Chapter 3 - Methodology

3.1   Theoretical Framework

In this study, the theoretical framework is based on Bloom's Taxonomy or in full 'Bloom's Taxonomy of Learning Domains' or "Bloom's Taxonomy of Educational Objectives'. It is in this taxonomy that the higher–order thinking skills are found. Although Bloom's Taxonomy was originally intended for academic education it was found to be useful and appropriate for all types of learning. It should also be borne in mind that activities for thinking skills should be planned and scaffolded. Students should realize that they are being made to think (meta–cognition) and that different problems require different strategies of thinking.

From the beginning, Bloom felt that education should focus more on a complete understanding of subjects and an encouragement on developing higher-order thinking skills. Bloom had always felt and proved that teaching in general had always focussed on transferring facts and information recall which are actually the lower–order thinking skills in his taxonomy.

Writer Kevin Paul (2004) says, "the human brain has been described as the most powerful computer ever conceived" (Study Smarter, Not Harder). He goes on even further to say, "It is an understanding of the biology of the brain, along with the discoveries of the scientists in the last 25 years that leads experts to conclude that we are only using 2% to 10% of our potential capacity for higher thought" (Study Smarter, Not Harder,2004).

Another aspect to be looked into is that Bloom's model has divided thinking skills into lower–order thinking skills and higher–order thinking skills. Therefore the early part of the taxonomy that deals with knowledge, understanding and application are

considered as lower–order thinking skills whereas analysis, synthesis and evaluation are considered as higher–order thinking skills and it is not an easy task to develop higher–order thinking skills in students. Higher–order thinking skills ensure qualities of good thinking processes.

Below is a simple adapted representation of Bloom's Taxonomy which can assist in understanding in what is said as at a quick glance.

Cognitive knowledge	Affective attitude	Psychomotor skills
1. Recall data	1. Receive (awareness)	1. Imitation (copy)
2. Understand	2. Respond (react)	2. Manipulation (follow instructions)
3. Apply (use)	3. Value (understand and act)	
4. Analyse (structure/ elements)	4. Organize personal value system	3. Develop precision
5. Synthesize (create/build)	5. Initialize value system (adopt behaviour)	4. Articulation (combined, integrate related skills)
6. Evaluate (assess, judge in relational terms)		5. Naturalization (automate, becomes expert)

Table 3.1 Bloom's taxonomy domains (at a glance)

(http://www.business_balls.com/bloomstaxonomyoflearningdomains.html)

NB: In the Cognitive Domain, at levels of 5 and 6 which are synthesis and evaluation, had been inverted in 2001 by Anderson & Krathwol.

3.2 The Use of Higher–Order Thinking Skills in MUET

Dr. Rajendran Nagappan (2001) said "when we say we want to teach students to think, what we really mean is that we want to improve the quality of their thinking" (Language Teaching and the Enhancement of Higher–Order Thinking Skills)

Of late, there has been a growing interest in the education system in Malaysia of the need to equip our students in thinking and reasoning power instead of rote–learning and regurgitation.

This study looks at how to use the higher–order thinking skills in the four basic language skills namely Listening, Speaking, Reading and Writing successfully as found in the Malaysian University English Test or MUET syllabus.

In Malaysia, although there is an emphasis on the teaching of thinking skills, it has been implemented in different forms in different schools or in some areas and schools, none at all. Dr Rajendran Nagappan (2001) felt that teachers need to delegate more time to instruction dealing with high–quality thinking with printed and spoken material. He is also of the opinion that in teaching the four language skills as found in the Malaysian University English Test or MUET syllabus was in a way like teaching the higher–order thinking skills.

The students have to reason and think and know how to handle the various skills involved. In each of the four language skills, the processing of the task involved has to be carefully planned and varied. Professor Hunter (2002) has diagrammatically portrayed the processing of task using a model frame.

INPUT TASKS
Listening
Looking
Watching
Reading a symbol
Reading Text
Feeling
Smelling
Tasting

PROCESSING TASKS
Remembering, Accumulating, Transforming, Naming, Describing, Classifying, Comparing, Finding an answer to a question, Selecting an answer to a question, Applying a rule, Describing a rule, Discovering a rule, Sequencing, Applying a process, Inferring, Analysing, Synthesizing, Evaluating, Deciding

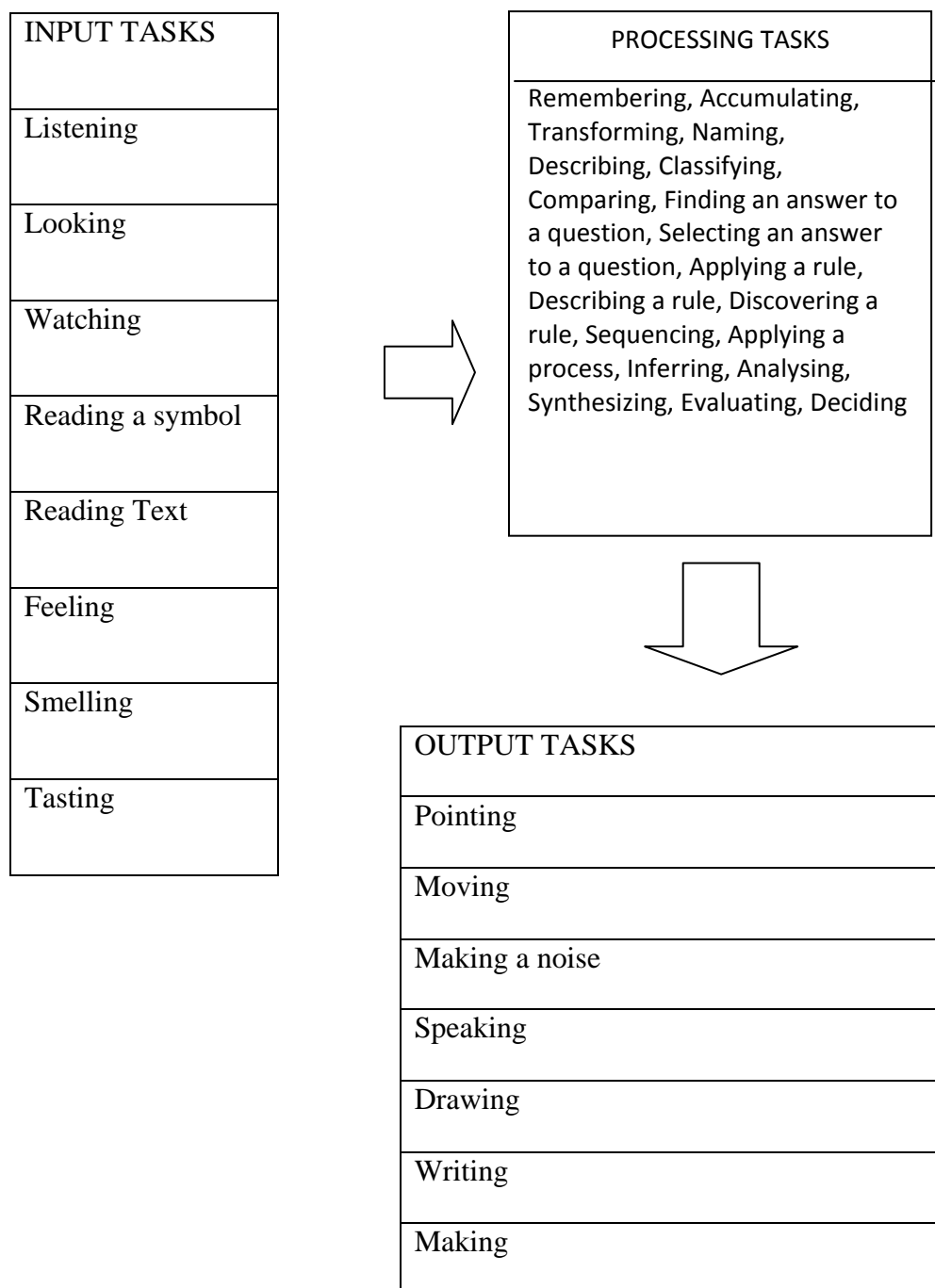| OUTPUT TASKS |
|---|
| Pointing |
| Moving |
| Making a noise |
| Speaking |
| Drawing |
| Writing |
| Making |

Diagram 3.1 Processing model of tasks

(Hunter, 2002, Genre based instruction in critical thinking)

Looking at the processing tasks involved, it can be noticed or rather it appears that Professor Hunter has incorporated Bloom's Taxonomy (the six levels) and de

Bono's thinking skills. The variety of input tasks, processing tasks and output levels has been listed by Professor Hunter as shown in the table below.

INPUT Tasks	PROCESSING Tasks	OUTPUT Tasks
Structure Drill		
Listening	Cumulative remember	Speaking (repeating)
Ordering Exercise		
Listening	Identifying key	Writing notes
Reading	Information	Writing numbers
Reading	Ordering	Drawing
Looking	Visualizing	Speaking
Dictation with graphic and cloze		
Listening	Visualizing	Drawing
Looking	Remembering	Writing
Listening	Identifying cloze words	Writing missing words
Process flowchart		
Listening	Identifying suitable example	Writing

Table 3.2 An example of input/output analysis of a lesson

http://www.info.kochi-tech.ac.jp/lawrie/criticalthinking/paper.html

As can be seen, in the Input section, the students are exposed to the language cues required for that task. This could be in the form of listening or reading. In the processing of the tasks, there is a series of activities and tasks which the students have

to use, using the language cues. Based on the language cues they use, the students arrange the information accordingly for further usage or try to solve the problems. In a way, it is an incorporation of the higher–order thinking skills.

Teaching of thinking skills to students can be done in a gradual manner, that is, from less complex to more complex tasks. Hence, the lower–order thinking skills of Bloom's Taxonomy can be considered the less complex tasks while the higher–order thinking skills can be considered the more complex tasks.

This gradual system of teaching the thinking skills can be taught in each of the four language skills found in the Malaysian University English Test or MUET. The four language skills that are tested are Listening, Speaking, Reading and Writing.

The table below is a classification of Bloom's Taxonomy by Dr. Bill Huitt (2001). It shows what is expected of a student at each level.

LEVEL	DEFINITION	SAMPLE VERBS	SAMPLE BEHAVIOURS
KNOWLEDGE	Student recalls or recognizes information, ideas, and principles in the appropriate form in which they were learned	Write List Label Name State Define	The student will define the 6 levels of Bloom's Taxonomy of the cognitive domain
COMPREHENSION	Student translates, comprehends, or interprets information based on prior learning	Explain Summarize Paraphrase Describe Illustrate	The student will explain the purpose of Bloom's taxonomy of the cognitive domain
APPLICATION	Student selects, transfers, and	Use Compute Solve	The student will write an instructional

	uses data and principles to complete a problem or task with a minimum of direction	Demonstrate Apply Construct	objective for each level of Bloom's taxonomy
ANALYSIS	Student distinguishes, classifies, and relates the assumptions, hypotheses, evidence, or structure of a statement or question	Analyze Categorize Compare Contrast Separate	The student will compare and contrast the cognitive and affective domains
SYNTHESIS	Student originates, integrates, and combines ideas into a product, plan or proposal that is new to him or her	Create Design Hypothesize Invent Develop	The student will design a classification scheme for writing educational objectives that combines the cognitive, affective, and psychomotor domains
EVALUATION	Student appraises, assesses, or critiques on a basis of specific standards and criteria	Judge Recommend Critique Justify	The student will judge the effectiveness of writing objectives using Bloom's Taxonomy.

Table 3.3 Dr. Bill Huitt's Classification

(Derived from Dr. Bill Huitt's Discussions about student learning, Vladosta State College, Vladosta, GA, Rich Wersinger, Heald College)

http://homepage.mac.com/niganit/ulrncptr0401/common/bloomtaxonomy2.html

The next table below shows another version of the same classification done above. This is meant to give the teachers ideas on how to make use of the various

resources available. It also shows the sequence of tasks from the less complex to the more complex and the language cues that can be used.

1. Category	2. Knowledge Information Gathering	3. Comprehension Confirming Application	4. Making use of Knowledge Analysis (Higher – Order)
Description: The skills demonstrated at this level are those of:	Observation and recall of information; Knowledge of dates, events, places; knowledge of major ideas; mastery of subject matter	Understanding information; grasping meaning; translating knowledge into new context; interpreting facts, comparing, contrasting; ordering, grouping, inferring causes; predicting consequences	Using information; using methods, concepts, theories in new situations; solving problems using required skills or knowledge
What the Student Does	Student recalls or recognizes information, ideas and principles in the approximate form in which they were learnt	Student translates comprehends, or interprets information based on prior learning	Student selects, transfers and uses data and principles to complete a problem or task
Sample Trigger Words	Define, list, label, name, identify, repeat, who, what, when, where, tell, describe, collect, examine, tabulate, quote	Predict, associate, estimate, differentiate, extend, summarize, describe, interpret, discuss, extend, contrast, distinguish, explain, paraphrase, illustrate, compare	Apply, demonstrate, complete, illustrate, show, examine, modify, relate, change, classify, experiment, discover, use, compute, solve
Sample Task(s)	Name the food groups and at least two items of food in each group. Make an acrostic poem about healthy food.	Write a simple menu for breakfast, lunch or dinner using the food guide chart.	What would you ask shoppers in a supermarket if you were doing a survey of what food they eat? (10 questions)

5. Taking Apart Synthesis (Higher – Order)	6. Putting together Evaluation (Higher – Order)	7. Judging the outcome
Seeing patterns; organization of parts; recognition of hidden meanings; identification of components	Using old to create new ones; generalizing from given facts; relating knowledge from several areas; predicting, drawing conclusions	Comparing and discriminating between ideas; assessing value of theories, presentations; making choices based on reasoned argument; verifying value of evidence; recognizing subjectivity
Student distinguishes, classifies and relates the assumptions, hypotheses, or structure, of a statement or question	Student originates, integrates and combines ideas into a product, plan or proposal that is new to him or her.	Student appraises, assesses, or critiques on a basis of specific standards and criteria
Separate, order, explain, connect, divide, compare, select, examine, infer, arrange, classify, analyze, categorize, compare, contrast	Combine, integrate, rearrange, substitute, plan, create, design, invent, what if? Prepare, generalize, compose, modify, create, design, hypothesize	Decide, grade, test, measure, recommend, judge, explain, compare, summarize, assess, judge, recommend, critique, justify, discriminate, support, convince
Prepare a report about what the people in this class eat for breakfast	Create a song and dance to sell bananas	Make a booklet about 10 important eating habits that would be suitable for the whole school to follow in order to eat correctly

Example Product List: (Products which can be used to demonstrate application of

Thinking Skills Framework

Advertisement	Debate	Graph	Monograph
Annotated	Detailed	Graphic design	Museum exhibit
bibliography	illustration	Greeting card	Musical
Art gallery	Diary	Illustrated story	composition
Biography	Diorama	Journal	News report
Blueprint	Display	Labelled diagram	Pamphlet
Board game	Drama	Large scale	Pattern with
Book Cover	Dramatic	drawing	instructions
Bulletin Board	monologue	Lecture	Photo essay
Card game	Editorial	Letter	Picture dictionary
Chart	Essay	Letter to the	Poem
Collage	Experiment	editor	Poster
Collection with	Experiment log	Lesson	Reference file
illustration	Fable	Line drawing,	PowerPoint
Collection with	Fact file	Magazine article,	presentation
narrative	Fairy tale	Map,	Survey
Comic strip	Family Tree	Map with legend	Transparency of
Computer	Glossary	Mobile	overhead
program			Vocabulary list
Crossword			Written report
puzzle			

Table 3.4 Bloom's Taxonomy of Thinking Skills

http://www.cdli.org.ca/grassroots/blooms.html

Having seen the classification of Bloom's Taxonomy, it can be seen that it can be easily superimposed on the Malaysian University English Test syllabus seen in the following table making possible for the use of language cues.

Test Component	Listening (Paper 1)	Speaking (Paper 2)	Reading (Paper 3)	Writing (Paper 4)
Paper code	800/1	800/2	800/3	800/4
Duration	30 minutes	30 minutes	90 minutes	90 minutes
Task/test format	To listen to recorded texts twice and answer **20 questions** on them.	To perform **2 tasks** based on contemporary issues: Task A: **Individual Presentation**	To answer **45 multiple-choice questions** in the form of 3-option multiple choice	To answer **2 questions:** Question 1: **Interpretation of information** based on

| | Questions consist of:

Information transfer

Short -answer questions

3-option multiple-choice questions

4-option multiple-choice questions

Possible genres:

News
Lecture
Briefing
Meeting
Interview
Discussion
Instructions
Documentary
Advertisement
Announcement
Telephone
Conversation | [2 minutes for preparation and 2 minutes for presentation given]

Task B:

Group presentation [4 candidates to a group; 2 minutes for preparation and 10 minutes for discussion given] | questions

4 – option multiple choice questions

Questions are based on **6 passages** from various types of texts. At least one text with graphics is given.

Possible genres:

• Journals

• Magazines

• Newspapers

• Academic and electronic sources | specific stimuli provided [at least 150 words]

Question 2:

Extended writing based on a given topic [at least 350 words]

Possible genres:

• Letter

• Report

• Essay

• Article |
|---|---|---|---|---|
| Weighting | 15% | 15% | 40% | 30% |
| Maximum score | 45 | 45 | 120 | 90 |
| | Aggregated Score = 300 | | | |

Table 3.5   Latest MUET Format

(MUET, Skills, Preparation & Practice,

Federal Marshall Cavendish Education, 2009)

In comparing Bloom's Taxonomy and the Malaysian University English Test or

MUET syllabus, the researcher plans to show how by using the relevant language cues

in the higher–order thinking skills, can be used to the full potential, namely, in relating it to Listening, Speaking, Reading and Writing language skills. Incidentally these four language skills make up the four language components of MUET.

3.3   Methods of Some Researchers and MUET

"Aristotle believed that the depths of one's thinking governed the types of language one could use" (Anderson 1985; Nagappan R.,2001). "Sophisticated understanding and mastery of higher–order challenges occurred only through the use of knowledge in a subject or topic whether it be consumer decision making, the design of a bridge or critique of a theatre performance" (Onosko and Newman 1994; Nagappan R., 2001). In other words, a subject well–taught will enable the usage of higher–order thinking skills and in helping the students to analyse, synthesize, evaluate and problem-solve. "Languages abilities and thinking competencies shape each other" (Block, 1992; Nagappan R., 2001). Prof. Dr. Rajendran Nagappan goes on further to say that "through the power of language use, the quantity and quality of students' thoughts can be improved. Through reading, writing, speaking and listening, transitory thoughts can be transformed into lasting principles" (Nagappan R., 2001, Language Teaching and Enhancement of Higher–Order Thinking Skills)

In the Malaysian University English Test or MUET, the teachers can use language cues that are commonly applicable in that skill. This can be done verbally or otherwise because the students are expected to develop from these and achieve the expected learning target within the given time for each skill.

One way of introducing these language cues is by having the cueing systems which can be well developed for usage. Based on Bloom's Taxonomy of higher–order

thinking skills, language cues that are commonly found in the four language skills of Listening, Speaking, Reading and Writing in the Malaysian University English Test or MUET can be highlighted and put into the different cueing systems. The teachers can then highlight on the usage of these language cues in the respective language skills.

Another way in which teachers of the Malaysian University English Test or MUET can make use of language cues is through the method of questioning. Using language cues as commonly found in the Malaysian University English Test or MUET language skills and at the same time pertaining to the higher–order thinking skills of Bloom's Taxonomy can evoke the thinking skills of the students. If successful, it can go a long way in preparing students for tertiary education and to face challenges in the work force. "Redfield and Rousseau (1981) suggest that higher–level questions appear to be instrumental in enhancing student thinking" (Nagappan R., 2001, Language Teaching and the Enhancement of Higher – Order Thinking Skills).

While using the method of questioning, the teachers can make use of what is called 'wait time'. This is carried out by the teachers to stimulate the thinking on the part of the students. The teacher asks the question, gives time for the student to respond and so forth. Researchers feel that "wait time" not only evokes thinking skills but gives more room for more student–to–student discourse or interactions.

According to Yost, Avila & Vexier (1977), there is proof that by asking questions it helps to improve students' comprehension and retention of content (Nagappan R., 2001). Van Zee and Minstrell (1997) found that 'the reflective tosses' they experimented with, achieved three goals. The first goal they achieved was they made use of questions to make sure the students got the meanings clear and understood. The next goal achievement was with the use of questions, the students were able to have

more than one view in a natural manner. The final goal was that the questions were used to help the students "monitor the discussion and their own thinking" (Nagappan R., 2001). According to Van Zee and Minstrell (1977) incidentally a reflective toss sequence is made up of a statement on the part of the student, followed by question or questions on the part of the teacher and then further additional statements from the students.

Thus it can be seen that language cueing systems and questioning methods help teachers to develop thinking skills on the part of the students. Teachers feel that there must be some kind of a guideline, like a classification to ensure that they are still adhering to the higher–order thinking skills. Many still feel that Bloom's Taxonomy is by far the best for these purposes. To be able to classify means to be able to identify the language cues which are common in that entity. Once identified, they can be compared and classified according to the respective categories.

A closely related feature of classification is what is called ordering. Ordering means sequencing. According to Piaget & Szeminska (1941), Feuerstein et al (1980), children are only able to start master ordering around the operational stage of around 7–8 years of age. But what was found was that even low achieving and very young children were able to achieve a certain level of ordering at given tasks (Nagappan R., 2001) This will be of great help to the students if they are able to use some of the language cues in Paper 4 of the Malaysian University English Test or MUET which is the writing paper.

Another tactic is that of summarizing which is said to enhance the thinking skills of the students. Researchers Brown, Campione and Day (1981) came up with a 'wide-based approach' where irrelevant details were omitted and substituted with

superordinate terms. Another feature that they found was that weaker students had difficulty enforcing these rules (Nagappan R., 2001) In this study the researcher feels that language cues can be used to help the students in the summary writing. Besides the note–taking and analytical skills of the students are also enhanced.

Teachers in general need to organize their classroom learning in a variety of ways so that the students can be actively involved where thinking skills are concerned. This can be in the form of group work, cooperation, and teacher questioning (Dillon 1984, George 1984, Nagappan R., 2001). According to Smith (1977) thinking skills have also been formed in peer interaction, teacher support and teacher questioning (Nagappan R., 2001).

3.4 The Use of Language Cues in MUET

Students need to learn how to make use of language cues in order to understand and communicate. The various cueing systems are made up of different language cues. These govern the four main language skills found in MUET. By combining their background knowledge with their language cues found in the cueing systems, students are able to convey meaningful meanings.

In the semantic cueing system, the language cues help in comprehending texts which is inclusive of words, speech, signs, symbols, and any other forms. Teachers can question the students' semantic knowledge by connecting new concepts to concepts that they are already familiar with. In this manner, the students will slowly learn on their own to relate information which is new to them to information that is already known and to which they have had personal experiences.

In the case of the syntactic cueing system, the syntactic cues are inclusive of patterns of language (grammar), rules, word order and punctuation. For instance, the position that a word holds in a sentence will give the cue to the person who is listening or reading as in MUET as to whether the word is a noun or a verb. On the other hand, the person who is listening or reading is likely to use his or her own intuitive knowledge of grammar to foretell what words are likely to come next. So when students are familiar with the word order patterns or grammar that determine the meaning in the sentences, they can make use of this knowledge to foretell words that are not so familiar and to be able to read with greater fluency. In fact, oral punctuation gives cues to meaning through pauses, voice modulations, rhythm and flow, and inflection.

In the textual cueing system, the students make use of cues in text in the case of headings and sub-headings, captions, titles, bold print or italics or any other text features to form meaning. Being able to read charts or graphs is also considered to be part of the process of comprehension. In fact, this is a necessity in MUET. The usage of language cues in text structures helps the students to see the writer's organizational patterns and thoughts in the various types of texts – be it an expository text, or a narrative text, or a dramatic text or even poetry. In fact, students who are able to use language cues in text structures are in a better position to organise, comprehend and remember information found in the texts.

The graphophonic cueing system makes use of the letter sound or sound symbol relationships in language. Here, students make use of graphophonic cues to identify words they do not know by connecting speech sounds to letters or letter patterns this is what we call decoding. The language cues here are used to give support to the language cues in the semantic, syntactic and pragmatic cues to help determine if the word makes sense or is logical.

Other problem solving strategies include the use of picture cues. In fact, children make use of this strategy in inventing texts. This can in applied in interpreting the non–linear texts in MUET.

Students can integrate the language cues in various language cueing systems to their advantage. For instance, by keeping in mind what has already happened will give them clues as to what a text may say about what may happen next. This again is a necessity in MUET. This can only happen if they have developed an understanding that printed language can make sense just like oral language.

According to the Conerstone framework (Tankersley, J.), they have given 6 language cueing systems which they have divided into two categories, namely the surface structure system and the deep structure system. Under the surface structure system, it is further sub–divided into the lexical cueing system which is the recognition of known words, the praphophonic cueing system which makes use of letter/sound relationships and finally the syntactic language cueing system which is the structure of language and grammar. Under the deep structure system they have the semantic cueing system which involves the meanings of words, phrases and sentences. They also have under the deep structure system, the schematic cueing system which deals with prior knowledge and the related comprehension strategies. Also under the deep structure system is the pragmatic language cueing system in which there is interaction with the texts such that the text has meaning for the student.

All six cueing systems can be taught at the same time. Some look at it as four language cueing systems while some look at it as six language cueing systems.

3.5 Summary

This chapter shows that the higher–order thinking skills is actually based on Bloom's Taxonomy. What is required in the higher–order thinking skills is actually what is required in the four language skills in MUET. The language cues found in either the four language cueing systems or the six language cueing systems will definitely help students to master the task required in MUET. Various methods have been mentioned which in one way or the other can be used in the teaching of language cues and higher–order thinking skills in the language components of MUET. This can be clearly seen in Chapter 4.