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**AN ANALYSIS OF CMPF112 COMPUTING SKILLS FINAL EXAMINATION SUBSECTION QUESTIONS FOR FOUNDATION STUDENTS IN CFGS: A CASE STUDY**

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**ABSTRACT**

*Foundation students are those students after SPM, and starting new life in campus environment. The transition between the styles of education from spoon-fed in high school to lectures in university surely affected the way they think and act. As CMPF112 Computing Skills are among the early subject being taught, it is interesting to study how the student answering questions which created based on Bloom Taxonomy, using their high school experiences only. This study analyzed three sections in CMPF112 Computing Skills final examination paper for trimester 1 2012/2013 based on their marks and conclude the level of transition from school-to-university.*

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**Keywords:** Cognitive domain, Student life, Bloom taxonomy, CMPF112, Computing skills, Final examination.

**1. INTRODUCTION**

The suitability of question asked and the ability of students who answering it is always a wonder of people involved in teaching and learning industry. The process of creating questions in order to ensure that those questions were actually the suitable questions to assess students' understanding is another big challenge. However, the next assessment process is to map out the questions based on the students' capabilities, and this also have to be based on the different level of Bloom Taxonomy. A study involved 258 fresh secondary high school leavers of our foundation students, who were conducted in order to look at the suitability of questions created by using Bloom taxonomy. In additions, the target of gender difference and students' background will be studied.

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## 2. COGNITIVE DOMAIN IN BLOOM'S TAXONOMY

An educational psychologist of University of Chicago, Benjamin Bloom, had invented the taxonomy of educational objectives or called as Bloom's Taxonomy in the year 1956. Bloom's taxonomy used to classify the different learning objectives by the educators in order for them to prepare subject's examination questions to their respective students. Bloom's taxonomy divides learning objectives into affective, psychomotor, and cognitive. (Anderson and Krathwohl, 2001). Education presently is more focusing of bloom's taxonomy because implementation of bloom's taxonomy used to give students a more holistic form of education, no matter in the high school level or Foundation Level (Pre-University level).

### 2.1. Cognitive Domain

Cognitive domain divided into six different levels from of taxonomy in order to assess students' understanding towards the subject taught during the lecture class from the lower level of taxonomy and then to the high level of taxonomy. Each level of taxonomy brings different ways of assessment based on different difficulties of the questions which might given in the assessment. Refer to Table 1.

**Table-1.** Six levels of taxonomy in cognitive domain

Level	Domain
Level 1	Knowledge
Level 2	Comprehension
Level 3	Application
Level 4	Analysis
Level 5	Synthesis
Level 6	Evaluation

Referring to Table 1, Knowledge is fundamental of taxonomy in cognitive domain, as known as basic level of taxonomy. It presents the fundamental concept and previously learned materials or phenomena by recalling the facts. In this level of taxonomy, the questions are created to aims students' ability to recall back what they have learned previously during the lecture class by asking them to give definitions; multiple-choices questions; or fill in the blank (Salim *et al.*, 2009). Commonly, this level of taxonomy is applies to be used in creating SPM's examination questions. The keyword typically to be used to create the questions in this level of taxonomy is to define, list, label and etc.

Comprehension, the second level of taxonomy in cognitive domain, indicates the student to have sufficient understanding of the facts and their knowledge by translating, comparing and interpreting. The difficulty of this kind of questions in this level of taxonomy is slightly harder comparing to just recalling the facts because students have to understand the facts instead of recall the facts. The keyword typically to be used to create the questions in this level of taxonomy is to explain, distinguish, interpret and etc (Bloom, 1956; Salim *et al.*, 2009).

Application, the third level of taxonomy in cognitive domain, aimed the students' problem solving skills which required students' abilities to solve the questions by applying what they have learned previously during their lecture class, tutorial session and practical lab session. The solution

may be defined into new situation by student who answered it. In additions, this level of taxonomy is to assess the student's abilities on how they transferring their knowledge from their learning in order of just understand the subject only. The keyword typically to be used to create the questions in this level of taxonomy is to apply, solve, generalize and etc (Bloom, 1956; Salim *et al.*, 2009).

Analysis, the fourth level of taxonomy in cognitive domain, required students' ability in order for them to classify material into its component parts with the aim to understand its organized structure. Students are required to analyze the elements to discover evidence to support their proposed solution. The common keyword to be used to create the questions in this level of taxonomy is to classify, analyze, differentiate and etc. (Bloom, 1956; Salim *et al.*, 2009)

Synthesis, the fifth level of taxonomy in cognitive domain, aimed students' ability and their understanding in order to combine the elements to form a new whole concept. However, the highest level of taxonomy in cognitive domain, Evaluation, required students to examine or judge carefully based on some certain criteria (Bloom, 1956; Salim *et al.*, 2009). Both level of taxonomy are not applicable for SPM's examination questions format because both level of taxonomy is consider high level of taxonomy which exceed the expectation for students in high school level.

### 3. CMPF112 COMPUTING SKILLS

The paper of the subject understudies is CMPF112 Computing Skills. This subject is the computing subject which offered in the first trimester for fresh undergraduate whom enrolled under foundation study. Foundation is a one-year programmes that is made compulsory for all students who enrolled by UNITEN with SPM results. After they completed their foundation programmes, they will then transfer to degree programmes which designed to further nurture what they learn in foundation course. The CMPF112 Computing Skills is a two (2) credits hour subject for foundation students who taking engineering programmes, means students and lecturer have two (2) lecture hours face to face lecturing session per week. The lab session is allocated under unsupervised, meaning that no lab tutor or lecturer will assist them. They can use the allocated unsupervised lab session to physically try the theory learned in lectures.

The assessment was given over the trimester period with mid-term examination which will be held in the middle of the trimester normally, or as known as in week eight (8) of the academic calendar. Other ways of assessment used to assess students' understand is quizzes, assignments, group project and project presentation.

Students need to use various research methodologies to find input to their assignments and projects instead of spoon-fed by their lecturers, this is a new skill which introduced and applied to every university students. After the final week of trimester, as known as after week fourteen (14) of academic calendar, they have to sit for final examination. The format of the final examination is shown in Table 2. For the Trimester 1 year 2012/2013, the question paper was structured into 3 sections: Section A, Section B and Section C as can be seen below. A total of 100 marks in CMPF112 Computing Skills will be divided into three sections.

Section A is given 10 questions which consist of 15 marks allocated for students in order to identify the true or false statement. Section B is given 10 questions which consist of 15 marks allocated for students to choose the best answer in multiple choices questions. While, Section C is given five (5) main questions which consist of 70 marks allocated for students to provide short

answer. Each of the five (5) main questions will be attached with several sub-questions. Student needs to answer all questions.

**Table-2.** CMPF112 Computing Skills's final examination format

Section	Question Type	Mark/Percentage
Section A	True or False statement	15
Section B	Multiple Choices	15
Section C	Short Answer	70

All sections covered all lessons learned which consolidate their experiences with gadgets and software with the formal understanding on how those machines influenced people's life and how to maximize the usage of all of it.

#### 4. METHODOLOGY

In order to assess the students who are registered for CMPF112 Computing Skills, bloom's taxonomy (Cognitive domain) is to be used when the subject coordinator creates any questions in quizzes, midterm test as well as final examination. Therefore, the percentage of bloom's taxonomy in CMPF112 Computing Skills's final examination paper being used by CMPF112's subject coordinator for the Trimester I, 2012/2013 is presented in Table 3.

**Table- 3.** Bloom's Taxonomy applied in CMPF112 Computing Skills's final examination paper

Level	Domain	Section A	Section B	Section C
Level 1	Knowledge	15	10	5
Level 2	Comprehension	10	15	5
Level 3	Application	5	5	30
TOTAL		30	30	40

In order to create the questions for respective sections in CMPF112 Computing Skills final examination paper for foundation students, the subject coordinator applied 30 % in level 1 of Bloom Taxonomy, 30% in level 2 of Bloom Taxonomy and the rest of 40% in level 3 Bloom Taxonomy. The level 4 and above of the Bloom Taxonomy are not applicable for CMPF112 Computing Skills due to the students who register for this subject are all foundation or Pre-University level. Therefore, the main influence that affects students in which they are unable to score well in CMPF112 Computing Skills is not mainly by the difficulty of the questions set but possibly due to the language constraints. Based on the current education system, SPM's questions were printed in dual language, which is Bahasa Malaysia and English, and this resulted that students are able to answer the questions either using Bahasa Malaysia or English. However, all the questions in CMPF112 Computing Skills were set in English language only. Students may understand the concept of the CMPF112 Computing Skills but may be not understand about what the question asked in CMPF112 Computing Skills final examination paper because he or she is weak in English. In additions, students may hard to elaborate their answer by using English or may be given wrong meaning of overall answer due to the weakness in English.

All students who are taking CMPF112 Computing Skills in Trimester 1 2012/2013 were

involved in this study. Their marks for final examination was counted and separated by applying Bloom's domain. A total of 366 students who were registered CMPF112 Computing Skills in Trimester 1 2012/2013. However, three (3) class sections which consist of 258 students were accessible and the other two (2) class sections which consist of 108 students could not join in the research because of the time constraint. In additions, the total of 366 students who involved in this research is consist of 198 male students, and 60 female students.

## 5. RESULTS AND DISCUSSION

The result of the study was given in the Table 4 below.

**Table- 4.** The finding

Average	Section A	Section B	Section C
Male	7.0	9.7	30.8
Female	7.9	10.4	38.6
All	7.2	9.8	32.5

From the findings, it can be concluded that:

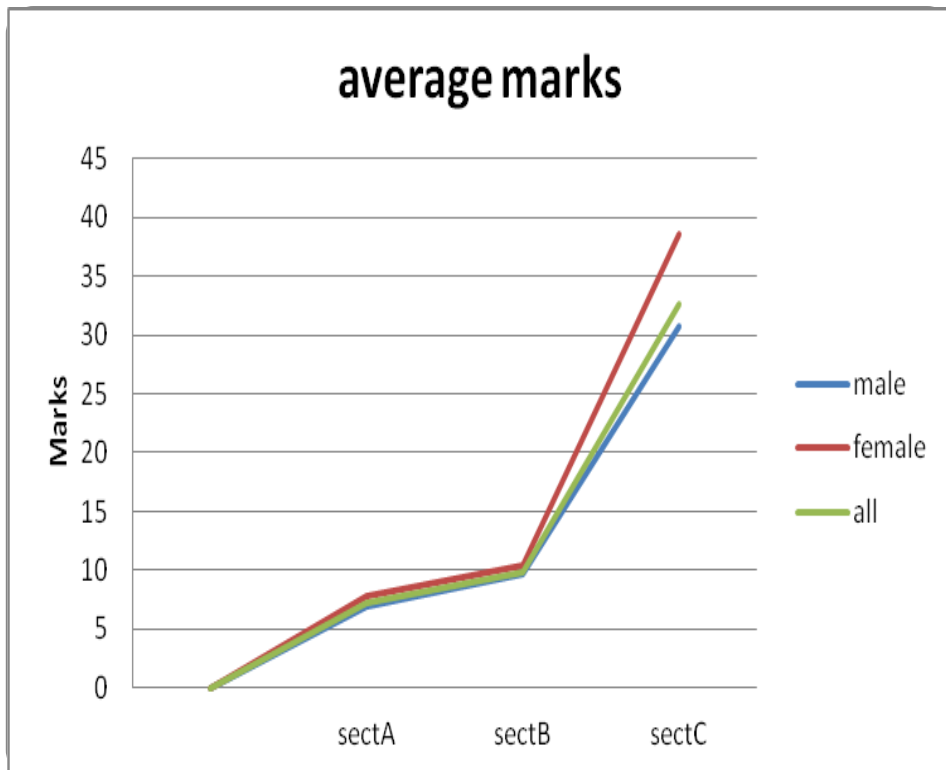
- The overall result is about half of the original marks. This applied for all three sections A, B and C.
- Difference in gender has some influences in their understanding of technical subject for fresh undergraduate.
- Female students score better than male students in section C.

Even though higher level of cognitive domain was not applicable in this subject, the suitability of question formulated for their final are adequate. However, the result shows that they not actually performed well in all sections. Reasons for this situation to happen are:

- Students are coming directly from high school leavers, which were more exposed on theoretical understanding rather than technical involvement. Therefore, they are not able to score higher when they are not custom to the new way of teaching and learning.
- The subject thought is two (2) credit hours. Therefore, the challenges in the subject are minimal. Furthermore, the students taking this subject are from generation Y whom have no difficulty in understanding this technical subject.
- The set-up of final exam paper is, taking into considerations, the huge number of students. This triggered to the low-down of question developed to ease the marking process afterward.
- Female students are more on application rather than knowledge gathering only. They shown a better improvement compared to male students in technical subjects in earlier subject taught in the foundation course.
- Students' perception and interest toward the computing subject because all of them are from engineering field. They might think of computing subject is not important comparing to their core subjects in engineering field. This might result that they are least motivated to score in computing subject.

- Language constraints as some of the students may be understand the concept of the CMPF112 Computing skills but may not be understand about what the question being asked in examination paper or they might hard to elaborate their answer in English due to the weakness in English.
- Unsupervised lab session will not ensure that all students are attending the lab and practice the computing skills such as Microsoft office functions as well as Linux programming.

For section A and section B in which consist of about the same percentage of level 1 and level 2 of Bloom's Taxonomy, section B show a promising result.



## 6. CONCLUSIONS

The mapping of bloom taxonomy and questions for final exam in trimester 1 2012/2013 was quite significant to the transition of SPM leavers blended into university environment. The difference between genders is the essential factor apart from their background and way of study. Further investigation on achievement of all-year assessment should be done to highlight the finding from this study. Other subjects that were offered in their first year could be as interesting subject to be studied too.

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