Faculty of Cognitive Sciences and Human Development

STUDENTS' INTEREST IN LEARNING SCIENCE SUBJECT AND ITS RELATIONSHIP WITH SELF-EFFICACY, SCHOOL, AND FAMILY CONTEXTS IN BAU, SARAWAK

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STUDENTS' INTEREST IN LEARNING SCIENCE SUBJECT AND ITS RELATIONSHIP WITH SELF-EFFICACY, SCHOOL, AND FAMILY CONTEXTS IN BAU, SARAWAK

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The dissertation entitled **Students' interest in learning Science subject and its relationship with self-efficacy, school, and family contexts in Bau, Sarawak** was prepared by Dorina Anak Lasah and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfilment of the requirements for the degree of Master of Science (Learning Sciences).

It is hereby confirmed that the student has done all the necessary amendments for examination and acceptance.

_____
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LIST OF ABBREVIATIONS

ANOVA	Analysis of variance (univariate)
B	Beta
df	Degree of freedom
F	Fisher's F ratio
M	Mean
MOE	Ministry of Education
MS	Mean square
N	Total number in a sample
p	Probability
R	Multiple correlation
R^2	Multiple correlation squared
SD	Standard deviation
SE	Standard Error
SS	Sum of squares
STEM	Science, Technology, Engineering, and Mathematics
t	Computed value of t-test

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ABSTRACT

STUDENTS' INTEREST IN LEARNING SCIENCE SUBJECT AND ITS RELATIONSHIP WITH SELF-EFFICACY, SCHOOL, AND FAMILY CONTEXTS IN BAU, SARAWAK

The enrolment of science stream students in the secondary schools across Malaysia has seen significant declines over the years. Students' interest is believed to be one of the major contributions to the issues. The main objective of this study is to determine the students' interest in learning Science subject and its relationship with self-efficacy, school, and family contexts by analysing the data of Form 2 students (n= 1038) from three secondary schools in Bau, Sarawak. This study has three specific objectives: (1) to determine the difference in students' interest in learning science subject based on gender; (2) to determine the difference in students' interest in learning science subject based on schools; and (3) to determine the significant factors such as self-efficacy, school context, family context in predicting students' interest in learning science subject. This study uses quantitative and surveys research design. The instrument used in this study is questionnaire which adapted from Hasni & Potvin (2015). The sample is chosen using stratified sampling method and the sample size is determined by Green (1991). The result shows that the students in Bau, Sarawak have the high level of general interest in science. There is a significant difference in students' general interest in learning science based on gender, $t (278) =-3.991$, $p<.001$. The female students have higher general interest in science compared to male students. This is due to the science syllabus in Form 1 and Form 2 are more focusing on themes that related to life science and less physical science. The result also shows that there is a significant difference in students' general interest in learning science based on schools, $F (2,275) = 24.214$, $p<.001$. Schools that actively organising and support students' learning activities can indirectly influence students' interest in learning. Five out of nine predictor variables (teaching method using inquiry process, utility of school science, predisposition and intention to act, teaching method based on student's preferences and self-efficacy in science) in this study are statistically significant at F-value of 57.338, $p<.001$ and $R^2 =.513$. This study found out that teaching method using inquiry process is the most dominant factor that affecting students' general interest in learning science in Bau, Sarawak. However, in this study, the family context does not one of the factors that contributed to students' general interest in science. Thus, the researcher suggests that these five factors should consider in order to increase the students' general interest in Bau, Sarawak.

Keywords: students' interest in learning science, self-efficacy, school context, family context

ABSTRAK

MINAT PELAJAR TERHADAP SUBJEK SAINS DAN HUBUNGANNYA DENGAN KEBERKESANAN DIRI, SEKOLAH DAN KONTEKS KELUARGA DI BAU, SARAWAK

Kemasukan pelajar ke aliran sains di sekolah menengah di seluruh Malaysia telah menampakkan kemerosotan yang ketara sejak beberapa dekad yang lalu. Minat pelajar dalam subjek Sains dipercayai merupakan salah satu penyumbang besar kepada isu tersebut. Objektif utama kajian ini adalah untuk menentukan minat pelajar dalam pembelajaran subjek Sains dan hubungannya dengan keberkesanan diri, sekolah, dan keluarga dengan menganalisis data pelajar Tingkatan 2 (n = 1038) dari tiga buah sekolah menengah di Bau, Sarawak. Kajian ini mempunyai tiga objektif khusus: (1) untuk menentukan perbezaan minat pelajar dalam pembelajaran mata pelajaran sains berdasarkan jantina; (2) untuk menentukan perbezaan minat pelajar dalam mempelajari subjek sains berdasarkan sekolah; dan (3) untuk menentukan faktor-faktor penting seperti keberkesanan diri, konteks sekolah, konteks keluarga dalam meramalkan minat pelajar dalam pembelajaran subjek sains. Kajian ini menggunakan reka bentuk penyelidikan kuantitatif tinjauan. Instrumen yang digunakan dalam kajian ini adalah soal selidik yang diubahsesuai daripada Hasni & Potvin (2015). Sampel dipilih dengan menggunakan kaedah pensampelan berstrata dan saiz sampel ditentukan oleh (Green, 1991). Untuk mencari jawapan bagi objektif-objektif khusus di atas, data dianalisis dengan menggunakan sampel bebas T-ujian, One-way ANOVA, dan regresi berganda. Hasil dapatan menunjukkan bahawa pelajar-pelajar di Bau, Sarawak mempunyai tahap kepentingan umum dalam sains yang tinggi. Terdapat perbezaan yang signifikan dalam minat pelajar terhadap pembelajaran sains berdasarkan jantina, $t (278) = -3.991$, $p < .001$. Pelajar perempuan mempunyai minat yang lebih tinggi dalam sains berbanding pelajar lelaki. Ini disebabkan sukatan pelajaran sains dalam Tingkatan 1 dan Tingkatan 2 lebih memberi tumpuan kepada tema yang berkaitan dengan sains hayat dan kurang menumpukan kepada sains fizikal. Hasil dapatan dalam kajian juga menunjukkan terdapat perbezaan yang signifikan dalam minat pelajar terhadap pembelajaran sains berdasarkan sekolah, $F (2,275) = 24.214$, $p < .001$. Sekolah yang aktif menganjurkan dan menyokong aktiviti pembelajaran pelajar secara tidak langsung mempengaruhi minat pelajar dalam pembelajaran sains. Lima daripada sembilan pembolehubah ramalan (kaedah mengajar menggunakan proses siasatan, utiliti sains sekolah, kecenderungan dan niat untuk bertindak, kaedah pengajaran berdasarkan keutamaan pelajar dan keberkesanan diri dalam sains) dalam kajian ini menunjukkan keputusan yang signifikan secara statistik pada nilai $F=57.338$, $p < .001$ dan $R^2 = .513$. Kajian ini mendapati bahawa kaedah pengajaran yang menggunakan proses siasatan adalah faktor paling dominan yang mempengaruhi minat pelajar terhadap pembelajaran sains di Bau, Sarawak. Walau bagaimanapun, dalam kajian ini, konteks keluarga bukan salah satu faktor yang menyumbang kepada kepentingan minat umum pelajar dalam sains. Oleh itu, penyelidik mencadangkan bahawa lima faktor ini harus dipertimbangkan untuk meningkatkan minat umum pelajar di Bau, Sarawak.

Kata kunci: minat pelajar dalam pembelajaran sains, keberkesanan diri, konteks sekolah, konteks keluarga

CHAPTER ONE
INTRODUCTION

1.0 Introduction

This chapter provides an overview of the study and consists of the background of the study, statement of the problems, objectives of the study, research framework, the significance of the study, limitations of the study, definition of terms and conclusion.

1.1 Background of the Study

In an effort towards a developed nation, Malaysia needs to fulfil the requirement for the field of work involving Science, Technology, Engineering, and Mathematics (STEM) much higher compared to other fields. Lack of talents and insufficient human resources in STEM might have the negative consequence on the Malaysia effort to expand more on technological innovations and become a high-income country.

Halimanton (2016) reported that Malaysia need to fill the gaps along the entire STEM talent chain to meet the requirements of 2020 and a strategic framework is essential to guide human capital development in science and technology sectors. Therefore, the Ministry of Education (MOE) plays an important role in preparing competitive students in terms of intelligence and skills in facing the 21st-century challenges.

MOE also provides a solid foundation by introducing science subjects starting from early primary school to upper secondary school to ensure Malaysia can provide sufficient skilled STEM human capital in driving the country's economic development (Malaysia Education Blueprint, 2013).

1.2 Statement of the Problem

Despite the importance of science subjects in developing Malaysia to be of equal and compete with other developing countries, the percentage of science stream students in the secondary schools across the country has seen significant declines over the years.

The growing gap between the science stream students offered by the schools and the social demand in this regard showing a growing need for the scientific and technical expertise, while the number of students attracted to it is declining.

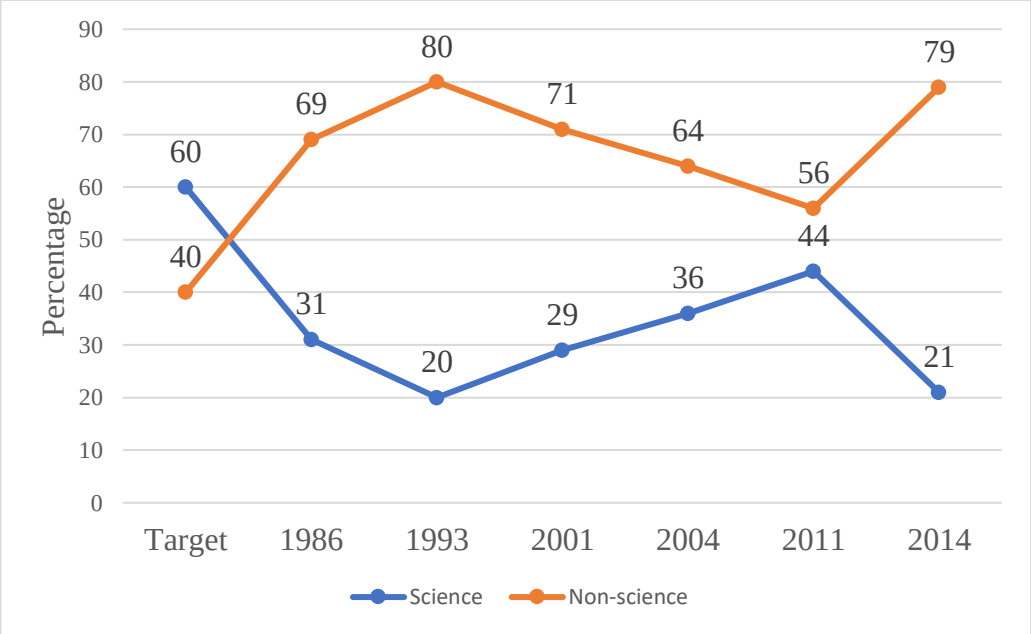

Figure 1.1 The percentage of science students to non-science students in Malaysia. Adapted from Halimanton (2016).

To answer the issue above, many studies have been conducted and observed in many countries such as England, Germany, United States, Canada and also in France (Hasni & Potvin, 2015). From the findings, the researchers strongly address that the main contribution to this issue is the students' interest in science subjects and they also recommended that several aspects such as cultural and educational milieu should be included since the interest in learning science subjects seem to depend on these two contexts (Ainley & Ainley, 2011; Hasni & Potvin, 2015; Krapp & Prenzel, 2011).

In Malaysia, most of the previous studies focused on one or two factors that may contribute to declining number of science enrolment in Malaysia such as the studies on teaching methods, students' perception in science, teachers' pedagogical content knowledge in Science (Phang, Abu, Ali, & Salleh, 2014).

Therefore, this study attempts to answer the general research questions as below:

i) What is the level of students' general interest (GI) in Science subject?

ii) What are the factors that influence their GI in Science subject?

1.3 Objectives of the Study

The main objective of this study is to determine the level of GI in learning Science subject among Form 2 students in the secondary schools in Bau District, Sarawak and the factors that influence it. Specifically, the objectives of the study are as follows:

i) to describe the selected demographic characteristics of the respondents.

ii) to describe the level of students 'general interest in Science subject in Bau, Sarawak.

iii) to describe the level of factors that influence students' general interest in Science subject in Bau, Sarawak.

iv) to determine the difference in students' in general interest Science based on gender in Bau, Sarawak.

v) to determine the difference in students' general interest in Science based on schools in Bau, Sarawak.

vi) to determine the significant factors in predicting students' general interest in Science subject in Bau, Sarawak.

1.4 Research Framework

The research framework of the study is designed to show the relationships among the variables as illustrated in figure 1.1. The dependent variable in this research framework is students' general interest in Science while the independent variables are self-efficacy, school, and family contexts. The study also will investigate the influence of gender and ethnicity on students' interest in learning Science subject.

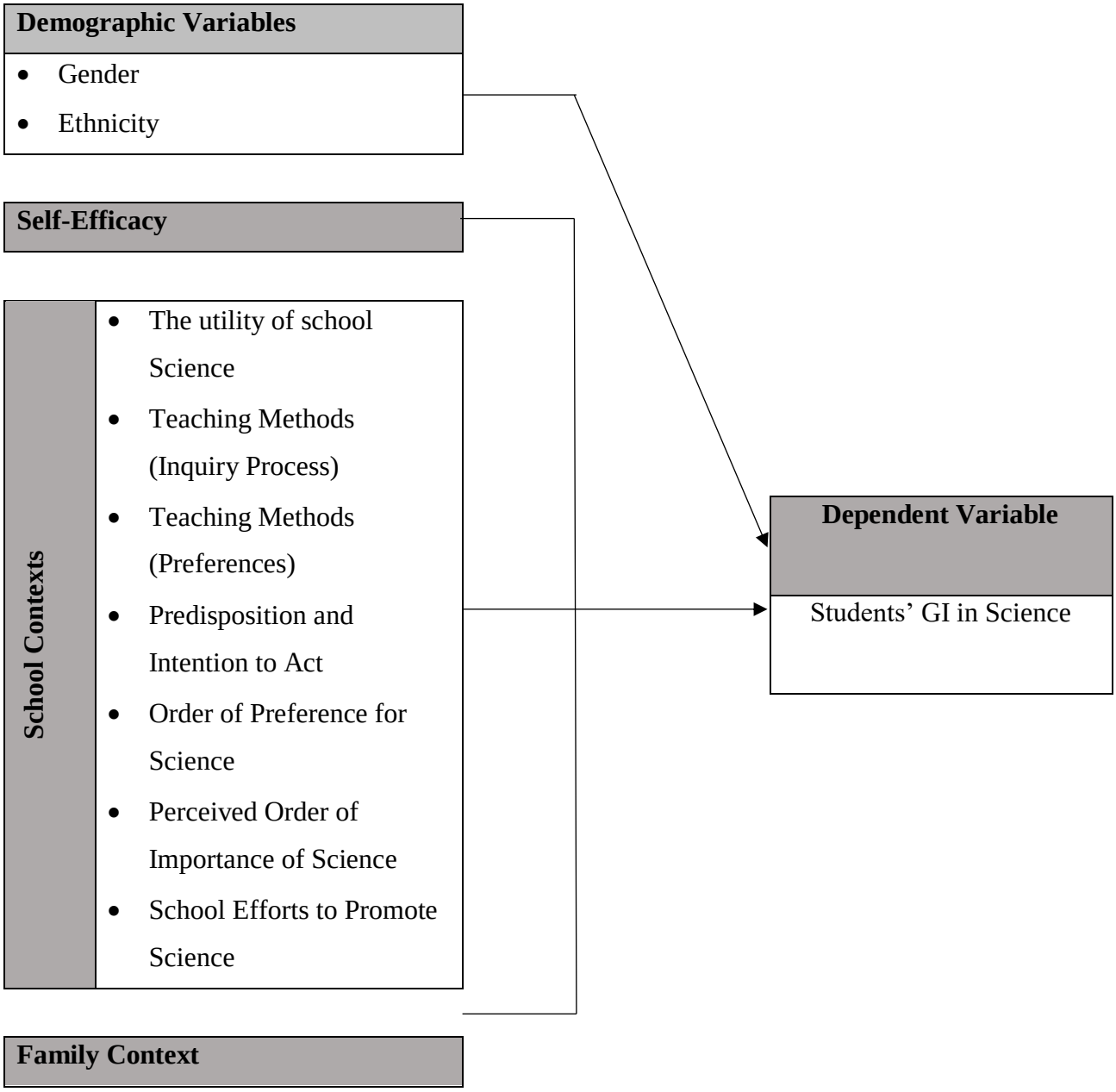

Figure 1.2 Research Framework for the Study

1.5 Research Hypotheses

In relation to the objectives of this study and based on the research framework, the following hypotheses are formulated:

Ho_1 : There is no significant difference in students' general interest in Science based on gender.

Ho_2 : There is no significant difference in students' general interest in Science based on schools.

Ho_3 : None of the nine independent variables has a significant influence on the students' general interest in science.

1.6 The Significance of the Study

The findings of the study are beneficial to the science teacher, students, parents, and policymakers.

1.6.1 Knowledge

The study may enrich the literature in this research areas of interest in learning science subject. The findings of the study could help in enlightening the factors that may influence students' interest in learning science subject.

1.6.2 Practice

The result of the study could empower educators, curriculum developers, and teachers plan strategies and approaches in developing the interest in learning science

which could correspondingly enable them to achieve higher achievement in the science subjects. In the light of the study, it is hoped that the relevant parties of the society will aware of the issue of other factors attributes on students' interest in learning science subjects.

1.6.3 Methodology and Instrument

The study contributes to the research methodology where the methods and instruments used in conducting this research can be replicated by other researchers to conduct their studies.

1.6.4 Policy

Through the study, it is hoped that the policy-makers will consider the suggestions that will be found in this study and coming out with the guideline to overcome the issue the low enrolment of science stream students among Malaysia's secondary schools.

1.7 Definition of Terms

This section attempts to define operationally several terms that will be used throughout this study.

Table 1.1
Definition of terms

Terms	Operational Definition
Students' general interest	Form 2 students' general interest in learning science subject in Bau, Sarawak.
Self-efficacy	The way Form 2 students in Bau, Sarawak feel, think, and motivate themselves in learning science subject.
School context	The schools' efforts and values in promoting science subject to the Form 2 students in Bau, Sarawak.
Family context	The students' family efforts and values in encouraging the Form 2 students to learn science subject in Bau, Sarawak.

1.8 Limitation of the Study

This study is limited to Form 2 students from three secondary schools in Bau district, Sarawak. Therefore, the findings of this study should not be generalizable to other secondary schools in Malaysia.

1.9 Conclusion

The chapter introduced the background of the study, statement of problem, objectives of the study, research framework, research hypotheses, the significance of the study, definitions of terms and limitations of the study are discussed. The following chapter provides a detailed look at the literature review relevant to the study.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter attempts to review related literature which consists of science in Malaysia, concepts of interest, theories related to interest, factors affecting interest toward Science, and summary.

2.1 Science in Malaysia

Science subject is introduced to children in Malaysia as early as 7 years of age upon entering primary school. Science is one of the compulsory subjects of Year 1 until Form 3 and this subject will continue to be taught until Form 5 if the student chose the art stream.

At the lower secondary level (Form 1 until Form 3), the science curriculum is systematized into themes which are intended to empower students to develop literacy science to improve the value of everyday life (Almaskari & Alrasbi, 2014). The science curriculum for lower secondary in Malaysia is in Table 2.1.

Table 2.1
Science Curriculum for Lower Secondary in Malaysia

Form	*Theme*	*Learning Area*	*Source*
1	Introducing Science	1. Introduction to Science	Ministry of Education Malaysia (2002)
	Man and the Variety of Living Things	1. Cell as a Unit of Life	
	Matter in Nature	1. Matter 2. The Variety of Resources on Earth 3. The Air Around Us	
	Energy	1. Sources of Energy 2. Heat	
2	Management and Continuity of Life	1. The World Through Our Senses 2. Nutrition	Ministry of Education Malaysia (2002b)
	Man and the Variety of Living Things	1. Biodiversity 2. Interdependence among Living Organisms and the Environment	
	Matter in Nature	1. Water and Solution 2. Air Pressure	
	Force and Motion	1. Dynamics 2. Support and Movement	
	Technological and Industrial Development in Society	1. Technological and Industrial Development in society 2. Stability 3. Simple Machine	
3	Management and Continuity of Life	1. Respiration 2. Blood Circulation and Transport 3. Excretion 4. Reproduction 5. Growth	Ministry of Education Malaysia (2003)
	Matter in Nature	1. Land and Its Resources	
	Energy in Life	1. Electricity 2. Generation of Electricity	
	Astronomy and Space Exploration	1. Stars and Galaxies 2. Space Exploration	

After *Pentaksiran Tingkatan 3* (PT3), students in Malaysia can make choices based on their results and interests whether to enter art, science, or technical and vocational stream when they are entering upper secondary. However Azian (2015) mentioned that 15% of the students who have met the prerequisite to enter science stream when Form 4.

MOE take this matter as crucial as Malaysia need to fill in the gaps along the STEM talent chains and to make ensure that Malaysia has adequate competent STEM graduates that can help in developing Malaysia in science and technology sectors (Azian, 2015; Halimanton, 2016).

Realizing the importance of science in developing Malaysia, MOE instituted the 60% science and 40% non-science policy in 1967 and started implementing it in 1970 (Halimanton, 2016). However, the policy target is still far to reach.

Table 2.2 shows that percentage between science students and non-science students in Malaysia since 1986 until 2014.

Table 2.2
The percentage of science students to non-science students in Malaysia.

Year	***Science***		***Non-Science***
Target	60	:	40
1986	31	:	69
1993	20	:	80
2001	29	:	71
2004	36	:	64
2011	44	:	56
2014	21	:	79

(Halimanton, 2016)

Through the meta-analysis study based on theses at postgraduate levels from the universities in Malaysia, Phang et al. (2014) found out that most of the studies that conducted in Malaysia were focusing on teaching methods, assessment on Science and Mathematics, school management, demographic and infrastructures and Science and Mathematics policies. Plus, the previous studies engrossed on one or two factors that influenced the declining enrolment of science students in Malaysia. Therefore, this study attempts to examine various influences that may affect the students' general interest in science in Malaysia context.

2.2 Concepts of Interest

The concept of interest is widely used in research fields especially in educational psychology where there are some significant studies has been conducted in the past few decades to recognize the close relationship exists between interest and learning development (Hidi, 1990, 2006; Krapp & Prenzel, 2011).

Over centuries ago, the importance of interest in educational frameworks has been highlighted by scholars such as Johann Amos Comenius (1592-1670) and Jean Jacques Rousseau (1712-1778), but Johann Friedman Herbert (1776-1841) was the one who developed a theory of education that stressed on the concept of interest is not only motivational state of learning but also significant goal or product of education (Krapp & Prenzel, 2011).

Some researchers have defined interest as a psychological condition which is multidimensional construct with requires cognitive, emotional, and value dimensions that helps in motivates individual in their learning experience by initiates productive engagement to achieve the goal-related elements or to gain new knowledge (Danjuma, 2015; Deci & Ryan, 2000; Hidi, 2006; Renninger & Hidi, 2016). Plus, Hidi (1990) argued that interest play the important role as the energetic feature that helps in the human processing system where the individual can choose or persist in processing information in preference to others.

Ainley & Ainley (2011) stated that interest in science will helps students to grasp opportunities to re-engage and become active in the teaching and learning process in science class. When the students are engaged in the learning process, the students will

attract to come to school to learn more which is the pivotal condition for teaching and learning to happen (Krapp & Prenzel, 2011).

2.3 Theories Related to Interest

Social cognitive theorists believe that the individuals must become an active learner in the process to gain knowledge and the learning process itself is defines as a result of interaction among three variables which are personal factors, behaviour patterns, and social environment that influence one another bidirectionally (Bandura, 1978). Through the interaction, the individual himself plays a key role in forming the intrinsic nature of man that whether he will retain, change or to reinforce their thoughts, feelings, and actions (Bandura, 2002).

From Social Cognitive Theory, Bandura (1978) established deterministic model known as Triadic Reciprocal Causation Model to explain the key tenets for scrutinizing psychosocial phenomena that occurs in the intrapersonal development, interpersonal transitions and interactive functioning of social systems. He also added the importance of self-efficacy, self-regulation, self-reflection, self-organization, forethought and intentionality to develop learner as a human agency over their learning process (Bandura, 1999, 2001).

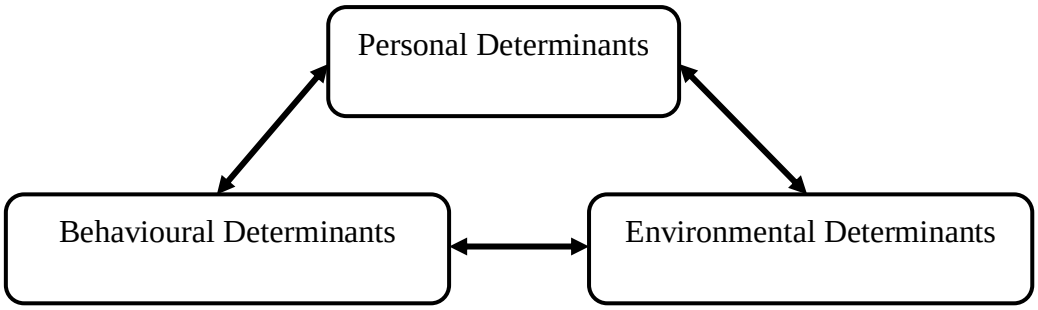

Figure 2.1 Triadic Reciprocal Causation Model (Bandura, 1978)

Bandura (1999) explained that person determinants as an internal element such as cognition, affective and biological event that influence bidirectionally with the other two factors which are behavioural and environmental determinants. Meanwhile, behavioural determinants can be described as unidirectional causation where the person's behaviour is represented as either present in a formed and driven by personal and environmental influences (Bandura, 1999). In social cognitive theory, environmental determinants are explained by distinctive three types of environmental factors which are executed environment, selected environment, and constructed environment (Bandura, 1999).

Extending from Bandura's Social Cognitive Theory, Lent, Brown, & Hackett (1994) established the Social Cognitive Career Theory that incorporate academic and career domains. According to Smith (2002), social cognitive career theory can be used for academic purposes because in the theory itself views academic progress in term of academic interest, choice and performance as a developmental to career ignition and growth.

Smith (2002) also believed that interest and skills are developed along the learning process in school and will affect future career selection. Carrico & Tendhar (2012) emphasized that social cognitive career theory framework ideally can be used identify the relationship between the student's interest and self-efficacy of their present curriculum choice to predict their outcome expectations and goals.

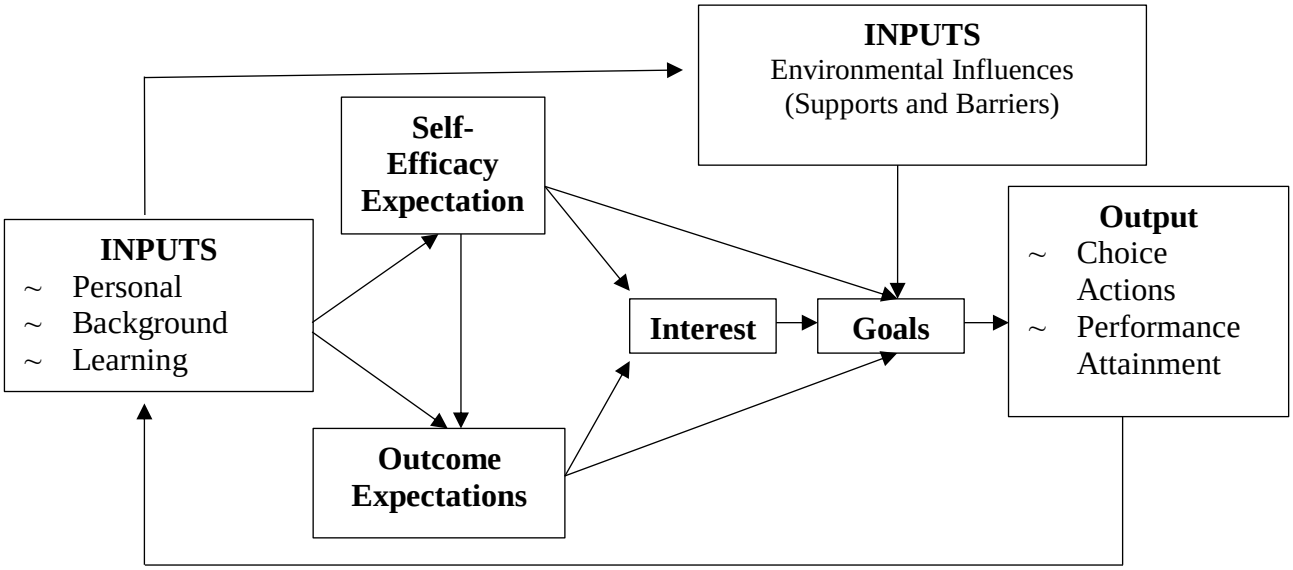

Figure 2.2 Theoretical Framework of Social Cognitive Career Theory Modified by Carrico & Tendhar (2012)

2.4 Factors Affecting Interest toward Science

2.4.1 Gender

In the previous study, academic experts often examine whether there is any significance difference based on gender that may affect student's interest in learning subjects related to science.

Randler et al. (2012) found out that the female students are more interest in learning life science such as Biology compared to male students which more to technical aspect such as engineering. Ceci et al. (2014) emphasized that female students have the higher percentage of interest in other scientific fields such as psychology, life science, and social science compared to the field that is mathematically intensive such as geoscience, engineering, computer science and physical science compared to male students.

Ing et al. (2014) also pointed out that the female showed less interest in designing, inventing, problem-solving, and using technology compared to the male student.

However, the study found that female students were as consistent as males students in their interest in pursuing the science career, but less interest in pursuing their studies in engineering (Ing et al., 2014).

Nasr & Soltani (2011) found out that their study showed there was no significant difference in student's attitude towards Biology between male students and female students but as for the academic achievement in Biology, the female students were better than the male students. However, Hand et al. (2017) believed that male students tend to achieve better performance than female students in the STEM subjects.

Therefore, from the previous studies above, the academicians still on the debate about whether gender has its effect on the students' interest in science and which gender is performed better in science and later pursuing their careers in STEM lines.

2.4.2 Self-efficacy

Self-efficacy helps in regulating the way individual feel, think, motivate themselves and eventually behave in the circumstances which may effects through cognitive, motivational, affection, and selection processes (Bandura, 1994). Bandura (1994) also emphasized that individuals who have strong self-efficacy have higher chances to achieve or overcome challenges because they are driven by the strong determination which eventually they will become expert in the tasks.

Students' self-efficacy can be defined as individual's sense of control over the action that influenced most of the self-knowledge and the considerable factor in academic performance (Motlagh et al., 2011). However, Garriott et al. (2014) emphasized that although self-efficacy can be used to predict the students' interest in science, it did not predict students' outcome expectations in science.

The previous study conducted by Meral et al. (2012) found that there is a positive correlation ($r=.45$, $p<.01$) between self-efficacy with the students' academic performance and achievement. This finding supported by Hasni & Potvin (2015) where they also found out that self-efficacy has the moderate correlation ($r=.470$) with interest in learning science and technology.

From the findings above, self-efficacy can be concluded as one of the factors that have moderately correlated with students' interest in learning and later contribute to students' academic achievement in school. Therefore, it is relevant to the researcher to also include self-efficacy as one of the predictor variables in this study.

2.4.3 School context

Schools that involve actively in organising science activities may have the positive and indirect influence on their students' performances (Zhang & Tang, 2017). The schools with the high value of good learning culture may help the students to perform better in the learning process due to the effectiveness of the school to become more productive, adaptive, and flexible (Maslowski, 2001).

Teachers' with good instruction in science play important role in nurture interest in science among the students who have the less conducive environment at home (PISA, 2016). Besides that, Sutherland (2010) also emphasised that the students' engagement in school is influenced by the schools' activities and the students' sense of belonging. There are two level of students' engagement namely; (1) students with learning environments which involve schools, decision-making, participation and relationship with teacher, and (2) students with their own learning which are motivation, interest and comfort with learning process (Sutherland, 2010).

From the previous study conducted by Hasni & Potvin (2015), two of the factors in school contexts showed a moderately correlated ($r \geq .400$) with students' interest in science such as intention to act ($r=.493$) and frequency of family in promoting science cultural practices ($r=.405$). Meanwhile, some factors have moderate to weak correlation with students' interest in science such as (1) student involvement in the inquiry process ($r=.375$), (2) teaching methods based on open investigation ($r=.310$), (3) traditional teaching ($r=.307$), (4) utility of school S&T ($r=.306$), and (5) teaching methods suing external resources ($r=.204$).

As for the order of preference and importance of science with the other subjects, the students slightly preferred science subject over other subjects and divided in term of preference between science and mathematics (Hasni & Potvin, 2015). However, the students considered mathematics and language subjects (English and French) are more important compared to science (Hasni & Potvin, 2015).

2.4.4 Family context

Turner (2012) explained the positive relationship between parents' involvement in their children's learning process in school. Parental support significantly influenced their children's interest in learning Mathematics and Science at school (Garriott et al., 2014). Parental support can be defined as the resources in term of time, money, and effort that the parents invest in their children's academic purposes (Grolnick & Slowiaczek, 1994).

Rice et al. (2013) reported that students who have support from the family performed better attitudes toward science in school. Hofstein & Mamlok-Naaman (2011) mentioned that when the students have positive attitudes towards their learning in science, the students may have developed the interest in learning science and have the better understanding of scientific concepts. Hasni & Potvin (2015) found that the family

involvement in students' learning science has the moderate correlation (r=.405) with students' interest in learning science.

2.5 Summary

In summary, this chapter had discussed the context of the study. In addition, some of the previous researches were reviewed. This chapter is crucial as it provides references and reading that may support future findings in this research. The next chapter will discuss the research methodology.

CHAPTER THREE
METHODOLOGY

3.0 Introduction

This chapter discusses in detail the research design, population and sample, the research instrument, pilot test, validity and reliability of the instrument, ethics of the study, procedure for data collection, procedure for data analysis and summary.

3.1 The Research Design

The objective of this study was determined the general interest for respondents in learning science subject among the secondary schools in Bau, Sarawak and to study the factors that influenced the general interest in science among the respondents. Variables in this study were divided into four main components which are (1) demographic factors, (2) the student's self-efficacy, (3) school contexts and (4) family participation in science cultural practices.

In this study, quantitative survey methodology was chosen as the most appropriate research design. The data were collected based on predetermined instrument and hypotheses were developed before the research was carried out which has been discussed in Chapter One.

3.2 Population and Sample

This study is involving Form 2 students from three secondary schools in Bau, Sarawak. The sample will be selected using stratified sampling where the participants are select randomly drawn from respective schools.

The sample size is determined based on Green (1991) where the formula is as follow:

$N > 50 + 8p$ where p is representing the independent variables in the study. Therefore,

$$N > 50 + 8(9) = \mathbf{122}$$

From the calculation above, it is sufficient for the researcher to collect at least a total of 122 respondents in order to estimate a relationship between independents variables and dependent variable. Even so, the researcher decided to distribute 330 sets of questionnaires to the respective schools in Bau, Sarawak and any incomplete questionnaires and extreme outliers will be excluded in the data analysis.

Table 3.1
Distribution of population and sample size of the study

No	*Name of school*	*Population*	*Sample Size*
1	SMK Bau	318	110
2	SMK Lake	393	110
3	SMK Paku	327	110
Total number of students		**1038**	**330**

3.3 The Research Instrument

A 6-Likert scale questionnaire adopted and modified from (Hasni & Potvin, 2015) is used in the study. The questionnaire is revised based on Malaysia educational context. The questionnaire consists of statements both in English and followed by *Bahasa Melayu* to make it easier for the respondents to choose the most appropriate language that they understand best in answering the questions given.

The questionnaire consists of Section A, B, C, D and E. An outline of the instrument is as shown in Table 3.2.

Table 3.2
An outline of the research instrument

Section	*Item Variables*	*Item Question No*	*No. of Item*
A	Gender	1	1
	Ethnicity	2	1
B	General interest in science	3	5
C Self - Efficacy	Self-efficacy in science	4	7
D School Context	Utility of school science	5	5
	Teaching Method (Inquiry Process)	6	2
	Teaching Method (Preferences)	7	3
	Predisposition and Intention to act	8	3
	Order of preference for science	9	4
	Perceived order of importance of science	10	4
	School effort to promote science	11	6
E Family	Frequency of family participation in science cultural practices	12	5
	Total number of items		**47**

3.3.1 Section A: Demographic Characteristics

For section A, the questionnaire will obtain the demographic data from the participants such as gender and ethnicity. Gender is categorised into male and female whilst ethnicity is categorised into four major ethnic groups in Bau, Sarawak, namely Malay, Chinese, Bidayuh, and Iban. The fifth category of "Others" is listed to cater the respondents from an ethnic group differing from the previous four.

For the demographic characteristics, each of the item will be coded in SPSS as illustrated in Table 3.3.

Table 3.3
Code system for demographic characteristics

Item	***Sub-item***	***Code***
Gender	Male	1
	Female	2
Ethnicity	Malay	1
	Chinese	2
	Bidayuh	3
	Iban	4
	Others	5

3.3.2 Section B: General interest in science

Section B consists of five items specifically designed to reflect the respondents' general interest in the Science subject. A six-point Likert scale is used as the response format. By using Likert-type scale, the researcher can measure the respondent's beliefs and opinions which are often thought in terms of gradation (Simon & Goes, 2013). In this study, the scale ranged from "Strongly Disagree" (1) to "Strongly Agree" (6).

Table 3.4
Six-Points Likert Scale

Score	***Category***	***Code***
1	Strongly Disagree	1
2	Moderately Disagree	2
3	Slightly Disagree	3
4	Slightly Agree	4
5	Moderately Agree	5
6	Strongly Agree	6

The score of general interest in science is calculated by the total score of all items in Section B. Then, level of general interest in science classified accordingly. The final set of questionnaires which was used for the study is as shown in Appendix A.

To determine the class intervals, the formula from Runyon & Haber (1991) is used.

The procedures for ranging of scores were as follows:

Step 1 : The difference between the highest possible score values and the lowest possible score values contained in the ordinal data was obtained, 5(6) – 5(1) = 25. A score of 1 was added to obtain the total number of score, that is 26.

Step 2 : Three classes of scores were required. The total number of scores was divided by three to obtain the range of the score for each class, that is 26÷3=8.67. Therefore, the range of the score for each class in section B is 9.

Step 3 : The lowest possible score of 5 was taken as the minimum value in the lowest class. The maximum score for the lowest class was obtained by adding (9-1) to the lowest possible score, thus 13.

Step 4 : The higher class began at the following maximum score for the lowest class. **Step 3** was repeated to obtain the maximum score for the second class. The range of the score for the second class was therefore 14 – 22.

Step 5 : **Step 4** was repeated for the subsequent classes. The range of score for the third class was 23 – 31.

Therefore, the overall scores that are obtained from this section is analysed with three composite categories of scores based on Table 3.5.

Table 3.5
Interpretation of scores for General Interest in Science

Range of Scores	***Level of General Interest in science***
5-13	Low
14-22	Moderate
23-31	High

3.3.3 Predictor Variables for the General Interest in Science

Predictor variables were divided into three sections which are Section C (Self-Efficacy in Science), Section D (School Context), and Section E (Family Context). In these sections, the same Likert-type scale in Section B is used.

The score for each variable is calculated by the total score of all items in each variable. Then, interpretation of score are classified accordingly and the class intervals are determined by using the formula from Runyon & Haber (1991).

Table 3.6
Interpretation of scores for Self-efficacy in Science in school

Range of Scores	***Interpretation of Score***
8-21	Low
22-35	Moderate
36-49	High

Table 3.7
Interpretation of scores for Utility of Science for everyday life

Range of Scores	***Interpretation of Score***
5-13	Negative
14-22	Neutral
23-31	Positive

Table 3.8
Interpretation of scores for Teaching Method (Inquiry Process)

Range of Scores	***Interpretation of Score***
2-5	Negative
6-9	Neutral
10-13	Positive

Table 3.9
Interpretation of scores for Teaching Method (Preferences)

Range of Scores	***Interpretation of Score***
3-8	Negative
9-14	Neutral
15-20	Positive

Table 3.10
Interpretation of scores for Predisposition and Intention to Act

Range of Scores	***Interpretation of Score***
3-8	Negative
9-14	Neutral
15-20	Positive

Table 3.11
Order of preference for Science with respect to other school subjects

Range of Scores	***Interpretation of Score***
4-10	Not Importance
11-17	Neutral
18-24	Importance

Table 3.12
Interpretation of scores for Perceived Order of Importance of Science in school with respect to other school subjects

Range of Scores	***Interpretation of Score***
4-10	Not Importance
11-17	Neutral
18-24	Importance

Table 3.13
Interpretation of scores for School efforts to promote Science

Range of Scores	***Interpretation of Score***
6-16	Low
17-27	Moderate
28-38	High

Table 3.14
Interpretation of scores for frequency of family participation in science cultural practices

Range of Scores	***Interpretation of Score***
5-13	Low
14-22	Moderate
23-31	High

3.4 Pilot Test

Prior to conducting the actual study, a pilot test was carried out to test the instrument. The main purpose of the pilot study was to determine its reliability and to identify the problems relating to questionnaire items. For this study, the pilot test has been conducted on 6th November 2017 using 50 respondents from Form Two students of SMK Senibong, Lundu which is not involved in the actual study. The data obtained from the pilot study is used in calculating the reliability of the instrument using SPSS Version 23.0.

3.5 Validity and Reliability of the Instrument

Since the questionnaire is adapted from Hasni & Potvin (2015), the validation of the questionnaire was done only by consulting the draft of the questionnaire with the researcher's supervisor and the translation English to *Bahasa Melayu* was using back-to-

back translation with the help from two experienced language teachers for both languages to check any possible translation errors.

The data obtained from the pilot study is used in calculating the reliability of instruments. Table 3.5 indicated the result of the Cronbach's alpha for the questionnaire.

Table 3.15
Reliability of questionnaire in the pilot study

Research Instruments	***Number of items***	***Cronbach's Alpha***	
		Pilot Study	***Actual Study***
Section B: General interest in Science			
General Interest in Science	5	0.804	0.760
Section C: Self-Efficacy			
Self-efficacy in science at school	8	0.697	0.686
Section D: School Context			
Utility of school science for everyday life	5	0.714	0.802
Teaching methods (Inquiry process)	2	0.555	0.665
Teaching methods (Preferences)	3	0.544	0.508
Predisposition and Intention to act	3	0.871	0.831
Order of preference for science with respects to other subjects	4	0.574	0.588
Perceived order of importance of science in school with respect to other subjects.	4	0.864	0.848
School Efforts to promote science	6	0.848	0.769
Section E: Science in Family cultural activities			
Frequency of family participation in science cultural practices	5	0.871	0.775

The result of the reliability analysis of the instrument showed that the overall reliability of the instrument is at the acceptable value of 0.734 for the pilot study and 0.723 for the actual study. However, there are four factors in this instrument which is below 0.70. The researcher decided to proceed with the four factors that below 0.70 for this study by referring to the previous study which used the instrument that had factors that had the Cronbach's alpha value as low as 0.502. (Griethuijsen et al.,2015).

3.6 Ethics of the Study

After the sample is selected, the participants were giving certain information that is personal to them. Then a consensus would have to be acquired. To conduct this study, the researcher has acquired the consent of the subjects prior to conducting the study. An agreement was also acquired from the MOE, JPNS, Principal and Science teachers of SMK Bau, SMK Lake and SMK Paku who taught the informants and the informants were briefed on the objectives of the study, as well as the methods used to conduct the study. This allows the informants to anticipate and understand better what they are required to do during the study.

3.7 Procedure for Data Collection

Data collection was carried out from 26th March until 29th March 2018 after obtaining the approval of the research proposal from the researcher's supervisor as well as the permission from the MoE. A total of 330 sets of questionnaires were distributed to the respondents with the help from the science teachers in the respective schools.

At the end of the deadline, the researcher personally collected the questionnaires. The summary of the sample collected is shown in Table 3.15.

Table 3.16
Summary of sample collected

Sets distributed	*Collected*	*%*	*Incomplete*	*%*	*Valid*	*%*
330	305	92.4	7	2.12	298	90.3

3.8 Procedure for Data Analysis

Descriptive and inferential statistics were used in the data analysis. The data were coded based on Table 3.3 and Table 3.4. In this study, there was a need to recode the respondents' responses into opposite value for item 4, 6, 7 and 8 in Section C (Self-

Efficacy) and in two factors in Section D (Order of preference for Science with respect to other school subjects and Perceived order of importance of Science in school with respect to other school subjects). Table 3.16 shows the summary of the statistical analysis methods carried out for the objectives of the study.

Table 3.17
Summary of statistical methods used for analysis of data

No	*Objectives of the study*	*Statistical Method*
1	To describe the selected demographic characteristics of the respondents.	**Descriptive Statistics** Percentage, frequencies
2	To describe the level of variables that involved in students' general interest in Science subject in Bau, Sarawak	**Descriptive Statistics** Percentage, frequencies, mean, standard deviation
3	to determine the differences in students' general interest in Science based on gender in Bau, Sarawak.	**Inferential Statistics** t-Test
4	to determine the differences in students' general interest in Science among the three secondary schools in Bau, Sarawak.	**Inferential Statistics** One-Way ANOVA
5	To determine the dominant factors that influence the students' general interest in learning science.	**Inferential Statistics** Multiple Linear Regression

3.8.1 Descriptive Statistics

The distributions of the demographics such as gender and ethnicity of the respondents were summarized using percentage and frequency analysis in SPSS. Meanwhile, the variables that involved in students' interest in learning Science were summarized using percentage, frequencies, mean, standard deviation.

3.8.2 Inferential Statistics

Even though the questionnaire used in this study are in ordinal data, it can commonly use the interval procedures because the scale item is more than 4 categories (Simon & Goes, 2013). Therefore, if the data collected fulfil the assumption testing for normality test, the parametric test will be used to test the hypotheses in this study. Table

3.17 shows the normality test results of Skewness and Kurtosis for the both dependent variable and independent variables in the study.

Table 3.18
The summary for normality test results

Section	*Item Variables*	*Skewness*	*Kurtosis*
B	General interest in science	-.577	-.153
C	Self-efficacy in science	.109	-.526
D	Utility of school science	-.897	.545
	Teaching Method (Inquiry Process)	-.703	.468
	Teaching Method (Preferences)	-.713	.245
	Predisposition and Intention to act	-.822	.250
	Order of preference for science	.443	-.386
	Perceived order of importance of science	.930	.989
	School effort to promote science	-.308	-.266
E	Frequency of family participation in science cultural practices	-.493	-.284

From the Table 3.17, the data collected can be assumed as normally distributed based on the values of skewness and kurtosis is ±1 without divided the values with standard deviation.

3.8.2.1 t-Test

Independent t-test is used in this study to test the significant differences in the students' general interest in learning science between the genders. Prior to carry out this test, Levene's test was performed and interpreted first before determining the t value. If the F value was not significant ($p>0.05$), the variance was assumed to be homogenous and the Equal Variances line of values for the t-test will be used. However, if $p<0.05$ the F value was then significant. Therefore, t-test based on Unequal Variances will be used in the study. In both cases, if the t value obtained was less than 0.05 ($p<0.05$), the difference between the means was significant and null hypothesis was thus rejected.

3.8.2.2 Analysis of Variance (ANOVA)

The result of ANOVA in this study shows whether the means from the three secondary schools are significantly different from one another, as indicated by the F statistic. Prior to carrying out this test, Levene's test was performed. If the variance was assumed to be homogenous, this study will proceed with ANOVA. If the one-way ANOVA indicates a significant difference, follow-up test using Tukey's HSD will be conducted to evaluate pairwise differences among the mean in this study. The one-way ANOVA test was carried out at the significant level $p<0.05$.

However, if the homogeneity assumption has been violated, this study will use an adjusted F statistic which is the Welch test. The Welch test is more prevailing than the Brown-Forsythe test and if the F value is significant, an appropriate post hoc test is required (Horn, 2008).

3.8.2.3 Multiple Linear Regression (Stepwise Method)

Multiple regression analysis allows the analysis of the relationship between the dependent variable and a set of independent variables or also known as predictors. The multiple correlation coefficients (R) indicates the relationship between the actual scores and the scores predicted by the independent variables of the study. Meanwhile, the squared multiple correlation coefficients (R^2) represents the percentage of variance in the dependent variable that is being explained by the regression equation, that is, by the independent variables acting together. The significant level was set at 0.05.

As for this study, the multiple regression equation is shown as below:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9$$

where

Y = General interest in learning science (the predicted variable)

a = The constant

X_1 = Self-efficacy in science

X_2 = Utility of school science

X_3 = Teaching Method (Inquiry Process)

X_4 = Teaching Method (Preferences)

X_5 = Predisposition and Intention to act

X_6 = Order of preference for science

X_7 = Perceived order of importance of science

X_8 = School effort to promote science

X_9 = Frequency of family participation in science cultural practices

$b_1 – b_9$ = regression coefficient of the predictor variables

Along with this multiple regression analysis, the correlation among the variables are also been analysed using Pearson Correlation. The description of the Pearson Correlation (Hinkle, 2003) is shown in Table 3.18.

Table 3.19
Interpreting the Size of a Correlation Coefficient

Size of Correlation	Interpretation
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to .90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	Little if any correlation

3.9 Summary

This chapter laid the foundation for carrying out the study. It covered the research design, sample, research instrument, collection of data and the procedure for analysis of data. It formed the basis for obtaining and understanding the results of the study.

CHAPTER FOUR
FINDINGS AND DISCUSSION

4.0 Introduction

This chapter outlines the data analysis and results of students' interest in learning science in Bau, Sarawak.

Data collection was carried out from 26th March 2018 until 29th March 2018 after obtaining the approval from the Ministry of Education. A total of 330 sets of questionnaires were distributed to the respondents with the help from the science teachers in the respective schools. After three days, the researcher personally collected the questionnaires. Table 4.1 shows the summary of the sample collected for the study.

Table 4.1
Summary of data collected for the study

Sets distributed	**Collected**	**%**	**Incomplete**	**%**	**Complete data = 298**			
					Extreme Outliers	**%**	**Valid**	**%**
330	305	92.4	7	2.12	20	6.06	278	84.24

4.1 Demographic Characteristics

The demographic characteristics and variables in this study are being analysed and presented using frequency, percentage, mean and standard deviation. The first part of the analysis is on demographic characteristics of the respondents, which based on two aspects: gender and ethnicity. Table 4.2 summarized the demographic characteristics for this study.

Table 4.2
Summary of Demographic Characteristics According to Schools in Bau, Sarawak.

Gender		***Frequency***	***Percentage***
School 1	Male	44	46.3
	Female	51	53.7
	Total	**95**	**100.0**
School 2	Male	33	34.7
	Female	62	65.3
	Total	**95**	**100.0**
School 3	Male	43	48.9
	Female	45	51.1
	Total	**88**	**100.0**
Ethnicity		***Frequency***	***Percentage***
School 1	Malay	16	16.8
	Chinese	70	73.7
	Bidayuh	8	8.4
	Iban	1	1.1
	Others	0	0.0
	Total	**95**	**100.0**
School 2	Malay	11	11.6
	Chinese	10	10.5
	Bidayuh	67	70.5
	Iban	6	6.3
	Others	1	1.1
	Total	**95**	**100.0**
School 3	Malay	10	11.4
	Chinese	30	34.1
	Bidayuh	40	45.5
	Iban	6	6.8
	Others	2	2.3
	Total	**88**	**100.0**

The overall sample used in this study is illustrated in Figure 4.1 for gender and Figure 4.2 for ethnicity.

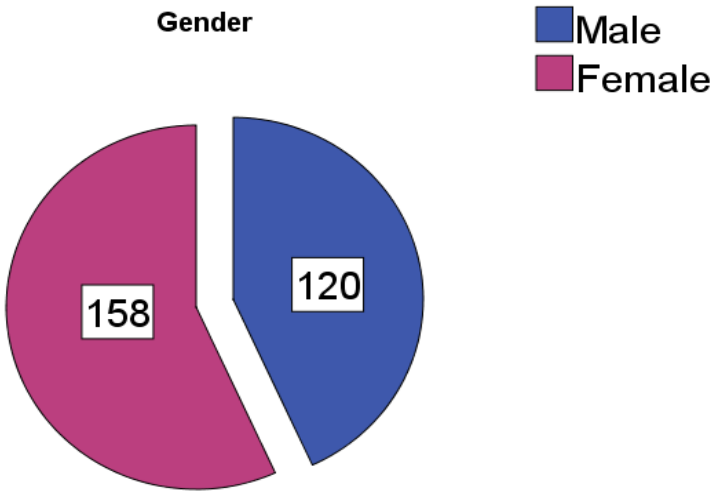

Figure 4.1 Demographic characteristic of the sample in Bau Sarawak based on gender.

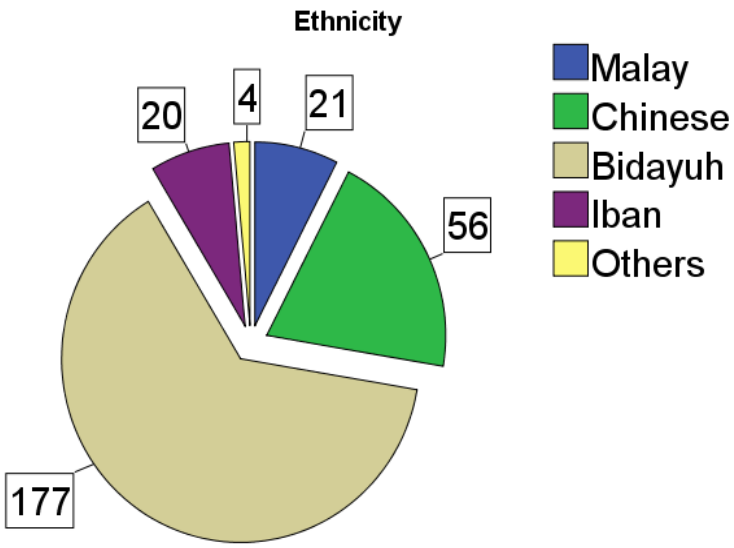

Figure 4.2 Demographic characteristic of the sample in Bau, Sarawak based on ethnicity.

4.1.1 General Interest in Science

This section enumerates the distribution of the respondents according to their level of general interest in learning science. The interest in learning science among respondents is summarized by statistical values on frequency and percentage in Table 4.4.

Table 4.3
Distribution of respondents by score on general interest in learning science

Level of General Interest in science	*Frequency*	*Percentage*
Low 5-13	0.00	0.00
Moderate 14-22	63	22.70
High 23-31	215	77.30
Total	278	100.0

It is noted that 77.30% of the respondents showed a high-interest level in learning science, followed by moderate interest with 22.70% and none of the respondents are in low-interest level in learning science. The mean score for general interest is 25.05 (*SD*=3.21) which indicates that most of the students in Bau, Sarawak are at the high level of general interest in learning science.

From the collected data, most of the respondents agreed that science is a fun subject (*M* =5.22, *SD*=.870) and they are looking forward to upcoming activities in the science subject (*M* =5.09, *SD*=.887). Besides that, the respondents also agreed that they enjoy the learning topics in their science class (*M* =5.06, *SD*=.866). The respondents relatively agreed that what there are learning in science class interesting (*M* =4.96, *SD*=.890). The data also showed that the respondents slightly agreed that they should spend more time for science at school (*M*=4.72, *SD*=.976).

4.1.2 Self-efficacy in science in school

There are eight items represent the factor for self-efficacy in science in school. From the eight items, the researcher came out with the score for level of self-efficacy in science among the respondents and the mean score for self-efficacy in science in this study is 32.72 (*SD* = 5.62). The distribution of respondents is presented in Table 4.5.

Table 4.4
Distribution of respondents by score on self-efficacy in science in school

Level of Self-Efficacy in Science	***Frequency***	***Percentage***
Low 8-21	4	1.40
Moderate 22-35	177	63.70
High 36-49	97	34.90
Total	278	100.00

For the overall score on self-efficacy in science in school, it was found that majority of the respondents (63.70%) possessed a “moderate” level of self-efficacy in science. There are about 34.90% of respondents have “high” level of self-efficacy and only 1.40% are in the “low” level of self-efficacy in learning science subject.

The data collected indicates that most of the respondents agreed that whenever they cannot understand something in science, they always tried to find the way to figure it out (*M*=4.78, *SD*=.994). The respondents sure that they can do well in science test (*M*=4.68, *SD*=1.132). Besides, whether the science content is difficult or easy, the respondents sure that they can understand the content (*M*=4.59, *SD*=1.133). The respondents also agreed that when they found the science content difficult, they tried to learn it (*M*=4.35, *SD*=1.423). They also agreed that if they put some effort, they can learn science better (*M*=4.33, *SD*=1.466).

But when the respondents compared themselves with other students, they slightly disagreed that they are better at science (*M*=3.81, *SD*=1.276). During science activities, the respondents slightly disagreed that they preferred to think or solving the activities by they own (*M*=3.28, *SD*=1.378). The respondents are have disagreed that they are confident about understanding difficult science concepts (*M*=2.91, *SD*=1.171).

4.1.3 The utility of school science for everyday life

The distribution score of respondents on their perception toward the utility of science school for everyday life is summarized in Table 4.6.

Table 4.5
Distribution of respondents by score on Utility of Science for everyday life

Interpretation for Utility of science for everyday life	***Frequency***	***Percentage***
Negative 5-13	0	0.00
Neutral 14-22	47	16.90
Positive 23-31	231	83.10
Total	278	100.00

From the survey, 83.10% of the respondents obtained score in between 23-31, which shows that they have positive perception toward the utility of school science in their daily life. Besides that, 16.90% respondents show moderate or neutral perception towards the utility of school science for everyday life. In this study, none of the respondents obtained score below 14 which indicate negative perception toward the utility of school science. The overall mean for this factor is 25.64 (*SD*=3.406).

Most of the respondents moderately agreed that they are learning valuable things in the science class (*M*=5.26, *SD*=.843) and what they are learning in science class can be applied to real life (*M*=5.22, *SD*=.893). They also believed that the science which they learn in school can help them to preserve the environment (*M*=5.14, *SD*=.897) and the

science subject is useful for them in everyday life (*M*=5.10, *SD*=1.005). The respondents slightly agreed that the topics in science class are practical for them to know (*M*=4.91, *SD*=.914).

4.1.4 Teaching Methods (Inquiry Process)

The mean score for teaching methods using inquiry process is 9.73 (*SD*=1.68). The distribution score of respondents on their perception toward teaching methods using inquiry process is summarized in Table 4.7. From the data, more than half of the respondents (60.80%) have positive perception toward the teaching method. Meanwhile, 38.10% of the respondents indicate neutral perception toward teaching method using inquiry process and the rest of 1.10% show negative perception of this teaching method.

In this study, the respondents agreed that when they need to conduct the experiment or construct technical objects, they preferred to participate in choosing the steps to follow (*M*=5.08, *SD*=0.917). The respondents also agreed that in science class, they participated in choosing the problem to solve (*M*=4.64, *SD*=1.02).

Table 4.6
Distribution of respondents by score on teaching method using inquiry process

Interpretation for Teaching Method (Inquiry Process)	***Frequency***	***Percentage***
Negative 2-5	3	1.10
Neutral 6-9	106	38.10
Positive 10-13	169	60.80
Total	278	100.00

4.1.5 Teaching Methods (Preferences)

The distribution score of respondents on their perception toward teaching methods based on their preferences in learning science in school is summarized in Table 4.7. This study found out that 56.10% of the respondents have a positive perception on teaching method based on student's preferences, followed by neutral perception 42.80% and a small of 1.10% of the respondents are in negative perception group. The overall mean for the score for this factor is 14.57 (*SD*=2.18).

Most of the respondents agreed that they like to spend more time doing observation, manipulations, and experiments (*M*=5.03, *SD*=0.925). They preferred to spend more time listening to the teacher giving explanation at the front of the class (*M*=4.87, *SD*=1.07). The respondents also slightly agreed that they like to spend more time consulting textbooks or websites (*M*=4.68, *SD*=1.07).

Table 4.7
Distribution of respondents by score on teaching method based on student preferences

Interpretation for Teaching Method (Preferences)	***Frequency***	***Percentage***
Negative 3-8	3	1.10
Neutral 9-14	119	42.80
Positive 15-20	156	56.10
Total	278	100.00

4.1.6 Predisposition and intention to act

The distribution score of respondents on their perception toward predisposition and intention to act in learning science in school is summarized in Table 4.8. From the table 4.8, it shows that 58.60% of the respondents are in positive position on predisposition and intention to act in learning science. Meanwhile, 37.40% of the

respondents are neutral and followed by 4.00% who are showed the negative response in their predisposition and intention to act in learning science. The overall mean score for respondents' predisposition and intention to act in learning science is 14.59 (*SD*=2.18).

Most of the respondents agreed that they intended to learn more about science careers (*M*=5.03, *SD*=1.08). They also intended to pursue their studies in science (*M*=4.87, *SD*=1.09) and later choose science-related career in the future (*M*=4.69, *SD*=1.20).

Table 4.8
Distribution of respondents by score on predisposition and intention to act

Interpretation for Predisposition and Intention to Act	***Frequency***	***Percentage***
Negative 3-8	11	4.00
Neutral 9-14	104	37.40
Positive 15-20	163	58.60
Total	278	100.00

4.1.7 Order of preference for science in school

The distribution score of respondents on order of preference for science in school is summarized in Table 4.9. Based on the result in Table 4.9, nearly half of the respondents (48.90%) are neutral in their perception on order of their preferences for science compared to the four subjects namely *Bahasa Melayu*, English, History and Mathematics. 41.7% of respondents preferred other subjects and only 9.40% of the respondents are preferred science subject in school. The overall mean score for this factor is 12.01 (*SD*=3.80).

From the survey, the study found out that the respondents slightly preferred History (*M*=3.22, *SD*=1.43) and *Bahasa Melayu* (*M*=3.15, *SD*=1.48) compared to Science

at school. They are also preferred English (*M*=2.85, *SD*=1.35) and Mathematics (*M*=2.85, *SD*=1.52) compared to Science subject.

Table 4.9
Distribution of respondents by score on order of preference for science with respect to other school subjects

Interpretation for order of preferences	***Frequency***	***Percentage***
Not Importance 4-10	116	41.70
Neutral 11-17	136	48.90
Importance 18-24	26	9.40
Total	278	100.00

4.1.8 Perceived order of importance of science in school

The distribution score of respondents on the perceived order of importance of science in school is summarized in Table 4.10. Based on Table 4.10, 48.20% of respondents are in neutral position toward their perception on order of the importance for science compared to the four subjects namely *Bahasa Melayu*, English, History and Mathematics. 43.90% of respondents are in negative perception of the importance science subject compared to the other subject and only 7.90% of the respondents have the positive perception in the order of importance of science subject in school. The overall mean for this factor is 11.44 (*SD*=4.20).

Table 4.10
Distribution of respondents by score on order of importance for science with respect to other school subjects

Interpretation of the importance of science	*Frequency*	*Percentage*
Not Importance 4-10	122	43.90
Neutral 11-17	134	48.20
Importance 18-24	22	7.90
Total	278	100.00

The data collected indicates that the respondents placed Mathematics as more importance subject (*M*=2.58, *SD*=1.274) compared to science, followed by English (*M*=2.79, *SD*=1.26), History (*M*=2.95, *SD*=1.217) and *Bahasa Melayu* (*M*=3.13, *SD*=1.318).

4.1.9 School efforts to promote science

The distribution score of respondents on school efforts to promote science is tabulated in Table 4.11. From the Table 4.11, most of the respondents (51.80%) perceived that their school is neutral or moderately promoted science, followed by 43.20% respondents perceived that their school has highly promote science to them and only 5.0% showed that their school are at the low effort in promoting science to the students. The mean score for this factor is 25.78 (*SD*=5.15).

Table 4.11
Distribution of respondents by score on school efforts to promote science

Interpretation for school efforts to promote science	*Frequency*	*Percentage*
Low 6-16	14	5.00
Moderate 17-27	144	51.80
High 28-38	120	43.20
Total	278	100.0

From the survey, the respondents slightly agreed that their school provide space for the students to demonstrate creativity in science (*M*=4.62, *SD*=1.15), besides that the school also advocates many school-level science competitions (*M*=4.48, *SD*=1.17), and promotes career in science to the students (*M*=4.43, *SD*=1.99). The respondents also agree that the school subscribed to science magazine and books to their students (*M*=4.37, *SD*=1.24). However, the respondents slightly disagreed that their school has plan to visit the museums or exhibitions that related to science (*M*=3.58, *SD*=1.52).

4.1.10 The frequency of family participation in science cultural practices

The distribution score of respondents on the frequency of family participation in science cultural practices is tabulated in Table 4.12. From the Table 4.12, most of the respondents (52.20%) perceived that is neutral or family participate moderately in science cultural practices, followed by 35.60% respondents perceived that their family has highly participated in science cultural practices and 12.20% showed that their school are at low effort in promoting and involved in practicing science cultural to them. The mean score for this factor is 19.85 (*SD*=5.08).

Table 4.12
Distribution of respondents by score on frequency of family participation in science cultural practices

Interpretation for family participation	*Frequency*	*Percentage*
Low 5-13	34	12.20
Moderate 14-22	145	52.20
High 23-31	99	35.60
Total	278	100.00

The data collected shows that the respondents slightly agreed their family like to watch television programs that talk about science (*M*=4.40, *SD*=1.30) and their family

encourage them to participate in science-related recreational activities (*M*=4.16, *SD*=1.25).However, the respondents slightly disagreed that their family like newspapers and magazines that talk about science (*M*=3.81, *SD*=1.31) and the respondents also disagreed that their family visit museums or exhibitions related to science (*M*=3.79, *SD*=1.48).Plus, most of the respondent's parents did not let them do scientific experiments at home (*M*=3.69, *SD*=1.62).

4.2 Hypothesis Testing

4.2.1 General interest in learning science based on gender

Ho_1 : There is no significant difference in students' general interest in Science based on gender.

Table 4.13
Distribution of the general interest in learning science based on gender

Score Range	***Level***	***Gender***	
		Male	***Female***
5-13	Low	0(0.00%)	0 (0.00%)
14-22	Moderate	36 (30.00%)	27 (17.10%)
23-31	High	84 (70.00%)	131 (82.90%)
Total		**120 (100.00%)**	**159 (100.00%)**

Table 4.13 shows the distribution of the students' general interest in learning science based on genders. Both gender reported a high level of interest in learning science, that is, 70.00 % for males and 82.90% for the females. This represents most of both genders. Moderate level of interest in learning science was obtained for 30.00% of the males and 17.10% of the females. None of the respondents is in the low level of interest were obtained. From the Table 4.13, there are differences in the levels of the general interest between the gender. However, whether this difference is statistically significant or not can only be determined by the t-test.

Table 4.14
The result of T-test to compare means of general interest in learning science based on gender

Gender	***N***	***M***	***SD***	***Levene's Test***		***T-test***		
				F	***Sig.***	***t***	***df***	***p***
Male	120	24.19	.309	3.084	.080	-3.991	276	<.001
Female	158	25.70	.231					

The Levene's test yielded F=3.084 with p = .080 which indicates that equal variance should be assumed. Scores on general interest in learning science were higher for female respondents (*M*= 25.70, *SD*=.231) than for male respondents (*M*=24.19, *SD*=.231). From Table 4.14, it shows that there is a significant difference in general interest between male and female respondents where *t* (276) = -3.991, p<.001. Therefore, hypothesis H_{o1} is rejected.

From this data, it indicates that the female students in Bau, Sarawak have higher interest compared to male students in learning Science due to the science syllabus in lower secondary is more to focus on life science and less physical science. Based on Science syllabus in Form 1 and Form 2 (Ministry of Education Malaysia, 2002a, 2002b), the themes are more to life science and less focus on physical science. This factor contributed to the result that in this study, the female students have higher interest in science compared to male students. This result supports the finding from the study conducted by Ceci et al. (2014) which also indicates that female students have high interest in learning life science compared to male students which are more interest in physical science.

4.2.2 General interest in learning science based on schools

Ho_2 : There is no significant difference in students' interest in Science based on school.

A One-way ANOVA was used to determine whether there is a significant difference among the three secondary schools in Bau, Sarawak in student's general interest in learning science. The independent variable represented three schools that involved in this study: A) SMK Bau; B) SMK Lake; and C) SMK Paku. The dependent variable was the students' score on general interest in learning science. See Table 4.15 for means and standard deviations for each of the three schools.

Table 4.15
Means and Standard Deviations of Standardized Test Scores

Method	***N***	***Mean***	***SD***
School A	95	25.06	2.77
School B	95	26.52	2.65
School C	88	23.45	3.46
Total Group	**278**	**25.05**	**3.21**

The Levene's test for the homogeneity of variance in this study yielded F= 3.657 with p=.027 which indicates that unequal variance should be assumed. Since, the equal variance assumption has been violated, therefore this study used an adjusted F statistic which is the Welch test. The Welch test is more prevailing than the Brown-Forsythe test and if the F value is significant, an appropriate post hoc test is required (Horn, 2008). For this study, the Welch's test yielded F = 22.750 with p<.001 which is significant and therefore the analysis is proceed with ANOVA and supported by post hoc test.

Table 4.16
The result of ANOVA to compare means of general interest in learning science among the male students in the three schools

	SS	***df***	***MS***	***F***	***Sig.***
Between-group	428.129	2	214.065	24.274	P<.001
Within-group	2425.166	275	8.819		
Total	2852.295	277			

From Table 4.16 above, the result indicates that there was a statistically significant difference between the schools as determined by one-way ANOVA F (2, 275) = 24.274, p <.001. Therefore, the null hypothesis (Ho2) is rejected.

Therefore, post hoc comparisons using Tukey procedures were used to determine which pairs of the three group mean differed. The results are presented in Table 4.17.

Table 4.17
Tukey Post Hoc Results on students' general interest in learning science by schools

					95% Confidence Interval	
School (I)	***School (J)***	***Mean Difference (I-J)***	***Std. Error***	***Sig.***	***Lower Bound***	***Upper Bound***
1.00	2.00	-1.45263*	.43088	.002	-2.4680	-.4373
	3.00	1.60861*	.43937	.001	.5733	2.6440
2.00	1.00	1.45263*	.43088	.002	.4373	2.4680
	3.00	3.06124*	.43937	.000	2.0259	4.0966
3.00	1.00	-1.60861*	.43937	.001	-2.6440	-.5733
	2.00	-3.06124*	.43937	.000	-4.0966	-2.0259

A Tukey post hoc test revealed that the general interest in learning science was statistically significantly higher in School B (26.52±2.65, p<0.01) and School A (25.06±2.77, p=.001) compared to School C (23.45±3.46). Besides, there was also statistically significant difference between the School A and School B (p=.002).

School is the second home to students and most of the students spend at least 6 hours of schooling together with friends and teachers at school. School administrators and

teachers who are actively in planning science-based activities are able to instil the interest of students in their schools in science subjects. The finding of the study is consistent with the literature review on the influential school factor can affect the student's performance and interest in learning. The schools that actively organising and support students' learning activities can indirectly influence students' performances and interest in learning (Zhang & Tang, 2017). The schools that provide the platform for their students to explore their own learning in science can also promote the student motivation and interest in science (Sutherland, 2010).

4.2.3 Determining the contribution of various factors towards Students' interest in learning Science

Ho_3 : None of the nine independent variables has a significant influence on the students' interest in learning science.

To reveal the relationship between students' interest in learning science with the students' self-efficacy, school and family contexts, this study used correlation and multiple regression (stepwise) procedures.

The findings show that students' interest in learning science has the moderately positive relationship with the utility of school science ($r=.585$, $p<.001$), teaching method using inquiry process ($r=.577$, $p<.001$) and predisposition and intention to act ($r=.548$, $p<.001$). Meanwhile, there are four factors that show low positive relationship with students' interest in learning science: (1) teaching methods (preferences) ($r=.483$, $p<.001$), (2) Frequency of family participation in science cultural practices ($r=.440$, $p<.001$), (3) self-efficacy in science ($r=.420$, $p<.001$) and (4) School effort to promote science ($r=.387$, $p<.001$).

However, two of the factors show a little negative relationship with students' interest in learning science which is (1) order of preference for science (r=-.050, p=.204) and (2) perceived order of importance of science (r=-.080, p=.091).

The results of the study support the findings of Hasni & Potvin (2015) which states that school contexts showed a moderately to low correlation with general interest in science.

Table 4.18 shows the correlation between general interest in learning science with other variables.

Table 4.18
Correlations between General Interest in Science with other Variables

Variables	***General interest in science***	***P value***
Self-efficacy in science	.420	<.001
Utility of school science	.585	<.001
Teaching Method (Inquiry Process)	.577	<.001
Teaching Method (Preferences)	.483	<.001
Predisposition and Intention to act	.548	<.001
School effort to promote science	.387	<.001
Frequency of family participation in science cultural practices	.440	<.001

As for multiple regression, the finding is shown in Table 4.19 where the predictor variables that were statistically significant and their "Beta weights" (B) are teaching method using inquiry process (B=.254), utility of school science (B=.252), predisposition and intention to act (B=.214), self-efficacy in science (B=.125) and teaching methods (preferences) (B=.104).

Therefore, these five predictor variables were entered into the multiple regression equation. They are statistically significant at the F-value of 57.338, p<.001 and R^2 =.513. Therefore, the finding of this study rejected hypothesis Ho_3.

The regression model used to predict the effects of the five factors upon the interest in learning science is:

Interest in science = $6.241 + .486\ X_1 + .237\ X_2 + .235\ X_3 + .153\ X_4 + .072\ X_5$

where

X_1 = Teaching Method (Inquiry Process)

X_2 = Utility of school science

X_3 = Predisposition and Intention to act

X_4 = Teaching Method (Preferences)

X_5 = Self-efficacy in science

Together, these five factors account for 51.30% in explaining the variance in the students' interest in learning science. The study found that the teaching method using inquiry process was the most dominant factor affecting interest in learning science. However, $(1-R^2) = 0.487$, which means that 48.70% of the students' interest in learning science is due to other factors other than those undertaken in this study.

From the results above, the study found that school is important and one of the main factors that can affect students' interest in science subjects. Teachers have an important role in fostering students' interest by providing inquiry-based activities. PISA (2016) reported that the teachers with good teaching methods can nurture students' interest in science.

Additionally, students should always be exposed to the interests of science subjects. Students should be aware of the importance of science in their lives, not just to

pass the exam. When they are aware of these interests, they will be more appreciative, and this can foster their interest in learning science.

Table 4.19
Results of Multiple Linear Regression Analysis on Factors That Influence the Students' Interest in Learning Science in Bau, Sarawak using the STEPWISE Procedure

Dependent Variable (Predicted variable) = Interest in learning science
Independent Variable (Predictor variable) = (1) Self-efficacy, (2) utility of school science, (3) Teaching method using inquiry process, (4) Teaching method (Preferences), (5) Predisposition and intention to act, (6) Order of preference for science, (7) Perceived order of importance of science, (8) School effort to promote science, and (9) Frequency of family participation in science cultural practices

R	R^2	Adjusted R^2	SE of Estimate
.716	.513	.504	2.260

Predictors: (Constant), Utility of school Science for everyday life, Teaching Method using Inquiry process, Predisposition and Intention to Act, Self-Efficacy, Teaching Method (Preferences)

Analysis of Variance (ANOVA)					
	SS	**df**	**MS**	**F**	**p**
Regression	1464.158	5	292.832	57.338	<.001
Residual	1389.137	272	5.107		
Total	2853.295	277			

Variables in Equation	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	SE	Beta		
(Constant)	6.241	1.197		5.215	.000
Utility	.237	.051	.252	4.615	.000
Inquiry	.486	.103	.254	4.738	.000
Predisposition	.235	.058	.214	4.054	.000
Self-Efficacy	.072	.028	.125	2.595	.010
Preferences	.153	.078	.104	1.973	.050

4.3 Summary

Even though 330 sets of questionnaires were distributed, the return is 305 (92.40%) of which 278 (84.24%) were valid and analysed in the study. The respondents comprised 43.17% males and 56.83% females.

The summary for descriptive statistics are as below:

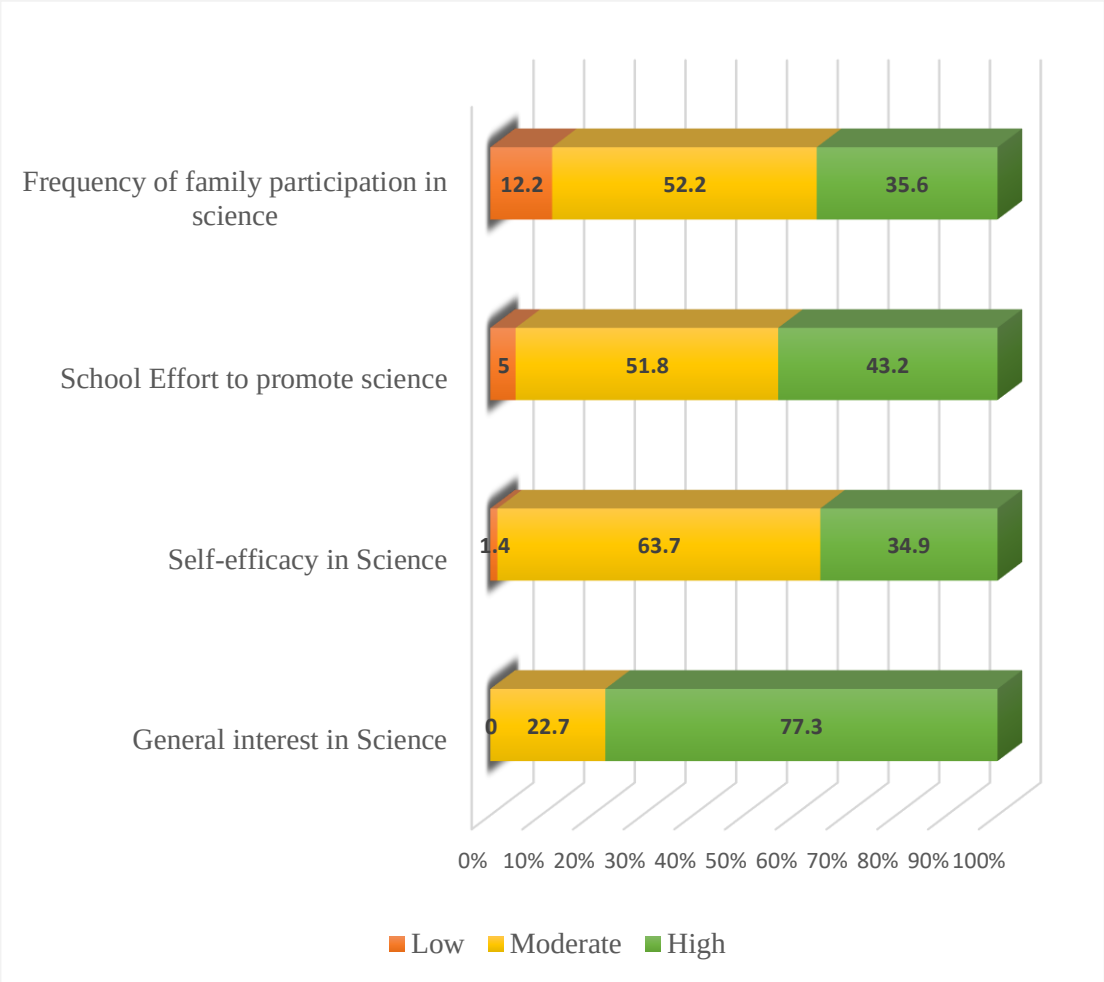

Figure 4.3 Summary of percentages for descriptive statistics (I)

From the result above, it can be concluded that the students in Bau, Sarawak have the high level of general interest in Science. However, the students in these three schools in Bau have the moderate level of self-efficacy in Science. From the students' perspective, the frequency of family participation in science and school effort to promote science have the moderate level of influence in nurturing their interest in science.

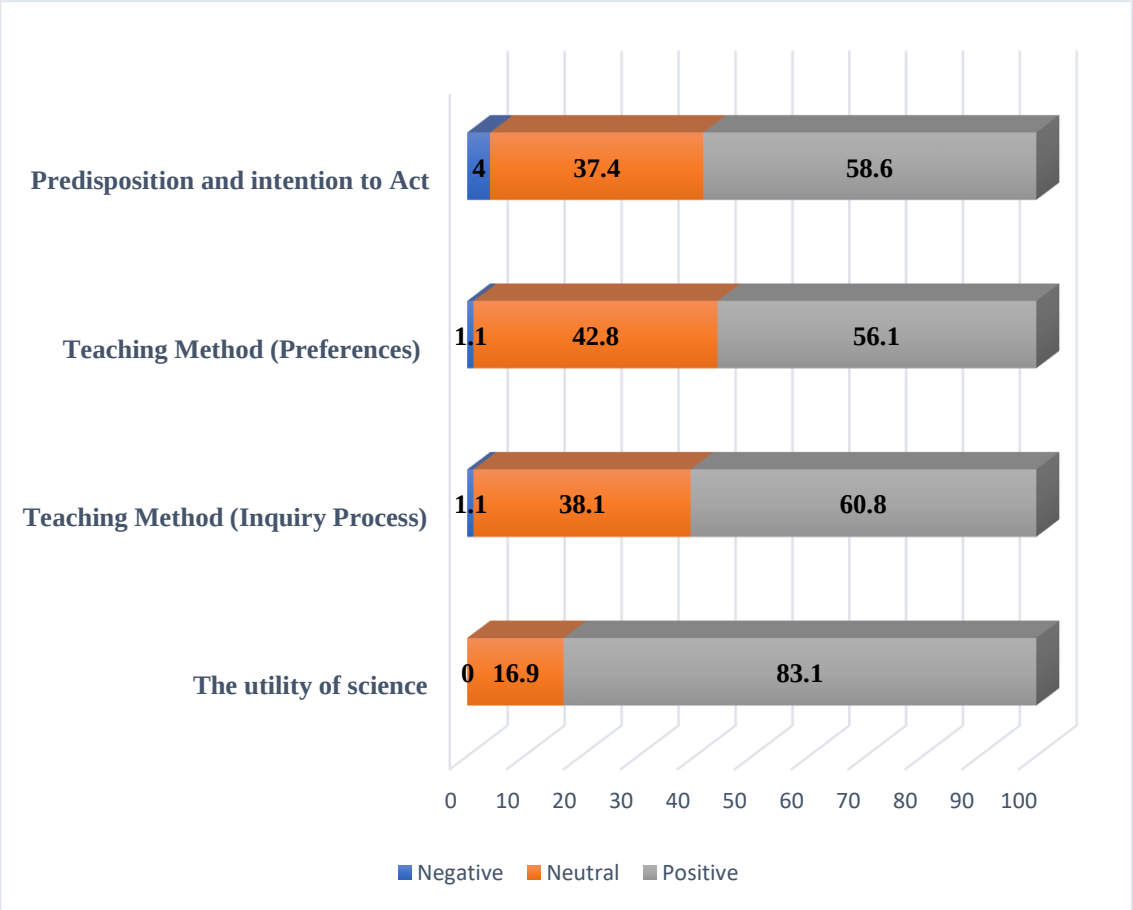

Figure 4.4 Summary of percentages for descriptive statistics (II)

From the result above, most of the students in Bau, Sarawak have positive perception on the utility of science, teaching method (Inquiry process), predisposition and intention to act and teaching method (Preferences). The results show that these four variables can influence the students' general interest in science in Bau, Sarawak.

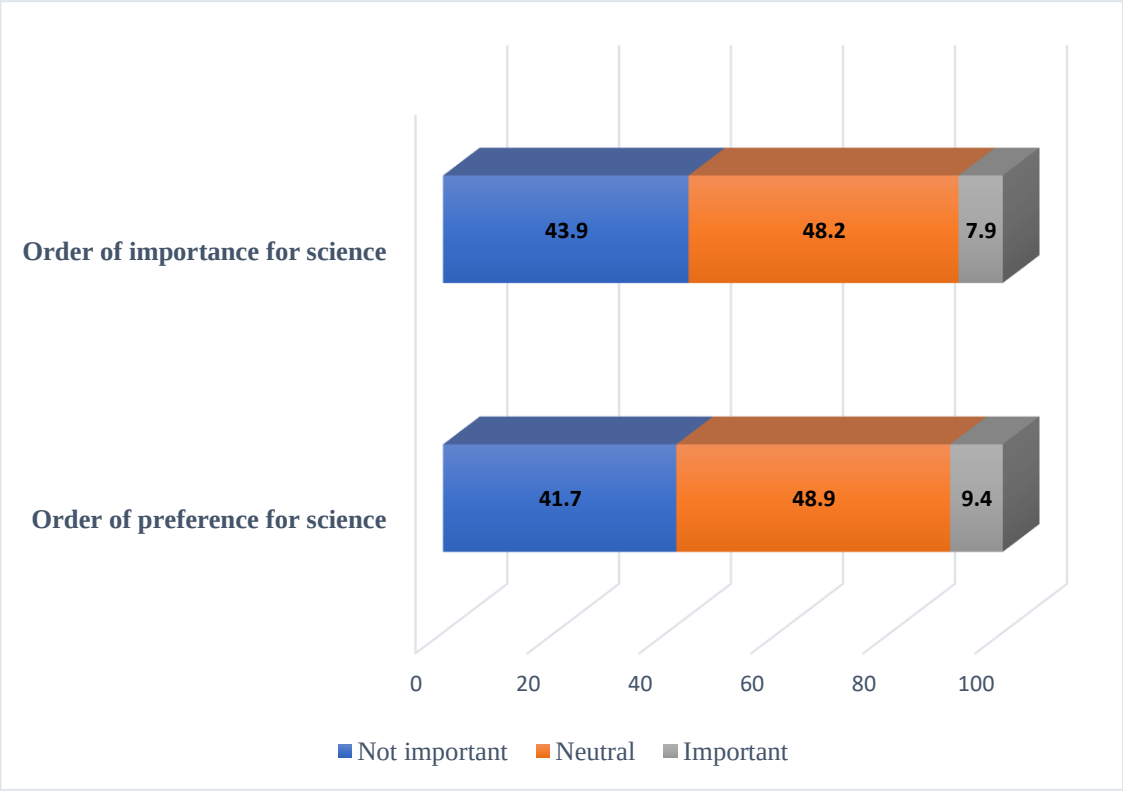

Figure 4.5 Summary of percentages for descriptive statistics (III)

From the Figure 4.5, this study can conclude that the students in Bau, Sarawak perceived that the order of importance for science and the order of preference for science compared to other subjects that are taught in school is neutral and not important in promoting interest in science subject.

Lastly, the summary for inferential statistics is shown in Table 4.19.

Table 4.20
Summary of Results of the Hypothesis Tests

Null Hypothesis	Statement of Hypothesis	Results of Hypothesis
Ho_1	There is no significant difference in students' general interest in learning Science based on gender.	Rejected t (278) = -3.991, p<.001
Ho_2	There is no significant difference in students' interest in learning Science based on schools	Rejected F (2,275) = 24.214, p<.001
Ho_3	None of the nine independent variables have a dominant influence on the students' interest in learning science.	Rejected R^2=.513, p<.001

CHAPTER FIVE
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.0 Introduction

This chapter provides a summary of the preceding chapters. It is summarizing the problems understudy, objectives of the study and methodology. It also briefly summarizes the research findings, followed by conclusion and recommendation.

5.1 Summary

This study was carried out to determine the students' interest in learning Science subject among Form Two students from three secondary schools in Bau, Sarawak and some possible factors that have the influence on the interest in learning Science subject. The Form Two students are seen as crucial assets in the future to help Malaysia to fill in the gaps along the entire STEM careers. Systematic and effective development programmes are necessary in order to achieve the target of 60:40 science students to non-science students. In 2014, the percentage for science students is only 21% which is far from the MOE target.

In the researcher's view, the findings of the study can provide the impetus to interested parties such as Ministry of Education, Sarawak Education Department or other researchers to explore further into the subject. It is hoped that the findings of the study

will be useful to relevant parties to plan development programmes to capture more students' interest in learning Science subject in school.

In this present study, 278 respondents are used to represent 26.78% of a total 1038 Form Two students in Bau, Sarawak. The questionnaire used is adapted and modified from Hasni & Potvin (2015). The statistical analysis of the data involved the use of descriptive statistics, mean, t-test, one-way ANOVA and Multiple Linear Regression.

The discussion of the findings is divided into four topics. Firstly, it describes the findings of the general interest in learning Science subjects among the Form Two students in Bau, Sarawak. Secondly, it describes the findings of the difference in general interest in learning Science subject based on gender. Thirdly, it describes the findings of the difference in general interest in learning Science subject based on school. Lastly, it describes the findings of the contribution of the various factors towards influencing the interest in learning Science among the Form Two students in Bau, Sarawak.

5.2 Conclusion

The focus of this study has been to determine students' interest in learning Science subject among Form Two students and the factors that influence their interest in learning Science subject.

This study concludes that the students in Bau, Sarawak have a high interest in learning Science subject. However, the students in these three schools in Bau have the moderate level of self-efficacy in Science. From the students' perspective, the frequency of family participation in science and school effort to promote science have the moderate level of influence in nurturing their interest in science.

The female students show more interest in learning Science subject compared to male students. As for the schools, School B shows higher interest in learning science compared to School A an C.

The findings also show that five out of nine factors contribute significantly to students' interest in learning Science which are the utility of school Science, teaching methods (inquiry process), teaching method (preferences), predisposition and intention to act, and self-efficacy in Science with R^2=.513, p<.001. The findings also showed that the relationship between interest in learning Science subject with these five factors was relatively strong and positively significant.

The regression model used to predict the effects of the five factors upon the interest in learning science is:

Interest in science = $6.241 + .486\ X_1 + .237\ X_2 + .235\ X_3 + .153\ X_4 + .072\ X_5$

where

X_1 = Teaching Method (Inquiry Process)

X_2 = Utility of school science

X_3 = Predisposition and Intention to act

X_4 = Teaching Method (Preferences)

X_5 = Self-efficacy in science

5.3 Recommendation

Based on the findings of this study, the following recommendations are made for future researchers.

5.3.1 Replication of study

The researcher recommends the replication of this study in other districts. In this study, the researcher used the survey method. However, other methods such as interviews can also be carried out and the results compared with the findings in this study.

5.3.2 Research on other factors such as peer influences and attitude

This study only adopts nine factors affecting interest in learning Science: utility of school Science, teaching methods (inquiry process), teaching method (preferences), predisposition and intention to act, self-efficacy in Science, order of Preference for Science with respect to other school subjects, perceived order of Importance of Science in school with respect to other school subjects and frequency of family participation in science cultural practices. however, the five predictor variables can only explain 51.30% of the variance in the students' interest in learning Science subject. Therefore, the researcher recommends that future study might research on the other factors such as peer influences and the students' attitude toward interest in learning Science subject in school.

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APPENDIX
Research Questionnaire Form:

Students' Interest in Learning Science and its Relationships with Self-Efficacy, School and Family Contexts in Bau District, Sarawak

Dear Sir/Madam,
Please spend 30 minutes to complete this questionnaire form.

The purpose of this questionnaire is to study the students' interest in learning science subjects and its relationships with self-efficacy, school, and Family contexts in Bau, Sarawak. There will be **five** sections which are Section A, the demographic profile, Section B, general interest in science, Section C, self-efficacy, Section D, school contexts and Section E, family context in this questionnaire.
Please answer **All** questions by following the instruction given. Information obtained from the respondents strictly **CONFIDENTIAL** and are only used for academic purposes. Please answer the questionnaire confidently and honestly. Your cooperation is highly appreciated. Thank you.

Postgraduate Students
M.Sc. Learning Sciences
Faculty of Cognitive Science and Human Resource Development
University Malaysia Sarawak
Contact Number: 0138945175
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Please tick (√) the most appropriate answers.

A. Demographic Questions

1. Gender : ☐ Male ☐ Female

2. Ethnicity : ☐ Malay ☐ Chinese ☐ Indian ☐ Bidayuh ☐ Iban

   ☐ Others, please specify_____

GENERAL INTEREST IN SCIENCE AND SPECIFIC SUBJECTS IN SCHOOL *MINAT AM DALAM SAINS DAN SUBJEK-SUBJEK SPESIFIK DI SEKOLAH*						
B **General interest in Science** ***Minat am dalam Sains***	**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1 I look forward to upcoming activities in Science subjects. *Saya menantikan aktiviti yang bakal dijalankan dalam subjek Sains.*	**1**	**2**	**3**	**4**	**5**	**6**
2 Science is fun. *Sains menyeronokkan.*	**1**	**2**	**3**	**4**	**5**	**6**
3 We should spend more time for Science at school. *Kita perlu lebih banyak masa untuk Sains di sekolah.*	**1**	**2**	**3**	**4**	**5**	**6**
4 I enjoy the learning topics in my science class. *Saya seronok belajar topik-topik yang ada dalam kelas Sains.*	**1**	**2**	**3**	**4**	**5**	**6**
5 I find what I am learning in my science class interesting. *Saya mendapati apa yang saya belajar di kelas Sains menarik.*	**1**	**2**	**3**	**4**	**5**	**6**

SECTION C						
Self-efficacy in Science in school ***Keberkesanan diri dalam Sains di sekolah***	**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1 Compared to all the other students, I consider myself good at Science *Berbanding dengan pelajar lain, saya menganggap diri saya baik dalam Sains.*	1	2	3	4	5	6
2 When I can't understand something in Science, I always find a way to figure it out. *Apabila saya tidak dapat memahami sesuatu dalam Sains, saya sentiasa mencari cara untuk memikirkannya.*	1	2	3	4	5	6
3 Whether the Science content is difficult or easy, I am sure that I can understand it. *Sama ada kandungan Sains adalah sukar atau mudah, saya yakin saya dapat memahaminya.*	1	2	3	4	5	6

4	I am not confident about understanding difficult Science concepts. *Saya tidak yakin tentang memahami konsep Sains yang sukar*	1	2	3	4	5	6
5	I am sure that I can do well on science tests. *Saya yakin saya boleh melakukan ujian sains dengan baik.*	1	2	3	4	5	6
6	No matter how much effort I put in, I cannot learn Science. *Tidak kira berapa banyak usaha yang saya masukkan, saya tidak boleh belajar Sains.*	1	2	3	4	5	6
7	During Science activities, I prefer to ask other people for the answer rather than think for myself. *Semasa aktiviti Sains, saya lebih suka bertanya kepada orang lain untuk menjawabnya daripada berfikir untuk diri sendiri.*	1	2	3	4	5	6
8	When I find the Science content difficult, I do not try to learn it. *Apabila saya mendapati kandungan Sains sukar, saya tidak cuba untuk belajar*	1	2	3	4	5	6

SECTION D

	Utility of school Science for everyday life ***Utiliti Sains sekolah untuk kehidupan seharian***	**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	The science I learn at school is useful in my life (outside school). *Sains yang saya pelajari di sekolah berguna dalam kehidupan seharian saya (di luar sekolah).*	1	2	3	4	5	6
2	The science I learn in school helps me to better preserve the environment. *Sains yang saya pelajari di sekolah membantu saya memelihara alam sekitar dengan lebih baik.*	1	2	3	4	5	6
3	The topics in science class are practical for me to know.	1	2	3	4	5	6

	Topik-topik dalam kelas Sains adalah praktikal untuk saya tahu.						
4	What I am learning in my science class can be applied to real life. *Apa yang saya belajar dalam kelas Sains saya boleh digunakan untuk kehidupan sebenar.*	1	2	3	4	5	6
5	I am learning valuable things in my science class. *Saya belajar perkara-perkara bermakna dalam kelas Sains saya.*	1	2	3	4	5	6
Teaching methods (Inquiry process) ***Kaedah Pembelajaran (Proses Inkuiri)***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	When we need to do experiments or construct/manufacture technical objects, I participate in choosing the problem to solve. *Apabila kita perlu melakukan eksperimen atau membina / menghasilkan objek teknikal, saya mengambil bahagian dalam memilih masalah untuk menyelesaikannya.*	1	2	3	4	5	6
2	In Science, when we need to do experiments or construct/manufacture technical objects, I participate in choosing the steps to follow. *Dalam Sains, apabila kita perlu melakukan eksperimen atau membina /menghasilkan objek teknikal, saya mengambil bahagian dalam memilih langkah-langkah untuk diikuti.*	1	2	3	4	5	6
Teaching Methods (Preferences) ***Kaedah Pembelajaran (Keutamaan)***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	In science class, I would like to spend more time listening to the teacher give explanations at the front of the class. *Dalam kelas sains, saya ingin menghabiskan lebih banyak masa mendengar guru memberikan penjelasan di hadapan kelas.*	1	2	3	4	5	6
2	In science class, I would like to spend more time doing observations, manipulations, and experiments.	1	2	3	4	5	6

	Dalam kelas sains, saya ingin menghabiskan lebih banyak masa melakukan pemerhatian, manipulasi, dan eksperimen.						
3	In science class, I would like to spend more time consulting textbooks or websites. *Dalam kelas sains, saya ingin menghabiskan lebih banyak masa dengan merujuk buku teks atau laman web.*	1	2	3	4	5	6
Predisposition and intention to act ***Kecenderungan dan niat untuk bertindak***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	I intend to pursue studies in science. *Saya ingin meneruskan pengajian dalam bidang sains.*	1	2	3	4	5	6
2	I intend to pursue a science related career in the future. *Saya bercadang untuk meneruskan kerjaya berkaitan sains di masa hadapan.*	1	2	3	4	5	6
3	I intend to learn more about science careers. *Saya ingin mengetahui lebih lanjut mengenai kerjaya sains.*	1	2	3	4	5	6
Order of preference for Science with respect to other school subjects ***Keutamaan Sains berbanding dengan subjek-subjek lain di sekolah***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	At school, I prefer Bahasa Malaysia over Science. *Di sekolah, saya lebih suka Bahasa Malaysia berbanding Sains.*	1	2	3	4	5	6
2	At school, I prefer English over Science. *Di sekolah, saya lebih suka English berbanding Sains.*	1	2	3	4	5	6
3	At school, I prefer History over Science. *Di sekolah, saya lebih suka Sejarah berbanding Sains.*	1	2	3	4	5	6
4	At school, I prefer Mathematics over Science. *Di sekolah, saya lebih suka Matematik berbanding Sains.*	1	2	3	4	5	6
Perceived order of importance of Science in school with respect to other school subjects ***Kepentingan Sains di sekolah berbanding dengan subjek-subjek lain di sekolah***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***

1	In school, Bahasa Malaysia is more important than Science. *Di sekolah, Bahasa Malaysia lebih penting daripada Sains.*	1	2	3	4	5	6
2	In school, English is more important than Science. *Di sekolah, Bahasa Inggeris lebih penting daripada Sains.*	1	2	3	4	5	6
3	In school, History is more important than Science. *Di sekolah, Sejarah lebih penting daripada Sains.*	1	2	3	4	5	6
4	In school, Mathematics is more important than Science. *Di sekolah, Matematik lebih penting daripada Sains.*	1	2	3	4	5	6
School Efforts to Promote Science ***Usaha-Usaha Sekolah Dalam Memperkenalkan Sains***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	My school promotes career in Science to students. *Sekolah saya mempromosikan kerjaya dalam bidang Sains kepada pelajar.*	1	2	3	4	5	6
2	In my school, I'm encouraged to participate in science-related recreational activities *Dalam sekolah saya, saya digalakkan untuk mengambil bahagian dalam aktiviti rekreasi berkaitan Sains.*	1	2	3	4	5	6
3	My school advocates many school-level Science competitions. *Sekolah saya menganjurkan banyak pertandingan Sains peringkat sekolah.*	1	2	3	4	5	6
4	In my school, we visit museums or exhibits related to Science. *Dalam sekolah saya, kami melawat muzium atau pameran yang berkaitan dengan Sains.*	1	2	3	4	5	6
5	Schools provide space for students to demonstrate creativity in Science. *Sekolah memberi ruang kepada pelajar untuk menunjukkan kreativiti dalam bidang Sains.*	1	2	3	4	5	6
6	My school subscribes to magazines and books on Science. *Sekolah saya melanggan majalah dan buku-buku tentang Sains.*	1	2	3	4	5	6
SECTION E							

Frequency of family participation in science cultural practices ***Kekerapan penyertaan keluarga dalam amalan budaya sains***		**Strongly Disagree** ***Sangat Tidak Setuju***	**Moderately Disagree** ***Sederhana Tidak Setuju***	**Slightly Disagree** ***Sedikit Tidak Setuju***	**Slightly Agree** ***Sedikit Setuju***	**Moderately Agree** ***Sederhana Setuju***	**Strongly Agree** ***Sangat Setuju***
1	In my family, we like TV programs that talk about science *Dalam keluarga saya, kami suka menonton program TV tentang sains*	1	2	3	4	5	6
2	In my family, we like newspapers and magazines that talk about science *Di dalam keluarga saya, kami suka akhbar dan majalah mengenai Sains*	1	2	3	4	5	6
3	In my family, I'm encouraged to participate in science-related recreational activities *Dalam keluarga saya, saya digalakkan untuk mengambil bahagian dalam aktiviti rekreasi berkaitan Sains*	1	2	3	4	5	6
4	In my family, we visit museums or exhibits related to Science. *Dalam keluarga saya, kami melawat muzium atau pameran yang berkaitan dengan Sains.*	1	2	3	4	5	6
5	My parents let me do scientific experiments at home *Ibu bapa saya membenarkan saya melakukan eksperimen saintifik di rumah*	1	2	3	4	5	6

(Hasni & Potvin, 2015)

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
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SARAWAK

Tuan,

KELULUSAN UNTUK MENJALANKAN KAJIAN DI SEKOLAH, INSTITUT PENDIDIKAN GURU, JABATAN PENDIDIKAN NEGERI DAN BAHAGIAN DI BAWAH KEMENTERIAN PENDIDIKAN MALAYSIA

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan.

" STUDENTS' INTEREST IN LEARNING SCIENCE SUBJECT AND ITS RELATIONSHIP WITH SELF-EFFICACY, SCHOOL, AND FAMILY CONTEXTS IN BAU, SARAWAK "

3. Kelulusan adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengetua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari **1 Mac 2018** hingga **30 April 2018** .

5. Tuan dikehendaki menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat pdf dalam CD kepada Bahagian ini.Tuan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak diterbitkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

Ketua Sektor
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

salinan kepada:-

JABATAN PENDIDIKAN SARAWAK

* SURAT INI DIJANA OLEH KOMPUTER DAN TIADA TANDATANGAN DIPERLUKAN *