded as an indirect factor but not a necessary factor in bridging the relationship between attitude, self-efficacy and academic achievement.

Introduction

The title of the current research is “A study of the attitude, self-efficacy, effort and academic achievement of CityU students towards research methods and statistics”. It is known that all of the students coming from the Department of Applied Social Studies (namely the departments of Psychology, Applied Sociology, Criminology and Social Work) are required to take a basic research methods and statistics course. However, many of the students do not know they are required to study research methodology and statistics beforehand and the emphasis placed on statistics and research-related skills has indeed surprised them. Some of the students even develop a “phobia” towards this academic subject that they tend to feel nervous and uncomfortable when they are required to deal with statistics and research-related problems.

In order to get an in-depth understanding about CityU students' views towards research methods and statistics, the current research aims at investigating the relationship between their attitude, self-efficacy, and effort they put into studying research methods and statistics as well as their academic achievement.

Research objectives and research questions

In the present study, there are primarily two objectives. First, the current research intends to test whether “effort” is significantly related to “attitude” and “self-efficacy”. Second, the study aims to test whether “effort” serves as a mediated factor between attitude, self-efficacy and academic achievement.

Being correspondent with the stated two research objectives, four research questions are derived:

1. Does attitude play a role in affecting students' academic effort?

2. Does self-efficacy play a role in affecting students' academic effort?
3. Does students' academic effort play a role in affecting their academic achievement?
4. Does effort play a mediating role between attitude, self-efficacy and academic achievement?

Research hypotheses

There are four main hypotheses in the present study, which are listed as follows:

- H₁: The more positive one's attitude towards research methods, the more effort he/she will put into the subject.
- H₂: The more positive one's attitude towards statistics, the more effort he/she will put into the subject.
- H₃: The higher one's academic self-efficacy, the more effort he/she will put into the subject.
- H₄: The more effort one puts into the subject, the higher he/she will achieve academically.

Literature review

The relationship between attitude, self-efficacy and academic achievement has always been a topic of interest in social sciences, particularly in the fields of educational and social-psychological researches. However, little researches were conducted on studying the relationship between attitude, self-efficacy and effort. Therefore, it is hoped that the present research can provide further insights on the phenomenon.

Relationship between attitude and effort

As aforementioned, most of the existing literature focused on studying the relationship between attitude, self-efficacy and academic achievement. Even though there were very few researches studying the relationship between attitude and effort, one study did prove that there was a significant relationship between the two variables.

In an Australian study, the researchers would like to explore the relationship between students' attitude towards mathematics and the amount of effort they would put into studying the subject (Hemmings and Kay 2010, p. 48). A sample of 56 Australian secondary school students were recruited to fill out a questionnaire, and the results indicated that their mathematics attitude was significantly associated with the amount of effort they would expend in the subject.

Relationship between self-efficacy and effort

From past literature, very few researches focused on investigating the relationship between self-efficacy and effort. However, one research suggested that a positive relationship could be observed between the two variables. For example, in a study conducted in Spain (Valle *et al.* 2009, p. 101), the researchers aimed at studying the relationship between university students' self-efficacy for performance and learning and their effort regulation. It was found that when students possessed a higher self-efficacy, they were more likely to put more effort into their academic studies.

Relationship between effort and academic achievement

After reviewing past literature, it was found that there was no general consensus about the relationship between effort and academic achievement. Some of the studies suggested that there was a positive relationship between the two variables, while some

other studies suggested that there was a negative relationship between the two variables. In a study conducted in America, the researcher was interested in studying how both individual factors (like effort) and structural factors (like school environment) could affect students' academic performance (Stewart 2008, p. 185). It was found that the amount of effort that students exerted in their studies was positively associated with their academic performance.

Even though most studies stated that there was a positive relationship between effort and academic achievement, there were few studies arguing the opposite. For example, in a study conducted by Chassie *et al.* (2004), they studied the relationship between university students' effort (in term of the time they spent in learning) and their academic performance (in term of the grades they achieved). After controlling some external variables like learning ability and prior academic achievement, the results indicated that effort was significantly and negatively correlated with academic performance.

Relationship between attitude and academic achievement

From past literature, it was found some scholars developed a theory that could be used to explain the relationship between attitude and academic achievement. According to Fishbein, he constructed the value-expectancy model by arguing that a person's attitude determined his/her intended behavior, which could ultimately affect the outcome. Based on the model, he stated that a person would hold certain attitudes towards an object by evaluating it. After going through this process, the person then decided whether to hold a favorable or unfavorable view towards it. Indeed, such a positive or negative attitude could further influence the person's intentions to engage in various behaviors with regard to that particular object (Fishbein and Ajzen 1975, p. 14). Based on the person's intended behavior, this could be regarded as a significant predictor of the final outcome.

In addition to the theoretical arguments, there were indeed numerous researches conducted on testing the relationship between attitude and academic achievement. Based on the past literature, there was a general consensus that attitude could be regarded as a significant predictor of one's academic achievement. Most of these researches illustrated the more positive one's attitude towards an academic subject, the higher the possibility for him/her to perform well academically. In a research conducted in the U.S., the researchers studied the relationship between students' attitudes and academic achievement in college mathematics by inviting 218 freshmen to complete a set of questionnaire. The result indicated that students' attitudes were highly correlated with their achievement in college calculus (House 1995, p. 112). In another longitudinal study also conducted in the U.S., the researchers assessed the relationship between attitude towards mathematics and achievement in mathematics. It was found that attitude had a powerful influence on students' academic achievement (Reynolds and Walberg 1992, p. 307).

Even though most of the studies suggested that there was a positive relationship between attitude and academic achievement, there were other researchers arguing that students' attitude might not be a significant predictor of their academic achievement. In a study conducted by Mickelson (1990), he stated that whether attitude could significantly predict one's academic achievement depended on a number of variables, particularly the ethnic background and social class (p. 44). Correspondingly, Ma and Kishor (1997) also argued that the statement "attitude was a significant predictor of academic achievement" was indeed a paradox. Attitude might not necessarily predict one's academic achievement as it also depended on different

factors, like race, sample selection and sample size (p. 26). All in all, although there were countless researches studying the relationship between attitude and academic achievement, a unanimous result could not be obtained. Therefore, further investigation is needed to confirm the relationship between attitude and academic achievement.

Relationship between self-efficacy and academic achievement

As previously mentioned, the relationship between self-efficacy and academic achievement has been a topic of interest in social sciences researches. Based on past literature, there was a general agreement that self-efficacy was strongly related to one's academic achievement. For example, in Turner, Chandler and Heffer's study (2009), they assessed the influence of parenting styles, achievement motivation and self-efficacy on college students' academic achievement (p. 338). The results indicated that self-efficacy was a significant predictor of one's academic achievement. Also, in Lent, Larkin and Brown's research (1986), they also supported that academic self-efficacy was a reliable predictor of one's educational performance (p. 265).

Although the vast majority of the existing literature supported the notion that there was a significant relationship between self-efficacy and academic achievement, there were also few researches did not support such an argument. In a study conducted by Strelnieks (2005), she found that whether self-efficacy could influence one's academic achievement depended on some external factors, like gender and socio-economic status (p. 13). After analyzing the data collected, the researchers found that self-efficacy could only successfully predict females' academic achievement while it failed to accurately foresee males' educational performance. Apart from this finding, it was also shown that self-efficacy could only predict the academic achievement of students with higher socio-economic status. As reflected in the above research findings, it could be seen that there were inconsistencies in contemporary understanding on the relationship between self-efficacy and academic achievement. Even though most of the existing studies supported there was a strong correlation between the two variables, there were still researches arguing the opposite. Therefore, further investigation is required to demonstrate a clearer understanding between the two constructs.

Limitations of previous studies

After reviewing the literature, it was found that three limitations can be summarized from these past studies. First of all, most of the studies are restrained to foreign countries, particularly America. Owing to dissimilarities in social norms and cultural values, the findings obtained from these studies may not be really applicable and useful to explain the case of Hong Kong. Apart from this, many of the researches restrained "academic achievement" to mathematics only and very few of them focused on studying research methods-related subjects. Last but not least, although many researches were already conducted on studying this social phenomenon, there are still flaws in our understanding as there is no consensus on the relationship between the four variables: attitude, self-efficacy, effort and academic achievement. Since there are very few studies studying the direct relationship between 1) attitude and effort and 2) self-efficacy and effort, it is hoped that the present study can provide insights on this adequately studied issue by including a new element – effort in the present study.

Conceptual framework

As the title of the current research is “A study of the attitude, self-efficacy, effort and academic achievement of CityU students towards research methods and statistics”, it is therefore utterly important to illustrate the relationship between the four variables: attitude, self-efficacy, effort and academic achievement. In order to reveal clearly how the variables relate to each other, their relationship will be reflected in the conceptual framework shown below:

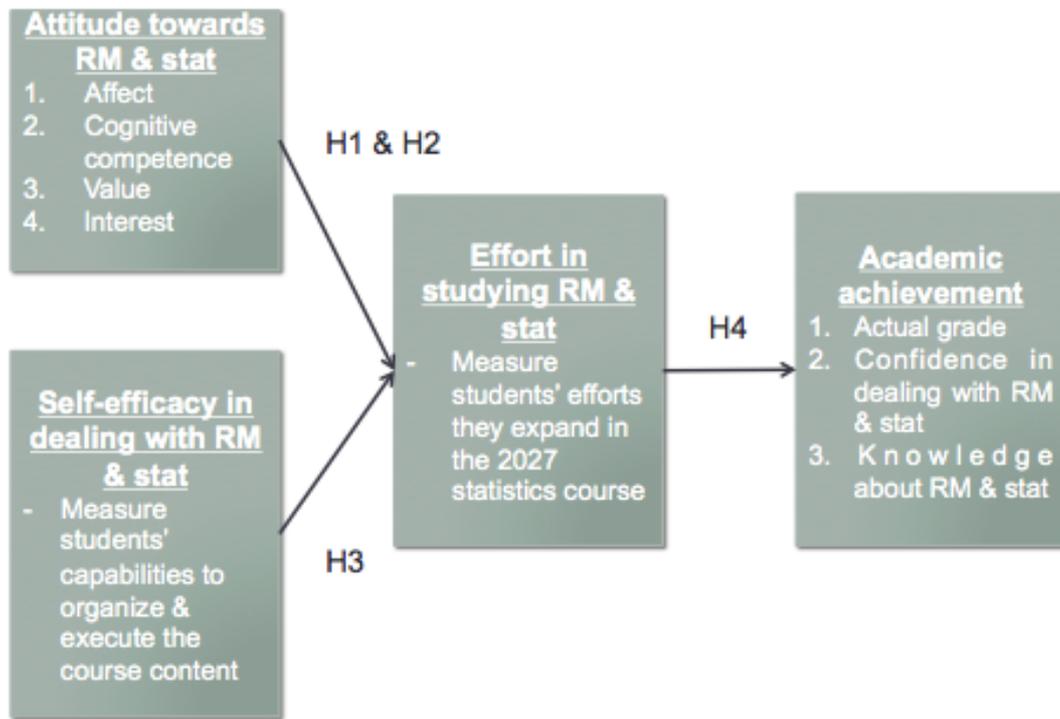


Figure 1. Conceptual framework of the present study.

Indeed, three theories are modified to help construct the conceptual framework of the present study, which are known as the motivational theory, attribution theory and the self-efficacy theory. The theories adopted can be used for explaining the relationship between 1) attitude and effort, 2) self-efficacy and effort and 3) effort and academic achievement.

Motivational theory

First and foremost, the motivational theory can be used to explain the relationship between *attitude* and *effort*. Different researches were carried out and the results revealed that when students considered learning activities as meaningful and relevant, this could help increase their intrinsic motivation (Gardner 1983, Sizer 1992, 1996, Cooperman 1994, and Seifert and O’Keefe 2001, cited Elliot *et al.* 2005, p. 27). On the basis of these researches, it can be assumed that students’ attitude towards an academic subject plays a role in affecting their intrinsic motivation, like effort. Therefore, the theory can be applied in the present study: when students possess a positive attitude towards research methods and statistics (e.g. the subject is meaningful and relevant to their academic studies and future career), they are more likely to put more effort into studying the subject. On the contrary, when students

possess a negative attitude towards research methods and statistics (e.g. the subject is meaningless and irrelevant to their academic studies and future career), they are less likely to exert extra effort into studying the subject.

Self-efficacy theory

In order to explain the relationship between *self-efficacy* and *effort*, the self-efficacy theory can be used. According to Bandura, self-efficacy is defined as “an individual’s belief or conviction that they can successfully achieve at a designated level on an academic task or attain a specific academic goal” (Feltz *et al.* 2007, p. 14). Bandura stated that self-efficacy played a role in determining how individuals felt, thought and motivated themselves, which then ultimately affected the behavior and the outcome.

On the basis of this theory, the present research assumes that when one’s self-efficacy towards research methods and statistics is high, he/she tends to put greater effort into studying the subject, which eventually results in a good grade. To put it in details, it means that when a student possesses a high self-efficacy towards research methods and statistics, it means that he/she has confidence in mastering the subject. With such a positive self-efficacy, this will simultaneously affect the student’s behavior. Since the student thinks he/she is capable of doing well, this will lead to a series of favorable behaviors. For example, the student attends all the lectures and works hard on this subject. Derived from such favorable behaviors, it is expected that the student is likely to achieve a good result in the subject.

On the contrary, when one’s self-efficacy towards research methods and statistics is low, he/she is less likely put great effort into the subject, which eventually results in a low grade. To put it in details, it means that when a student possesses a low self-efficacy towards research methods and statistics, it means that he/she does not have confidence in mastering the subject. With such a negative self-efficacy, this will at the same time affect the student’s behavior. Since the student thinks he/she is incapable of doing well in statistics, this will lead to a series of unfavorable behaviors. For example, the student refuses to attend the lectures and works hard on this subject. Derived from such unfavorable intended behaviors, it is expected that the student is less likely to obtain a good result in the subject.

Attribution theory

Last but not least, concerning the relationship between *effort* and academic *achievement*, the attribution theory is adopted. According to this theory, it states that individuals are considered as active beings that “seek to understand and master their environment and themselves” (Elliot *et al.* 2005, p. 17). Based on this assumption, it is argued that the outcome of individuals’ behavior can be determined by both external attributions and internal attributions. External attributions refer to those factors that individuals are unable to control (e.g. difficulty of the task) while internal attributions refer to those factors that individuals are able to control (e.g. effort, like the amount of time students spent on homework). According to this model, both internal attributions and external attributions play a role in affecting individuals’ subsequent behavior, like task engagement and persistence (Elliot *et al.* 2005, p. 18). However, some researchers argued that internal attributions played a more influential role than external attributions. It was found that when students considered themselves as exert great effort into studying the academic subject and hard working, they also tended to achieve better academically (Blatchford 1996, Lightbody *et al.* 1996, Gipps and Tunstall 1998, cited Elliot *et al.* 2005, p. 18).

In the present research, the focus is also placed on the internal attribution – effort and its’ role in affecting students’ academic achievement. It is assumed that when students put more effort into studying research methods and statistics, they are more likely to perform better in the subject. In contrast, when students exert less effort into studying research methods and statistics, they are less likely to achieve a satisfactory result.

Conceptualization and Operationalization

Conceptualization

As stated in the research title “a study of the attitude, self-efficacy, effort and academic achievement of CityU students towards research methods and statistics, it can be seen that there are primarily four variables that need to be conceptualized concretely, which are attitude, self-efficacy, effort and academic achievement.

Attitude (Independent variable)

According to Fishbein, attitude was conceptualized as “learned predispositions to respond to an object or class of objects in a favorable or unfavorable way” (Fishbein 1967, p. 257). In the present research, attitude is specifically defined as respondents’ attitude towards research methods and statistics.

Self-efficacy (Independent variable)

According to Bandura, self-efficacy was defined as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura 1977 cited Feltz *et al.* 2007). In the present study, self-efficacy is further refined as “academic self-efficacy”. Academic self-efficacy refers to “an individual’s belief (conviction) that they can successfully achieve at a designated level on an academic task or attain a specific academic goal” (Institute for Applied Psychometrics, 2008). In the present research, self-efficacy is further defined as respondents’ academic self-efficacy in dealing with the 2027 research methods and statistics course.

Effort (Mediated variable)

According to Carbonaro, he defined effort as the “amount of time and energy that students expend in meeting the formal academic requirements established by their teacher and/or school” (Carbonaro 2005, p. 28). In the current study, effort refers to the amount of effort that students expend in the 2027 research methods and statistics course.

Academic achievement (Dependent variable)

Based on past literature, there were numerous definitions of academic achievement. Generally speaking, academic achievement was defined as “a student’s academic performance in school” (Chen 2007, p. 23). In the current research, academic achievement mainly refers to the respondents’ actual grade in the 2027 research methods and statistics course, their confidence in dealing with research methods and statistics as well as their knowledge related to research methods and statistics.

Operationalization

Different scales were borrowed from western scholars as a means to measure the four main variables – attitude, self-efficacy, effort and academic achievement. With reference to the measurement of attitude towards research methods and statistics, the Attitude Toward Research Scale (ATRS) was adopted. For the measurement of academic self-efficacy, the College Academic Self-efficacy Scale was used. While concerning the measurement of effort, one of the subscales from the ATRS was modified and used. Last but not least, for the measurement of academic achievement, five questions were specially designed to measure the variable.

Attitude towards research methods and statistics

The Attitude Toward Research Scale (ATRS) is adopted to measure respondents’ attitude towards research methods and statistics (Walker 2010, p. 19). The Cronbach’s Alpha for the original scale is .85 and the scale is composed of 28 items, in which 14 of them measure respondents’ attitude towards research methods while the remaining 14 items measure respondents’ attitude towards statistics. The ATRS adopts a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) and higher scores indicate more positive attitude towards research methods and statistics.

The scale is composed of 4 sub-scales, which are known as affect, cognitive competence, value and interest:

(a) Affect

This subscale is comprised of 6 items, which aims at measuring students’ feelings concerning research methods and statistics. The subscale items are listed as follows:

Table 1. Scale items for attitude towards research methods and statistics (affect).

Scale items	Answer
1. I like statistics.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. I like research methods.	
3. I feel insecure when I have to deal with statistics problems.	
4. I feel insecure when I have to deal with research methods-related problems.	
5. I am under stress during statistics class.	
6. I am under stress during research methods class.	

(b) Cognitive competence

This subscale is comprised of 8 items, which aims at measuring students’ attitudes about their intellectual knowledge and skills when applied to research methods and statistics. The subscale items are listed as follows:

Table 2. Scale items for attitude towards research methods and statistics (cognitive competence).

Scale items	Answer
1. I can learn statistics.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. I can learn research methods.	
3. I find it difficult to understand statistical concepts.	
4. I find it difficult to understand research methods.	
5. I find statistics formulas easy to understand.	
6. I find research methods concepts easy to understand.	
7. I think statistics is a complicated subject.	
8. I think research methods is a complicated subject.	

(c) Value

This subscale is comprised of 6 items, which aims at measuring students’ attitude about the usefulness, relevance, and worth of research methods and statistics in personal and professional life. The subscale items are listed as follows:

Table 3. Scale items for attitude towards research methods and statistics (value).

Scale items	Answer
1. I think statistics is worthless.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. I think research methods are worthless.	
3. Statistics should be a required part of my professional training.	
4. Research methods should be a required part of my professional training.	
5. Statistical skills make me more employable.	
6. Research methods skills make me more employable.	

(d) Interest

This subscale is comprised of 8 items, which aims at measuring students’ level of individual interest in research methods and statistics. The subscale items are listed as follows:

Table 4. Scale items for attitude towards research methods and statistics (interest).

Scale items	Answer
1. I am interested in being able to communicate statistical information to others.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. I am interested in being able to communicate research methods-related information to others.	
3. I am interested in using statistics.	
4. I am interested in using research methods.	
5. I am interested in understanding statistical information.	
6. I am interested in understanding research methods-related information.	
7. I am interested in learning statistics.	
8. I am interested in learning research methods.	

Academic self-efficacy

Owen and Froman’s College Academic Self-efficacy Scale (CASES) was adopted to measure college students’ academic self-efficacy by studying their capabilities to organize and execute the 2027 research methods and statistics course content (Education Resources Information Center, 2010). The Cronbach’s Alpha for the original scale is .86 and the scale is composed of 6 items with a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). When respondents score high in the scale, it means that they have higher academic self-efficacy and vice versa. The scale items are presented in the following table:

Table 5. Scale items for academic self-efficacy.

Scale items	Answer
1. I was able to take well-organized notes during the 2027 research methods and statistics class.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. I participated in the 2027 research methods and statistics tutorial class by answering lecturer’s question.	
3. I can relate the 2027 course content to material in other courses.	
4. I can explain and tutor other students about the 2027 course content.	
5. I can understand most ideas I read in the 2027 tests.	
6. I can understand most ideas presented in the 2027 class.	

Effort

The ATRS was modified to measure the amount of effort students expend in the 2027 research methods and statistics course. The Cronbach’s Alpha for the original scale is .85 and the scale is composed of 7 items with a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). When respondents score high in the scale, it means that they put more effort into the 2027 research methods and statistics course. The scale items are presented in the following table:

Table 6. Scale items for effort.

Scale items	Answer
1. Apart from completing the stated 2027 course assignments, I also completed extra exercises related to research methods and statistics.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. Apart from reading the stated 2027 lecture notes, I also read extra readings/information related to research methods and statistics.	
3. I worked hard to complete the 2027 course.	
4. I studied hard and prepared well for every 2027 test.	
5. In order to get full understanding on the 2027 course content, I read the lecture notes more than once.	
6. I attended every 2027 class section on time.	
7. I paid close attention to what the lecturer said in class.	

Academic achievement

Five questions are specially designed to measure the variable, which aims at studying students’ knowledge about research methods and statistics, their confidence in dealing with statistics and research methods-related problems as well as their actual course grade. The scale items are presented in the following table:

Table 7. Scale items for academic achievement.

Scale items	Answer
1. After completing the 2027 course, I have increased statistical knowledge.	Close-ended questions with a 7-point likert scale (1 = strongly disagree, 7 = strongly agree), in which respondents are required to indicate their level of agreement with each questionnaire item.
2. After completing the 2027 course, I have increased research methods-related knowledge.	
3. After completing the 2027 course, I have more confidence in dealing with statistics problems.	
4. After completing the 2027 course, I have more confidence in dealing with research methods-related problems.	
5. My actual course grade of the 2027 course is ____.	Close-ended question, in which respondents are required to indicate their actual course grade by selecting from 14 options (ranging from A+ to F).

Survey Design and Sampling

Survey Design

In the present research, quantitative research method was adopted. Concerning the primary data collection method, self-completed questionnaire was chosen because it was comparatively timesaving and had the benefit of collecting responses from a large group of subjects with a relatively low cost (Dahlberg and McCaig 2010, p. 161).

Sampling

In the present research, the targeted sample was students who are currently studying at the City University of Hong Kong. However, the sample population was further confined to students coming from the Department of Applied Social Studies, which was composed of the Department of Applied Sociology, Psychology, Social Work and Criminology. The primary reason for targeting students majoring in these four subjects was due to the fact that all of them had already completed the 2027 research methods and statistics course. Concerning the number of samples selected for participating in the present research, 153 data was collected in total.

Regarding the sampling method, convenience sampling and snowball sampling were adopted in the process of selecting samples from the target population. Concerning convenience sampling, it was a sampling method in which samples were selected on the basis of easy availability. Since the researcher was from the Department of Applied Social Studies, she could easily approach students studying the four main streams. After distributing the questionnaires to those students she personally came in touch with, she then invited the respondents to further recruit subjects from among their acquaintances to fill out the questionnaire, which was known as the snowball sampling.

Pilot test

Pilot test is a crucial part before asking the respondents to fill out the questionnaires, and there are numerous benefits for carrying out pilot tests. Apart from assuring the validity and the reliability of the questionnaire, it can also ensure the questions are clearly worded, and that the respondents comprehend the questionnaire in the right way (Dahlberg and McCaig 2010, p. 181).

To conduct the pilot test, the researcher distributed 30 pilot questionnaires to her fellow classmates, who were Applied Sociology Year 3 students. After the respondents completed the pilot questionnaire, they were invited to provide feedbacks regarding the pilot test. For example, they were asked how long it took them to fill out the questionnaire, whether they found the questionnaire items clear or confusing, and whether any improvements could be made, etc. After collecting respondents' feedbacks, the researcher carefully read the suggestions provided by the respondents and made corresponding adjustments to the questionnaire items. With reference to the collection of pilot questionnaires, the researcher chose to collect them in person once the questionnaires were completed. As there were only 30 sets of pilot questionnaires being distributed, collecting them in person was a swift way for gathering information (Dahlberg and McCaig 2010, p. 162).

Data collection

Throughout the data collection procedure, respondents' privacy was protected as their anonymity was assured. First and foremost, respondents were not required to provide sensitive and detailed personal information, like their full name. Instead, respondents only needed to indicate their sex, major, year of study, ways of getting into university as well as A-level major.

Apart from this, in order to further protect respondents' anonymity, they were not required to hand in the questionnaire to the researcher directly but to put the completed questionnaire in a collection box. Through such measures, there was no way for the researcher to identify which set of questionnaire was completed by a particular respondent, and their anonymity was guaranteed.

Moreover, even though the scales adopted in the questionnaire were borrowed from western scholars, in order to facilitate respondents' comprehension of the questionnaire items, they were translated to Chinese. Indeed, there was another advantage for adopting the Chinese translation. Since Chinese was regarded as the respondents' first language, they did not need to spend extra time to comprehend the questionnaire items and therefore, the questionnaire completion procedure was simultaneously facilitated.

Data Processing and Data Analysis

Level of measurement

In the present study, all the scales adopted are regarded as interval level of measurement, which include the scales measuring 1) attitude towards research methods and statistics, 2) academic self-efficacy, 3) effort as well as 4) academic achievement. All the scales are composed of items with equal unit of measurement, which can be ranked accordingly.

Data analysis

In the present research, there are four main variables included in hypotheses testing, which are attitude, self-efficacy, effort as well as academic achievement and they were subjected to in-depth data analysis. For those variables that are not included in hypotheses testing, like respondents' demographic background, they are mainly used for providing descriptive information.

In analyzing the relationship between the variables, SPSS 19.0 was used and four main analyses were conducted:

1. *Reliability test* was conducted to estimate the reliability of the scales adopted in the present study.
2. *Descriptive statistics* were used to reveal the demographic characteristics of the respondents.
3. *Pearson's correlation coefficient* was used to indicate whether the 4 main variables were significantly related to each other (H1, H2, H3 and H4).
4. *Multiple regression analyses* were used to estimate 1) the prediction power of attitude and self-efficacy on effort and 2) the prediction power of attitude, self-efficacy, and effort on academic achievement.

Findings

After using SPSS 19.0 to process the data collected, four sets of analyses were undergone:

1. *Descriptive statistics* were used to display the socio-demographic characteristics of the respondents.
2. *Reliability tests* were conducted to determine whether the scales adopted in the present study were reliable.
3. *Pearson's correlation coefficient* was carried out as a means to estimate the relationship between the four variables of the present study, which were known as attitude, self-efficacy, effort and academic achievement.
4. *Multiple regression analysis* was done to estimate the predictability of the above-mentioned variables.

Descriptive statistics about respondents' socio-demographic background

There were totally 153 students participated in the present study, in which all of them came from the City University of Hong Kong. Concerning the gender of the participants, the distribution of male and female was proportionate, in which 49.7% of them were male while 50.3 % of them were female. As indicated in the table, all of the students came from the Department of Applied Social Studies. Nearly half of the respondents studied Applied Sociology (42.5%), followed by Social Work (26.1%), Criminology (16.3%) and Psychology (15.0%). Concerning respondents' year of study, almost half of them were Year 3 students (45.8%), while the remaining 32.7% and 21.6% were Year 2 and Year 1 students respectively. Among the participants, most of them studied arts for A-level major (58.2%), followed by science (22.2%), and commerce (13.1%). For those respondents who chose not applicable (6.5%), it meant that they did not take the Advanced level examination.

Table 8. Socio-Demographic Characteristics of the Study Sample of 153 Students.

Socio-Demographic Characteristics	Percent
Gender (N=153)	
Male	49.7
Female	50.3
Major (N=153)	
Applied Sociology	42.5
Psychology	15.0
Social Work	26.1
Criminology	16.3
Year of Study (N=153)	
Year 1	21.6
Year 2	32.7
Year 3	45.8
A-level Major (N=153)	
Science	22.2
Arts	58.2
Commerce	13.1
Not Applicable	6.5

Reliability test of the scales

As earlier mentioned, the scales adopted in the present study were borrowed and modified from scales used in past studies. Since modification was involved, the reliability of the scales might be affected. Therefore, it was necessary to conduct reliability tests as a means to ensure the scales were reliable enough.

After conducting the reliability tests, it was found that the modified scales were quite reliable as the Cronbach's Alpha ranged from .603 to .954. Therefore, it could be said that even though the scales had been modified, they could still sustain a satisfactory level of reliability.

Table 9. Reliability among all scales.

Scale	Number of items	Cronbach's Alpha
Attitude towards research methods	14	.915
(Sub-scale) Affect	3	.791
(Sub-scale) Cognitive competence	4	.795
(Sub-scale) Value	3	.603
(Sub-scale) Interest	4	.948
Attitude towards statistics	14	.924
(Sub-scale) Affect	3	.790
(Sub-scale) Cognitive competence	4	.829
(Sub-scale) Value	3	.612
(Sub-scale) Interest	4	.954
Self-efficacy	6	.904
Effort	7	.788
Academic achievement	4	.896

Descriptive statistics of the scales

After providing an overview of the scales adopted in the present study, each scale will be discussed in details in the following parts.

Independent variable 1: Attitude towards research methods and statistics

In order to present a clearer overview of the variable "attitude towards research methods and statistics", the variable will be sub-divided into two parts: attitude towards research methods and attitude towards statistics. As shown in the table 10, the total mean score for attitude towards research methods is $M = 51.07$ and the item with highest mean score is "I think research methods are worthless" ($M = 5.29$). As shown in table 11, concerning the attitude towards statistics, the total mean score is $M = 47.52$ and the item with highest mean score is "I think statistics is worthless" ($M = 5.24$).

Table 10. Mean scores and standard deviation for “attitude towards research methods”.

Reliability	Number of items	Cronbach’s Alpha
Attitude towards research methods	14	.915
Items	Mean	SD
1. I like research methods.	3.25	1.484
2. I feel insecure when I have to deal with research methods-related problems.	3.17	1.261
3. I am under stress during research methods class.	3.11	1.336
4. I can learn research methods.	4.17	1.332
5. I find it difficult to understand research methods.	3.50	1.308
6. I find research methods concepts easy to understand.	3.54	1.400
7. I think research methods are a complicated subject.	2.75	1.121
8. I think research methods are worthless.	5.29	1.301
9. Research methods should be a required part of my professional training.	4.90	1.062
10. Research methods skills make me more employable.	4.82	1.060
11. I am interested in being able to communicate research methods-related information to others.	3.05	1.549
12. I am interested in using research methods.	3.05	1.462
13. I am interested in understanding research methods-related information.	3.11	1.579
14. I am interested in learning research methods.	2.59	1.238
Total attitude towards research methods	51.07	12.845

Table 11. Mean scores and standard deviation for “attitude towards statistics”.

Reliability	Number of items	Cronbach’s Alpha
Attitude towards statistics	14	.924
Items	Mean	SD
1. I like statistics.	2.89	1.624
2. I feel insecure when I have to deal with statistics problems.	2.96	1.395
3. I am under stress during statistics class.	2.92	1.460
4. I can learn statistics.	3.93	1.419
5. I find it difficult to understand statistics.	3.03	1.333
6. I find statistical concepts easy to understand.	2.81	1.351
7. I think statistics is a complicated subject.	2.38	1.147
8. I think statistics is worthless.	5.24	1.302
9. Statistics should be a required part of my professional training.	4.88	1.124
10. Statistical skills make me more employable.	4.70	1.170
11. I am interested in being able to communicate statistical information to others.	2.82	1.363
12. I am interested in using statistics.	3.26	1.512
13. I am interested in understanding statistical information.	3.21	1.413
14. I am interested in learning statistics.	3.29	1.546
Total attitude towards statistics	47.52	13.662

Independent variable 2: Academic self-efficacy

As reflected in the following table, the total mean score for academic self-efficacy is $M = 23.22$ and the item with the highest mean score is “I was able to take well-organized notes during the 2027 research methods and statistics class” ($M = 4.25$).

Table 12. Mean scores and standard deviation for “academic self-efficacy”.

Reliability	Number of items	Cronbach’s Alpha
Academic self-efficacy	6	.904
Items	Mean	SD
1. I was able to take well-organized notes during the 2027 research methods and statistics class.	4.25	1.222
2. I participated in the 2027 research methods and statistics tutorial class by answering lecturer’s question.	3.69	1.439
3. I can relate the 2027 course content to material in other courses.	3.97	1.386
4. I can explain and tutor other students about the 2027 course content.	3.71	1.385
5. I can understand most ideas I read in the 2027 tests.	3.75	1.316
6. I can understand most ideas presented in the 2027 class.	3.85	1.245
Total academic self-efficacy	23.22	6.379

Mediated variable: Effort

As shown in the table below, the total mean score for effort is $M = 28.54$ and the item with the highest mean score is “I attended every 2027 class section on time” ($M = 4.91$).

Table 13. Mean scores and standard deviation for “effort”.

Reliability	Number of items	Cronbach’s Alpha
Effort	7	.788
Items	Mean	SD
1. Apart from completing the stated 2027 course assignments, I also completed extra exercises related to research methods and statistics.	2.78	1.642
2. Apart from reading the stated 2027 lecture notes, I also read extra readings/information related to research methods and statistics.	3.01	1.672
3. I worked hard to complete the 2027 course.	4.63	1.450
4. I studied hard and prepared well for every 2027 test.	4.53	1.328
5. In order to get full understanding on the 2027 course content, I read the lecture notes more than once.	4.08	1.480
6. I attended every 2027 class section on time.	4.91	1.528
7. I paid close attention to what the lecturer said in class	4.60	1.330
Total effort	28.54	6.942

Dependent variable: Academic achievement

As seen in table 14, the total mean score for academic achievement is $M = 16.84$ and the item with highest mean score is “after completing the 2027 course, I have increased statistical knowledge” ($M = 4.57$).

Table 14. Mean scores and standard deviation for “academic achievement”.

Reliability	Number of items	Cronbach’s Alpha
Academic achievement	4	.896
Items	Mean	SD
1. After completing the 2027 course, I have increased statistical knowledge.	4.57	1.196
2. After completing the 2027 course, I have increased research methods-related knowledge.	4.52	1.113
3. After completing the 2027 course, I have more confidence in dealing with statistics problems.	3.86	1.222
4. After completing the 2027 course, I have more confidence in dealing with research methods-related problems.	3.90	1.226
Total academic achievement	16.84	4.153

Correlation analysis

Pearson’s correlation coefficient was used for testing the hypotheses stated in the present study and this part mainly summarizes the correlation between the concerned variables. However, it should be noted that “attitude towards research methods and statistics” are presented in separate findings. Also, “actual achievement” is divided into two parts “actual grade” and “increase in knowledge and confidence in dealing with research methods and statistics” because the measurement is different for the two scales.

As can be seen in the graph below, the correlation intensity between the variables is clearly presented.

Table 15. Respondents’ attitude towards research methods, attitude towards statistics, academic self-efficacy, effort and academic achievement.

Measure	1	2	3	4	5	6
1. Attitude towards research methods	--	.844*	.589*	.512*	.475*	.542*
2. Attitude towards statistics	--	--	.641*	.542*	.478*	.671*
3. Academic self-efficacy	--	--	--	.683*	.475*	.728*
4. Effort	--	--	--	--	.482*	.556*
5. Academic achievement (Actual grade)	--	--	--	--	--	-
6. Academic achievement (Increase in confidence and knowledg)	--	--	--	--	--	-

* $p < .01$ (2-tailed)

H1: The more positive one's attitude towards research methods, the more effort he/she will put into the subject

Pearson's correlation coefficient showed that the attitude towards research methods ($r(153) = .512$) was statistically significant and moderately correlated with effort. Therefore, hypothesis 1 was supported.

H2: The more positive one's attitude towards statistics, the more effort he/she will put into the subject

Pearson's correlation coefficient showed that the attitude towards statistics ($r(153) = .542$) was also statistically significant and moderately correlated with effort. Therefore, hypothesis 2 was supported.

H3: The higher one's academic self-efficacy, the more effort he/she will put into the subject

Pearson's correlation coefficient showed that academic self-efficacy ($r(153) = .683$) was statistically significant and strongly correlated with effort. Therefore, hypothesis 3 was supported.

H4: The more effort one puts into the subject, the higher he/she will achieve academically

Pearson's correlation coefficient showed that effort ($r(153) = .482$) was statistically significant and moderately correlated with academic achievement (actual grade). Also, it was found that when students put more effort into studying research methods and statistics, they were likely to indicate an increase in knowledge and confidence in dealing with the subject ($r(153) = .556$).

Apart from testing the stated hypotheses, it was found that extra findings could be obtained after conducting the correlation analysis:

Relationship between attitude towards research methods & attitude towards statistics

Correlation analysis displayed that there was a significantly positive relationship between attitude towards research methods and attitude towards statistics ($r(153) = .844$). This meant that the more positive one's attitude towards research methods, he/she also tended to have a positive attitude towards statistics.

Relationship between attitude towards research methods & statistics and academic self-efficacy

It was also found that there was a moderately positive correlation between attitude towards research methods & statistics and academic self-efficacy. The more positive one's attitude towards research methods, his/her academic self-efficacy also tended to be higher ($r(153) = .589$). Similarly, when one's attitude towards statistics was positive, he/she also tended to have higher academic self-efficacy ($r(153) = .641$).

Relationship between attitude towards research methods & statistics and academic achievement

Apart from this, it was also discovered that there was a positive correlation between attitude towards research methods & statistics and academic achievement. When a student's attitude towards research methods is positive, he/she tended to indicate an increase in knowledge and confidence in dealing with the subject ($r(153) = .542$), and he/she was likely to achieve a higher grade in the 2027 research methods & statistics course ($r(153) = .475$).

Similarly, when a student's attitude towards statistics is positive, he/she tended to indicate an increase in knowledge and confidence in dealing with the subject ($r(153) = .671$), and he/she was likely to achieve a higher grade in the 2027 research methods & statistics course ($r(153) = .478$).

Relationship between academic self-efficacy and academic achievement

Pearson's correlation coefficient reflected that there was a positive relationship between the two variables: academic self-efficacy and academic achievement. It was found that when a student possessed high academic self-efficacy, he/she was more likely to indicate an increase in knowledge and confidence in dealing with the subject ($r(153) = .728$), and he/she tended to achieve a higher grade in the 2027 research methods & statistics course ($r(153) = .475$).

Multiple regression

In this part, mainly two multiple regression analyses were carried out. The first set of multiple regression analysis was conducted to test the prediction power of attitude towards research methods & statistics and academic self-efficacy on effort while the second set of multiple regression analysis was conducted to test the prediction power of attitude towards research methods & statistics, academic self-efficacy and effort on academic achievement.

Multiple regression of attitude towards research methods & statistics and academic self-efficacy on effort

In table 16, it showed the multiple regression of attitude towards research methods and academic self-efficacy on effort. It was found that both attitude towards research methods ($B = .088$, $p < .05$) and academic self-efficacy ($B = .619$, $p < .01$) could significantly predict effort. The two variables could explain 48.5% of variation of the amount of effort that students expended in studying the 2027 course ($R^2 = .485$, $F(152) = 70.762$, $p < .05$).

Table 16. Multiple regression of attitude towards research methods and academic self-efficacy on effort.

Variables	B	Beta	t	Sig.
Attitude towards research methods	.088	.167	2.324	.021
Academic self-efficacy	.619	.586	8.151	.000
F	70.762**			
R	.697			
R ²	.485			
Regression df	2			
Residual df	150			
N	152			

Note: * $p < .05$, ** $p < .01$
 DV: Effort

In table 17, it showed the multiple regression of attitude towards statistics and academic self-efficacy on effort. Similar to the results shown in table 16, it was found that both attitude towards statistics ($B = .091$, $p < .05$) and academic self-efficacy ($B = .599$, $p < .01$) could significantly predict effort. The two variables could explain 48.7% of variation of the amount of effort that students expended in studying the 2027 course ($R^2 = .487$, $F(152) = 71.316$, $p < .05$).

Table 17. Multiple regression of attitude towards statistics and academic self-efficacy on effort.

Variables	B	Beta	t	Sig.
Attitude towards statistics	.091	.184	2.448	.016
Academic self-efficacy	.599	.567	7.534	.000
F	71.316**			
R	.698			
R ²	.487			
Regression df	2			
Residual df	150			
N	152			

Note: * $p < .05$, ** $p < .01$
 DV: Effort

Multiple regression of attitude towards research methods & statistics, academic self-efficacy, effort on academic achievement

In the following part, the multiple regression analyses of attitude research methods & statistics, academic self-efficacy, effort on academic achievement will be displayed. However, since academic achievement is composed of two variables, which are made

of different scale measurements: 1) knowledge and confidence in dealing with research methods and statistics and 2) actual 2027 course grade. Therefore, it is necessary to conduct separate multiple regressions on this variable.

Part 1: Multiple regression analyses of attitude towards research methods, academic self-efficacy, effort on academic achievement (knowledge and confidence)

In table 18, it showed the multiple regression analysis of attitude towards research methods, academic self-efficacy and effort on academic achievement (knowledge and confidence). It was found that only attitude towards research methods ($B = .038$, $p < .01$) and academic self-efficacy ($B = .153$, $p < .01$) could significantly predict academic achievement (confidence and knowledge). The two variables could explain 45.6% of variation of students' academic achievement (knowledge and confidence in dealing with the subject) ($R^2 = .456$, $F(152) = 43.454$, $p < .05$).

Table 18. Multiple regression of attitude towards research methods, academic self-efficacy and effort on academic achievement (knowledge and confidence).

Variables	B	Beta	t	Sig.
Attitude towards research methods	.038	.231	3.066	.003
Academic self-efficacy	.153	.481	5.420	.000
Effort	.016	.054	.650	.516
F	43.454			
R	.683			
R ²	.456			
Regression df	3			
Residual df	149			
N	152			

Note: * $p < .05$, ** $p < .01$

DV: Academic achievement (knowledge and confidence)

Multiple regression of attitude towards statistics, academic self-efficacy, effort on academic achievement (knowledge and confidence)

As indicated in table 19, similar findings could be obtained. It was found that only attitude towards statistics ($B = .051$, $p < .01$) and academic self-efficacy ($B = .173$, $p < .01$) could significantly predict academic achievement (confidence and knowledge). The two variables could explain 61.6% of variation of students' academic achievement (knowledge and confidence in dealing with the subject) ($R^2 = .616$, $F(152) = 82.244$, $p < .05$).

Table 19. Multiple regression of attitude towards statistics, academic self-efficacy and effort on academic achievement (knowledge and confidence).

Variables	B	Beta	t	Sig.
Attitude towards statistics	.051	.316	4.737	.000
Academic self-efficacy	.173	.514	6.707	.000
Effort	.015	.047	.668	.505
<hr/>				
F	82.244			
R	.790			
R ²	.616			
Regression df	3			
Residual df	149			
N	152			

Note: * $p < .05$, ** $p < .01$

DV: Academic achievement (knowledge and confidence)

Part 2: Multiple regression analyses of attitude towards research methods, academic self-efficacy, effort on academic achievement (actual 2027 course grade)

In table 20, it showed the multiple regression analysis of attitude towards research methods, academic self-efficacy and effort on academic achievement (actual 2027 course grade). It was found that only attitude towards research methods ($B = .092$, $p < .01$) and academic self-efficacy ($B = .355$, $p < .01$) could significantly predict academic achievement (actual course grade). The two variables could explain 59.6% of variation of the actual 2027 course grade that students obtained ($R^2 = .596$, $F(152) = 73.267$, $p < .05$).

Table 20. Multiple regression of attitude towards research methods, academic self-efficacy and effort on academic achievement (actual 2027 course grade).

Variables	B	Beta	t	Sig.
Attitude towards research methods	.092	.263	4.016	.000
Academic self-efficacy	.355	.518	6.712	.000
Effort	.059	.091	1.258	.211
<hr/>				
F	73.267			
R	.772			
R ²	.596			
Regression df	3			
Residual df	149			
N	152			

Note: * $p < .05$, ** $p < .01$

DV: Academic achievement (actual 2027 course grade)

Similar findings could be obtained in table 22, which showed the multiple regression analysis of attitude towards statistics, academic self-efficacy and effort on academic achievement (actual 2027 course grade). It was found that only attitude towards statistics ($B = .106$, $p < .01$) and academic self-efficacy ($B = .324$, $p < .01$) could significantly predict academic achievement (actual 2027 course grade). The two variables could explain 61.1% of variation of the actual 2027 course grade that students obtained ($R^2 = .611$, $F(152) = 78.128$, $p < .05$).

Table 21. Multiple regression of attitude towards statistics, academic self-efficacy and effort on academic achievement (actual 2027 course grade).

Variables	B	Beta	t	Sig.
Attitude towards statistics	.106	.322	7.532	.000
Academic self-efficacy	.324	.473	4.760	.000
Effort	.053	.082	1.149	.252

F	78.128
R	.782
R ²	.611
Regression df	3
Residual df	149
N	152

Note: * $p < .05$, ** $p < .01$
 DV: Academic achievement (actual 2027 course grade)

Discussion

Discussion on Pearson’s correlation coefficient

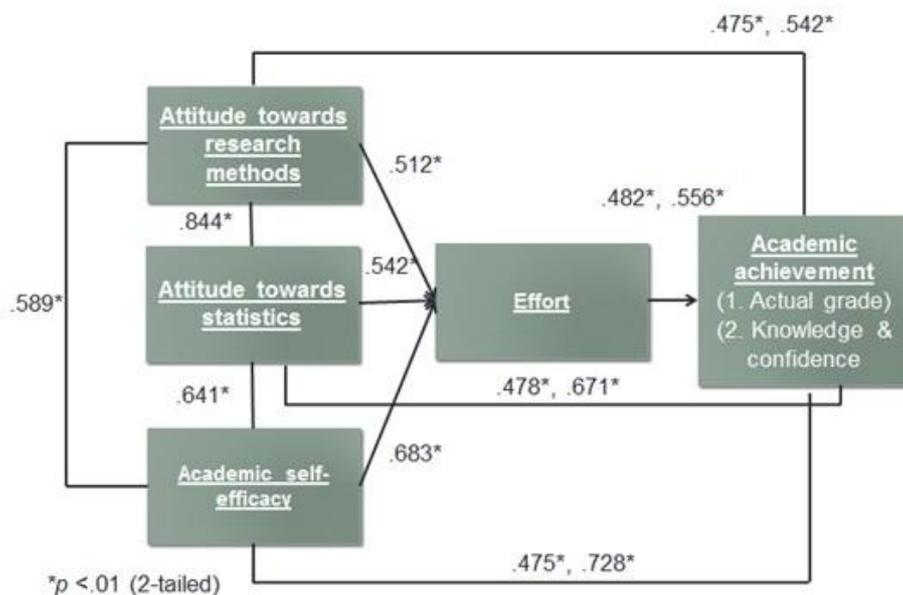


Figure 2. Summarized graph of Pearson’s correlation coefficient.

Present findings are consistent with past literature

(a) Attitude and self-efficacy are respectively related to effort

The present research discovers that when students possess a positive attitude towards research methods and statistics, they tend to put more effort into studying the subject. Similarly, students with a high self-efficacy towards research methods and statistics, they also tend to put more effort into studying the subject. Indeed, these two findings are similar to existing literature.

Concerning the relationship between attitude and effort, in a research conducted in Washington, the researcher studied the relationship between students' attitude towards science and the amount of effort they would expend in completing a computer science program. The results indicated that there was a positive relationship between attitude and effort, and attitude could be regarded as a reliable predictor of effort (Center for Educational Technologies, 2007).

With reference to the relationship between self-efficacy and effort, similar findings are found in existing literature. According to Bandura's developmental analysis of self-efficacy, he stated that there was a positive relationship between self-efficacy and effort, in which self-efficacy affected how much effort individuals would expend (Flavell, 1981, p. 200).

(b) Effort is related to academic achievement

In the present research, it is found that there is a positive correlation between effort and academic achievement, in which similar findings are existent in past literature. For example, in a study conducted in the U.S., the researchers stated that Asian American students tended to exert more effort in their studies (e.g. spent more time working on assignments, attended more lessons outside school) and they achieved better academically when compared to other minority students (Peng and Wright, 1994, p. 348).

Present findings are consistent with the stated hypotheses

As stated in the hypotheses, it was assumed that there was a positive relationship between 1) attitude towards research methods and effort, 2) attitude towards statistics and effort, 3) academic self-efficacy and effort and finally, 4) effort and academic achievement.

As aforementioned, Pearson's correlation coefficient demonstrated that there was a positive relationship (ranging from moderately to strongly) between the concerned variables and that all the stated hypotheses were supported.

Present extra findings are consistent with past literature

(a) Attitude and self-efficacy are related to each other

In the present research, it is found that when students' attitude towards research methods and statistics are positive, their self-efficacy is also higher. Indeed, such a finding is consistent with past researches. For example, in a study conducted by Delcourt and Kinize, they found that if students held positive attitude towards an academic subject (e.g. they found it comfortable to study the subject and they thought the subject was useful to their studies and future career, they tended to possess higher self-efficacy in studying the subject.

(b) Attitude is related to academic achievement

From the present research, it is found that attitude is moderately and positively correlated with academic achievement, which provides support to past literature. For example, a research proved that students who possessed a positive study attitude were more likely to demonstrate higher academic performance than those who had a less positive attitude towards studies. In addition, the research also showed that 98.7% of the underachievers tended to possess a less favorable attitude towards their studies (Moghni and Riaz 1994, Hamachak 1998, cited Bakar 2010).

(c) Academic self-efficacy is correlated with academic achievement

The present study demonstrates that academic self-efficacy and academic achievement are positively correlated, which is found to be consistent with most of the existing literature. For example, in a study conducted in the U.S., the researchers examined the effect of self-efficacy on first-year university students' academic achievement (Chemers *et al.* 2001, p. 55). After analyzing the data collected, it was shown that the higher one's self-efficacy, the better the academic performance he/she could achieve.

Discussion on multiple regression analyses

Multiple regression of attitude towards research methods & statistics and academic self-efficacy on effort

As shown in the results, it is found that both attitude towards research methods and attitude towards statistics as well as academic self-efficacy can significantly predict effort. As aforementioned, in a research conducted in Washington, the researcher studied the relationship between students' attitude towards science and the amount of effort they would expend in completing a computer science program. The results indicated that attitude could be regarded as a reliable predictor of effort (Center for Educational Technologies 2007).

Concerning self-efficacy's prediction power on effort, in a research studying the relationship between one's self-efficacy and health behaviors, it was found that self-efficacy could successfully predict one's effort in engaging in health behaviors (Fuchs and Schearzer 1995 cited Conner and Norman 1995).

Multiple regression of attitude towards research methods & statistics, academic self-efficacy, effort and academic achievement

After conducting the second set of multiple regression analysis, an interesting finding is obtained. As earlier mentioned, it is found that attitude and academic self-efficacy could significantly predict effort in the first set of regression analysis. However, in the second set of regression analysis, it is discovered that only attitude and academic self-efficacy can significantly predict academic achievement while effort fails to do so. Indeed, such a finding is contradictory with most of the existing literature, in which most of them stated that effort could significantly predict academic achievement. Even so, it was found that there was a past study stating that effort could not successfully predict achievement. The researchers examined the relationship between university students' effort (measured in term of the amount of time students spent in learning) and academic performance (grades achieved by the respondents). The results indicated that effort failed to predict respondents' academic performance (Chassie *et al.* 2004, p. 232).

All, in all, the present result finding indicates that even though effort does relate to attitude and effort, it fails to be an important factor in predicting academic achievement. Therefore, effort can only be regarded as an indirect factor, but not a necessary factor in bridging the relationship between attitude, self-efficacy and academic achievement.

Limitations and recommendations

Limitations of the present study

Indeed, three limitations can be observed in the present study, which include limited representativeness in terms of sample size, sampling method as well as social desirability bias, and absence of a pre-test study.

Limited sample size

First and foremost, there were only 153 respondents participated in the present research, which could not be regarded as a large sample size. Also, all of the respondents came from the same university – City University of Hong Kong. Therefore, the opinions collected from them could not be generalized to a larger population, like all the university students in Hong Kong and the data collected was considered as limited in representativeness because of its' homogeneity.

Sampling method

Owing to limited resources, the researcher adopted two non-probability sampling methods, which were known as convenience sampling and snowball sampling. Under non-probability sampling, not every sample had the equal chance of being selected. Therefore, the sampling method could also be regarded as another limitation, which reduced the representativeness of the present study.

Social desirability bias

In the present research, the data collection method was self-completed questionnaire and there was a methodological flaw for adopting this method. Since respondents filled out the questionnaire on their own, it was possible for them to give answers that are considered favorable as a means to impress the researcher.

Absence of a pre-test study

Since the present study only took place after the respondents had completed the 2027 research methods and statistics course, a comparison could not be made. If a pre-test was available, the researcher could observe whether there was a change in attitude, self-efficacy and effort that students expended in studying research methods & statistics before and after taking the 2027 course.

Recommendations for future studies

In order to further improve the study on this area, some recommendations are suggested:

Large and heterogeneous sample

First and foremost, in order to improve the representativeness of future studies, it is suggested that researchers should invite students who need to study research methods and statistics from all the 9 universities in Hong Kong to participate in the study. Since the respondents respectively represent distinctive universities in Hong Kong, the data collected will be more heterogeneous. Therefore, the results generated from the study can be generalized to represent a larger population – general university students in Hong Kong.

Apart from including a larger and more heterogeneous sample, it is also suggested that researchers should adopt a probability sampling method, like random sampling in collecting data. For example, researchers can make the data collected more representative by randomly recruit a proportionate amount of students from each university to participate in the study.

Focus on studying the role of “effort”

In addition, in the present research, the statement that “effort” serves as a mediated factor between attitude, self-efficacy and academic achievement is still under question. The correlation analysis proved that there was a positive relationship between attitude, self-efficacy and effort. Similarly, after conducting the multiple regression analysis, it was found that both attitude and self-efficacy could significantly predict effort. However, when the researcher conducted another multiple regression analysis to test whether all the three variables (attitude, self-efficacy and effort) could significantly academic achievement, it was found that effort failed to predict academic achievement.

Therefore, the role of “effort” in serving as a mediated factor between attitude, self-efficacy and academic achievement needs to be further studied. All in all, it is suggested that future researchers can focus on studying this area by testing whether “effort” genuinely serves as a mediated factor by bridging the relationship between attitude, self-efficacy and academic achievement.

More researches need to be conducted in Hong Kong

Last but not least, even though the topic of attitude, self-efficacy, effort and academic achievement has been a popular topic in the fields of socio-educational researches, a vast majority of these studies were conducted in foreign countries, particularly in the U.S. and European countries.

On the contrary, in Hong Kong, there are few researches concerning this area of study. Therefore, it is therefore suggested that researchers can get an in-depth understanding on Hong Kong’s phenomenon by studying the attitude, self-efficacy, effort and academic achievement of university students in Hong Kong.

Conclusion

First and foremost, the present research proves that all the four variables (attitude, self-efficacy, effort and academic achievement) are positively correlated with one other. However, even though they are related to one another, multiple regression analyses display some interesting findings. For the first set of multiple regression analysis, it is found that attitude and self-efficacy can significantly predict effort. However, in the second set of regression analysis, when all the three variables (attitude, self-efficacy and effort) are considered as independent variables while academic achievement is considered as the dependent variable, it is discovered that effort cannot predict academic achievement. Therefore, effort can only be regarded as

an indirect factor that can influence both attitude and self-efficacy, but not necessarily academic achievement.

Apart from this, the present research also further consolidates the direct relationship between attitude, self-efficacy and academic achievement as suggested in past literature. It is observed that attitude has a direct effect on academic achievement while self-efficacy also has a direct effect on academic achievement.

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Biographic Note

Miss Lilian K.Y. Li is the 2012 graduate of Bachelor of Social Sciences (Honours) in Applied Sociology at City University of Hong Kong. Her email address is lilian_li220@hotmail.com.

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