



**UNIVERSITI PUTRA MALAYSIA**

**EFFECTS OF CD AND PAPER DICTIONARIES ON READING  
COMPREHENSION:  
QUALITATIVE AND QUANTITATIVE ANALYSES**

**KON MOOI FOON**

**FBMK 1999 4**

**EFFECTS OF CD AND PAPER DICTIONARIES ON READING  
COMPREHENSION:  
QUALITATIVE AND QUANTITATIVE ANALYSES**

By

**KON MOOI FOON**

**GS00539**

**Thesis Submitted in Fulfilment of the Requirement for the  
Degree of Master of Arts (English) in the Faculty of  
Modern Languages and Communication  
Universiti Putra Malaysia**

**October 1999**



## ACKNOWLEDGEMENTS

The preparation of this thesis involved a great deal of pain and time. It would not have been possible without the help of a number of people. First of all, I would like to thank all my supervisors, namely, Ms Tan Bee Hoon, Dr. Sali Mustapha dan Dr. Shameem Rafik-Galea for all their help rendered in the course of this thesis.

I am indeed most grateful to Ms Tan, who aside from guiding me so meticulously throughout this thesis, has also given me lots of motivation, encouragement and advice. Words could not help me to describe my thoughts of appreciation. My special thanks to Dr. Sali, who has taken her time to guide me in the initial stages of this thesis although with her tight schedule. My appreciation also goes to Dr. Shameem, who is always there to offer help, support and advice in the later stages of this thesis. Kudos to all of you!

I would also like to take this opportunity to thank Dr. Majid Konting from the Faculty of Educational Studies, for helping me with the statistical interpretation in this research. A word of thanks to the principal of SMK Sultan Abdul Aziz Shah Kajang, Encik Abdul Aziz bin Abdul Manaf, for granting me the permission and for being supportive in a number of ways for me to do my MA (English) programme.

Also, I would like to express my gratitude to a number of individuals who have rendered help in one way or another for the successful completion of this thesis.



Finally, I would like to thank all my family members, namely, my parents, my husband, Peng Sang, my daughter, Shu Ying and my son, Jing Wen who have supported me so faithfully and who have been so patient with me during the two and a half years course of doing my thesis. Thank you so much.

## TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS	.....	ii
LIST OF TABLES	.....	vii
LIST OF FIGURES	.....	viii
LIST OF ABBREVIATIONS	.....	ix
ABSTRACT	.....	x
ABSTRAK	.....	xiii
CHAPTER		
I	INTRODUCTION .....	1
	Background of the Study .....	1
	Statement of the Research Problem .....	5
	Research Questions .....	8
	Purpose of the Study .....	8
	Conceptual Framework of the Study .....	9
	Experimental Hypotheses .....	10
	Significance of the Study .....	14
	Definition of Terms .....	17
	Paper Dictionary .....	17
	CD Dictionary .....	18
	Qualitative Analysis .....	18
	Quantitative Analysis .....	19
	Content of the Dictionary .....	19
	Presentation Format .....	20
	Intact Group .....	20
	Group 1 and Group 2 .....	21
	Effectiveness of the Dictionary .....	21
	Reading Comprehension .....	22
	Text Readability .....	22
	The CODE 77 Rubrics-Self Evaluation for Basic Teacher Computer Use .....	23
	Assumptions and Limitations .....	23
II	LITERATURE REVIEW .....	25
	The Background of Dictionaries .....	25
	Lexicography .....	27
	Types of Dictionary .....	30
	Advantages of Using Dictionaries .....	37
	Criteria for Dictionary Selection .....	39
	The Content of a Standard Dictionary .....	41



	Basic Differences between a Native Speaker Dictionary (NS) and a Foreign Learner Dictionary (FL) .....	42
	Designing Dictionaries for Language Learning .....	44
	Vocabulary and Text Readability .....	48
	The Relationship of Vocabulary, Dictionary Use, Reading Comprehension and Language Learning .....	49
III	METHODOLOGY .....	55
	The Study Design .....	55
	Qualitative Analysis and Instrumentation .....	57
	Dictionary Checklist .....	58
	Questionnaire .....	60
	Informal Observation .....	61
	Random Exit Interview .....	62
	Quantitative Measurement .....	62
	Quantitative Instrumentation .....	64
	Control and Measurement of Text Difficulty in Comprehension Passages .....	65
	Formulation of Comprehension Test Items ...	67
	Population and the Sampling Procedure .....	68
	Variables .....	71
	Schedule of the Experiment.....	72
	Administration of the Comprehension Tests..	73
	Data Collection and Analysis.....	73
	Experimental Procedure.....	74
IV	FINDINGS AND CONCLUSIONS.....	78
	Qualitative Analysis .....	78
	Comparison of the Different Aspects in CDD and PD .....	81
	The Content of <i>Longman Interactive English Dictionary</i> (CDD).....	87
	The Content of <i>Longman Dictionary of Contemporary English</i> (PD).....	91
	Treatment of Words in CDD and PD .....	93
	The Presentation Format of the CDD and PD .....	99
	The Informal Observation .....	106
	Random Exit Interview .....	109
	Findings from the Questionnaire.....	111
	Quantitative Measurement.....	116
	Hypothesis Testing .....	118
	Findings from Hypothesis Testing.....	129

V	<b>SUMMARIES, CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>133</b>
	<b>Summaries .....</b>	<b>133</b>
	<b>Qualitative Analysis.....</b>	<b>133</b>
	<b>Quantitative Analysis.....</b>	<b>134</b>
	<b>Conclusions .....</b>	<b>134</b>
	<b>Conclusions from the Qualitative and     Quantitative Analyses .....</b>	<b>134</b>
	<b>Conclusions from the Research Questions ...</b>	<b>137</b>
	<b>Recommendations .....</b>	<b>142</b>
	<b>Weaknesses of this Research.....</b>	<b>142</b>
	<b>Suggestions .....</b>	<b>144</b>
	<b>Implications .....</b>	<b>148</b>
	<b>REFERENCES .....</b>	<b>152</b>
	<b>APPENDIX</b>	
A	<b>Personal Detail Questionnaire .....</b>	<b>158</b>
B	<b>Questionnaire .....</b>	<b>159</b>
C	<b>Key to Computer Literacy .....</b>	<b>162</b>
D	<b>Observation List .....</b>	<b>163</b>
E	<b>Reading Passage 1 .....</b>	<b>165</b>
F	<b>Reading Passage 2 .....</b>	<b>168</b>
G	<b>Reading Passage 3 .....</b>	<b>171</b>
H	<b>Written Instruction .....</b>	<b>174</b>
I	<b>Raw Data of Comprehension Test Scores of     Group 1 with the Respective Dictionaries .....</b>	<b>175</b>
J	<b>Raw Data of Comprehension Test Scores of     Group 2 with the Respective Dictionaries .....</b>	<b>177</b>
K	<b>Answer Scripts .....</b>	<b>179</b>
	<b>VITA .....</b>	<b>181</b>



## LIST OF TABLES

Table		Page
1	The Experimental Design .....	64
2	Calculation of the Fog Index .....	66
3	Comprehension Passages .....	66
4.	The Fog Index and Flesch Reading Ease .....	67
5	Sampling Size .....	70
6	Comparison of CDD and PD .....	81
7	Features Absent in the CDD and PD .....	83
8	Problems Encountered while Using the CDD.....	107
9	Responses to Random Exit Interview .....	110
10	Reasons for CDD Preference in Descending Order ..	112
11	Reasons for PD Preference in Descending Order .....	114
12	Correlation between Computer Literacy and Preference for Dictionary .....	115
13	Performance of Comprehension Tests .....	117





## LIST OF FIGURES

Figure		Page
1	The Study Design .....	55
2	Sampling Procedure .....	69
3	Variables .....	71
4	Experimental Procedures .....	74
5	Explanatory Chart .....	92
6	Layout of the Screen .....	101
7	A Page from the PD .....	105
8	Preference for Dictionary .....	113



## LIST OF ABBREVIATIONS

CDD	Compact Disc Dictionary
LDOCE	<i>Longman Dictionary of Contemporary English</i>
LIED	Longman Interactive English Dictionary
MCE	Malaysian Certificate of Examination
OED	<i>Oxford English Dictionary</i> on CD-ROM
PD	Paper Dictionary
SMK	Sekolah Menengah Kebangsaan
SRK	Sekolah Rendah Kebangsaan
SRJK(C)	Sekolah Rendah Jenis Kebangsaan (Cina)
TESL	Teaching English as a Second Language
UPM	Universiti Putra Malaysia
YMCA	Young Malaysians Christian Association



**Abstract of thesis presented to the Senate of Universiti Putra Malaysia in partial fulfilment of the requirement for the Degree of Master of Arts**

**EFFECTS OF CD AND PAPER DICTIONARIES ON READING  
COMPREHENSION:  
QUALITATIVE AND QUANTITATIVE ANALYSES**

**By**

**KON MOOI FOON**

**OCTOBER 1999**

**Chairperson : Ms Tan Bee Hoon**

**Faculty : Faculty of Modern Languages and Communication**

**In this era that emphasizes electronic and digital technologies, dictionaries which have long been an important learning tool have taken a new form. Electronic references that aid in understanding texts are rapidly being produced and more easily available. Such electronic references may present a learning environment that is totally different from the present. Hence, there is a need to investigate the two different media of dictionary use: compact disc and paper form in terms of similarities and differences. In this exploratory study, the qualitative analysis analysed the content and presentation format of the two types of dictionary and students' preference over them. Students' behaviour during the compact disc dictionary (CDD) use was also observed. The quantitative analysis focussed on how useful the CDD was as compared to the paper**



dictionary (PD) in aiding reading comprehension among first-year undergraduates at Universiti Putra Malaysia.

Results from the qualitative analysis showed that both the CDD and PD were not similar in terms of content and presentation format. Certain features were absent in the CDD but present in the PD and vice versa. Moreover, the treatment of words was different in both the dictionaries. The presentation format also differed. It was also discovered that students preferred the CDD to the PD. There was no correlation between computer literacy and scores in the reading comprehension tests. In addition, students who were computer literate did not show their preference for the CDD. This resulted in the “no correlation” between computer literacy and preference for the CDD. The findings from the quantitative measurement revealed no significant difference in reading comprehension tests between students who used the CDD as compared to students who used the PD.

In spite of the no significant difference, this study proved that both CDD and PD helped students in reading comprehension. Quantitative analyses found that students who used either the CDD or the PD performed far better than those who did not use any dictionaries. Although both media had their strengths and weaknesses, they should co-exist to suit students’ needs and convenience. Hence, dictionary use should be prioritized and encouraged by students in their pursuit of language proficiency attainment.



**Abstrak Tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai  
Memenuhi Keperluan Ijazah Master Sastera**

**KESAN-KESAN KAMUS CAKERA PADAT DAN KAMUS BIASA PADA  
PEMAHAMAN TEKS:  
ANALYSIS KUALITATIF DAN KUANTITATIF**

Oleh

**KON MOOI FOON**

**OKTOBER 1999**

Pengerusi : Puan Tan Bee Hoon

Fakulti : Fakulti Bahasa Moden dan Komunikasi

Dalam era yang mementingkan teknologi elektronik dan digital ini, kamus yang telah lama digunakan sebagai alat bantu pembelajaran telah muncul dalam bentuk yang baru. Rujukan-rujukan elektronik yang membantu dalam pemahaman teks sedang giat direka dan mudah diperolehi. Ia menyediakan suatu situasi pembelajaran yang berbeza sekali daripada sekarang. Memandangkan keadaan ini, adalah mustahak untuk menyelidik dua jenis kamus: kamus cakera padat dan kamus biasa dari segi persamaan dan perbezaannya.

Dalam kajian ini, analisis kualitatif menganalisis isi kandungan dan format kedua-dua kamus tersebut. Ia juga melihat pilihan pelajar antara dua jenis kamus



tersebut. Tingkahlaku pelajar semasa menggunakan kamus cakera padat juga diperhatikan pada masa yang sama. Analisis kuantitatif memfokuskan kepada sejauh mana penggunaan kamus cakera padat berbanding dengan kamus biasa dalam membantu pemahaman teks di kalangan pelajar tahun pertama di Universiti Putra Malaysia.

Dapatan daripada analisis kualitatif menunjukkan bahawa terdapat perbezaan di antara kamus cakera padat dan kamus biasa dari segi isi kandungan dan formatnya. Terdapat ciri-ciri di dalam kamus cakera padat yang tidak terdapat di dalam kamus biasa dan juga sebaliknya. Tambahan, cara perkataan didefinisikan di dalam kedua-dua kamus itu berbeza. Format kedua-dua kamus pun berbeza. Juga di dapati bahawa pelajar lebih gemar menggunakan kamus cakera padat daripada kamus biasa. Dapatan daripada kajian ini juga menunjukkan bahawa tiada korelasi di antara celik komputer dengan skor daripada ujian pemahaman teks. Di samping itu, pelajar-pelajar yang celik komputer tidak lebih minat terhadap kamus cakera padat. Dapatan daripada analisis kuantitatif pula membuktikan tiada perbezaan yang signifikan dalam skor pemahaman teks antara pelajar yang menggunakan kamus cakera padat dengan pelajar yang menggunakan kamus biasa.

Walaupun tiada perbezaan yang ketara di antara pelajar-pelajar yang menggunakan kamus cakera padat dengan pelajar-pelajar yang menggunakan kamus biasa, kajian ini membuktikan bahawa kedua-dua kamus cakera padat dan kamus biasa membantu pelajar dalam pemahaman teks. Analisis kuantitatif menunjukkan bahawa

prestasi pelajar yang menggunakan sama ada kamus cakera padat atau kamus biasa adalah lebih baik daripada mereka yang langsung tidak menggunakan sebarang jenis kamus. Akhir kata, walaupun kedua-dua media tersebut ada kelebihan dan kelemahannya, ia perlu wujud bersama untuk kemudahan dan keperluan pelajar. Oleh itu, penggunaan kamus patut diutamakan dan digalakkan di kalangan pelajar untuk mempertingkatkan penguasaan bahasa mereka.

# CHAPTER 1

## INTRODUCTION

The aim of this study was to investigate qualitatively and quantitatively the effects of compact disc (CD) dictionaries, in particular, *Longman Interactive English Dictionary (LIED)*, as compared to conventional paper dictionaries, *Longman Dictionary of Contemporary English (LDOCE)*, in aiding reading comprehension among first-year undergraduates at University Putra Malaysia. The main objectives were to analyse the effects of use: the content, presentation format, and students' preference over the two types of dictionaries through qualitative and quantitative analyses.

### Background to the Study

Students in secondary schools in Malaysia use dictionaries to enable them to look for meanings when they encounter difficult or unknown words. It can be assumed that almost every family has a paper dictionary. This was based on an informal survey when the researcher was teaching English in a secondary school in Kajang. The dictionary may be a monolingual, bilingual or even a trilingual one. Although some textbooks have exercises which require students to find the meanings of words, dictionary skills are not taught explicitly in class. Teachers assume students





will pick up the skills along the way. Moreover, because the dictionary is not a compulsory "government syllabus" of English, most teachers if not all prefer to assume that some previous teachers have taught the skill (Yorkey, 1963:257). In a study conducted by Atkins and Knowles (1988) with 1,100 EFL learners from four language groups in seven countries, it was found that over 60% of the students had not received any tuition in dictionary skills although 50% owned at least one dictionary. Sadly, the dictionary is "probably the most taken for granted" and under-utilised of "our key institutions" (Brumfit in Tickoo, 1989). And this happens much more in Asia than in Europe.

In recent years, students get a number of choices when buying a dictionary. There are traditional paper dictionaries and electronic dictionaries to choose from. Both can be purchased either in the monolingual, bilingual or even trilingual version. Paper dictionaries are in the book form whereas electronic dictionaries are available in three modes: on-line via the Internet, compact disc and portable pocket type. Nowadays, electronic dictionaries seem to gain popularity with ESL students. However, there are a number of different views regarding the use of them.

The latest addition to electronic dictionaries is the compact disc dictionaries or in short, CD dictionaries. Publishing industries have added to the dictionary production by producing sophisticated versions of CD dictionaries. CD dictionaries run on a software programme. Lexical data is represented computationally in machine-readable versions of published dictionaries. Some of the better known CD dictionaries are those published by Oxford, Merriam-Webster, Longman and Collins.

Generally, these dictionaries have universal appeal and the user finds them user-friendly. They give the user effective access to a wealth of information in a fraction of the time it would take if one is to use a paper dictionary.

In a review by Turner (1997), the *Oxford English Dictionary* on CD-ROM (OED) is a unique publication for several reasons. The amount of information included is staggering. An entry for a word includes much more information than a regular paper dictionary. There is a chronologically arranged list of quotations which illustrates the changing meanings of a specified word.

In addition, one of the many features of this dictionary is the use of *Olde* English. It provides not only charming and humorous insight into a word's evolution but useful information on why a word has come to have alternate meanings in different situations. In addition, the OED is a diachronic dictionary: one that defines a word in contemporary language and exhibits historical uses. The OED entertains by being a rich source of historical and sociological language history. The reviewer also finds himself spending far too much time looking at alternate words, phrases and meanings and simply browsing through interesting quotations and references. The printed versions of this dictionary contain over 20 volumes and takes up several feet of shelf space. Nearly two and a half million quotations are presented. The *Oxford Dictionary Second Edition* on CD (OED2) also has the meanings of English words and phrases from the year 1150 to the present. This dictionary has been more than a dictionary of definitions. The OED2 contains authoritative definitions for more than half a million words and 2.4 million quotations. It illustrates the evolution of English

language and has a unique coverage of international English. The surprising fact is that OED2 takes up less than one twentieth the space of the printed edition. All these features show the amazing facts on CD dictionaries. However, not all these features are present in all CD dictionaries.

Disappointingly, Malaysian students do not commonly use such dictionaries on CD. In addition, they are definitely not within the reach of students studying in rural areas. This is because a CD dictionary can only be utilised on a computer with a CD drive. Moreover, the concept of using a CD dictionary is totally new to them. It is also not surprising to note that CD dictionaries are not popularly utilised at the tertiary level.

Despite having so many varieties of dictionaries to choose from, there are some students who are not particularly bothered with what dictionary they use. They may pick up any dictionary that is available in the house and try to make sense out of the meaning of the word they are finding. This problem is further aggravated as many teachers do not assist students in the selection of dictionaries. Thus, without the much needed assistance and guidance in the dictionary selection, students may face a situation which can have negative consequences (Baxter, 1980:325). Baxter believes that if teachers avoid helping students in the selection of dictionaries, there will also exist a parallel problem of not integrating the dictionary in the learning or teaching process. Hence, this problem will be carried forward to the tertiary level.

## Statement of the Research Problem

Researchers and teachers have been interested in dictionary study throughout the twentieth century. But as Tono (1989) puts it, very few studies have been conducted on the relationship between dictionary reference skills with reading comprehension. Further comparative research studies concerning the effectiveness of different types of dictionaries are even fewer. Moreover, such studies if conducted involved students in foreign countries. There has been no such study conducted in Malaysia so far based on the researcher's library and recent Internet search. In an informal interview with some primary and secondary teachers in Kajang, most teachers believe that CD dictionaries are better than paper dictionaries. Although many people believe and it seems to be common sense that CD dictionaries are able to provide more aid rather than paper dictionaries, empirical validation of this belief is lacking.

On a larger scale, the vision of the Ministry of Education is to produce a generation of IT-literate Malaysians who are not only educated for the Information Age but who are also ready to meet the challenges of this information era. Therefore, teaching and learning approaches and methods with innovative technologies and different modes are contemporarily being used. One of the latest in the development of information technology (IT) education is the pilot phase of the proposed Mobile Internet Unit (MIU) project. This project is a co-operation between The United Nations Development Programme (UNDP) and Mimos Bhd, a local Internet Service Provider. According to a report in In-Tech by Angelina (1999), the project aims to

increase awareness and interest concerning information technology by bringing IT and Internet training to schools. Here again is the move from traditional stereotyped teaching to new technologies in education. Hence, as students move from the traditional to the more IT-based educational technologies, they are actually expounding on the magnitude of the benefits of computers in the classrooms. The limitless potential of computers to revolutionise education is beyond words.

Hence, specific to this study, there is a need to investigate if the move from a traditional paper dictionary to a CD dictionary is going to benefit students in the learning process. The possibility of studying in a paperless environment where pens, pencils and papers are no longer used is not a far-fetched idea. Society needs to be prepared for this eventuality.

Also, with this advent of information technology and the demand on more computer use among university students, there is a need to investigate whether students are keeping up with the trend of using more electronic media in this information technology age. Furthermore, studies of this type provide evidence as to whether students are ready to take up the information technology challenge as has been encouraged by our Education Minister or reluctant to embrace new technologies. Data collected from such studies will ascertain students' resistance or acceptance to a CD dictionary learning environment. The concept of virtual schools and virtual education with new technologies and state-of-the-art technologies in education is slowly been realised. The possibility of virtual education replacing normal classroom teaching will materialise in the near future.

Besides, there is a concern to find out if the information technology facilities which are available to these students, are utilised to the fullest. The preference for the use of paper dictionary or CD dictionary may lie upon a number of internal or external factors. The internal factors referred to are the students' preference in using the two types of dictionaries. It is also vital to know whether the use of paper dictionary should continue to be advocated in schools or not. Perhaps the use of both the paper and CD dictionaries should occur symbiotically, one complementing the other as in a partnership. Hence, the coexistence of the two should be deployed expertly by ESL teachers.

Another important aspect not to be dismissed is the qualitative analysis of the CD dictionaries and paper dictionaries. This is referred to as the external factors in students' choice of a dictionary. The external factors take into account the similarities and differences between the two types of dictionaries in terms of content and presentation format. This is important because the medium of use is different and may have implications on ease of use and on language learning.

Overall, such research can look at the similarities and differences between the two types of dictionaries and can provide an overview for educators on the usefulness of CD dictionaries as compared to the paper dictionary in aiding reading comprehension and students' preference over the two media of use. The results may also have some pedagogical implications which may provide some insights for educators.

## Research Questions

The study addressed the following research questions:

1. Did the students perform the best in comprehension tests when using the CDD or the PD or when not using any dictionary?
2. Was the CDD more useful than PD in helping students to answer comprehension test questions?
3. Was the students' performance consistent based on the type of dictionary used on the two comprehension tests?
4. Was the CDD user-friendly enough to students when checking the meaning of words in the comprehension tests?
5. Did the students show any special preference for a specific type of dictionary?
6. Was there any correlation between computer literacy and the preference for the CDD?
7. Was there any correlation between computer literacy and the scores from the reading comprehension tests?

## Purpose of the Study

There were three general objectives in this study. They were:

1. to determine how useful the CDD was as compared to the PD in aiding reading comprehension among first-year undergraduates at University Putra Malaysia.
2. to find out students' preference in using the two types of dictionaries.

3. to analyse qualitatively the content and presentation format of the two types of dictionaries.
4. to examine the effects of CDD and PD on reading comprehension.

The specific objectives were :

1. to compare the performance in the reading comprehension passages based on the number of correct answers to comprehension questions between the groups which used the CDD, PD and the control group which did not use any dictionary.
2. to compare the similarities and differences in the content and presentation format of the two types of dictionaries.
3. to observe students' behaviour when using the CDD.
4. to investigate if there is any correlation between computer literacy and preference for a specific dictionary.
5. to investigate if there is any correlation between computer literacy and scores from the reading comprehension tests.

### **Conceptual Framework of the Study**

Three important concepts serve as the driving forces behind this study. First, it is an intellectually accepted fact that the potentiality of dictionaries should not be undermined. However, in spite of the number of progress in the development and publication of dictionaries, the dynamics of dictionaries are not fully exploited. The intent of dictionary compilers in producing lexical aids of maximum usefulness to the



students seems to be failing. Dictionaries represent the “non-stop information highway” of language learning. Therefore, the legitimisation of compulsory dictionary use in the classrooms should be further propagated.

Second, the difference in the media of dictionary garners a difference in students’ preference over them. Thus, students’ preference should shed some light as to why such preferences have taken place.

Third, primary attention should be paid to the similarities and differences in both; compact disc and paper dictionaries. Such a listing could be invaluable in decisions on which dictionary to buy. Putting such evidences forward enable a potential buyer to see very clearly the features that are present or absent in both dictionaries. This is also important in view of students’ interests and welfare.

### Experimental Hypotheses

In addressing research questions 1-4, an experiment was designed to investigate which type of dictionary was more helpful in aiding reading comprehension. There were three categories of hypotheses which made up the eighteen hypotheses. They were based on the overall group (n=80); within-group (n=40) and between-group (n=40) measurements. The first three hypotheses were based on the overall group (n=80). The next six were based on the within-group (n=40) and the last nine were based on the between-group measurements. Hypotheses 1-3 were the focus of this study while hypotheses 4-18 were used as