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## **Relationship among students' learning styles, assessment methods and students' performances**

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### **ABSTRACT**

Management of the Horizon Campus spends considerable amount of funds as capital and operational cost annually to provide better teaching and learning environment but students' performances are low compare to the allocated funds. According to the Nelson Mandela "Education is the most powerful weapon which you can use to change the world ", unfortunately most of the lecturers are used assessments as the weapon. Therefore, most of the students are fear to face for assessments. Hence, lecturers have to change students' mindset by conveying assessments are used as a tool/indicator to improve student learning and not to penalize students.

This study is aimed to identify learning styles of students and observe the relationship among students' learning styles, assessment methods and students' performances. The population of this study is comprised the students at faculty of Information Technology in Horizon Campus. Depending on the students' marks obtained in pre-assessments, it is aimed to improve students' knowledge and skills in studying. Survey outcome depicted there is a significant difference between marks of pre and post assessments and further it is fact that the students are performed better in preferred assessment methods/assessment methods based on their learning styles. Therefore, survey outcomes evident that there is a relationship among students' learning styles, assessment methods and students performances of the selected group of students.

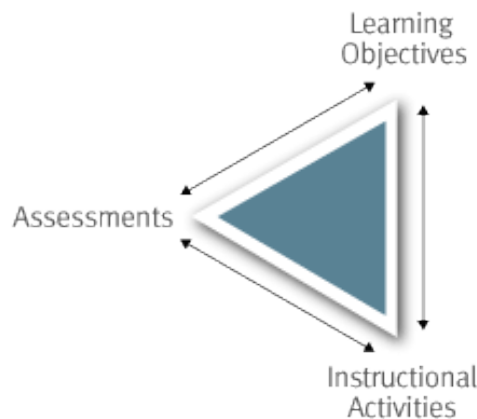
**Keywords:** *Assessments, Learning Outcomes, Learning Styles*

## 1.0 INTRODUCTION

According to the Nelson Mandela “*Education is the most powerful weapon which you can use to change the world*”, unfortunately most of the lecturers are used assessments as the weapon. Therefore, most of the students are fear to face for assessments. Hence, lecturers have to change students’ mindset by conveying assessments are used as a tool/indicator to improve student learning and not to penalize students.

Assessment is claimed to be the ‘life-blood’ of learning and by assessing we make inferences about our students’ current and future performance (Fardon, 2013). The investigation considers the effect of identifying learners’ perceived abilities, in relation to their visual, auditory and kinesthetic learning styles, in order to help guide and develop them and their tutors to maximize their abilities and desires.

Assessments should reveal how well students have learned what we want them to learn while instruction ensures that they learn it (Eberly Centre, Teaching Excellence & Educational Innovation, 2015). For this to occur, assessments, learning objectives, and instructional strategies need to be closely aligned so that they reinforce one another.



To ensure that these three components of your course are aligned, ask yourself the following questions:

- **Learning objectives:** What do I want students to know how to do when they leave this course?
- **Assessments:** What kinds of tasks will reveal whether students have achieved the learning objectives I have identified?
- **Instructional strategies:** What kinds of activities in and out of class will reinforce my learning objectives and prepare students for assessments?

If assessments are misaligned with learning objectives or instructional strategies, it can undermine both student motivation and learning. Consider these two scenarios: Objective is for students to learn to *apply analytical skills*, but assessment measures only *factual recall*. Consequently, students sharpen their analytical skills and are frustrated that the exam does not measure what they learned.

Assessment measures students' ability to *compare and critique* the arguments of different authors, but your instructional strategies focus entirely on *summarizing* the arguments of different authors. Consequently, students do not learn or practice the skills of comparison and evaluation that will be assessed.

The table 1 presents examples of appropriate assessments can be used to assess different types of learning objectives (adapted from the revised Bloom's Taxonomy).

*Table 1 - Types of activities that can be used to assess different types of learning objectives  
(Source: Revised Bloom's Taxonomy)*

Type of learning objective	Examples of appropriate assessments
<b>Recall</b> <b>Recognize</b> <b>Identify</b>	Objective test items such as fill-in-the-blank, matching, labeling, or multiple-choice questions that require students to: <ul style="list-style-type: none"> <li>recall or recognize terms, facts, and concepts</li> </ul>
<b>Interpret</b> <b>Exemplify</b> <b>Classify</b> <b>Summarize</b> <b>Infer</b> <b>Compare</b> <b>Explain</b>	Activities such as papers, exams, problem sets, class discussions, or concept maps that require students to: <ul style="list-style-type: none"> <li>summarize readings, films, or speeches</li> <li>compare and contrast two or more theories, events, or processes</li> <li>classify or categorize cases, elements, or events using established criteria</li> <li>paraphrase documents or speeches</li> <li>find or identify examples or illustrations of a concept or principle</li> </ul>
<b>Apply</b> <b>Execute</b> <b>Implement</b>	Activities such as problem sets, performances, labs, prototyping, or simulations that require students to: <ul style="list-style-type: none"> <li>use procedures to solve or complete familiar or unfamiliar tasks</li> <li>determine which procedure(s) are most appropriate for a given task</li> </ul>
<b>Analyze</b> <b>Differentiate</b> <b>Organize</b> <b>Attribute</b>	Activities such as case studies, critiques, labs, papers, projects, debates, or concept maps that require students to: <ul style="list-style-type: none"> <li>discriminate or select relevant and irrelevant parts</li> <li>determine how elements function together</li> <li>determine bias, values, or underlying intent in presented material</li> </ul>
<b>Evaluate</b> <b>Check</b> <b>Critique</b> <b>Assess</b>	Activities such as journals, diaries, critiques, problem sets, product reviews, or studies that require students to: <ul style="list-style-type: none"> <li>test, monitor, judge, or critique readings, performances, or products against established criteria or standards</li> </ul>
<b>Create</b> <b>Generate</b> <b>Plan</b> <b>Produce</b> <b>Design</b>	Activities such as research projects, musical compositions, performances, essays, business plans, website designs, or set designs that require students to: <ul style="list-style-type: none"> <li>make, build, design or generate something new</li> </ul>

Learning takes place in students' heads where it is invisible to others. This means that learning must be assessed through performances (what students can do with their learning). Assessing students' performance can involve on formal or informal, high- or low-stakes, anonymous or public, individual or collective.

Following suggestions and strategies for assessing student learning and performance as well as ways to clarify expectations and performance criteria to students.

- Creating assignments
- Creating exams
- Using classroom assessment techniques
- Using concept maps
- Using concept tests
- Assessing group work
- Creating and using rubrics

During any assessments, simply checking how students are achieved the learning outcomes of particular module/course. Students' grades are varied from student to student at the assessments based on how they achieved the learning outcomes. There are four (4) levels of thinking about learning and teaching.

1. What the student is?
2. What the teacher does?
3. What the student does?
4. How the student manages?

When we try to find answers for what the student is? or what the student does?, students' learning style provides the answer for both questions.

Management of the Horizon Campus spends considerable amount of funds as capital and operational cost annually to provide better teaching and learning environment such as computer lab, library, study area, well-trained & qualified academic staff, guest lectures from industry experts and etc. However, **students' performances are low compare to the allocated funds.** It is noted that the faculty of IT students pass rate is very low and some students were absent even at the mid-term and final exams.

My personal idea is when we conduct assessments, we should not concentrate only to the learning outcomes, but also consider to the students' learning style. Therefore, my motivation was to do this **study to observe the relationship among Students' Learning Styles, Assessment Methods and Students' Performances.** Main objective of the study was to examine the impact of identifying the students' learning style at the early stage to improve students' performances by improving their marks during examinations.

## 2.0 LITERATURE REVIEW

Learning outcomes describe what students are able to demonstrate in terms of knowledge, skills, and values upon completion of a course, a span of several courses, or a program (Tiu). Clear articulation of learning outcomes serves as the foundation to evaluating the effectiveness of the teaching and learning process.

The Components of a Measurable Learning Outcome. Three essential components of a measurable learning outcome are:

- Student learning behaviors
- Appropriate assessment methods

- Specific student performance criteria / criteria for success

**Formative assessment** is an assessment that determines how much students already know, and if they possess mastery of the content matter. Examples of formative assessments might be a *pre-test, rough draft, quizzes, homework, rough drafts of papers, or answering questions in class.*

Information gathered from these assignments will provide insights as to how much students already know, and how well they can articulate what they know. ***Formative assessments help instructors learn what needs to be taught.***

**Summative assessments** are intended to *determine how much, and to what extent, students have learned and mastered the content.* Summative assessments include final projects (be sure to use rubrics), final exam, final test over a unit of learning, portfolio, or final paper.

Summative assessment scores/ grades also help to provide information about the effectiveness of the curriculum, and the extent to which the curriculum is aligned with instruction and assessment. Wise instructors pay attention to summative assessments and make instructional adjustments during the teaching/ learning process.

The Visual-Auditory-Kinesthetic (VAK) learning styles model, usually abbreviated to VAK, provides a simple way to explain and understand own learning style. The original VAK concepts were first developed by psychologists and teaching specialists such as Fernald, Keller, Orton, Gillingham, Stillman and Montessori, starting in the 1920's. VAK theory is now a favourite of the accelerated learning community because its principles and benefits extend to all types of learning and development, far beyond its early applications. The Visual-Auditory-Kinesthetic learning styles model does not overlay Gardner's multiple intelligences, or Kolb's theory, rather the VAK model provides a different perspective for understanding and explaining a person's preferred or dominant thinking and learning style, and strengths.

**Visual: learning by seeing visual images.**

Visual learners learn best when information is presented in a written language format or in another visual format such as pictures or diagrams. Most of the visual learners practice followings to succeed during their studies.

- Create graphic organizers such as diagrams and concept maps that use visual symbols to represent ideas and information.
- When trying to remember information, close your eyes and visualize the information.
- Include illustrations as you take notes in class.
- Use highlighter pens of contrasting colors to color code different aspects of the information in your textbooks.
- Sit in the front of the class so that you can clearly see the teacher. This will allow you to pick up facial expressions and body language that provide cues that what your teacher is saying is important to write in your notes.
- Study in a place that is free from visual distractions.

- When using flashcards, limit the amount of information on a card so that you can form a mental picture of the information.
- Benefit from field trips where observation skills can be used
- Watch videos about topics you are studying in class.
- When hearing a new word you want to remember, visualize its spelling.
- When reviewing information, rewrite or draw the information from memory.
- When taking notes, replace words with symbols wherever possible.
- Type your written notes from class using different fonts, bold print, and underlining to make the most important concepts and facts visually apparent.
- When solving math problems that involve a sequence of steps, draw a series of boxes, each containing the appropriate piece of information in sequence.

**Auditory: learning by listening or by speaking.**

Auditory learners learn best when information is presented in a spoken language format. If you are an auditory learner, the suggestions that follow can help you to succeed to the best of your ability.

- Participate in study groups in which you can talk things out.
- If allowed by your teacher, use a recording device to record class sessions. Use the recordings to support your written notes.
- Use a recording device to record important information from your textbooks so that you can listen to the information as frequently as needed.
- Work out math problems aloud, explaining to yourself the steps you are doing.
- Repeat facts and definitions of words over and over to yourself with your eyes closed.
- Create musical jingles or songs to remember information.
- Dictate assigned papers and type them later.
- Participate in class discussions as much as possible.
- Look for books on tape or other audio materials when learning about a subject.
- Be certain that your study place is free of auditory distractions.
- When you encounter new words while reading, sound them out syllable by syllable.
- Sit in front of the class to minimize things that might distract you from what your teacher is saying.
- Read aloud when doing proofreading.

**Bodily-Kinesthetic: learning by using bodily movements such as doodling, outlining, or actively taking notes.**

Bodily-kinesthetic learners are those who have to be actively involved by doing something that requires physical engagement. These learners need to be actively involved. During lectures these are the ones who are busy writing and taking notes. Instructors should plan some time during the class period for students to work in groups, go to the library to accomplish a specific, time-oriented task, be given class time to work on an individual project, etc.

Good lecturers/teachers find a way to incorporate all of these into a given class period, so that each learning style can benefit. If you are a tactile/kinesthetic learner, the suggestions that follow can help you to succeed in school to the best of your ability.

- Be physically active while you study. Rather than just sit at your desk, occasionally walk back and forth with your textbook or notes as you read the information out loud.
- To decrease your fidgeting as you study, listen to music, preferably baroque music. However, discontinue this if you find the music to be distracting.
- Make extensive use of a computer and the Internet. Actively touching the keyboard will keep your mind active.
- Take extensive written notes in class. Edit and type them later.
- Study in short blocks of time with frequent but short breaks.
- Do something physical as you study such as tapping a pencil or squeezing a stress ball.
- Use your finger as a guide while reading.
- Act out things you have to learn whenever possible.
- Construct models of things you have to learn whenever possible.
- If you find it difficult to sit at a desk when studying, try lying on your stomach or back.
- When trying to remember information, close your eyes and "write" the information in the air. Picture the information in your mind as you do so.
- Use concrete objects to help you understand math concepts.
- When trying to learn the spelling of a difficult word, arrange letter blocks to spell the word.

Further, the assessment should be changed based on students' learning style of the class. Therefore, before conducting lectures, it is better to understand students' learning styles while finding answers to the following questions. What do you know about learning styles? How can you use knowledge about learning styles in your teaching and assessment?

Students who are having different learning style are set of assessment methods. Preferred and the worst assessment methods for Visual, Auditory and Kinesthetic learners are mentioned in the table 2.

*Table 2 – Preferred and the Worst Assessment methods for Different Learning Styles  
(Source: <https://www.studyingstyle.com/tactile-kinesthetic-learners>)*

<b>Learning Style</b>	<b>Preferred Assessment Methods</b>	<b>Worst Assessment Methods</b>
Visual	Essays, Diagramming, Maps, Demonstrating a Process <i>(Method 1)</i>	Listen and Respond
Auditory	Writing responses to lectures, Oral Exams <i>(Method 2)</i>	Reading comprehension exercises
Kinesthetic	Multiple choice, Short Definitions, Fill-in-the-blanks, Hands-on practical <i>(Method 3)</i>	Long essay tests



### 3.0 METHODOLOGY

Qualitative research methodology is used in the study. Primary data is collected through a questionnaire survey and secondary data collected from existing information on students' marks in different assessments (Continuous, Mid-term and End-term) in modules namely "Module 1 - Object Oriented Analysis, Design and Programming" and "Module 2 - Social and Professional Issues in IT". Questionnaire has been distributed among undergraduate students in the faculty of IT (Intake 1 & 2) to identify the learning style in respective groups.

Questionnaire (attached in Annex 3) has been used to identify the learning style of the sample. The questionnaire based on 30 MCQs with three (3) options such as A, B and C) to be selected. Based on the number of A's, B's and C's is selected by the students identify their under which learning style.

If sample students chose mostly A's => VISUAL learning style.

If sample students chose mostly B's => AUDITORY learning style.

If sample students chose mostly C's => KINAESTHETIC learning style.

If sample students chose same number of A's, B's and C's their learning style may be a blend of two or three styles.

Questionnaire survey is conducted at the beginning of the semester to identify the learner style before conducting the examinations. Both intake 1 & 2 followed modules 1 and 2 during their semester 3. Further, both groups (Intake 1 & 2) have gone through similar assessment methods (two different papers).

Multiple Choice Questions (MCQs), Presentations, Case Study based Questions, Debates, Assignments, Develop System and System Demonstration are the assessment methods used to evaluate the sample of the study under Continuous Assessments and End Semester in Modules 1 and 2.

Target population is all the undergraduate students in the faculty of Information Technology at the Horizon Campus. At present, total undergraduate student population in the faculty of Information Technology is 53 (N=53). Therefore, entire student population at the faculty of IT is taken as the sample.

Table 3 illustrates the different assessment methods conducted for modules namely Object Oriented Analysis, Design & Programming and Social & Professional Issues in IT to observe learning outcomes in the selected sample.

Table 3 - Different assessment methods conducted for selected two modules

Assessment Methods	Module 1 – Object Oriented Analysis, Design & Programming	Module 2 – Social & Professional Issues in IT
Multiple Choice Questions (MCQs) and Fill in the Blanks	✓	✓
Draw Use-Case and Class Diagrams for Library Management System based on gathered data during the Interview had with the Librarian	✓	
Draw UML Diagrams based on the Case Study	✓	
Develop a System based on the given Case Study	✓	
Demonstration the Developed System	✓	
Debate on Ethical Hacking		✓
Take Home Assignment - Prepare a report on Cyber Crimes		✓
Final Exam (Written Paper-Case Study Question, Matching Q & A)		✓

#### 4.0 DATA ANALYSIS

Based on the survey outcomes, majority of students were Visual learners (47%) and the rest of the sample students were Kinesthetic and Auditory that is 28% and 25% respectively. Figure 1 represents the distribution of sample students' learning style.

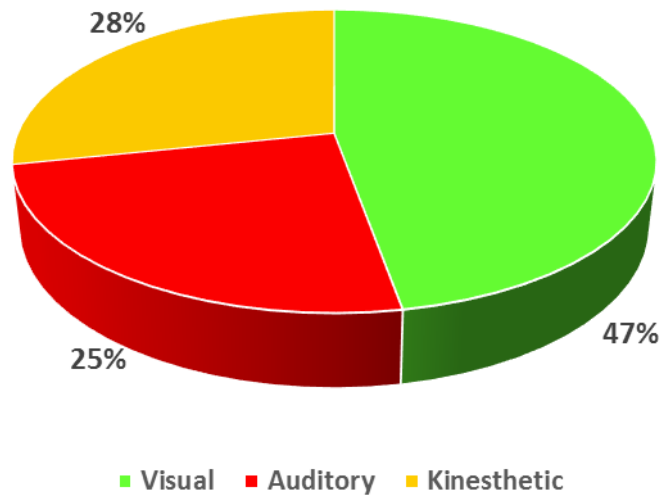


Figure 1 - represents the distribution of sample students' learning style.

Table 4 is illustrated the learner styles of the sample undergraduates and their average marks for different assessments methods conducted in Object Oriented Analysis, Design & Programming and Social & Professional Issues in IT modules.

Table 4 – Average Marks obtained in Different Assessments for Modules 1 & 2 against students' learning style

Learner Style	Average Marks obtained in Different Assessment Methods								
	Module 1					Module 2			
	Multiple Choice Questions (MCQs) and Fill in the Blanks	Draw Use-Case and Class Diagrams for Library Management System based on gathered data during the Interview had with the Librarian	Draw UML Diagrams based on the Case Study	Develop a System based on the given Case Study	Demonstration the Developed System	Multiple Choice Questions (MCQs) and Fill in the Blanks	Debate on Ethical Hacking	Assignment - Prepare a report on Cyber Crimes	Final Exam (Written Paper- Case Study Question, Matching Q & A)
<b>Visual</b>	<b>63</b>	<b>64</b>	<b>77</b>	<b>66</b>	<b>75</b>	<b>64</b>	<b>54</b>	<b>65</b>	<b>75</b>
<b>Auditory</b>	<b>56</b>	<b>77</b>	<b>67</b>	<b>53</b>	<b>55</b>	<b>56</b>	<b>79</b>	<b>76</b>	<b>53</b>
<b>Kinesthetic</b>	<b>75</b>	<b>52</b>	<b>56</b>	<b>78</b>	<b>62</b>	<b>77</b>	<b>65</b>	<b>54</b>	<b>73</b>

Following figures 2 to 6 are illustrated how sample students who are having different learning styles performed in different assessment methods used for module 1 in their semester 3. According to the figure 2, Kinesthetic learners are obtained the highest average marks (75, 77) for MCQs in modules 1 and 2 while Visual and Auditory learners are obtained (63, 64) and (56 of each) respectively.

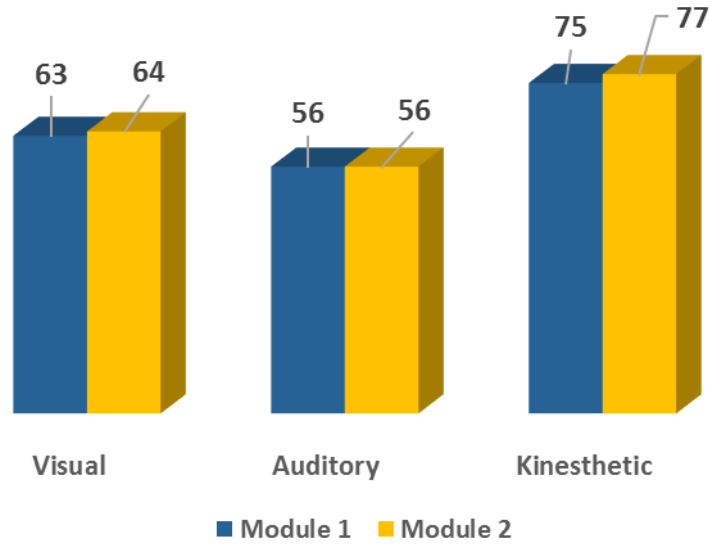


Figure 2 - Average Marks for MCQs in Module 1 & 2

In figure 3 is illustrated, Auditory learners obtained the highest average marks that is 77. Visual and Kinesthetic learners obtained 64 and 52 average marks respectively for assessments on Draw Use-Case and Class Diagrams for Library Management System based on gathered data during the Interview had with the Librarian.

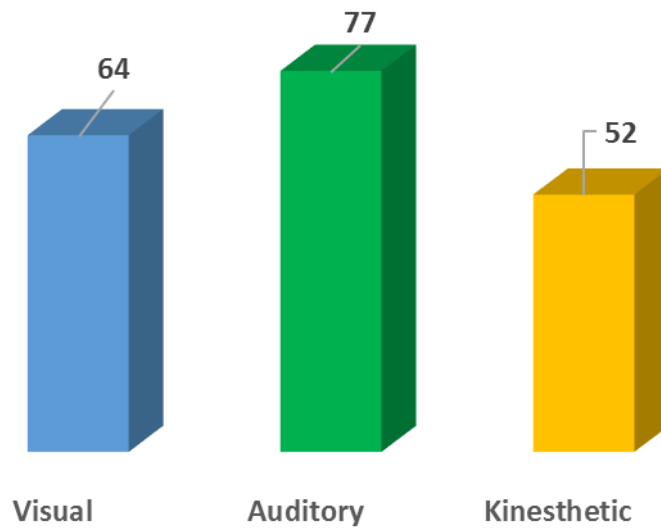
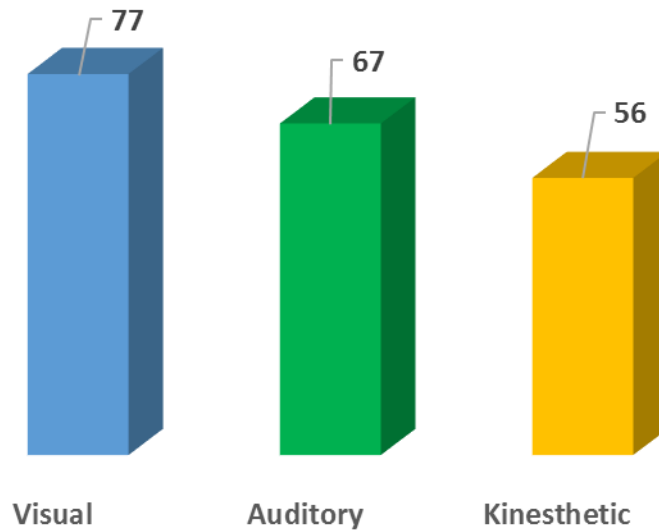


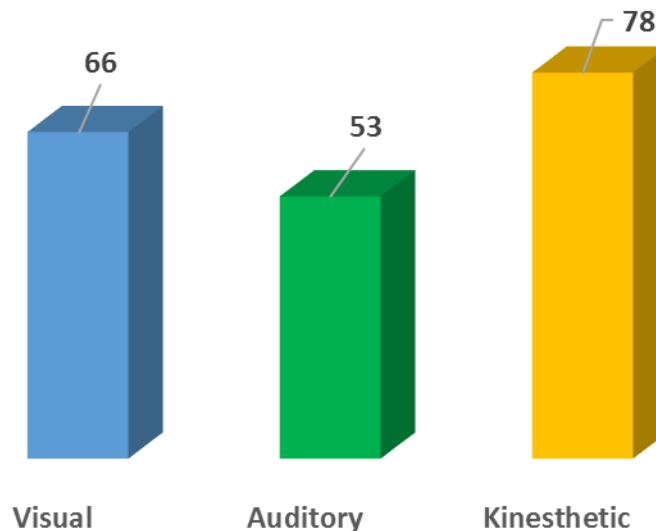
Figure 3 – Average Marks for Assessment on Draw Use-Case and Class Diagrams for Library Management System based on gathered data during the Interview had with the Librarian in Module 1

Figure 4 shows the average marks for assessment on Draw UML Diagrams based on the Case Study in module 1. Visual learners obtained the highest average marks that is 77 while auditory and kinesthetic learners obtained 67 and 56 respectively.



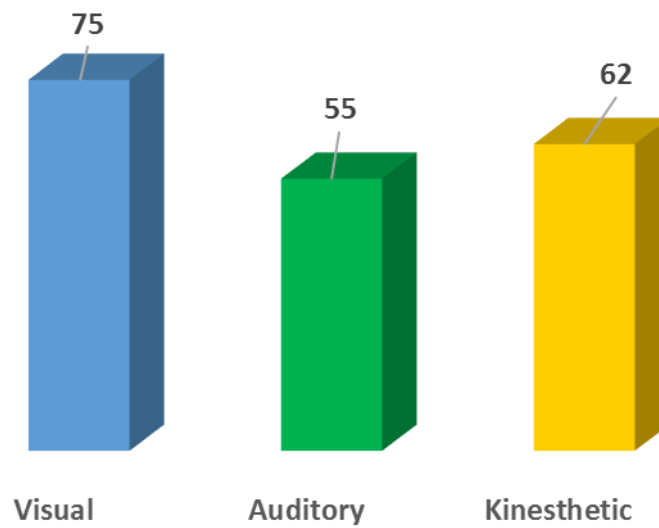
*Figure 4 – Average Marks for Assessment on Draw UML Diagrams based on the Case Study*

According to the figure 5, the highest average marks of 78 is obtained by kinesthetic learners and the second highest average mark (66) is obtained by visual learners and the lowest average mark (53) is obtained by auditory learners for assessment on developing a system using JAVA.



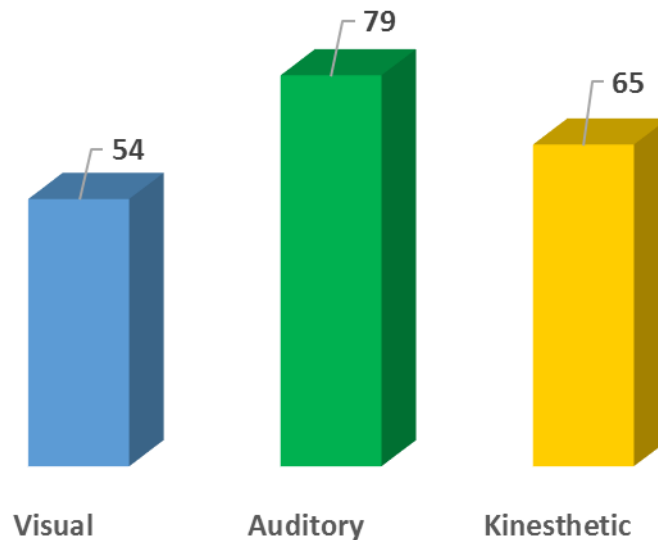
*Figure 5 – Average Marks for Assessment on developing a system based on the given case study in Module 1.*

Figure 6 depicts, visual learners obtained the highest average marks (75) for assessment on System Demonstration while Kinesthetic and Auditory learners obtained average marks of 62 and 55 respectively.



*Figure 6 - Average Marks for Assessment on Demonstration of Developed in Module 1.*

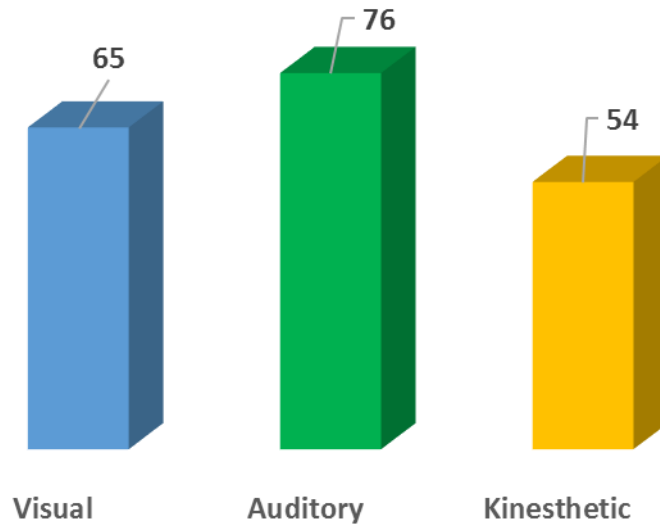
Following figures 7 to 9 are illustrated how sample students having different learning styles performed in different assessment methods used for module 2 in their semester 3.



*Figure 7 - Average Marks for Assessment on Debate on Ethical Hacking in Module 2.*

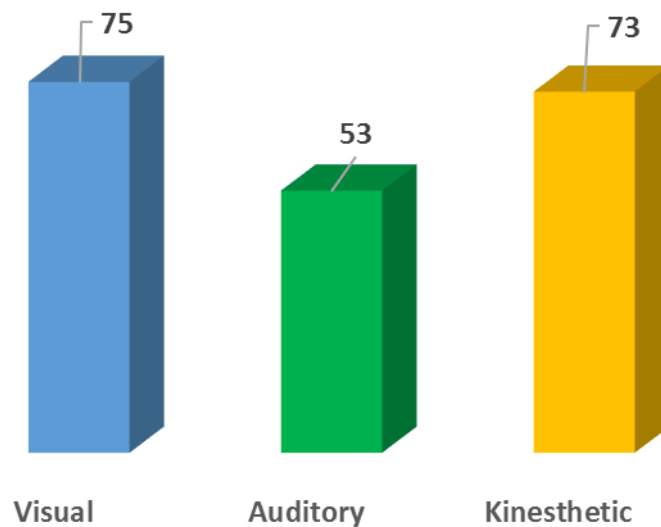
According to the figure 7, the highest average marks of 79 is obtained by auditory learners. Kinesthetic and Visual learners obtained 65 and 54 average marks respectively for assessment on Debate.

Figure 8 is shown the average marks on preparing a report on Cyber Crimes. The highest average mark is obtained by auditory learners that is 76. Average marks of 65 and 54 are obtained by visual and kinesthetic learners respectively.



*Figure 8 - Average Marks for Assessment on preparing a report on Cyber Crimes.*

Average marks for final exams (Written Paper with Case Study Question and Matching Questions and Answers) in module 2 are shown in figure 9. The highest mark is obtained by visual learners that is 75, the second highest average mark is obtained by kinesthetic learners that is 73 and the lowest average mark is obtained by auditory that is 53.



*Figure 9 - Average Marks for Final Exam in Module 2.*

Table 5 illustrates the relationship among average marks are obtained by different learners for their preferred assessment methods. It is cleared that the visual learners are best in Essays, Diagramming, Maps, Demonstrating a Process assessment method. While auditory learners are best in Writing responses to lectures, Oral Exams and the kinesthetic learners are best in Multiple choice, Short Definitions, Fill-in-the-blanks, Multiple choice, Short Definitions, Fill-in-the-blanks, Hands-on practical.

*Table 5 - Relationship among average marks are obtained by different learners for their preferred assessment methods.*

Preferred assessment method for different learners		Average Marks of different learners for preferred assessment		
		Visual	Auditory	Kinesthetic
<b>Visual</b>	Essays, Diagramming, Maps, Demonstrating a Process	<b>73</b>	<b>63</b>	<b>57</b>
<b>Auditory</b>	Writing responses to lectures, Oral Exams	<b>60</b>	<b>78</b>	<b>60</b>
<b>Kinesthetic</b>	Multiple choice, Short Definitions, Fill-in-the-blanks, Hands-on practical	<b>64</b>	<b>55</b>	<b>76</b>

Table 6 is shown the percentage of students' pass rate of the sample undergraduate students in the faculty of IT. There is a significant improvement of students' pass rate in both intakes in semester 3 onwards as different assessment methods are conducted in semester 3.

*Table 6 – Comparison of Student's Pass Rates with pre and post assessments*

Intake	Pass rate of students				
	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Intake 1	55%	67%	90%	92%	100%
Intake 2	60%	68%	82%	-	-

## 5.0 DISCUSSION AND CONCLUSION

According to the literature, it is found that the Essay, Diagramming, Maps and Demonstrating a Process are the preferred assessment method for Visual Learners whereas Writing responses to lectures and Oral Exams are the preferred assessment method for Auditory Learners and Kinesthetic Learners preferred in Multiple choice, Short Definitions, Fill-in-the-blanks and Hands-on practical.

It is fact that the students are performed better in preferred assessment methods according to their learning styles. Further it is evident that there is a major improvements of students' pass rates in the faculty of IT after implementing the process. Therefore, it can conclude there is a relationship among students' learning styles, assessment methods and student performances.

Hence, it is recommended that, when conducting assessments, lecturers should think not only learning outcomes but also think on preferred assessment methods/assessment methods which different learners perform well on courses/modules as once we identified the learning styles of particular intake/batch throughout their degree programme it remains as same. This will be an advantage to increase the pass rate and student performances at examinations. Further, based on the distribution of the



students' learning style weightage of the marks for different assessments can be decided.

Finally, I would like to quote Sir Albert Einstein's saying on education system, "Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that is stupid" which is still valid and applicable to our education system.

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## **ANNEXES**

### **Annex 1 – Detailed Course Outline of the Object Oriented Programming Module**

<b>Course Title</b>	Object Oriented Programming		
<b>Course Code</b>	IT21053	<b>Theory hours</b>	30
<b>No. of Credits</b>	3	<b>Practical hours</b>	45
<b>Pre-requisites Course Codes</b>	IT11023	<b>Tutorial hours</b>	none
<b>Course Type</b>	<i>core</i>		
<b>Learning outcomes</b>			
<ol style="list-style-type: none"> <li>1. Describe the principles of object-oriented programming</li> <li>2. Apply the concepts of data encapsulation, inheritance, and polymorphism to large-scale software</li> <li>3. Acquire the concepts of Graphical User Interfaces</li> <li>4. Design and develop object-oriented computer programs</li> <li>5. Design and develop programs with Graphical User Interfaces capabilities</li> <li>6. Formulate problems as steps so as to be solved systematically</li> <li>7. Integrate robustness, reusability, and portability into large-scale software development</li> <li>8. Develop software with team-work in mind</li> </ol>			
<b>Course contents</b>			<b>Aligned Learning Outcomes</b>
<ol style="list-style-type: none"> <li>1. Object oriented concepts</li> <li>2. Object oriented programming: classes &amp; objects, methods &amp; messages, classification, generalization &amp; specification, inheritance, interfaces &amp; inner classes, static binding and dynamic binding, polymorphism, modularity</li> <li>3. GUI programming: event handling, applets</li> <li>4. Exception handling, overloading and overriding, streams and files, advanced features, Class hierarchies, Collection classes and iteration protocols</li> </ol>			<p>1 – 2 4 – 5  3, 6 7 - 8</p>
<b>Methods of teaching and learning:</b> Lectures, practicals ( <i>Lab sheet is attached in Annex 5 – Page 177</i> )			
<b>Assessment Method</b>			<b>Weight</b>
Continuous assessments			40%
End semester examination			60%
<b>Recommended Readings</b>			
<ul style="list-style-type: none"> <li>• T. Budd, An Introduction to Object-Oriented Programming, ISBN: 978-0201760316</li> <li>• R. Lafore, Object-Oriented Programming in C++, ISBN: 978-0672323089</li> </ul>			

**Annex 2 – Detailed Course Outline of the Social and Professional Issues in IT Module**

<b>Course Title</b>				Social and Professional Issues			
<b>Course Code</b>		IT21012		<b>Theory hours</b>		30	
<b>No. of Credits</b>		2		<b>Practical hours</b>		none	
<b>Pre-requisites Course Codes</b>		none		<b>Tutorial hours</b>		none	
<b>Course Type</b>		<i>core</i>					
<b>Learning outcomes</b>							
<ol style="list-style-type: none"> <li>1. Describe the characteristics of a professional</li> <li>2. Communicate at a professional level</li> <li>3. Discuss the role of ethics in industry</li> <li>4. Appreciate how to accept responsibility and ownership for yourself and other people under your direction</li> <li>5. Describe the role of professional associations</li> <li>6. Apply own level of social intelligence to his/her own position related to other professionals in the workplace</li> <li>7. Make informed decisions aligned to the professional practice in the industry</li> </ol>							
<b>Course contents</b>						<b>Aligned Learning Outcomes</b>	
1. Communication, Ethics, Differentiation between law, morals and ethics						1	
2. Introduction to decision making, Professionalism, Professional associations						2	
3. Using standards, Codes of ethics, Social intelligence, Professional judgment						3	
4. Inter-relationships between communication and professionalism, the inter-relationships between professionalism and ethics, the inter-relationships between ethics and professional judgment, The inter-relationships between professional judgment and social intelligence.						4 - 7	
<b>Methods of teaching and learning:</b> Lectures, group work, case studies							
<b>Assessment Method</b>						<b>Weight</b>	
Continuous assessments						40%	
End semester examination						60%	
<b>Recommended Readings</b>							
<ul style="list-style-type: none"> <li>• S. Basse, A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 2013, Pearson.</li> <li>• J.M. Kissa, Ethical and Social Issues in the Information Age (Texts in Computer Science), ISBN: 978-1447149897</li> </ul>							

**Annex 3 – Questionnaire Distributed among Students to Identify their Learning Style** (Source: <http://www.businessballs.com/vaklearningstylestest.htm>)

**VAK Learning Styles Self-Assessment Questionnaire**

**Instructions: Circle or tick the answer that most represents how you generally behave.**

1. When I operate new equipment I generally:
  - a) read the instructions first
  - b) listen to an explanation from someone who has used it before
  - c) go ahead and have a go, I can figure it out as I use it
  
2. When I need directions for travelling I usually:
  - a) look at a map
  - b) ask for spoken directions
  - c) follow my nose and maybe use a compass
  
3. When I cook a new dish, I like to:
  - a) follow a written recipe
  - b) call a friend for an explanation
  - c) follow my instincts, testing as I cook
  
4. If I am teaching someone something new, I tend to:
  - a) write instructions down for them
  - b) give them a verbal explanation
  - c) demonstrate first and then let them have a go
  
5. I tend to say:
  - a) watch how I do it
  - b) listen to me explain
  - c) you have a go
  
6. During my free time I most enjoy:
  - a) going to museums and galleries
  - b) listening to music and talking to my friends
  - c) playing sport or doing DIY
  
7. When I go shopping for clothes, I tend to:
  - a) imagine what they would look like on
  - b) discuss them with the shop staff
  - c) try them on and test them out
  
8. When I am choosing a holiday I usually:
  - a) read lots of brochures
  - b) listen to recommendations from friends
  - c) imagine what it would be like to be there

9. If I was buying a new car, I would:
  - a) read reviews in newspapers and magazines
  - b) discuss what I need with my friends
  - c) test-drive lots of different types
  
10. When I am learning a new skill, I am most comfortable:
  - a) watching what the teacher is doing
  - b) talking through with the teacher exactly what I'm supposed to do
  - c) giving it a try myself and work it out as I go
  
11. If I am choosing food off a menu, I tend to:
  - a) imagine what the food will look like
  - b) talk through the options in my head or with my partner
  - c) imagine what the food will taste like
  
12. When I listen to a band, I can't help:
  - a) watching the band members and other people in the audience
  - b) listening to the lyrics and the beats
  - c) moving in time with the music
  
13. When I concentrate, I most often:
  - a) focus on the words or the pictures in front of me
  - b) discuss the problem and the possible solutions in my head
  - c) move around a lot, fiddle with pens and pencils and touch things
  
14. I choose household furnishings because I like:
  - a) their colours and how they look
  - b) the descriptions the sales-people give me
  - c) their textures and what it feels like to touch them
  
15. My first memory is of:
  - a) looking at something
  - b) being spoken to
  - c) doing something
  
16. When I am anxious, I:
  - a) visualise the worst-case scenarios
  - b) talk over in my head what worries me most
  - c) can't sit still, fiddle and move around constantly
  
17. I feel especially connected to other people because of:
  - a) how they look
  - b) what they say to me
  - c) how they make me feel

18. When I have to revise for an exam, I generally:
- write lots of revision notes and diagrams
  - talk over my notes, alone or with other people
  - imagine making the movement or creating the formula
19. If I am explaining to someone I tend to:
- show them what I mean
  - explain to them in different ways until they understand
  - encourage them to try and talk them through my idea as they do it
20. I really love:
- watching films, photography, looking at art or people watching
  - listening to music, the radio or talking to friends
  - taking part in sporting activities, eating fine foods and wines or dancing
21. Most of my free time is spent:
- watching television
  - talking to friends
  - doing physical activity or making things
22. When I first contact a new person, I usually:
- arrange a face to face meeting
  - talk to them on the telephone
  - try to get together whilst doing something else, such as an activity or a meal
23. I first notice how people:
- look and dress
  - sound and speak
  - stand and move
24. If I am angry, I tend to:
- keep replaying in my mind what it is that has upset me
  - raise my voice and tell people how I feel
  - stamp about, slam doors and physically demonstrate my anger
25. I find it easiest to remember:
- faces
  - names
  - things I have done
26. I think that you can tell if someone is lying if:
- they avoid looking at you
  - their voices changes
  - they give me funny vibes

27. When I meet an old friend:

- a) I say “it’s great to see you!”
- b) I say “it’s great to hear from you!”
- c) I give them a hug or a handshake

28. I remember things best by:

- a) writing notes or keeping printed details
- b) saying them aloud or repeating words and key points in my head
- c) doing and practising the activity or imagining it being done

29. If I have to complain about faulty goods, I am most comfortable:

- a) writing a letter
- b) complaining over the phone
- c) taking the item back to the store or posting it to head office

30. I tend to say:

- a) I see what you mean
- b) I hear what you are saying
- c) I know how you feel