Alternative Framework, Attitudes towards Science and Problem Learning: A Pilot Study

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Abstract: *This research seek amongst 54 students, in form four Science subject. Research was conducted in one school in Sandakan, Sabah East Malaysia. Quantitative and qualitative designs were administered in this research. Body Coordination Two Tier Concept Test (BCTTCT) was used to assess the students' understandings of the Sciences' concepts. The test consisted of 20 question, the student needs to select the answer and write down the justifications of their answer. Interview were conducted with eight students to get in-depth views of their original Alternative Framework (AF) and Misconception and the relationships between AF and their Misconceptions. The findings suggested that AF Category 1 and Category 2 are relevant and the findings could be explained by Lumen Mind Theory. AF is useful model for teachers to interpret the students' answer.*
Key Words: *alternative Framework and Misconception, Body Coordination*

I. Introduction

I.1.1 Introduction

A researcher in the discipline of science education has identified a large diversity of misconceptions and Alternative Framework (AF) of which be potential conflict among students. In fact, many studies show that student's posses a number of pre-existence of the conception (alternative) about potential scientific phenomena interfere with the learning of students (Driver and Easley, 1978; Driver and Erickson, 1983; Fleer, 1999; Palmer, 1999, Posner *et al.*, 1982; Taber, 2000). This is because Helm, Hugh and Joseph D. Novak (1983) asserts that students come to school already has a trust how things happen and have different interpretations based on past experience that enables them to predict future events. They also have a clear meaning of the word they use, among which only understood by their own, this condition is called by the children's science (Gilbert *et al.*, 1982; Osborne *et al.*, 1984) are unparallel with scientific concepts, one being used in schools and the other is used in the *'real world'* students (Trowbridge and Mintzes, 1985). AF use is synonymous with the word misconceptions but the two terms have slightly different (Davy Seligin, 2010) even though its use is often whether construed by most researchers.
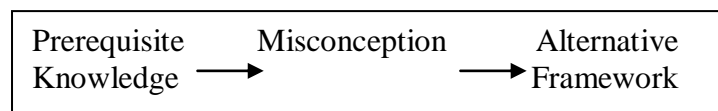

| Prerequisite Knowledge | → | Misconception | → | Alternative Framework |

Figure 1. AF position and misconceptions

Source: Davy Seligin (2010)

II.

III.1.2 Problem Statement

Students can not be thought of as empty containers to be loaded with the knowledge but the students rich with experience, knowledge and beliefs of their own understanding of the phenomena that occur in nature (Zurida Ismail, Syed Syarifah Idros & Mohd. Ali Shamsuddin, 2006). Students already have the scientific knowledge acquired from the environment, interaction with parents and friends, media, culture and socialization factors in which one concept is usually related directly to the students' understanding related to the environment (Joel K. Abraham *et al*, 2009). Before learning occurs, students already have their views and opinions of different explanations as recommended by scientists (Osborne *et al.*, 1983).

In Sabah Malaysia, with environmental conditions that are influenced by elements of agriculture and a strong local culture based on ethnicity, students need to understand and master the concepts they are learning science, students will fail if not dominate certain topic even until the expiration of a student has not mastered topics that have been learned (Allan Bell *et al.* 1994). This is because the concept of science rather than stand alone (Stimela, S.M., 2005) but has to do with subtopics, concepts or other facts. Sometimes students have strong misconceptions about a topic, even after correction done in class, they are difficult to modify the existed idea of the existence among them (Khalid, 2003; Özmen, H. 2004).

However, according to Karin Ehrlén (2009) the existence AF among students due to their self-assessment in a situation or development of student conceptual understanding is influenced by their cognitive (Hye-Eun Chu *et al.* 2007). Razila (1998, Kamisah Osman, Zanaton Hj. Iksan & Lilia Halim, 2007) said view of

science is not only too boring but too abstract to understand, making this the subject of less interest than other subjects. Collection of misconceptions among the students to form AF very influential in determining students' understanding of science to understand the concept. Therefore, AF is closely related to the attitude of students to learn science. Kamisah *et al.* (2007) study show survey on attitudes is an important study because of the attitude can be highlighted the relationship to subsequent behaviour. They felt that if a student has a positive attitude towards science subjects, they typically show positive attitudes towards subjects such as showing strong interest in science presented in science subjects taught by he or she teacher, showed a positive response during the teaching and learning (T&L) science so often asked, not sleepy and actively participate in all activities performed either in class or in the laboratory. Consequently, students who have a positive attitude usually will get a good performance in science subjects even not at all.

Similarly, if the students have a positive attitude towards science subjects, they will show negative behaviour towards subjects such as do not show high interest in science presented in science subjects taught by his or hers teacher, did not show response good during the teaching of science as not to ask, drowsiness, do not try to take part and do not participate in laboratory activities and working groups and so on results obtained in science subjects is very disappointed. Finally, students who do not have a positive attitude towards science subjects or will result in scientific attitude can not be integrated even though these students learn science in a relatively long period of time.
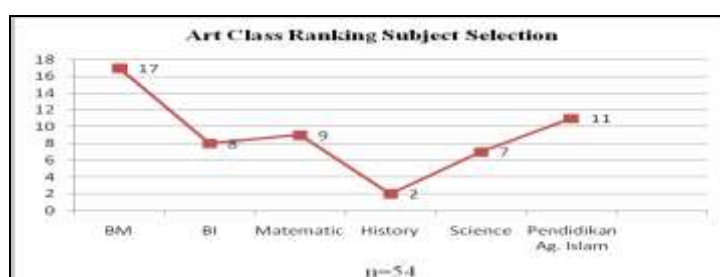

Figure 2. Art Class Ranking Subject Selection

Figure 2 shows that ranking science subject stayed on second lower than the history subject. Less of interest for science subject shows the mostly students not interesting to the science subject.

IV.
V.1.3 Research Questions

i) What is the graph pattern of Questionnaire? ii) What is the understanding analysis by category of questionnaire? iii) What is attitudes towards science and mean scores? iv) What is the pattern of AF among students? v) What is the list of AF and misconception among students vi) What is problem learning among students?

1.4 Definition of Operations
1.4.1 The concept

According Thijs, G. D. & Berg, E. van den (1995) the concept of a scientific idea underlying class of things or events as recommended by the community of scientists or in documented in textbooks. The underlying concept is the idea of something, the general meaning, concept (AS Hornby, 2000). The concepts of the meaning of the network need to be linked through other concepts.

VI.
VII.1.4.2 The conception

Conception refers to the individual ideas about the meaning of a concept.

VIII.
IX.1.4.3 Alternative conceptions

Alternative conception refers to the conceptions which in some cases contradictory or inconsistent as recommended by scientists.

X.
1.4.4 Preconception

Preconception is owned conception of students who formed without going through formal learning at School. This condition is also called instinctive (intuitive) or pre-conceptions of learning, knowledge, spontaneous, science knowledge of children and parents (folk-knowledge) (Thijs, G. D. & Berg, E. van den, 1995).

XI.
XII.1.4.5 Alternative Framework (AF)

Use of the terms used to refer to the concept of offense experienced by students in a concept or

fact in science-related research shows that research in this field showing the concept of AF compared to other offenses in which the position of AF such as frame which is outside the minds of students. When the students were given new information in the learning of science, they will accept or against obstacles (BauJaoude, 1992).
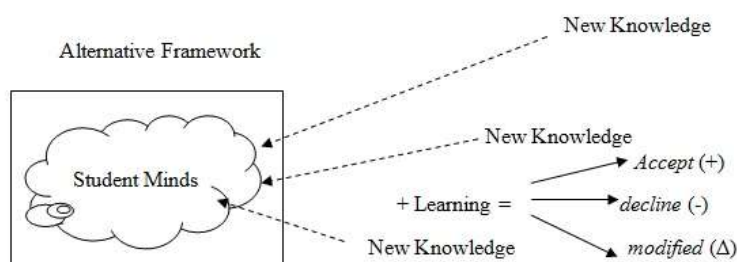

Figure 3: AF imagination and its position

Source and modified: J. Piaget, 1896-1980; Poh Swee Hiang, 2000; Davy Seligin, 2010**.**
Figure 3 show the new information will come into the minds of students when existing knowledge to form AF to process the new information. Students' understanding of scientific concepts depends on whether they accept, reject or modify the new information (Davy Seligin, 2010). Researchers concluded AF and all other offenses concept can be simplified and categorized into two levels as shown in Table 1.

Table 1: Types of mistakes of AF and their level

Concept Mistakes	Level
alternative conception, concept difficulty , misconceptions, naive belief, personal conception, existing knowledge, student perception, student preconception, student representatives, student view, student view.	1
alternative framework, concept framework, alternative multi explanation.	2

Source and modified: Gunstone (1995)

Researchers concluded that, when students learn new information, concepts offense students will be changing according to the levels above and try to understand how the new science concepts learned. Alternative term to refer to ideas that do not sound acceptable in the framework of scientific explanation and the concept of consistency refers to the degree of more than one set of phenomena, in which various alternative framework which is contrary to real science (McClelland, 1984; Mohd. Zaki Bin Ishak, 2008). Driver & Easley (1978) reports an alternative framework is used to describe the framework of student opinion of their own autonomy to interpret a natural phenomenon. A study of students' alternative framework to produce a variety of words to describe the new information and objects that have never travelled by students in the classroom. The term AF used by the (Driver & Easley, 1978; Driver & Erickson, 1983; Watts, 1983; McCleland, 1984; Hewson, 1985; Mutukrishna N., Carnine, D., B. Grossen, and Miller, S., 1993). AF term first time used by Driver and Easley (1978; Joseph Nussbaum & Shimshon Novick, 1982) in which they proposed the term AF. AF is term widely used in discussing the opinion of students in science than a proper concept as proposed by the scientists.

1.4.6 Misconceptions
Misconceptions word used by the (Driver & Easley, 1978; Helm H.& Novak, 1983). Various other names used to express the science misconceptions among children (Gilbert *et al*, 1982; Wong, T., K., & Seth Solomon, 2008), preconception (Novak, 1977; Clement, 1982,1993; Osborne & Freyberg, 1985; Hasweh, 1988; Mohd. Zaki Ishak, 2008), the naive belief (Caramazza *et al*, 1981), intuitive beliefs (McCloskey, M. Washburn, A. & L. Felch, 1983) or schema (Mel Stephen Sabella, 1999). This term either refer to different students' comprehension of science concepts (Driver, 1983) or is inconsistent or incompatible with the concept of scientificknowledge (Piaget, 1929).
Misconception is that a mistake or error views, opinions or behaviour of the situation, subject
Or object that is true (World English Dictionary, 2009). Also, this misconception of students is difficult to change and still give the wrong answer consistently (Driver and Easley 1978; Osborne, 1983; Champagne *et al*., 1985; Wanders *et al*., 1984; Stimela Mathabatha Simon, 2004).

II. Literature Review

2.1 Lumen Mind Theory

Davy (2010) shows student acceptance of knowledge is differing which is influence with what happen inside their mind. Students knowledge shows as a flow or Lumen Mind. Lumen is the thickness of human blood circulatory vessels (PPK, 2001). Figure 4 show the illustrate the understanding about Lumen Mind.
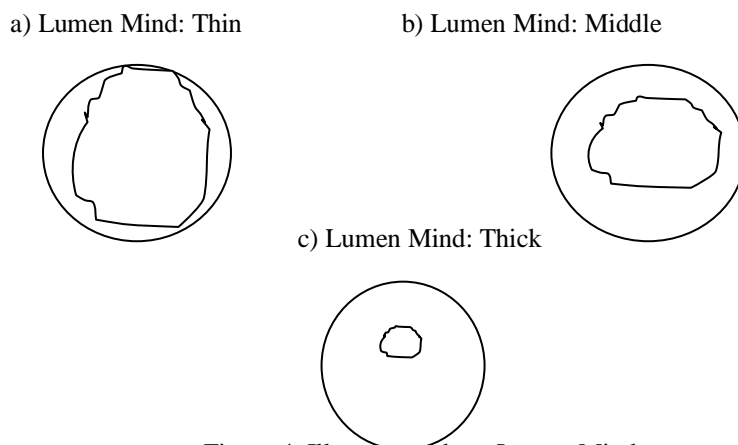
a) Lumen Mind: Thin   b) Lumen Mind: Middle

c) Lumen Mind: Thick

Figure 4. Illustration about Lumen Mind

III. Methodology

3.1 Survey Instruments

Questionnaire contains 20 questions 2 level (two-tier). There are two versions of the two-stage question (Costu B., A. Ayas, S. Unal, M. M. Niaz and Calik, 2007) the first version were used by Haslam and Treagust (1987) to detect misconceptions among students (Appendix 1). Test of item 2 in which two levels of questions true / false because the answers are provided to support the student answer. The second version of this type of question is a variation of the first version but more like having a choice of one to five roman roman (Test item 5) students choose the correct answer and their are needed give the reasons of justification the selection of the answer included. In both versions of the question, students may express their answers on their own opinions freely. Test item 8 is an open type of questions that require students to answer question opinion based on what is understood by them.

3.2 Test Questions Format

Researcher using closed-question multiple-choice and open-ended question to identify and detect AF found among the students. Sub Titles and subtitles Question Test Table 2 shows the subtitles of the topics of Body Coordination and Table 3 shows the source book used by researcher in the preparation of research questions related to Body Coordination topic. In Malaysia education system context, this science topic will be taught when student in Form 4 (higher secondary school) aged sixteen years old chapter two and will seat the Malaysian Education Certificate exam in Form 5.

Table 2: The title and subtitles of Body Coordination

No.	Title: Body Coordination	question number
1	Body Coordination	1,2, 7
2	Human Nervous System	3,4
3	Nervous Coordination	5,6,
4	Proprioceptors	8
5	The Human Brain	9, 10
6	Hormonal Coordination	11, 12
7	Coordination Between the Nervous System and the Endocrine System	13, 14
8	Effect of Drug Abuse On Body Coordination and Health	15, 16, 17
9	Effects of Excessive Consumption of Alcohol on Body Coordination and Health	18,
10	The Importance of a Sound and Healthy Mind	19, 20

Source: Chong Kum Ying *et. al* (2012)

Table 3: Book Themes and Their Authors

Book Themes	Autors
Success Science SPM	Peter Ling Chee Chong, Tan Kim Low dan Ling Tien Sing.
Fokus Sains Sukses Tingkatan 4	Chong Kum Ying, Chang See Leong, Mak Sew Lin dan Noor Hayatee Bt Mohd. Noor.
Nexus Pro Science SPM 4.5	Lau Hut Yee

3.3 Answering Questions Test Guide
 Test questions are displayed in front of the student through the LCD in the science laboratory. Teacher read the questions while the students observe the instructions on the LCD display. Students only need to fill in answers on A4 paper which is available without writing their name. Students are only allowed to write the class only. There are 20 questions asked in this question.

3.4 Science Attitude Inventory Questionnaire (Scientific Attitude Inventory)- SAI- II
 Science Attitude Inventory (Scientific Attitude Inventory-SAI) was developed and tested over 25 years ago (Moore and Foy,1997) in the Journal of Research in Science Teaching (Moore and Sutman, 1970). Some improvements made to the SAI-II compared with SAI-I in which aspects such as readability, gender differences in language as he and she are eliminated and reduce some instrument that is easy to use and understand. SAI-II questionnaire of 40 questions only from the original SAI-I, 60 questions (Moore and Foy, 1997). Improvements done by using of 557 students from grades 6, 9 and 12 in rural areas and small towns around Ohio, the United States. SAI-II consists of 40 questions derived from the SAI-I consisting of 60 questions. However, the researcher only used 20 questions only after looks the suitability for the students in Sabah and aspects that were dropped was a questionnaire related to student opinion against the opinion of scientists. Researcher using this questionnaire and modify the questionnaire to detect scientific attitude among students in SMK Sandakan II for pilot study before to apply in the real field. There are five point Likert response scale of 1-Strongly Agree, 2-Agree, 3-Do not Know, 4-Less Agree and 5-Strongly Disagree.

3.5 Focus Group Interviews and Unstructured Interviews
 Researcher using focus group interviews to explore the AF and misconceptions that are among the students. The show is called the focus for this interview conducted as a target to be achieved by each researcher. Interview method can reduce the time researcher from individual interviews. There are advantages and disadvantages of individual interviews and focus groups, but it depends on the aims and objectives of the study. This interview method provides interaction between the respondents interviewed, and intensive data collection and participation of all individuals in the group (Krueger, 1994; Creswell J.W, 2008). Researchers must be wise to address the situation before, during and after the interview so that the involvement of students at the maximum.
 The researcher used unstructured interviews contains semi-open interview questions to tap all available AF and misconceptions among students about the topic of body coordination. Interview questions based on the same test questions have been answered by students. An interview a day after the written examination questions are occupied by the students. A total of eight students were randomly selected by researcher to be the respondent to be interviewed and selected students based on their ability to speak one's mind to answer the test questions AF verbal responses and verbal misconception the that there will be categorized according to level of student understanding as suggested by (Mustafa Cin, 2007). According to Mustafa (2007), the level of understanding of students categorized into three categories as in Table 4.

Table 4: Category of Students Understanding

Category	Description	Example
Category 1	responses showed no evidence of student understanding	'I do not know ..'
Category 2	students' responses showed AF / misconceptions	'glands located at the foot'
Category 3	students have a full understanding	'the example of drug is cocaine'

Source: Mustafa Cin (2007).

 General questions will be prepared in advance for guidance and specific questions will be determined when the researcher to interview with the respondent for the purposes of the study (Sabitha Marican, 2005). Of general questions, will form the specific questions that lead to complete the questionnaires. This method gives researcher the opportunity to make an interview with the

normal way (natural) and are free to ask questions to the respondent. As a guide, a list of guide questions will be provided and rarely use a fixed interview schedule (Sabita Marican, 2005). The purpose of the interview was carried out to uncover and explore the misconceptions in the title AF and Body Coordination. Test questions will be screened through a slide yesterday in front of the LCD lab and the students respond to all questions. The findings were recorded for the purpose of student opinion data analysis focus group interviews. Researcher as far as possible not to respond to any of the answers the students so that students continue to provide information to independent researchers and natural and not awkward to express their views.

3.6 Preliminary Review of Subjects Ranking (Pre Research Survey)

Researchers modified ranking subjects from Whitfield (1980) and Ormerod (1971; Osborne *et al*. 2004). Popularity ofsubjectrelated research guidesto themost popular subjects bystudents. Reliability of .604 obt ained indicate that the questionnaire is suitable to implement for the initial survey. A total of 54 students in Sandakan II Secondary School Sandakan Sabah East Malaysia involved in the survey ranked subjects as simple ranking selection is used, are presented and interpreted (Whitfield, 1980; Osborne et al., 2004).

Table 5: Item Statistic

	Min	SD	N
Numbers	2.5347	1.37524	54
Subject	3.0297	1.95169	54

Table 6:Reliability Statistic

Alpha Cronbach's	Alpha Cronbach's Standardization	N Items
.682	.604	20

Table 4 shows the min of the number of subjects, respectively 2.5347 and 3.0297, Standard Deviation is 1.37524 and 1.95169. Table 5, Cronbach's Alpha standardized in Item Improved to .604 and Alpha Cronbach's is .682 although somewhat lower than 1:00, but these items can still be used in the pilot study before to implement in real field.

3.7 Data Analysis Procedures

Each question has one correct answer, some question is distracter will test level of students in answering questions. To analyze the question, two criteria used to classify and check the students' response to the answer. Analysis of question two tier the student (multiple choice and true / false) as specified in the tables 7.

Table 7: Criteria for Analysis of two-tier (Type Multiple Choice and True False)

Category			Symbol	Marks
Stage One		Stage Two		
True Respond	-	True Justification	T-T	3
Wrong Respond	-	True Justification	W-T	2
True Respond	-	Wrong Justification	T-W	2
True Respond	-	No Justification	T-N	1
No Respond	-	True Justification	N-T	1
Wrong Respond	-	Wrong Justification	W-W	0
No Respond	-	Wrong Justification	N-W	0
Wrong Respond	-	No Justification	W-N	0
No Respond	-	No Justification	N-N	0

To analyze the types of questions open, student responses were analyzed thematic answers and set the following criteria to classify the response answers.

Table 8: Criteria for Analysis of Two-Stage Question (two-tier) Response	Marks	Types of Response	Marks
True	1	Full Understanding (FU)	3
		Partially Understanding (P/U)	2
Wrong	0	Specific AF/Specific Misconception (SAF/SM)	1
		No Understand(NU)	0
		No Response (NR)	0

Resource and modified: B. Costu *et al*. (2007).

IV.   Finding

4.1   Graf Pattern of Questionnaire
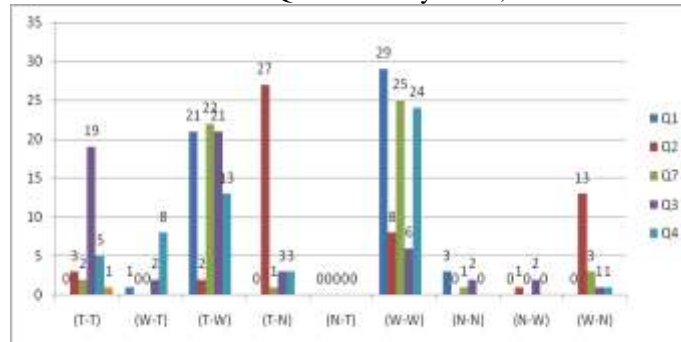
Table 9: Question analyze 1-4, 7
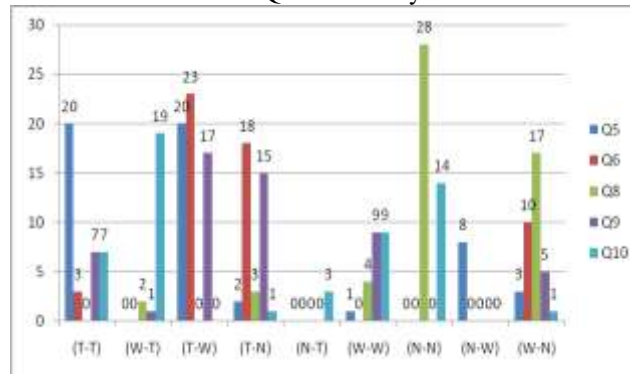

Table 10: Question analyze 5-10
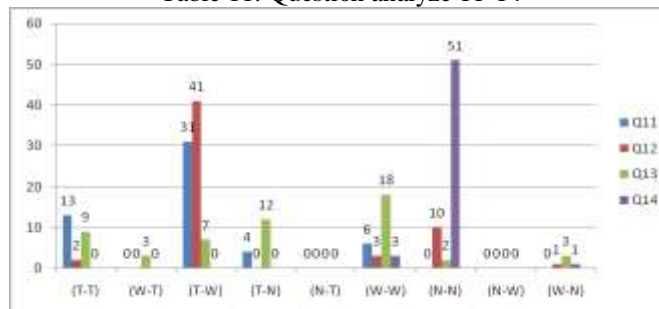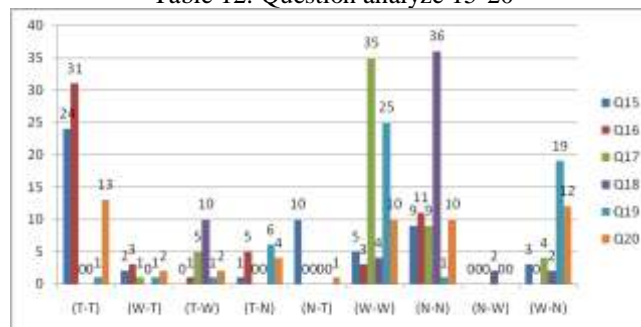

Table 11: Question analyze 11-14

Table 12: Question analyze 15-20

A total of 54 students from SMK Sandakan II, Sandakan Sabah East Malaysia is involved in this pilot study of 24 boys and 30 girls. All Respondents Demographic information is shown in Table 13.

Table 13: Respondent Demography

Item	Profile	N	Percent
Sex	1. Boy	24	44.44
	2. Girls	30	55.55

4.2 Understanding analysis by category of questionnaire

Table 14: Analysis of test questions no. 1-5

Subtitle	Body Coordination			Human Nerves System	
Category of Questionnaire	1 (%)	2 (%)	7 (%)	3 (%)	4 (%)
(T-T)	-	3 (5.55)	2 (3.70)	19 (35.18)	5 (9.25)
(W-T)	1 (1.85)	-	-	2 (3.70)	8 (14.81)
(T-W)	21 (38.88)	2 (3.70)	22 (40.74)	21 (38.88)	13 (42.97)
(T-N)	-	27 (50)	1 (1.85)	3 (5.55)	3 (5.55)
(N-T)	-	-	-	-	-
(W-W)	29 (53.70)	8 (14.81)	25 (46.29)	6 (11.11)	24 (44.44)
(N-N)	3 (5.55)	-	1 (1.85)	2 (3.70)	-
(N-W)	-	1 (1.85)	-	-	-
(W-N)	-	13 (42.97)	3 (5.55)	1 (1.85)	1 (1.85)
n	54	54	54	54	54

Table 14, in terms of full understanding, question two shows the number of students to answer (R-R) of 3 students (5.55%) compared to 2 students (3.70%) question 7. Category (R-N) question number two at 27% (50 students) answered this category, and only one student replied to questions 1.2 and 7 which is a (W-R), (N-W), and No Answer-No response (N-N). In the title of the Human Nervous System, the number of (R-R) that been answered by the students was 35.18% (19 students) among the highest compared to only 9.25% (5 students) for question 4. (R-W) category, question number 3, amounting to 38.88% (21 students) and only 1.85% (1 student) to answer questions 3 categories of (W-R). Question number 4, only 9.25% (5 students) who answered correctly (R-R).

Table 15: Analysis of test questions no. 5-10

Subtitle	Nerve Coordination		Role of Prioreseptor to maintain the balancing and Coordination	Human Brain	
Category of Questionnaire	5 (%)	6 (%)	8 (%)	9 (%)	10 (%)
(T-T)	20 (37.03)	3 (5.55)	-	7 (12.90)	7 (12.90)
(W-T)	-	-	2 (3.70)	1 (1.85)	19 (35.18)
(T-W)	20 (37.03)	23 (42.59)	-	17 (31.48)	-
(T-N)	2 (3.70)	18 (33.33)	3 (5.55)	15 (27.77)	1 (1.85)
(N-T)	-	-	-	-	3 (5.55)
(W-W)	1 (1.85)	-	4 (7.40)	9 (16.66)	9 (16.66)
(N-N)	-	-	28 (51.85)	-	14 (25.92)
(N-W)	8 (14.81)	-	-	-	-
(W-N)	3 (5.55)	10 (18.51)	17 (31.48)	5 (9.25)	1 (1.85)

	n	54	54	54	54	54

Table 15, Nervous coordination consists of questions 5 and 6. Number of students who correctly answer five ques (R-R) category is 37.03% (20 students) compared to only 5.55% (3 students) to question 6. However, the number of (R-W) answer category did not show significant difference of 37.03% (20 students) and 42.59% (23 students) to questions 5 and 6. What a difference clearly visible to the category (R-N) merits questions 5 and 6 of 3.70% (2 students) than 33.33 (18 students). Category 5 (N-W) questions worth 14.81% (8 students) and (W-N) category of 5.55% (3 students) and 18.51% (10 students) indicated that students have AF and misconceptions in the title. Subtitle Role of Prioreseptor to maintain the balancing and Coordination have one question, question number 8, not there one right answer to this question (R-R) category. in fact, the (N-N) category recorded the highest percentage of 51.85% (28 students) who have had no answer and no response. This implies the existence AF and a lot of misconceptions in their minds when answering this question. Category (W-N) recorded the second highest percentage, 31.48% (17 students), which was contributed by AF and misconceptions that exist among students. In the title of the Human Brain consists of questions 9 and 10, (R-R) correct category still shows a relatively low amount of 12.90% for the two questions. The highest was 35.18% selected (19 students), namely (W-R) 10 questions followed by (RW) of 31.48% (17 students). Category (R-N) drops slightly be 27.77% (15 students).

Table 16: Analysis of test questions no. 11-14

Subtitle Category of Questionnaire	Human Body Chemical Coordination		Coordination Between Nerve System and Endocrines System	
	11 (%)	12 (%)	13 (%)	14 (%)
(T-T)	13 (24.07)	2 (3.70)	9 (16.66)	-
(W-T)	-	-	3 (5.55)	-
(T-W)	31 (57.40)	41 (74.92)	7 (12.96)	-
(T-N)	4 (7.40)	-	12 (22.22)	-
(N-T)	-	-	-	-
(W-W)	6 (11.11)	3 (5.55)	18 (33.33)	3 (5.55)
(N-N)	-	10 (18.51)	2 (3.70)	51 (94.44)
(N-W)	-	-	-	-
(W-N)	-	1 (1.85)	3 (5.55)	-
n	54	54	54	54

Table 16, (R-R) category of questionnaire for question 11 shows the 13 percent (24.07 percent) compared favourably with the question 12 to 14. However, the category (R-W) 57.40% (31 students) indicated that most students still have many misconceptions that inhibit the AF and students to master the science of understanding the topic Body Coordination. Question 12, the (R-W) category increased 10 percent compared to the same category of questions 11 questions, to be 74.92% (41 students). Title Coordination among the endocrine system of the nervous system, only 16.66% (9 students) who answered correctly for the (R-R) category and there is no correct answer to question number 14. Category (R-R) question 11 shows percentage the number of questions comparing favourably with the 12 to 14. Question 12, the (R-W) category increased 10 percent compared to the same category of questions 11 questions, to be 74.92% (41 students). Title Coordination Among the endocrine system of the Nervous System, only 16.66% (9 students) who answered correctly for the (R-R) category and there is no correct answer to question number 14 (W-W) shows the highest category been answered by the students 33.33% (18 students), while the highest answered by the students to question 14 is the category (N-N) 94.44% (51 students). (N-N) is very high category showed that the students have difficulty applying the concept of science as compared to the right answer.

Table 17: Analysis of test questions no. 15-20

Subtitle Category of Questionnaire	Drug Abuse Effect			Effect of Usage of Alcohol For Body	Necessary of Healthy Mind	
	15 (%)	16 (%)	17 (%)	18 (%)	19 (%)	20 (%)
(T-T)	24 44.44)	31(57.40)	-	-	1 (1.85)	13 (24.07)
(W-T)	2(3.70)	3(5.55)	1(1.85)	-	1 (1.85)	2 (3.70)
(T-W)	-	1 (1.85)	5(9.25)	10 (18.5)	1 (1.85)	2 (3.70)
(T-N)	1 (1.85)	5 (9.25)	-	-	6 (11.11)	4 (7.40)
(N-T)	10 (18.5)	-	-	-	-	1 (1.85)

(W-W)	5 (9.25)	3 (5.55)	35(64.81)	4 (7.40)	25 (46.29)	10 (18.51)
(N-N)	9(16.66)	11(20.37)	9(16.66)	36 (66.66)	1 (1.85)	10 (18.51)
(N-W)	-	-	-	2 (3.70)	-	-
(W-N)	3 (5.55)	-	4 (7.40)	2 (3.70)	19 (35.18)	12 (22.22)
n	54	54	54	54	54	54

Table 17, Effect of Drug Abuse consist of questions 15, 16 and 17. The number of students answering questions (R-R) for 15 and 16, respectively 44.44% (24 students) and 57.40% (31 students). Category (W-W) questions 17 to 64.81% (35 students) was the top student options. (W-R) category for Impact of Drug Abuse shows low of percentage 3.70% (2 students), 5.55% (3 students) and 1.85% (1 student). Total (N-N) category of no response and no response to this topic shows clearly the problems that occur in science learning among students in understanding this topic. 16.66% (9 students), 37% (11 students) and 16.66% (9 students). Number 18 question relating with Effect of Usage of Alcohol For Body. No student who answered correctly by category (R-R). (N-N) category shows the amount of 66.66% (36 students) do not understand very well this part of (R-W) but the category of one right, but the response shows that there are some students still understand this part but gave the wrong response. (R-R) category only 1.85% (1 student) to questions 19 and 24.7% (13 students) to question 20, 46.29% (25 students) for the category (W-W). 51 % (10 students) the same category for question 20. High amount of students did not answer this question indicated that most students are still influenced by aspects of their environment resulting in a more dominant as expected answer is not consistent with a proper answer.

4.3 Descriptive Statistics
4.3.1 Descriptive Statistic Attitudes Towards Science and Mean Scores

Table 18 shows the descriptive statistics analysis related Attitudes on Science include the mean, M and standard deviation, SD. Data analysis showed that the overall attitude toward science among the 54 students who studied at a lower mean 1.1091 and standard deviation of .24063 indirectly with a rather low and negative in science. This data shows that most students are quite interested in science as a popular subject among students. Among the factors that contribute to this problem is less interested in the facts of science, had to remember facts and formulas of science and lack of initiative to succeed. Teachers need to diversify the teaching and learning methods that are capable of attracting students to learn.

Table 18: Attitudes toward Science
Descriptive Statistic

	N	Minimum	Maximum	Sum	Min, *M*	Std. Deviation, *SD*
SD	54	.60	1.82	59.89	1.1091	.24063
Valid N (list wise)	54					

Table 19: Descriptive Statistic
Descriptive Statistics

	Mean	Std. Deviation	N
Mean	2.7111	.39759	54
Marks	34.5741	12.13696	54

The significance is .397 Table 19 shows the low interest among students toward science. Low of interest towards science affected students understanding and their pathway of the future.

4.4 AF patterns among students

Table 20: AF Pattern Among Students
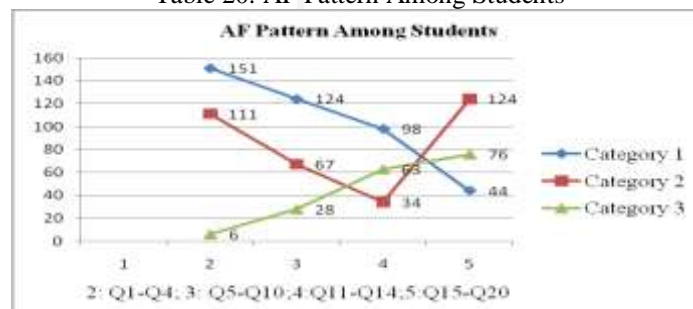
AF patterns of students in Category 1 of Table 16 shows the downward trend. Cumulative questions on the label 2 is 151 point, down 27 point to 124 point in the label 3. Category 1 continued to decrease to about 98 point in the cumulative label question 3 and down again to 44 point in cumulative labeled question 5. AF patterns in Category 2 shows the flow range. This pattern can be explained when the cumulative label question 2 of 111 point and down to 67 point and down 33 point to a low category 2 worth 34 point. However, this trend is upward to 124 point the cumulative questions labeled 5. AF pattern category 3 showed an upward trend. From 6 points this flow upward to 28 points in the cumulative questions to 3, and elevated to 68 points in the cumulative questions to 4 and 76 points in the cumulative questions to 5. This trend indicates that the AF grows and misconceptions that more and more.

4.5 List of Alternative Frameworks (AF) and misconceptions in Title Body Coordination:

Table 21 shows the diversity of AF and misconceptions in the title Body Coordination. Data obtained from the written responses of students in question collected from semi structure interview.

Table 21: Framework Alternative / misconceptions in Title Body Coordination

Students ID	Question numbers	AF and Misconception
1	6	PU: 'reacting too quickly'
3	19	SM: 'incurred in the brain that much memory'
4	6	PU: 'chemical system'
8	19	NU: 'one for his own wrong'
9	19	SM: 'disturbed area of the brain store memories'
16	15	SAF/SM: 'drug is a hallucinogenic pills'
18	19	SAF/SM: 'true medulla oblongata injury'
19	8	SAF/SM: 'nerve fibers as the muscle stimulating uncontrolled'
	10	SAF/SM: 'such as cycling'
	19	SAF/SM: 'true as can be fatal'
	20	SAF/SM: 'true because they take pills or drugs can bring diseases'
22	6	SAF/SM: 'reflex action as the neurons directly into the spinal cord'
	15	SAF/SM: 'destroy the body. For example ganjan (morphine), herven (heroin)'
23	10	SAF/SM: 'cerebral for example to read'
	12	PU: 'true because it is located above the kidneys'
	17	NU: 'none of the above'
		NU: 'do not know they do not know'
24	18	SAF/SM: 'processing of alcohol'
25	10	PU: 'pierced nails, cerebellum'
27	6	SAF/SM: 'shows the path of reflex action as impulses in the nervous system'
28	20	SAF/SM: 'true because the law'
29	5	SAF/SM: 'voluntary action does not involve muscle control as'
	8	SAF/SM: 'muscle fiber muscle fiber as it is'
30	6	SAF/SM: 'action as for giving the response'
		SAF/SM: 'muscle fibers as function as a sensory organ '
	8	PU: 'a drug developed by scientists'
	15	
35	10	SAF/SM: 'such as walking slowly
38	6	SAF/SM: 'action for carrying impulses from receptors to effectors'
	10	SAF/SM: 'singing'
	18	SAF/SM: 'the increase in energy because of the glucose'
39	17	NA: 'none of the above'
42	15	SAF/SM: 'Drugs is a powder that contains strong chemicals'

	20	SAF/SM: 'true as cause of death'
46	20	SAF/SM: 'because the drug is lethal to a person'
53	19	SAF/SM: 'because the affected parts of the brain that stores memory or a memory'

4.6 Problem Learning Amongst Students:

Partially of the Student Answer Is *'I don't Know'*: In the interviews conducted, the word 'I don't know' something that is common word in the discussion group. Through the observation of researcher, most students do not master the facts of science well. When confronted with questions that allow students to think and respond with a scientific fact or formula, students easily and readily answered 'don't know' or '...wrong because do not know....' than trying to find a proper answer. Answer 'no idea' shall disadvantage students because they did not try to find an answer factual science. In addition, the science test questions are also seeing the same problem scenario. Some of the answers the students, when having with difficult questions, they like to write the word 'no idea'. Table 18 shows examples of the word 'no idea' to be recited by students during interviews conducted.

Table 22: Interviews with students

Researcher	: 'Observe items number 13'
S1	: 'True, because we **do not know** teacher'
S2	: 'like as rambutan (Malaysian Fruit)........ *(all laughed)*
Researcher	: 'What is the function of Figure 6?'
S3	: 'Foo .. teachers .. to control the metabolic rate in the body'
Researcher	: 'Ok .. as well. Question 14, indicate a similarity and a nerves and coordination difference hormone'
S5	: '**Do not know** teacher. Look at the new books can answer the teacher. I do not remember teachers directly ... "

In certain circumstances, there are also students who give an answer but did not provide the rationale for the selection of their answers. For example, the test question item number 13 when students were asked to give reasons or rationale behind their answers, students are not able to provide rational, the student replied, 'one that does not know .....' or 'true because do not know '.

Very Low Level of Student Understanding: This statement is proved by the questions they asked questions that require students to write a comparison of the facts of science to question the test item number 14 for example, from 54 students who are involved in this pilot study, 46 (71%) students did not answer this part. This question is related to a comparison between the Nerve and Body Coordination chapter 2.1 in the form four science education system of Malaysia. Normally this section is taught between March and April in the education system in Malaysia and is clearly stated in the syllabus (HSP), the Curriculum Development Centre (CDC), since this chapter is in the early part of the form 4 science topics.

Answer Questions Differ: The findings showed that most students answer different questions. In the test item number 15 questions asking students to give definitions of drugs, however, some students are answering by giving the definition of 'drug is a hallucinogenic pills' clearly shows that there are different students to answer a proper question. This shows students effectively apply the scientific facts about the style of the correct treatment.

Motivation in Education: Motivation plays an important role to increase the confidence level of students. From the kindergarten school level up to tertiary level, the motivation is very effective to increase the interest of students to continue studying. According to the theory of Maslow, a hierarchy of motivation is at the top position compared to other factors.

Table 23: Interviews with students

Researcher	: 'That is the problem, your have to study hard' *(Class silent for a while)*
S5	: 'The function Y is to control body posture
Researcher	: 'Ok ... good answer ...
S8	: 'the answer is wrong teacher!! Y function is to control the external action controlled. It is right teacher ... yes .. yes ..'
Researcher	**: 'Yes, that can be accepted ... Ok ... We see the question item 10. Give an example

	of involuntary action, and an example activities :'An involuntary action controlled by the Cerebellum'
S1	: 'Why? '
Researcher	: 'I don't know teacher'
S1	

In conversation, Table 23, students seem to want to be appreciated and given words of praise. As an educator, it is important to give the words of praise where necessary when the student has answered the questions.

Disorders Facts of Science: Researchers think confusion caused by the change in the facts of science facts in answering the questions. This is because some students are not fully prepared to face the subject example, there are some students said posture is controlled by the medulla oblongata and reflex actions are controlled by the cerebrum. Students need to have clear facts and sufficient knowledge before answering this question well. There are students who can give an answer but can not provide the rationale or justification based on scientific fact or answer that is acceptable to the scientific community.

No respond to the question: There are some students not answering the questions. This will be detrimental to students because the marks will disappear out of if the question is not answered. Motivation will fall because of a mentality that they failed to answer the question properly. Of the 54 students who answered questions test, a total of 160 questions (12.5%) of 1280 not been answered question (No Answer-No Answer).

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