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EFFECTS OF ONLINE READING STRATEGIES AND LEARNING STYLES ON READING COMPREHENSION OF MALAYSIAN TERTIARY ESL LEARNERS

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By

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November 2015

Chair: Assoc. Prof. Wong Su Luan, PhD

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Many Malaysian learners struggle at the tertiary level due to poor reading skills (Majid, Jelas, & Azman, 2006; Ramaiah, 1997; Ellis, 1996 and Ramaiah & Nambiar, 1993). While it is hard to address core problems such as low English proficiency, some researchers believe that reading comprehension can be improved significantly through reading strategy instruction (Sorrell, 1996; Fehrenbach, 1991). However, different learners respond to reading strategies differently (Hsieh, 2007; Sharma & Hannafin, 2004). There is a lack of research addressing the congruence between reading strategy and differences between learners which has served as the impetus for the present research.

The purpose of this study was to discover the relative effectiveness of different types of reading strategies on measures of reading comprehension performance for students with different learning styles. Students were separated into four learning style groups (active, sensitive, visual and sequential) based on their scores on the Index of Learning Styles (ILS) questionnaire developed by Felder and Solomon (2003).

A large sample was canvassed with the ILS to find learners with specific learning styles as stipulated by the research protocol. Since learners with only one learning style preference are rare, the final sample sizes comprised groups of 32-34 students. As such the repeated measures design was used to ensure mitigate the loss of power in the study. To reduce the sequencing effects that come with using a repeated measures design, counterbalancing was employed. The reading strategies were incorporated into the text and the different groups were made to answer a series of multiple choice questions to test their reading comprehension. A split-plot ANOVA was used to analyze the data collected.

The results indicated that students with varying learning styles responded differently to the reading strategies tested in the study. Active learners performed better than other groups when using the keyword and question and answer strategy but performed significantly worse than other groups with the rereading strategy. Sensitive and sequential learners on the other hand performed better than other groups with the rereading strategy. Visual learners did well with the keyword strategy.

Of the strategies tested, only the keyword strategy showed consistently positive results for all learning style groups. Each group scored higher on the keyword condition than on the control condition. Hence use of the keyword strategy is highly recommended in classroom environments and incorporating the keywords into texts to make texts easier to understand is a viable method for improving comprehension. The question and answer strategy should be used with caution as it results in sub-par comprehension for learning styles other than the active learning style. Similarly the rereading strategy which works well for sensitive and sequential learners should also be used only for these learners as it confuses active learners. In a nutshell, a student's learning preference will influence the way information is processed and thus selecting and using appropriate reading strategies is essential to ensure the best possible results.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KESAN STRATEGI MEMBACA DAN GAYA PEMBELAJARAN PADA PRESTASI PEMAHAMAN BACAAN PELAJAR ESL DI INSTITUSI PENGAJIAN TINGGI DI MALAYSIA

Oleh

CHIAM KEE SWAN

November 2015

Pengerusi: **Prof. Madya Wong Su Luan, PhD**

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Ramai pelajar di Malaysia menghadapi masalah di peringkat pengajian tinggi kerana tiada kemahiran membaca (Ellis, 1996; Majid, Jelas, & Azman, 2002; Ramaiah & Nambiar, 1993; Ramaiah, 1997). Walaupun ia adalah sukar untuk menangani masalah teras seperti penguasaan bahasa Inggeris yang rendah, sesetengah penyelidik percaya bahawa kefahaman membaca boleh meningkat dengan ketara melalui pengajaran strategi bacaan (Fehrenbach, 1991; Sorrell, 1996). Walau bagaimanapun, pelajar yang berbeza memerlukan strategi membaca yang berbeza (Hsieh, 2007; Sharma & Hannafin, 2004). Terdapat kekurangan penyelidikan menangani kesesuaian antara strategi membaca dan perbezaan antara pelajar dan ini menjadi dorongan untuk penyelidikan ini.

Tujuan kajian ini adalah untuk mengetahui keberkesanan relatif pelbagai jenis strategi bacaan keatas prestasi kefahaman membaca pelajar dengan gaya pembelajaran yang berbeza. Pelajar telah dibahagikan kepada empat kumpulan gaya pembelajaran (aktif, sensitif, visual dan berurutan) berdasarkan skor mereka pada Indeks Gaya Pembelajaran (ILS) soal selidik yang dibangunkan oleh Felder dan Solomon (2003).

Satu sampel besar telah dikumpul dengan ILS untuk mencari pelajar dengan gaya pembelajaran tertentu seperti yang ditetapkan oleh protokol penyelidikan. Memandangkan pelajar dengan hanya satu keutamaan gaya pembelajaran susah dicari, sampel akhir terdiri daripada kumpulan yang mengandungi 32-34 pelajar. Oleh itu reka bentuk kajian yang berulang telah digunakan untuk memastikan mengurangkan kehilangan kuasa dalam kajian ini. Untuk mengurangkan kesan urutan yang wujud dengan peggunaan reka bentuk kajian berulang, langkahpengimbangan telah dilaksanakan. Strategi membaca telah dimasukkan ke dalam teks dan kumpulan-kumpulan yang berbeza telah dibuat untuk menjawab

beberapa soalan aneka pilihan untuk menguji kefahaman bacaan mereka. Kaedah SPANOVA digunakan untuk menganalisis data yang dikumpul.

Hasil kajian menunjukkan bahawa pelajar yang mempunyai gaya pembelajaran yang berbeza-beza menunjukkan respons yang berbeza kepada strategi membaca diuji dalam kajian ini. Pelajar aktif menampilkan prestasi yang lebih baik daripada kumpulan-kumpulan lain apabila menggunakan kata kunci dan strategi soal dan jawab tetapi mendapat skor yang lebih teruk daripada kumpulan lain bila menggunakan strategi membaca semula. Pelajar sensitif dan berurutan sebaliknya menunjukkan prestasi yang lebih baik daripada kumpulan lain dengan strategi membaca semula. Pelajar visual pula mendapat skor tinggi dengan strategi kata kunci.

Antara strategi yang diuji, hanya strategi kata kunci menunjukkan hasil positif secara konsisten untuk semua kumpulan gaya pembelajaran. Setiap kumpulan memperoleh skorlebih tinggi dengan kaedah kata kunci daripada kaedah kawalan. Oleh itu penggunaan strategi kata kunci amat disyorkan dalam persekitaran bilik darjah dan menggabungkan kata kunci ke dalam teks untuk membuat teks lebih mudah untuk difahami adalah kaedah yang berdaya maju untuk meningkatkan kefahaman. Persoalan dan jawapan strategi harus digunakan dengan berhati-hati kerana ia mengakibatkan kefahaman sub par untuk gaya selain gaya pembelajaran aktif pembelajaran. Begitu juga strategi membaca semula yang berfungsi dengan baik untuk pelajar sensitif dan urutan juga perlu digunakan hanya untuk pelajar ini kerana ia mengelirukan pelajar aktif. Secara ringkas, pilihan pembelajaran pelajar akan mempengaruhi cara maklumat diproses dan dengan itu memilih dan menggunakan strategi membaca yang sesuai adalah penting untuk memastikan hasil yang terbaik.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. Thememembers of the Supervisory Committee were as follows:

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

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LIST OF ABBREVIATIONS

A	Active
AC	Abstract Conceptualization
AE	Active Experimentation
ANOVA	Analysis of Variance
ASI	Approaches to Study Inventory
ASSIST	Approaches and Study Skills Inventory for Students
BES	Building Excellence Survey
BDI	Brain Dominance Instrument
CAI	Computer Assisted Instruction
CE	Concrete Experience
CMLHS	Centre of Modern Languages and Human Sciences
CSA	Cognitive Styles Analysis
CSI	Cognitive Style Index
DV	Dependent Variable
ELT	Experiential Learning Theory
EPCCI	Eastern Province Chamber of Commerce and Industry
ESL	English as a Second Language
ESP	English for Specific Purposes
FSLSD	Felder Solomon Learning Styles Dimensions
HOTS	Higher Order Thinking Skills
ICT	Information and Communications Technology
ILS	Index of Learning Style
IV	Independent Variable
K	Keyword
L1	First Language
L2	Second Language
LSI	Learning Style Inventory
LSP	Learning Style Profiler
LSQ	Learning Style Questionnaire
N	No Strategy
NASSP	National Association of Secondary School Principals
NILAM	Nadi Ilmu Amalan Membaca
MBTI	Myers-Briggs Type Indicator
MCQ	Multiple Choice Question
MSD	Mind Styles Delienator
MSP	Motivational Style Profile
MUET	Malaysian University Entrance Test
PC	Personal Computer
PDP	Parallel Distributed Processing
PDPM	Parallel Distributed Processing Model
PDA	Personal Data Assistant
Q&A	Question And Answer
QAR	Question-Answer Relationship
R	Rereading
RAM	Random Access Memory
RASI	Revised Approaches To Study Inventory
RC	Reading Comprehension
RO	Reflective Observation

SALL	Self-Access Language Learning	
Sn	Sensitive	
SPANOVA	Split Plot Analysis of Variance	
SPSS	Statistical Package for the Social Sciences	
Sq	Sequential	
TMM	Tell Me More	
TOEFL	Test Of English As A Foreign Language	
UMP	Universiti Malaysia Pahang	
V	Visual	
VAK	Visual-Auditory-Kinesthetic	
VAKT	Visual-Auditory-Kinesthetic-Tactile	

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

Reading strategies are the "secret recipe" in the enhancement of reading comprehension. Utilizing such strategies effectively empowers learners to read prolifically; a vital tool to comprehend texts, understand concepts and develop critical thinking skills. Many believe this teaching of reading strategies is purposive and specific; not meant distinctively for learners who are behind reading but also for learners who are ahead in reading (Wagaman, 2008). This assertion consolidates the importance of reading strategies as they are vital for all learners. The goal is the ability to read and make clear sense of what has been read. However, different learners have different learning styles. To date there have been no studies reconciling the difference between learning proclivities and reading strategies. Learners are simply expected to be actively involved in their selection; using appropriate reading strategies suited to their preferences to advance further in their reading and close their gaps in understanding.

At the turn of the century with technology invading all aspects of education, decoding information from an online environment has become ever so crucial and requires its own form of literacy (Leu et al., 2007). Learners are now exposed to a wider access of reading materials and references on electronic databases through the internet. Reading strategies, in turn have become extremely important as it is an essential skill required to understand and retain all these bits and pieces of e-information (Lee, 2006). As such, paper-reading strategies such as proposed by Huang, Chern and Lin, (2009) which are effective in the enhancement of reading comprehension are also being used to supplement comprehension during online reading. Along with the problems presented by the advent of the computer age is also a unique opportunity; to take advantage of proliferation of digital media and use it as a tool to teach and enhance reading comprehension.

Studies have proven that there are strategies which are adaptable to online reading (Akyel & Ercetin, 2009; Konishi, 2003 and Elshair, 2002). The ultimate challenge is acknowledging which strategy is most beneficial to use in accordance to learners' preferences (Sasson, 2007). Learners with different styles are required to select and use the appropriate online reading strategies to enhance their comprehension in a manner that is commensurate to the rapid advance of technology.

1.1   Background of Study

Reading strategies are drawn up to help reading in a very efficient way. Using such strategies result in the maximum benefit from reading with the minimum effort. Reading strategies scaffold learners' interaction with texts. Most texts require meta-cognition, the ability to orchestrate learning individually. In fact, it is

a requisite for learners to think about how their learning styles interrelate with the text they are reading, and perhaps change their reading strategies to meet the challenges of that text (Chapman &King, 2009).

In a knowledge-based economy, where the target is to achieve a modern, prosperous, peaceful and high income nation; Malaysia in its recently introduced Government Transformation Programme (Performance Management and Delivery Unit, 2011), has laid a great emphasis on the importance of information and communications technology (ICT) in schools and universities (Smart School Project Team, 1997). It aims to achieve a world class education under the Education Development Master Plan, "Pelan Induk Pembangunan Pendidikan" which is to build a more technologically, literate, thinking workforce of the future (Ministry of Education, 2007) and this requires the reformation of its whole education system from memory based learning to an education that caters to learners' abilities and learning styles in an ICT learning environment.

The success of such a transformation lies in the hands of our educators' readiness to change their roles in the teaching and learning process (Shaharuddin & Abiddin, 2009). Learners should be pro-active, responsible and stand on their own two feet in matters of learning. This entails some basic requirements - the ability to read and comprehend reading; making reading skills an essential part of the process of acquiring independence in learning.

Nevertheless in this transformation period where ICT plays an integral part of the nation's learning (Multimedia Development Corporation, 2005), many of our Malaysian undergraduates at the tertiary level lack this reading capability; they "… are found to be unprepared for the reading demands placed upon them and they encounter difficulties" (Noor, 2006, p.66).

Firstly, the execution of technology in education; the fourth and final wave, 'Consolidate and Stabilise' (2010-2020) is still newly in progress (Multimedia Development Corporation, 2005). Our undergraduates as well as our educators are in a tight spot; they are at the halfway point between the traditional chalk and board talk and modern technology (Ministry of Education, 2007). This means both educators and learners are being forced to adapt to and deal with the evolutionary pressures that technology is placing on the education sector. Secondly, most undergraduates and teachers in their primary and secondary levels are very examination/result oriented attributable to the prioritizing of national examinations in Malaysia (Koo, 2008). They depend heavily on drills and practice to perfect skills and techniques they need to use only in examinations (Ambigapathy, 2002). Furthermore, many are still ingrained with a 'spoon feeding' mentality. They are deficient when it comes to their awareness and control over learning (Zahidi & Azizah, 2012).

To date, it is uncommon for reading strategies to be taught to improve on reading per se in our Malaysian classrooms. Instead, students are usually trained to answer

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reading comprehension questions according to the exam format. They are stuffed with information and notes which they sometimes 'memorize to death' to excel in their studies (Sarjit & Salasiah, 1996).

In recognition of the importance of reading, the Malaysian government has introduced several reading programmes such as the structured and extensive reading programmes for primary school students (using the Ladybird series for younger students and moving to more advanced reading material for the older ones), the contemporary literature programmes for primary and secondary school students and 'NILAM' (Nadi Ilmu Amalan Membaca) which is a programme which tracks how many books a student reads and rewards ardent readers.

A survey of the programmes indicates that learners read better in their first language than their second and that learning styles also affect their reading progress where English is concerned (Noorizah, Nadzrah, Hazita, Nor & Afendi, 2009). Therefore, learners need to be trained to use reading strategies while reading especially when engaging with online reading material. These reading strategies should also be suited to their learning styles to harness better reading performance.

Many studies have been conducted on reading strategies (Baier, 2005; Sheorey & Mokhtari, 2001; Chang, 1998; Cheng, 1998; Cohen, 1998; Anderson, 1991; Oxford, 1990; Sarig, 1987 and Block, 1986) but fewer studies have focused on the next evolutionary step, online reading strategies (Coiro, 2011; Amer, Barwani & Ibrahim, 2010; Huang et al., 2009; Coiro & Dobler, 2007;Chang, 2005 and Anderson, 2003) or speculated on the effects of strategies used on different levels of comprehension (Brantmeier, 2005 and Singhal, 2001) or matching with learners' learning styles.

There are also no substantial studies on the amalgamation of existing reading strategies on the web even though these paper-reading strategies in the English classroom have been researched quite thoroughly and have proven fruitful over the decades. More prominent though is of course the lack of investigations linking compatible reading strategies to an online basis and to learners' learning styles. Nevertheless, this is essential as we are crossing the threshold into the information age where we embrace the borderless world and open ourselves to new technologies in the teaching profession. The identification of apposite reading strategies to be adopted and adapted online or the evaluation of which reading strategies suit what learning styles, are considered vital in improving reading comprehension performance.

Progressively, educators and practitioners have engaged learners in e-learning tasks in their language classrooms (Bikowski & Kessler, 2002; Ioannou-Georgiou, 2002; Sutherland-Smith, 2002; Dudeney, 2000 and Warschauer, 2002, 1999, 1997). The paradigm shift from paper to digital display has become extremely prominent. Coiro stresses that "electronic texts introduce new supports as well as

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new challenges that can have a great impact on an individual's ability to comprehend what he or she reads" (Coiro, 2003, p.458). Leu et al., (2007) mentioned that some of the lowest offline readers may actually be some of the best online readers when they acquire distinctive reading skills. In short, learners need to harness online reading skills using the appropriate strategies as an opportunity to 'leapfrog' in bridging the gap of knowledge (Leu, 2002).

To date, reading is supported electronically in Malaysian universities. It is crucial for the undergraduates to adapt to or be equipped with new ways to handle the impending technological change in education. However few universities concentrate on doing honest reviews of their students' reading habits or teaching reading strategies. Most universities have the predominant assumption that their undergraduates are armed with the tools necessary to cope with tertiary level reading (Erikson, Peters & Strommer, 2006). To enter Malaysian universities, students must have passed the Malaysian University Entrance Test (MUET) or they may not have the credit hours needed to add courses that teach these very necessary and essential reading strategies. In addition, most university courses are already saturated with subjects. Thus, this study proposes to provide a solution to allow these undergraduates to learn their skills online; first by identifying which reading strategies are suitable to be implemented online and second, by evaluating which reading strategies are best suited to improve the reading comprehension performance of learners with specific learning styles.

1.2   Statement of Problem

Reading is indisputably one of the most important aspects of higher or tertiary education through which learner acquire new knowledge, synthesize, evaluate and interpret data to learn more about their subject matter (Noor, 2006). It becomes even more important when one takes into consideration the fact that as learners' progress through the education system they have to become increasingly independent readers to keep up with the challenges of academic pursuit.

Despite its importance, reading has time and again proven to be a problem area for both learners and educators. According to Ellis (1996), many Malaysian learners at the tertiary level struggle to cope with studies due to poor study skills with the core problem being reading. Some of the contributing causes for this reading problem are factors such as low level of proficiency in the English language, poor knowledge and use of reading strategies, misconceptions about reading and low interest (Majid, Jelas, & Azman, 2006; Ramaiah, 1997 and Ramaiah & Nambiar, 1993). However, without expending a great amount of effort, time and resources, one effective and efficient way to handle the current situation would be through reading strategy instruction and this has been supported by Sorrell (1996) and Fehrenbach (1991) who concur that to be a good reader, one must have a large repertoire of reading strategies.

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It is imperative to note that different learners respond differently to different reading strategies (Sharma & Hannafin, 2004). This suggests that learning preferences or learning styles have an effect on the types of reading strategies that a learner may be comfortable with. While a perceptive learner may be aware consciously or subconsciously of the correct reading strategies that best suit his or her learning style, most learners are not which is evidenced by the ongoing problem most learners have with reading independently at the tertiary level. In order to achieve effective reading strategy instruction which result in improved comprehension for all types of learners, the reading strategies taught should best suit the students' learning styles. Additionally, the interaction between learning styles and reading comprehension should also be examined to procure richer and more complex data. Hsieh's (2007) study on the relationships between learning styles and reading strategies points out that the students' learning styles may influence them to process information differently as it passes from sensory memory to short-term memory to long-term memory. This means that while a learning style is more of a preference, since reading is a reflex and the thought process as one reads a sentence is complex and divergent in nature, the choice of reading strategy to use whether implicit or explicit can mean the difference between understanding a sentence and missing the point completely.

Given the fact that resources such as teaching staff and credit hours in most universities are stretched thin, very little can be done to remedy the ongoing problem with reading that most students face. This points towards a need for better understanding of the complex interplay between reading strategies and learning styles; thus justifying a closer examination of the relationship between these two elements.

1.3 Objectives of Study

The objective of this experimental study is to examine the relative effectiveness of different types of reading strategies in measuring reading comprehension performance for students with different learning styles during their reading process in an electronic environment. Felder and Soloman's (2003) Index of Learning Style Scale (ILS) will be the measurement employed in this study to identify readers' learning styles. Several reading comprehension tests adapted from the MUET tests using Hsieh's (2007) framework will then be used to gauge Reading comprehension (RC) performance for students with different reading strategies. The reading strategies tested are the rereading, keyword, and question and answer (Q & A) strategy as well as a control testing condition in which no strategy is embedded in the text. Specifically, the objectives of this study are:

1. To investigate the overall profile of students' learning style distribution.
2. To investigate if reading strategies (keyword, rereading, Q&A or no strategy) have an effect on reading comprehension performance of ESL learners.
3. To investigate if the learning styles (active, sensitive, visual and sequential) have an effect on reading comprehension performance of ESL learners.

4.   To investigate if the effect of reading strategies (keyword, rereading, Q&A or no strategy) on reading comprehension performance depends on the learning styles of ESL learners.

1.4   Research Questions

This chapter will also address the following research questions:

RQ 1: What is the overall profile of students' learning style distributions?

RQ 2: Is there a significant difference between reading comprehension scores of learners using the keyword, rereading, Q&A strategies and no strategy?

RQ 3: Is there a significant difference between reading comprehension scores of learners having the active, sensitive, visual and sequential learning styles?

RQ 4: Is there a significant difference between reading comprehension scores of active learners using the using the keyword, rereading, Q&A strategies and no strategy?

RQ 5: Is there a significant difference between reading comprehension scores of sensitive learners using the using the keyword, rereading, Q&A strategies and no strategy?

RQ 6: Is there a significant difference between reading comprehension scores of visual learners using the using the keyword, rereading, Q&A strategies and no strategy?

RQ 7: Is there a significant difference between reading comprehension scores of sequential learners using the using the keyword, rereading, Q&A strategies and no strategy?

1.5   Significance of Study

The key purpose of any education-oriented research is to provide new knowledge to the field of pedagogy and to improve teaching methods. In pursuit of this goal, researchers have to understand the problems learners face by closely examining learners' responses to innovations in teaching and formulating new methods of teaching that improve on previous shortcomings.

While previous studies on the effects of hypermedia and multimedia annotations focus mostly on providing users with more options, enhancing comprehension and improving vocabulary, this study tackles the complexities of coupling reading strategies and learning styles to produce the best reading comprehension performance for different learners.

Relatively few studies have reported on online L2 (second language) reading strategies (Coiro & Dobler, 2007; Huang et al. 2009; Chang, 2005; Anderson, 2003 and Tseng, 1998). As a point of comparison, significantly more studies have dealt with paper-reading strategies (Sheorey & Mokhtari, 2001; Chang, 1998; Cheng, 1998; Cohen, 1998; Anderson, 1991; Oxford, 1990; Sarig, 1987 and Block, 1986). Of the studies that deal with online reading strategies, most advocate techniques to cope with information in multimedia environments, very few however harness the advantages of multimedia to aid in teaching those strategies. This research offers some fresh ideas on how to incorporate reading strategies into texts using simple multimedia tools which can easily be adapted and adopted in classrooms. This differs from reading strategy instruction which burdens the educator with additional lessons to cover in an already saturated lesson plan. The present research broaches the idea of a system which can be embedded within a text to make it more comprehensible and this system would also be sensitive to the learnes' preferences and needs so as to improve reading comprehension performance with minimal direct involvement from the educator.

Even less common than the association of multimedia with the teaching of reading strategies is the examination of relationships between multimedia and learning styles. Wei-Fan and Dwyer (2003) concluded, after an extensive review of literature related to hypermedia and learning, future contributions to the field need to consider learners' prior knowledge and varied learning styles.

Previous studies on reading strategies and scaffolding for readers have observed that certain kinds of readers used particular reading strategies (Sharma & Hannafin, 2004). However these observations were not followed by any scientific classification linking the types of readers with their preferred strategies. As such, the present body of work deals with the implications of various learning styles and their effect on reading comprehension performance when different reading strategies are used. Hence the researcher seeks to fill this gap in knowledge by including the variability among individual learning preferences as a measured parameter in the study.

Only a few studies have attempted to address the theoretical and conceptual framework of web-based instruction (Jung, 2001). The researcher aims to provide a comprehensive and detailed account of the instructional effects of reading strategies taught online as well as convincing explanations as to the mechanisms involved in the learning process. As such, the findings of this research have potential contributions to the field of distance education and online learning.

This study also contributes to the body of L2 reading knowledge by merging traditional reading strategies with modern annotation techniques to cater for learners with different learning styles. It aims to benefit teachers, lecturers, curriculum planners, textbook writers and most importantly ESL (English as a Second Language) readers by examining the interaction between reading strategies taught online and learning styles. This is especially relevant in light of

the constant shift towards learner centred teaching which places emphasis on the needs of individual learners. This research will allow educators and students alike to understand how learners with different learning styles can read better.

1.6   Limitations of Study

This study is limited to approximately 132 participants in one university in the district of Kuantan, Pahang due to the size of computer labs in the university. Since the sample size is relatively small it is difficult to generalize to all universities in Malaysia. Furthermore, the participants will only be first or second year undergraduates. This means these students' perceptions about learning are not solidified as compared to graduate students or senior adult learners. In addition, these participants may have a relative advantage compared to the average university student as UMP (Universiti Malaysia Pahang) is a "hands on" university and is inundated with the latest multimedia tools and gadgets. Learners from other universities may be less familiar with interactive multimedia tools and have had fewer opportunities to immerse themselves in various online reading environments.

Next, the scope of study has its limits. The objective of this study is to investigate the effects of various online reading strategies and learning styles on student achievement in reading comprehension. The findings would be more insightful if the study has also touched on the effects of learning styles on reading and other factors, such as instructional motivation and reading environment. Additionally, the present research does not examine long term effects of continued exposure to the individual strategies on ESL learners. As such, it cannot determine if the learners would internalize the strategies incorporated into the text. It simply examines the effect of the strategy on immediate RC performace at the time of use.

Also, the online reading strategies employed in this study concentrates only on rereading, keyword and Question and Answer strategies individually. The effects of dual- or multi-reading strategies and learning styles on reading are beyond the scope of this study. Combining rereading, keyword and Q&A strategies may result in the same effects from the rereading-keyword strategy or the Q&A-keyword strategy. However the combination effect is not in the scope of this research.

1.7   Definition of Terms

1.7.1   Reading Strategies

Reading strategies are processes that learners apply in order to improve their reading comprehension and problem-solving skills when they encounter difficulties in reading (Singhal, 2001). Reading strategies can also be viewed as ways of processing information that will enhance comprehension and improve the transfer of knowledge (O'Malley & Chamot, 1990). Carrell (1998) prefers the

term "strategies" rather than the term "skills" because the focus is on the actions that readers actively select and control to achieve desired goals or objectives, although there are different claims in the literature as to how much conscious deliberation is involved in these actions. Paris, Wasik and Turner (1991) define "strategies" and "skills" based on the degree of autonomy exerted. A strategy is used consciously and purposefully whereas a skill is an automated response to aid in overcoming a frequently encountered problem. A frequently used strategy can become automated and thus graduate into a skill. A skill likewise can also be intentionally employed as a strategy in certain situations.

The distinction between strategy and skill is of particular importance in this study due to the nature of the treatment which incorporates the reading strategies *into the text.* As such, the operational definition of a reading strategy in this research is a technique employed deliberately or induced to achieve the goal of enhancing comprehension. The word induced is added to the definition to acknowledge that different learners may respond differently to the reading strategies embedded in the text; some may embrace the strategy and feel comfortable using it and subsequently benefit from the use of the strategy while others may feel awkward using the strategy and therefore perform worse than usual in which case the use of the reading strategy would be considered induced.

1.7.2 Online Reading Strategies

Online reading strategies are a subset of reading strategies specifically relating to the online environment. This phrase contains some inherent ambiguity because it can be construed in two different ways. One definition would refer to reading strategies that are applied online for example when browsing the internet or navigating hyperlinks. These strategies would focus on items such as how to isolate and assimilate important information or how to conduct efficient and effective searches. An alternate definition would be reading strategies that are taught in an online or multimedia environment. The difference between the two definitions is: the first refers to how the strategies are to be used whereas the second refers to how the strategies are taught. For the purposes of this study, the latter definition will be used. Online reading strategies in this study refer to reading strategies incorporated into online texts using multimedia tools. Specifically this study will focus on the keyword, rereading as well as the question and answer strategy:

Rereading
Conceptually the rereading strategy requires students to quite simply go over the same material two or more times in order to increase absorption. Similarly in this study, rereading involves participants processing the same information twice; in the implementation of this strategy, some sentences related to specific learning objectives and test questions have repetition and are presented twice, the second time with emphasis on the more important or relevant sections of the text. The students review the same sentences on the second page. The central idea of this

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strategy is to reinforce through repetition so as to store information in long term memory as well as increase the opportunities of activating prior knowledge.

Keyword

The keywords strategy is implemented in online texts exactly the same way it is in printed texts. It involves participants viewing highlighted words related to key learning objectives and test questions. The terms are highlighted with bold and large font styles. The strategy seeks to focus the readers' attention on specific words with the aim of activating prior knowledge and connecting separate pieces of information to achieve better clarity of understanding.

Question and Answer (Q&A)

Theoretically the Q&A strategy requires students to ask questions as they read and seek the answers to their questions as the progress through the text. In the present study, the original texts are altered such that questions are embedded into the texts and the answers form the paragraphs of the passage. The Q&A strategy is used to focus attention on specific learning objectives and related criterion measures with a question-and-answer format. The format is like a label connecting the learning content to the specific test questions. This strategy would allow readers to process information in chunks and make sense of the organization of the entire passage as well as grasp main points and ideas in the paragraph.

1.7.3   Learning Styles

A learning style can be defined as the unique collection of individual skills and preferences that affect how a student perceives, gathers, and process learning materials (Johnson & Orwig, 1998). Each individual has his/her distinctive way of perceiving and processing information. "Students learn in many ways – be seeing and hearing, reflecting and acting; reasoning logically and intuitively; memorizing and visualizing and drawing analogies and building mathematical models; steadily and in fits and starts" (Felder & Silverman, 1988, p. 674). Proponents learning styles theories operate on the assumption that how much an individual learns often has more to do with whether the educational experience is suited to the individual's preferred mode of learning rather than the individual's intelligence (Graf, Viola, Leo & Kinshuk, 2007; Wolf, 2007; Felder & Spurlin, 2005; Kolb, 1984 and Myers& Paris, 1978). A learning style in this research therefore, refers an individual's preference or affinity for one particular learning environment or mode of processing information.

1.7.4   Reading Comprehension

Reading comprehension is an interactive process of purposefully extracting and constructing meaning from various texts and formats motivated by a need or interest (Abilock, 2004). It is essentially the ultimate goal of the act of reading; whereby reading without comprehending is tantamount to not reading at all or

having no ability to read. An individual's reading comprehension ability is commonly assessed by a reading comprehension test which usually involves a text or passage followed by multiple choice questions. In this study, reading comprehension will refer to how accurately learners' extract useful meaning from the text as measured by a MUET multiple choice question test.

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