UNIVERSITI PUTRA MALAYSIA

LEARNING STYLES, READING STRATEGIES AND ACHIEVEMENT AMONG IRANIAN EFL MALE HIGH SCHOOL SENIORS IN COMPUTER- BASED AND FACE-TO-FACE LEARNING MODES

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FBMK 2015 59

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ZAHRA MOHARRER

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

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Chair   : Associate Professor Wong Bee Eng, PhD
Faculty : Modern Languages and Communication

The infusion of technology into teaching and learning environments has compelled educators and material designers to refocus their attention on new educational paradigms to successfully use computers in conventional Face-To-Face (FTF) classrooms. Accordingly, the Iranian education system has pursued the trend of using computers, especially at secondary school level, to help students to cope with their learning problems independently. This study explored the effect of two independent variables namely learning style preferences and awareness of metacognitive reading strategies of Iranian senior high school male students on the dependent variable of their English lesson achievement scores. The Reading Proficiency (RP) of the students was also determined on the basis of their scores on the standardized Test of English as a Foreign Language (TOEFL$^©$). Three RP levels were used later as moderator variables to explore the moderation effect on the relationship between learning styles and the English lesson achievement scores, and reading strategies and the English lesson achievement scores in the two instructional formats, that is, Computer-Based Learning (CBL) and FTF contexts. The CBL students were a group of senior high school male students who studied at a distance education center in Shiraz, Iran. Due to some problems such as the lack of high Internet speed in all parts of the province, Fars, the distance education center has provided the CBL students with interactive multimedia CD-ROMs which could be used everywhere. Some other difficulties like the lack of access to the CBL students, the only available technological distance education center which offered services for males, lack of cooperation on the part of the authorities due to the researcher's gender, and the shortage of time at the senior level since they were extremely busy preparing for the National Entrance Examination had made the researcher to use various types of sample selection, including simple random sampling, stratified random sampling, cluster random sampling, and purposive non-probability sampling.

The purpose of this study was to determine the differences between dimensions of learning style preferences, metacognitive reading strategies, and the English lesson achievement scores and their relationships with each other while the three RP levels were chosen as a moderator variable. A total number of 236 EFL male high school seniors

were selected from both the CBL and FTF contexts from different educational districts in Shiraz, Iran. The study administered the ex-post facto research design to explore whether the CBL students fine-tuned their learning styles to the newly engaged educational context and whether they performed differently compared to their counterparts in the FTF group. Various instruments were employed to collect data including Willing's (1988) questionnaire of learning style preferences, Anderson's (2003) Online Survey Of Reading Strategies (OSORS) questionnaire, a demographic questionnaire, TOEFL© Test, and an achievement test on the English course. The data were analyzed by using the AMOS software for Confirmatory Factor Analysis and Multigroup Path Analysis while the three RP levels were chosen as a moderator variable to investigate the interaction effects of RP on the relationships between learning style and achievement scores as well as awareness of metacognitive reading strategies and achievement scores. Descriptive statistics and Independent Samples t-test were conducted using the SPSS software.

The results indicated that the most preferred to the least preferred learning styles among the FTF students were the communicative learning styles followed by authority-oriented, concrete, and analytical learning styles respectively. However, the most preferred to the least preferred learning styles among the CBL students were concrete followed by authority-oriented, analytical, and communicative learning styles. On the other hand, the most to the least dominant metacognitive reading strategy types used by the CBL students were problem solving, global, and support reading strategies, and of the FTF students, support, global, and support reading strategies. In addition, the mean score of the English lesson achievement scores in the CBL context was higher than that of the FTF context. Due to the CBL students' self-report of using CD-ROMs less frequently per week, their higher achievement scores might indirectly be influenced by their higher reading proficiency, having more experience in learning English outside the school, and more familiarity with software, hardware, or Internet use.

The findings obtained from Multigroup Path Analysis indicated that there were statistically significant correlations between the overall preferences of learning styles and achievement scores in both the CBL and FTF learning environments. Reading proficiency could, in addition, affect the relationships significantly in the two pairwise comparisons of medium and high RP levels in the CBL context and only one of the pairwise of the high RP level in the FTF context. Nonetheless, there was no moderation effect of these RP levels because of the violation of the Critical Ratio criteria (CR > ± 1.96); therefore, the relationship between learning style preferences and achievement scores could not be moderated by any of the three RP levels in neither of the learning contexts. Employing the same statistical procedures for metacognitive reading strategies, it was found that there were significant relationships between the overall metacognitive reading strategies and achievement scores in both the CBL and FTF contexts. More specifically, reading proficiency could influence these relationships significantly in the two pairwise comparisons of medium and high RP levels in both the CBL and FTF contexts. However, the medium and high RP levels in the CBL context could have the moderator effects on the relationships between the overall metacognitive reading strategy awareness and achievement scores. However, there was only the moderation effect of high RP level on the relationships, but not the medium RP level due to the violation of the Critical Ratio criteria (CR > ± 1.96), in the FTF context.

The findings of the current study indicate that introducing the use of computers in Iranian traditional classrooms is important. They also reveal that classroom practice should be concerned with accommodating students' preferences of learning styles in the both

contexts. Furthermore, this study also shows that pedagogical practices should be modified to help students adjust their reading strategies to successfully plan, monitor, and evaluate themselves in both contexts.

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

STAIL PEMBELAJARAN, STRATEGI PEMBACAAN, DAN PENCAPAIAN DALAM KALANGAN PELAJAR LELAKI SENIOR SEKOLAH TINGGI EFL (ENGLISH AS A FOREIGN LANGUAGE) IRAN DALAM MOD PEMBELAJARAN BERDASARKAN KOMPUTER DAN PEMBELAJARAN BERSEMUKA

Oleh

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Infusi teknologi ke dalam pengajaran dan pembelajaran (P&P) telah memaksa ahli pendidik dan pereka bentuk bahan untuk memfokuskan semula perhatian mereka terhadap paradigma pendidikan baharu dalam penggunaan komputer dengan jayanya dalam kelas bersemuka (FTF) yang konvensional. Oleh sebab itu, sistem pendidikan di Iran telah mengikuti tren penggunaan komputer, terutama sekali pada tahap sekolah menengah, bagi membantu para pelajar menghadapi masalah pembelajaran secara independen. Kajian ini meneliti kesan dua faktor tak bersandar, iaitu keutamaan stail pembelajaran dan kesedaran terhadap strategi pembacaan metakognitif pelajar lelaki sekolah tinggi Iran terhadap variabel bersandar ke atas skor pencapaian bahasa Inggeris mereka. Kemahiran membaca (RP) pelajar tersebut juga ditentukan berdasarkan skor asas ujian standard , iaitu Ujian Bahasa Inggeris sebagai Bahasa Asing (TOEFL). Tiga tahap RP digunakan kemudiannya sebagai variabel moderator bagi mengenal pasti kesan moderasi terhadap hubungan antara stail pembelajaran dan skor pencapaian pelajaran bahasa Inggeris, dan strategi membaca dan skor pencapaian pembelajaran bahasa Inggeris dalam dua format penyampaian, iaitu Pembelajaran Berdasarkan Komputer (CBL) dan Konteks Pembelajaran Bersemuka (FTF). Pelajar CBL merupakan pelajar lelaki senior sekolah tinggi yang belajar di pusat pendidikan jarak jauh di Shiraz, Iran. Akibat beberapa masalah, seperti kekurangan kelajuan internet yang tinggi di semua bahagian daerah Fars, pusat pendidikan jarak jauh telah menyediakan pelajar CBL dengan CD-ROM multimedia interaktif yang dapat digunakan di mana-mana. Kekangan lain adalah seperti kekurangan akses bagi pelajar CBL, hanya sebuah pusat pendidikan jarak jauh yang berteknologi bagi pelajar lelaki, kekurangan kerjasama pihak berwajib disebabkan gender penyelidik, dan kekurangan masa bagi pelajar tahap senior kerana mereka sangat sibuk menyediakan Peperikasaan Kemasukan Kebangsaan yang menyebabkan penyelidik menggunakan pelbagai jenis pemilihan sampel, termasuk persampelan rawak mudah, persampelan rawak berlapis , persampelan rawak kluster, dan persampelan bukan kebarangkalian bertujuan.

Tujuan kajian ini adalah untuk menentukan perbezaan antara dimensi keutamaan stail pembelajaran, strategi pembacaan metakognitif, dan skor pencapaian pelajaran bahasa

Inggeris dan hubungannya antara satu dengan yang lain, manakala tiga tahap RP telah dipilih sebagai variabel moderator. Sebanyak 236 pelajar lelaki senior sekolah tinggi EFL telah dipilih daripada kedua-dua mod, iaitu CBL dan konteks FTF dari daerah pendidikan yang berbeza di Shiraz, Iran. Kajian ini menggunakan reka bentuk penyelidikan ex post facto , bertujuan untuk meneliti sama ada pelajar CBL mengubah suai stail pembelajaran mereka kepada konteks pendidikan yang baharu diperkenalkan atau sama ada mereka melaksanakannya berbeza berbanding dengan rakan mereka dalam kumpulan pembelajaran bersemuka (FTF). Pelbagai instrumen telah digunakan bagi mengumpul data, termasuk soal selidik Keutamaan Stail Pembelajaran Willing (1988), soal selidik Strategi Pembacaan Survei Atas Talian (OSORS) Anderson (2003), soal selidik demografi, ujian standard Pengujian Bahasa Inggeris Sebagai Bahasa Asing (TOEFL), dan ujian pencapaian kursus bahasa Inggeris. Data telah dianalisis menggunakan perisian AMOS bagi Analisis Faktor Konfirmatori dan Analisis Laluan Multikumpulan, manakala ketiga-tiga tahap kemahiran membaca (RP) dipilih sebagai variabel moderator bagi mengkaji kesan interaksi kemahiran membaca (RP) ke atas hubungan antara stail pembelajaran dan skor pencapaian di samping kesedaran strategi pembacaan metakognitif dan skor pencapaian. Statistik deskriptif dan ujian t Sampel Tak Bersandar dilaksanakan dengan menggunakan perisian SPSS.

Hasil kajian menunjukkan bahawa stail pembelajaran yang paling diutamakan hingga pada stail pembelajaran yang paling kurang diutamakan dalam kalangan pelajar FTF , masing- masing ialah stail pembelajaran komunikatif , diikuti oleh stail pembelajaran berorientasikan autoriti, konkrit, dan stail pembelajaran analitikal. Walau bagaimanapun,stail pembelajaran yang paling diutamakan hingga pada stail pembelajaran yang paling kurang diutamakan dalam kalangan pelajar CBL , masing-masing ialah konkrit, diikuti oleh stail pembelajaran berorientasikan autoriti, analitikal, dan stail pembelajaran komunikasi. Di samping itu, jenis strategi pembacaan metakognitif yang paling diutamakan hingga pada yang paling kurang dominan yang digunakan oleh pelajar CBL ialah penyelesaian masalah, global, dan strategi pembacaan sokongan, dan bagi pelajar konteks FTF ialah strategi sokongan, global dan pembacaan sokongan. Di samping itu, min skor bagi skor pencapaian pelajaran bahasa Inggeris dalam kalangan pelajar konteks CBL adalah lebih tinggi daripada pelajar konteks FTF. Akibat laporan kendiri pelajar CBL yang amat kurang menggunakan CD-ROM dalam seminggu, skor pencapaian mereka mungkin secara tidak langsung dipengaruhi oleh kemahiran membaca mereka yang tinggi, mempunyai pengalaman yang lebih dalam pembelajaran bahasa Inggeris di luar sekolah, serta kebiasaan mereka menggunakan perisian, perkakasan, dan internet.

Hasil kajian yang diperoleh daripada Analisis Laluan Multikumpulan menunjukkan bahawa terdapatnya korelasi yang signifikan secara statistik antara keseluruhan keutamaan stail pembelajaran dan skor pencapaian bagi kedua-dua persekitaran pembelajaran, iaitu CBL dan FTF. Sebagai tambahan, kemahiran membaca mungkin menyebabkan hubungan yang signifikan dalam kedua-dua perbandingan secara berpasangan antara tahap kemahiran membaca (RP) pertengahan dan tahap tinggi dalam konteks CBL dan hanya merupakan salah satu dari pasangan pada tahap RP tinggi dalam konteks FTF. Walau bagaimanapun, tidak terdapat kesan moderasi bagi tahap RP disebabkan pelanggaran Kriteria Ratio Kritikal (CR > ± 1.96); oleh sebab itu, hubungan antara keutamaan stail pembelajaran dan skor pencapaian tidak dapat dimoderasi oleh sebarang tiga tahap RP dalam sebarang konteks pembelajaran. Dengan menggunakan prosedur statistik yang sama bagi strategi pembacaan metakognitif, didapati bahawa terdapat hubungan yang signifikan antara keseluruhan strategi pembacaan metakognitif

dalam kedua-dua konteks CBL dan FTF. Lebih spesifik lagi, kemahiran membaca mungkin mempengaruhi hubungan tersebut secara signifikan dalam kedua-dua perbandingan secara berpasangan bagi tahap RP pertengahan dan tinggi dalam kedua-dua konteks, iaitu CBL dan FTF. Namun begitu, tahap RP pertengahan dan tinggi dalam konteks CBL dan tahap RP tinggi dalam konteks FTF mungkin mempunyai kesan moderator terhadap hubungan antara keseluruhan kesedaran strategi pembacaan metakognitif dan skor pencapaian.

Hasil kajian semasa ini menunjukkan bahawa pengenalan bagi penggunaan komputer dalam kelas tradisional di Iran adalah penting. Kajian ini juga memperlihatkan bahawa amalan bilik kelas diharapkan dapat mengakomodasi keutamaan stail pembelajaran pelajar dalam kedua-dua konteks. Tambahan pula, kajian ini juga menunjukkan bahawa amalan pedagogi harus diubah suai bagi membantu para pelajar menyesuaikan strategi pembacaan mereka dengan merancang, mengawal, dan menilai diri mereka secara berkesan dalam kedua-dua konteks.

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I certify that a Thesis Examination Committee has met on 10 September 2015 to conduct the final examination of Zahra Moharrer on her thesis entitled "Learning Styles, Reading Strategies and Achievement Among Iranian EFL Male High School Seniors in Computer-Based and Face-To-Face Learning Modes" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

3S3R	Survey-read, Speed-read, Study-read, Recall or Record, Review, and Reflect
AMOS	Analysis of Moment Structures
AVE	Average Variance Extract
CA	Cronbach Alpha
CALL	Computer Assisted Language Learning
CBI	Computer-Based Instruction
CBL	Computer-Based Learning
CBLs	Computer-Based Learners
CBT	Computer-Based Training
CD-ROM	Compact Disc of Read Only Memory
CFA	Confirmatory Factor Analysis
CITEd	Center for Implementing Technology in Education
CPM	Creative Personality Measurement
CR	Critical Ratios
CR	Composite Reliability
DE	Distance Education
DV	Dependent Variable
EAP	English for Academic Purposes
EFL	English as a Foreign Language
ELPT	English Language Proficiency Test
ESL	English as a Second Language
ESP	English for Special Purposes
FD	Field Dependent
FI	Field Independent
FCE	First Certificate in English
FESCDP	Fourth Economic, Social, and Cultural Development Plan
FTF	Face-To-Face
GPA	Grade Point Average
IBL	Instructional-Based Learning
IELTS	International English Language Testing System
IQ	Intelligence Quotient

IRBA	Internal Rating Based Approach	
ICT	Information and Communication Technology	
IT	Information Technology	
IV	Independent Variable	
L2	Second Language	
LLSs	Language Learning Strategies	
LP	Language Proficiency	
LS	Learning Style	
LSs	Learning Styles	
LSI	Learning Style Inventory	
MARSI	Metacognitive Awareness Reading Strategies	
MHME	Ministry of Health, Medicare, and Education	
MOE	Ministry of Education	
MRSs	Metacognitive Reading Strategies	
MSLQ	Motivated Strategies for Learning Questionnaire	
MSs	Metacognitive Strategies	
MARSI	Awareness of Reading Strategies Inventory	
MSQ	Metacognitive Strategy Questionnaire	
MSRT	Ministry of Science, Research, and Technology	
NCTI	National Center for Technology Innovation	
NEE	National Entrance Exam	
NEMT	National English Matriculation Test	
NASSP	National Association of Secondary School Principals	
OK4R	Overview, Key-points, Read, Recite, Reflect, and Review	
OSORS	Online Survey Of Reading Strategies	
PEPS	Productivity Environmental Preference Survey	
PERU	Preview, Enquire, Read, and Use	
PETS	Public English Test System	
PQRST	Preview, Question, Read, Select or Scan, and Test	
PUN	Payam-e Noor University	
R2	R Square	
REDEC	Rasa Electronic Distance Education Center	
RP	Reading Proficiency	
RS	Reading Strategy	

RSs	Reading Strategies
SAMT	Saazeman-e Motalete-e Tadvin-e-kotob olum-e-ensani-e daneshgahha (the Organization for Research and Composing University Textbooks in Humanities)
SCME	Supreme Council of Ministry of Education
SCORM	Sharable Content Object Reference Model
SCOs	Sharable Course Objects
SILL	Strategy Inventory for Language Learning
SQ3R	Survey, Question, Read, Recall, and Review
SRSs	Supportive Reading Strategies
SAS	Statistical Analysis System
SASs	Summative Assessment Scores
SEM	Structural Equation Modeling
SILL	Strategy Inventory for Language Learning
SORS	Survey Of Reading Strategies
SPSS	Statistical Package for Social Science
TEFL	Teaching English as a Foreign Language
TOEFL	Test Of English as a Foreign Language
TEM	Test for English Majors
TTS	Text-To-Speech
UKM	Universiti Kebangsaan Malaysia
UTM	Universiti Technology Malaysia
X*X'	An Independent Variable Interacted by a Moderator Variable
VIF	Variance Inflation Factor
VL	Virtual Learning
WBL	Web-Based Learning
WBT	Web-Based Training

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

The infusion of technology into teaching and learning environments has forced policy makers, material designers, and instructors to reconsider their focus of attention to new educational paradigms and to apply computer-based technologies and digital media in conventional Face-To-Face (FTF) classrooms. Furthermore, the integration of Information Technology (IT) with education has changed the traditional meaning of literacy, as the ability to read and write, to a competency required in educational settings and workplace as basic skills (Murray & McPherson, 2006, p. 132). Moreover, societal changes and the requirements of living in a new digital world have widely increased people's awareness of teaching and learning via Distance Education (DE). To keep pace with the international growth of the English language in all walks of life, numerous schools and institutions of language for learners have also extensively offered English courses through distance education and other online websites throughout the world.

The first involvement of technology in education took place via computer-aided instruction which could deliver content based on a single style without considering the variety of students' learning styles (Selwyn, 2011). However, the development of electronic learning environments has presently sustained numerous types of learning styles (LSs) using various computer-based facilities such as texts, graphs, audio, or full motion videos in real time and/or off-line or e-mailing interaction with content and people (Lee & Pansy Amirthamalar Kandiah, 2000, p. 255). In fact, through the use of multimedia (different media), machines, and networking, learning by computers has almost become as real and natural as FTF settings. These teaching and learning channels of delivery can provide electronic facilities through electronic educational technology or electronic learning (e-learning) by the use of various programs. These different terminologies which are used by researchers in various studies possess more or less similar nature. However, they might highlight a particular issue, for instance, one might mainly emphasize teaching. As this study is focused on learning and not teaching, the term technology-based and/or computer-based learning (CBL) are employed. Some of electronic environments are presented in the following chart in Figure 1.1.

Digital Media

Media Encoded in Machine-readable Formats

Web-based Learning

Virtual Learning

Various Online Environments

Educational Technology

Computer-based Training

Computer Assisted Language Learning

Distance Online Learning

Computer-based Learning
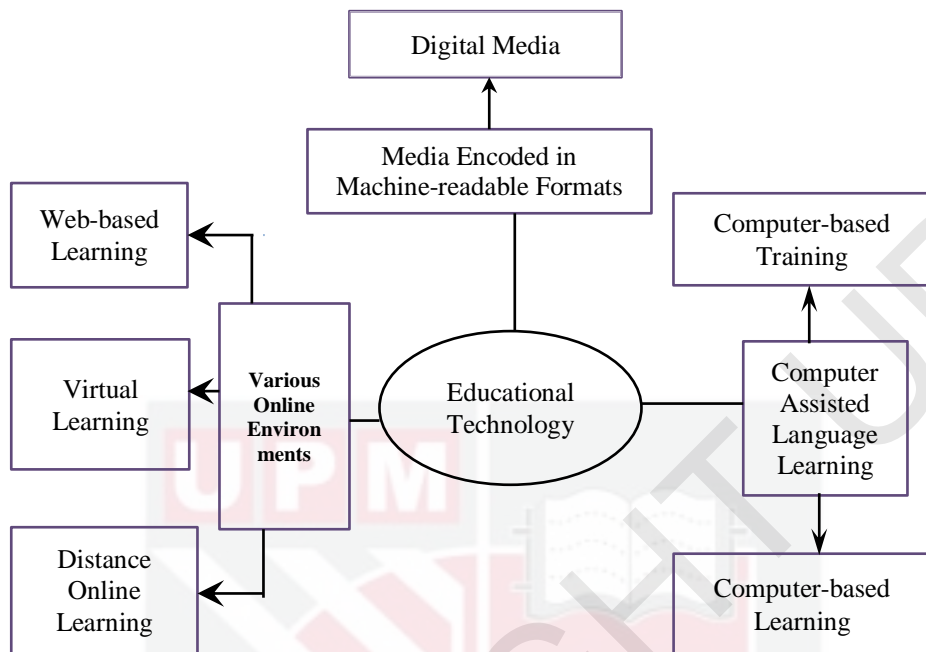
Figure 1.1 Educational Technology Reference-Based

Learning materials have often been transmitted to users through the Internet, intranet, extranet, satellite TV, audio or video tape, and CD-ROMs with multimedia capabilities (Devajit Mahanta & Majidul Ahmad, 2012, p. 46).

There are undoubtedly, benefits to be gained from learning opportunities wherever technology is accessible and whenever the learner feels that it is more convenient to voluntarily go through the learning materials provided that different learners' preferences and expectations are taken into account. Nonetheless, learning at a distance necessitates that learners possess appropriate capabilities so as to be able to independently take charge of their learning process. In this, White (2003, pp. 7-8) believes that technology per se cannot be the mere central factor in technology-based learning. In other words, there are a number of factors which call for further attention (such as learners' characteristics, motivation, LSs and LLSs, instructors' feedback, accessibility to learning materials, interactivity, and instructors' and learners' new roles). She also underlines that the process in distance language learning has barely been taken into consideration. Identifying LSs of language learners can lead to discovering various implications for curriculum designers, educators, and teachers (Reid, 1987, p. 88). However, Oxford (1990) indicates that "learning styles and personality traits are difficult to change" (p. 12) LSs are internal skills and often used subconsciously by students (Reid, 1998, p. ix) whereas language learning strategies (LLSs) can compensate for the lack of appropriate LSs because they are "easier to teach and modify" (Oxford, 1990, p. 12).More research on LSs and LLSs and their relationships are proposed by Willing (1988, p. 177) and Oxford (1989a, p. 241).

As the use of technology in education has been pervasively welcomed by a huge number of educational centers, a challenging issue is how to detect LS preferences in

the new instructional formats and the learning strategies employed by them to cope with the problems encountered due to the lack of conformity between their LSs and teaching styles in technology-based contexts. In the Iranian education system, the use of computers and technology for teaching and learning purposes is at the early stages of development. Computer-based learning is one of the promising means of using technology at Iranian high schools. However, instead of evaluating the efficiency of systems or programs, this study aims to explore the influence of the English instructional formats on the seniors' learning capabilities in the two learning modes of FTF and CBL. As such, four dimensions namely concrete, analytical, communicative, and authority-oriented LSs and three dimensions namely problem-solving, global, and support metacognitive reading strategies were investigated. Also, the two groups achievement scores obtained from the final exam held at the end of academic year are compared. It is important to find whether the CBL students can handle their language learning process independently in the absence of the teacher. Finally, the possible moderation effect of the three levels of reading proficiency (RP) on the relationships between the overall LSs and achievement scores obtained from the English lessons and the overall reading strategies and achievement scores obtained from the English lesson are explored in this study. Moderation analysis which in many cases refers to as Multigroup Path Analysis is a statistical technique which enables the simultaneous comparisons of multiple models, each with different sub-groups, to understand whether the relationship between an exogenous and endogenous variable is affected by the systematic influence of other variables of interest (Hair , Hult, Ringle, , & Sarstedt, 2013). These variables that influence the relationship between an exogenous and endogenous variables are called moderating variables (Ho, 2006).

The advantage of the study is to compare and contrast all the above mentioned variables and factors with the traditional FTF contexts. Therefore, the goals of this study are to determine the Iranian EFL male high school seniors' LSs, metacognitive reading strategies awareness, and their relationship with their achievement scores while three levels of RP are used in the moderation test across two instructional formats of CBL and FTF. The present study findings can fill the gap of related literature on learners who study within a technology-based context. Chapelle (2003) and Talebinezhad and Azizi Abarghoui (2013) stated that there are three classifications for Computer Assisted Language Learning (CALL) research including focusing on software design, the learning task or pedagogy, and finally the pupils.

However, in accessible database, there has been a dearth of research on students' LSs and LLSs or the moderation effects of RP on the relationships between independent and dependent variables in computer-based contexts or a comparison of technology-based with non-technology-based contexts (that is, FTF) to obtain deeper insight from students' learning process in two different learning modes. In Iran, the emphasis has mainly been paid on the effectiveness of systems and their development without considering the role of students seriously (Tabatabaie, 2010; Doulatabadi & Dillon, 2009; Sarlak & Aliahmadi, 2008; Shaikhi Fini, 2008; Yaghoubi, Malek Mohammadi, Iravani, Attaran, & Gheidi, 2008; Sarlak & Jafari, 2006; Gharehbakloo, 2005; Montazer & Bahreininejad, 2004).

3

1.2   Statement of the Problem

Although a body of research has discussed the effectiveness of using computer-based technologies for language teaching and learning in conventional FTF classrooms (Shahamat & Riazi, 2009, p. 73), there are some educational settings in which teachers and learners do not recognize the importance of using technology and computers in language learning, or they take the need for computer literacy for granted (Murray, 2007, p.758).

In the context of this study, Iran, technology-based learning has been started with the launch of some online courses in some virtual universities since 2001. A national project for Ministry of Science, Research, and Technology (MSRT) conducted by Rabiee (2003, p. 2) highlighted the importance of employing virtual learning to provide affordable distance education which has attracted an increasing number of learners. In the Fourth Economic, Social, and Cultural Development Plan proposed by the Iranian Ministry of Education (MOE) (2005), new policies with a similar trend have been carried out on school students. In the Fourth Plan of Development, high school senior students (previously called pre-university students) of a few high schools have also been involved in electronic education contexts using technology via computers. However, some political, social, environmental, economic, and educational problems in the country had led to constraints on such contexts, some of which were low Internet speed with inappropriate bandwidth, lack of access to authentic materials, unavailability of native speakers in Iranian teaching and learning contexts, and filtration of some online sites by the country. These came about as the direct result of sanctions imposed by other countries on Iran. To elevate students' capabilities with the requirements of the new learning context, that is, the use of using technology, it is essential to increase students' readiness to cope with the new educational policies which, in turn, calls for more research and investigation.

Therefore, it is appropriate to investigate the application of interactive multimedia CD-ROMs in Iranian secondary schools since this is the actual state of affairs with regard to CBL context in the country. The Iranian MOE has equipped some high schools with technological facilities for computer-based instruction and/or computer-based learning to explore to what extent this non-traditional context might influence learning outcomes. This has encouraged the researcher of this study to investigate the influence of using technology in high schools while at the same time, take into account learner factors. A review of literature on distance education and e-learning in Iran reveals that most research was carried out at the tertiary level of education (Tabatabaie, 2010; Sarlak & Aliahmadi, 2008; Sarlak & Jafari, 2006; Gharehbakloo, 2005). Moreover, these studies revealed that no enough attention has been paid to the learners themselves. In other words, students' characteristics, expectations and requirements, LSs and LLSs, and effective solutions for students' self-assessment to adjust themselves to technology-based contexts have not been seriously taken into consideration. This might be due to various reasons such as the lack of a reasonably long history behind online learning in Iran as it is still at the infancy stages of development (Yaghoubi, *et al.*, 2008, p. 90); critical problems in systems and the Internet, as emphasized in the same study by Dilmaghani (2003) and Noori (2003); and the importance of other aspects of learning conditions like teaching methodology of distance learning, the framework in educational system, educational policies, distance learning management, and curricula in the context of study (Tabatabaie, 2010; Sarlak & Aliahmadi, 2008; Sarlak & Jafari, 2006; Gharehbakloo, 2005). It is noteworthy to

mention that even if some studies highlighted learners' integration with technological contexts, they explored learners and/or teachers' perceptions and attitudes or their satisfaction with the e-contexts for further evaluation of systems but not benefits to users or learners (Doulatabadi & Dillon, 2009; Shaikhi Fini, 2008; Ebrahimzadeh, 2007; Fortootan, 2004).

Thus, it is crucial to seek ways of effective learning which can positively influence the learners' academic outcomes and achievement. LSs and LLSs are influential factors that assist educators to detect how well learners acquire an L2 language (either a second language or a foreign language) (Oxford, 2003, p. 1). Although a great number of studies have investigated LSs in different countries in both the traditional and/or online contexts (for example, Tabatabaei & Mashayekhi, 2013; Alkhatnai, 2011; Jilardi Damavandi, Rahil Mahyuddin, Elias, Shafee Mohd Daud, & Shabani, 2011; Evans, 2009; Liu, 2007; Shen, Chung, Challis, & Cheung, 2007; Zhang, 2005; Wright, 2003; Rivera & Rice, 2002; Manochehri, 2001) or explored the relationship or influence of LSs on learners' achievement and outcomes (Chen & Chiou, 2012; Mohamad Jafre Zainol Abidin, Rezaee, Helan Nor Abdullah, & Kiranjit Kaur Blbir Singh, 2011; Zacharis, 2010), there is still a gap in the literature regarding the variables employed in this study.

Despite the abundant studies that compare the influence of technology-based and traditional FTF settings on students' learning outcomes or achievement, the findings of such studies have not been consistent with each other (Chen & Chiou, 2012, p. 1). For instance, Zhang (2005) indicated that the online learners achieved higher achievement and better performance than learners in a traditional classroom. Manochehri's (2001) study also emphasized the positive effect of online learning on developing appropriate LSs and obtaining higher academic achievement. In another study, Jilardi Damavandi, *et al*. (2011) showed that there were significant differences between different types of LSs and the students' academic achievement. On the other hand, other studies showed that there was no relationship and/or significant relationship between LSs and students' performance either in online or traditional classrooms (Alkhatnai, 2011; Evans, 2009; Liu, 2007; Shen *et al*., 2007; Roberts, 2003; Wright, 2003). In contrast, Zacharis (2010) showed that the traditionally instructed students obtained higher achievement than online learners and their LSs had no relation to either the students' achievement or the modes of instruction. Therefore, due to dearth of related research in the Iranian literature and elsewhere on LS preferences and the relationship between them and achievement scores in a technology-based context and to compare the findings with traditional FTF classrooms, particularly at the secondary school level, has motivated the researcher to conduct this study. The findings would also inform cognitive psychologists and educators alike in terms of the LS preferences that might be more influential on students' achievement in different learning contexts. The findings would also fill the gap in the related literature, that is, the lack of studies that consider the moderation effect of the three levels of reading proficiency on the relationship between the overall LS preferences and achievement scores of students in both the CBL and FTF contexts.

To assist learners to better control their learning process and to compensate for the mismatch of LSs with the instructional styles or educational context properties, the teaching and using proper learning strategies has been proposed (Jackson, Helms, Jackson, & Gum, 2011; Kanninen, 2008; Zapalska & Dabb, 2002). In language learning, among the various LLSs, metacognitive strategies are more likely to draw the

attention of researchers as having great impact on learning (Wang, Spencer, & Xing, 2009; Tseng, Dörnyei, & Schmitt, 2006; Rasekh & Ranjbary, 2003; Hsiao & Oxford, 2002). The necessity to learn more about metacognitive strategies was stressed by Oxford (1990, p. 137). O'Malley and Chamot (1990) and White (1995) point out that the mode of study affects the metacognitive dimensions of strategy even more than age or the level of study. Hence, it seems crucial to discover to what extent the awareness of metacognitive strategies of learners who study in these two instructional modes might differ. Increasing learners' awareness of the most appropriate reading strategies, especially metacognitive reading strategies, can effectively influence reading abilities (Vianty, 2007; Anderson, 2003; Sheorey & Mokhtari, 2001; Oxford, 1990). As such, readers become more motivated and the concrete impetus can be observed in the learners' improved proficiency or achievement scores in overall or specific skill areas (Nunan, 1994; Oxford, 1994; Oxford, Park-Oh, Ito, & Sumrall, 1993; Thompson & Rubin, 1993).

An abundance of research has found a link between the development of reading ability and reading comprehension scores and the use of Computer Assisted Instruction programs (Jones, Staats, Bowling, Bickel, Cunningham, & Cadle, 2005; Traynor, 2003; Mann, Shakeshaft, Becker, & Koftkamp, 1999). These researchers used pre- and post-tests and standardized tests and showed a growth in comprehension scores in the post-tests. Anderson (2003) also found that there was no difference in the overall online reading strategies between ESL and EFL students. Other studies investigated the types of reading strategies such as metacognitive, cognitive, and support reading strategies (Naseri & Zaferanieh, 2012; Anderson, 2003; Mokhtari & Sheorey (2002). However, there is a gap in the literature on enough research to probe metacognitive reading strategy awareness of high school students. Few studies have been carried out on the possible differences and/or similarities of these reading strategies in the technology-based and traditional instructional formats. In addition, there is a lack of research that has explored the relationship between the overall metacognitive reading strategies and achievement scores or the mediation effect of the three levels of reading proficiency among Iranian students in technology-based and FTF contexts.

Less literature found in the available database to provide some suggestions on how developing countries like Iran which cannot afford advanced online contexts can still use technology in schools. Based on this scenario, there is a need to compare the Iranian male high school seniors in the CBL and FTF groups on their preferences of LSs and the awareness of metacognitive reading strategies as well as the relationship between these two variables and their English course achievement scores while maintaining reading proficiency as a moderator variable. This investigation handles by using Multigroup Path Analysis using the AMOS software which, in turn, is another gap in the literature as no studies could find to use this statistical method of analysis. Therefore, the study contribution has mostly been associated with adding to the literature in the related areas of the Iranian context, especially in technology-based contexts, and also shedding light on some points in the related literature globally.

1.3   Objectives of the Study

The purpose of this study is to compare the Iranian EFL high school male seniors in the two instructional formats of CBL and FTF using a number of variables such as LS preferences and the awareness of metacognitive RSs, and their relation with the English

lesson achievement scores. The moderation effect of three levels of reading proficiency may also affect the magnitude of these relationships. It is critical to discover to what extent the CBL students' LSs or metacognitive RS awareness may be different from those of their FTF counterparts. It can be a response to the new trend of the Iranian MOE as they decide to employ computers and technology in the secondary school level. The current study is exclusively making an attempt to pursue the following objectives:

x   To identify the Iranian EFL high school male seniors' preferences of the four LS dimensions in the two instructional formats, that is, CBL and FTF contexts;

x   To explore the Iranian EFL high school male seniors' choices and frequency of strategy use across the three dimensions of metacognitive reading strategies in the two instructional formats, that is, CBL and FTF contexts;

x   To examine the differences in the achievement scores obtained by the Iranian EFL high school male seniors in the two instructional formats, that is, CBL and FTF contexts; and

x   To compare the differences of prediction between the overall LS preferences and metacognitive RSs and achievement scores obtained by the Iranian EFL high school male seniors after inclusion of three RP levels as a moderator variable in the two instructional formats of CBL and FTF.

1.4   Research Questions

The following research questions are addressed in this study:

1.   To what extent do the Iranian EFL high school male seniors differ in their preferences of the four learning style dimensions in the two instructional formats, that is, the CBL and FTF contexts?

2.   What are the Iranian EFL high school male seniors' choices and frequencies of strategy use across the three dimensions of metacognitive reading strategies in the two instructional formats, that is, the CBL and FTF contexts?

3.   What are the differences in the achievement scores obtained by the Iranian EFL high school male seniors in the two instructional formats, that is, the CBL and FTF contexts?

4.   How differently can the overall learning style preferences and metacognitive reading strategies predict achievement scores obtained by the Iranian EFL high school male seniors after the inclusion of three RP levels as moderator variables in the two instructional formats of CBL and FTF?

1.5   Rasa Electronic Distance Education Center

The Rasa Electronic Distance Education Center offers two types of programs: computer-based training and computer-based learning. In the CBT context, students are exposed to a mixed delivery channel which can be a complement to pure FTF

classrooms. The students are provided with the CD-ROMs and printed format of materials. This mode of delivery helps learners not only to be familiar with computer-based teaching and learning, they also have access to the teacher in FTF classrooms as the immediate supporter to receive feedback on their problems, discuss with peer groups, and develop a sense of belonging to a community of participants. This is a type of blended teaching and learning context (White, 2003, p. 31). The CBT program is offered for the Grades 9, 10, and 11 at the Center.

After evaluating the technological facilities, due to the nature of this study, the CBL program seems more appropriate. The most important reason for selecting the senior level at the Rasa Center is the mode of delivery, that is, the computer-based learning mode which is a self-study program without the guidance of the tutor or instructor. The senior students are provided with the interactive multimedia CD-ROMs software program. Therefore, the CBL context is purposively chosen to fulfill the objectives of this study that can be compared with the FTF contexts. The two contexts have totally different instructional formats; one without any immediate accesses to the teacher or peer group classmates' interaction while the other has access to FTF help and instruction.

The Rasa Center commenced its distance education program at the high school senior level in 2008. However, at the high school senior level, it is a challenge for senior students to cope with the problems of an unfamiliar teaching and learning context. This level is the watershed between total FTF contexts and potential total e-learning or virtual learning in institutions of higher education, if students intend to continue their studies. Thus, the CBL students are selected in this study. However, some online clips or extra materials can also be found on the school web-site at http://www.rasafars.com.

The senior level is a difficult and crucial level as students get ready to take part in the National Entrance Exam (NEE). It should be noted that the school also provides services for school leavers whose ages might be higher than 19 years who intend to obtain their diplomas. Thus, age is considered a control variable in the current study, that is, the electronic school sample is selected from those students whose ages are between 17 and 19 years to create a homogeneous condition with the FTF students whose ages are also in this range. Both the CBL or FTF seniors have to pass a total of 14 courses of two credits each within two semesters. In other words, in each semester, students are required to pass 14 credits, including general, basic foundation, and specialized courses, English is considered a general course which is a two-credit course in each semester, or offers an overall of four credits at the senior level.

The entry requirements for the Centre are the same as the ordinary FTF schools. Similar to most FTF schools, the Rasa Center offers the four school disciplines: Math, Experimental Sciences, Humanities, and Arts. The school may be a favorite of many students because of its novelty, flexibility of time and place, no age limitation, possibility of getting a diploma while not attending on-campus classes, being enrolled as a student from other towns, and the self-paced instructional system in which the learner controls his learning speed. Moreover, as some of its students are school leavers, they might be busy with their personal lives, and therefore, cannot obtain a diploma after attending conventional instructional-based classes due to shortage of time.

1.6   Theoretical Framework of the Study

A research on language learning in a technology-based context is a multidisciplinary effort. It necessitates the involvement of researchers from different disciplines such as psychology, linguistics, education, and instructional designers to dedicate their own roles and share their knowledge (Peggy & Timothy, 2013; Selwyn 2011; Eisenberg, 2008; Peramela Krish N. Krishnasamy, 2005; Bates & Pool, 2003). In all previous language learning methods, from the grammar-translation method to communicative approach, attention has focused on how teachers teach but not how learners learn. In fact, despite the large body of research, textbook materials are far from teaching learning strategies (Griffiths, 2004, p. 9). Due to inability of previous theories to explain the role of a learner in learning processes, new inclinations target cognitivist perspectives to understand how humans learn.

The theory of cognitive psychology focuses not only on the processing of information to acquire and comprehend the surrounding world using mental operations, it also applies these mental operations to construct, reorganize, and utilize the new knowledge using particular strategies (Grob & Wolff, 2001, p. 236). In fact, L2 learning theories and cognitive psychology are integrated in mental processes and cognitive theories. As such, it is possible to explain what strategies are and how they can affect learning (O'Malley & Chamot, 1995; Mayer, 1988; Rabinowitz & Chi, 1987; Garner, 1988). Language learning strategy theory highlights the different strategies that students use in learning contexts. To underline the perspective that individuals are considered active and conscious in their own learning process, language learning is seen as a cognitive process (Griffiths, 2004; McLaughlin, 1978).

Furthermore, learners can construct their knowledge on the basis of their personal knowledge which varies from learner to learner since an individual learner's experiences, interests, expectations, and needs are different from other learners (Hannafin; Hill; Song; & West, 2007, p. 124; Grob & Wolff, 2001, p. 237). Modern concerns about language learning emphasizes the role of learners in the teaching and learning contexts as the contributors in learning. In this regard, a body of research has shown that language learners are responsible for their own language learning process to the extent that they achieve independence and autonomy by using learning strategies (Griffiths, 2004; Green & Oxford, 1995; Bialystok, 1991; Cohen, 1991; Wenden, 1991; O'Malley & Chamot, 1990; Oxford, 1990). In the case of reading, the important points which lead learners to combining effective strategies to comprehend the main idea of a text are: for teachers, to develop learners' metacognitive awareness; and for learners, to increase a repertoire of effective reading skills and strategies which can help them to be good strategic readers (Grabe, 2009, p. 207). These three elements, that is, skills, strategies, and meatcognitive awareness are extensively discussed (Grabe, 2009; Hudson, 2007; Baker, 2002).

Due to the focus of the current study on investigating the Iranian EFL high school male seniors' LSs preferences and metacognitive reading strategies in two modes of instruction, that is, Computer-based Learning and Face-To-Face, the research theoretical framework is culled from Keefe's (1979) framework of LSs which can support Willing's (1988) model of LS preferences. This means cognitive psychology provides more evidence on the importance of strategies and metacognition in reading and schema theory.

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According to Keefe (1979, p. 4; 1985), "learning styles are characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment". Keefe posits that the three dimensions of LSs are cognitive styles, affective styles, and physiological styles. Cognitive styles define as "information processing habits representing the learner's typical mode of perceiving, thinking, problem solving, and remembering" (Keefe, 1979, p. 8). Cognitive styles are not value laden and are involved in the process of cognition and answer how information is being processed. The second dimension of the framework deals with affective styles involving attention, emotion, and valuing. Keefe (1979) mentions affective LSs are similar to "motivational processes viewed as the learner's typical mode of arousing, directing, and sustaining behavior" (p. 11). Finally, the third dimension refers to physiological styles as "biologically-based modes of response that are founded on sex related differences, personal nutrition and health, and accustomed reaction to the physical environment" (Keefe, 1979, p. 15). (See Section 2.4.4).

The prior knowledge is in the form of clusters called schema. Schemata are called the "building blocks of cognition" and "the fundamental elements upon which all information processing depends" (Shanker, 1997, p. 51). As people have different experiences, their schemata are undoubtedly varied. For instance, non-native speakers of English possess different schemata from those of English native speakers, and therefore, the non-native might encounter difficulties in understanding and processing the English language (Tan, 2004). Furthermore, language proficiency (LP) of second/foreign language learners has an important role in activating the prior knowledge and integrating the linguistic input in the process of comprehension (Carrell, 1987).

1.7 Conceptual Framework

This study compared preferences of LSs and awareness of metacognitive RSs among Iranian EFL high school male seniors in two learning modes of technology-based and non-technology-based contexts. To this end, the researcher administered Willing's (1988) model of LSs to measure concrete, analytical, communicative, and authority-oriented LSs. For the next step, Anderson's (2003) Online Survey Of Reading Strategies (OSORS) questionnaire was employed. This questionnaire measures global, problem-solving, and support RSs. To address the objectives of the study, it was also necessary to measure the English course achievement scores of the CBL and FTF students. The relationship between the two above mentioned variables and achievement scores were examined while the three levels of RP were as moderator variables. The study intended to find whether RP could moderate the relationship between LSs and achievement scores and metacognitive RSs and achievement scores.

Moreover, the study employed Keefe's (1978) Framework, cognitive psychology theory, and schema theory (Carrell, 1983) to provide theoretical support for the variables and the relationships among them. Based on the research questions and objectives of this study, the conceptual framework of the present study is illustrated in Figure 2.1.
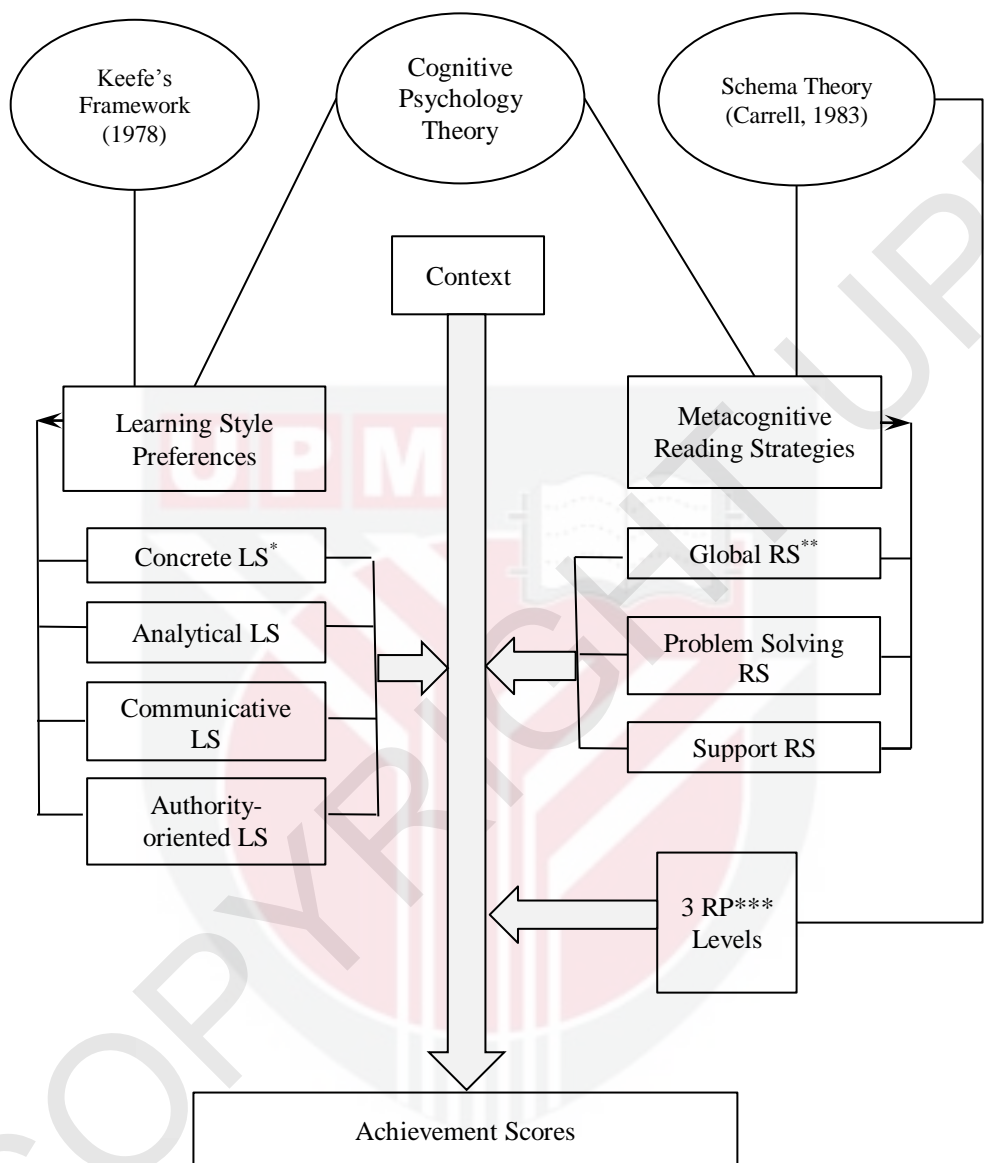
Figure 1.2. Conceptual Framework

*Learning Styles
**Reading Strategies
***Reading Proficiency

1.8   Significance of the Study

In the Fourth Economic, Social, and Cultural Development Plan (FESCDP) of Ministry of Education of the Islamic Republic of Iran, the government has taken steps in knowledge-based development with respect to knowledge, technology, and skills. Within the Fourth Plan of Development, Article 43-Section A, the focus is on "revising and reformulating research, technological, and educational policies and strategies in order to enhance accountability of the scientific research and education centers of the country to social, cultural, and industrial demands and working in an increasingly competitive milieu of the global arena" (Ministry of Education, 2005, p. 80). In the Fourth Plan of Development, a 20-year strategy (from 2005 to 2025), new educational views on the development of all aspects of the country was proposed. This included implementing computers and technology in the county's various information environments as well as education system, supervised by MSRT, Ministry of Health, Medicare, and Education (MHME), and MOE which is committed to "take necessary initiatives towards reforming the country's educational system and …creating the spirit of independent learning …among the young generation" (Ministry of Education, 2005, p. 85). Moreover, under Article 50-Section B of the Fourth Plan of Development, different methods of providing education, in particular higher education such as evening courses, second turn, remote (semi-attendance), virtual education, and joint programs with credible foreign universities, have been emphasized (Ministry of Education, 2005, p. 87).

Keeping this in the mind, as e-learning in Iran is still in its developmental stages, the researcher believes that it is highly essential to know what types of LSs and metacognitive reading strategies are prevalent among students, how CBL students might either perform similarly or differently from their FTF counterparts, what the relationship is between the students' LS preferences and their achievement while RP is a moderator variable, and what the relationship is between the students' metacognitive RS awareness and their achievement while reading proficiency is a moderator variable.

To this end, the present study includes some advantages and significances to be addressed as follows:

a. The nature of this study makes it critical to be conducted in the Iranian context to investigate whether it is closely in line with the goals of Ministry of Education of the Islamic Republic of Iran. In Article 52, Section K, the use of Information Technology (IT) in "curriculum development and execution of educational programs at all levels, and equipping the country's school systems with compute facilities and information networking" (Ministry of Education, 2005, p. 93) is emphasized. Therefore, the findings of this study can partially fulfill the needs and requirements of dealing with the sensitive issue of using computers in Iranian schools.

b. Moreover, higher education institutions have mostly been the focus of research attention. Research on Iranian tertiary levels is extensively related to technology use, learners' and teachers' satisfaction, or effectiveness of systems. The importance of this study is to fill the gap in research on secondary-level education and to investigate the reading strategies of high school seniors while they are naturally involving in reading the school content of the English course for which they enrolled. This is because research has

showed that the contexts of teaching and learning environments may strongly affect the learners' choice of strategy use (Zhang & Wu, 2009; Zhang, 2008; Chamot, 2005; Cohen, 1998). Thus, the present study can cast light on the possible differences between high school seniors in the CBL and FTF contexts.

c. Another advantage of this study is its comparative nature. Using comparison, the preferences of LSs and awareness of metacognitive RSs of the two different instructional formats, that is, traditional Face-To-Face and Computer-Based Learning are investigated. The preferences of LSs and metacognitive RSs used by the CBL students who undergo the technology-based content of the English course using the interactive multimedia CD-ROM program might be different from those who use paper-based textbooks in the FTF contexts. Therefore, the present study appears to be quite promising for presenting more implications on how technology-based contexts accommodate the needs of learners who are used to studying in FTF contexts. To them the teacher is the only authority and source of knowledge in the traditional classrooms where they are the recipients of the prescribed materials delivered by the teacher. The findings of this study might cast light on the path for English teachers how to choose more effective teaching styles or to develop more efficient RSs.

d. As stated above, most of the Iranian studies addressed technology rather than learners. In countries which are undergoing technological development, before huge amounts of money are spent on the education system, it is important to firstly acknowledge what type of systems might be workable in a particular context. However, it is important to keep in mind that learners are about to utilize that system. Without considering how learners learn or what their LSs are, the result of designing an applicable system will likely be failure (Chapelle, 2008; Cooze & Barbour, 2005). This study is valuable in the Iran and similar contexts worldwide because it pinpoints learners at the high school level and it pays attention to the learners' minds while they are exposed to technological and non-technological educational environments. This study does not underline the design and effectiveness, or the learners' satisfaction of content and materials, or the instructors' competency, as they are prevalent issues in research work in Iran (Rahimi & Yadollahi, 2011; Doulatabadi & Dillon, 2009; Yaghoubi *et al.*, 2008). In the Iranian technology-based and distance education (DE) contexts, there are, undoubtedly, a handful of studies which concentrated on learners, such as Iranian university applicants' attitudes towards distance education in Payam-e Noor (a form of correspondence education) (Zahed-Babelan, Ghaderi, & Moenikia, 2011); LSs via DE through Payam-e Noor (Moenikia & Zahed-Babelan, 2010), motivational and learning strategies of EFL learners in a three-month e-learning program (Bagheri, Yamini, & Riazi, 2009); online and offline reading strategies (Motallebzadeh & Ghaemi, 2009); the extent of using educational technology by teachers and learners in the high schools and private institutes (Shahamat & Riazi, 2009); and professors and students' attitudes towards virtual learning (Shaikhi Fini, 2008). In fact, it can be concluded that what makes the nature of the present study different from the above mentioned research works is the extent of consideration given to LSs and metacognitive RSs and their relation to English course achievement scores. The CBL seniors are also in a natural

context of teaching and learning within an academic year. Moreover, the comparative feature of the FTF and CBL, casts light on the similarities and differences of high school seniors in the variables selected.

e. As far as the study is concerned, a consideration of the learners' cognitive, affective, and physiological behaviors according to Willing's (1988) model of LSs may yield alternative formats for technological instructional designs to fulfill learner's needs, facilitate learning, and motivate learners to pursue their future careers more independently. Therefore, the beneficial aspects of the present study are that firstly, it is conducted in a CBL context; and secondly, it focuses on learners employing Willing's (1988) LS model. Many studies used this model in traditional contexts; however, as shown by Thang's (2003) study, it was administered to the distance L2 language learning context and on-campus university students in Malaysia. To the knowledge of the researcher, the model has rarely been applied in a technology-based environment of an EFL context such as Iran.

f. An important significance of the present study is the chosen sample of high school seniors. In Iran, high school seniors are under great pressure to read widely on content in order to be ready for the National Entrance Exam. Most research in the local Iranian literature emphasizes tertiary education. Hence, according to the available database, the researcher cannot find a study in the Iranian literature that involves high school senior level which employs a technology-based program and compares it with the conventional FTF environments in which two important variables of LSs and strategies are investigated. The findings can even be beneficial to the whole body of literature, especially to curriculum planners for whom LSs and LLSs might be more suitable.

g. The use of AMOS to carry out Confirmatory Factor Analysis (CFA), as a part of Structural Equation Modeling (SEM), to create higher reliable instruments and to measure the construct validity of the questionnaires applied provides a sound background and foundation in the administration of these two questionnaires to an EFL context with two modes of instructions. This can add to the pool of literature in using more effective selection of reading strategies and accommodating learners' LSs.

h. The findings obtained by using AMOS to determine the three levels of reading proficiency might have an interaction effect as a moderator variable on the relationship between LS preferences and achievement scores, and on the relationship between metacognitive RSs and achievement scores. This would provide valuable implications and suggestions to the existing body of literature in teaching and learning English language in different contexts.

1.9   Definition of the Key Terms

In the scope of the present study, the key terms and their definitions are as follows:

1.9.1   Iranian EFL High School Seniors

In this study, the EFL students refer to those students learning English in a foreign context. They are, moreover, high school seniors (previously called Pre-university students) aged 17-19, who are preparing to take part in the NEE for admission to a university. Due to the nature of the context, that is, a Computer-Based Learning setting, there is a limitation in age since older school leavers might join the Rasa Electronic Distance Education Center. Since the CBL students are going to be compared with their counterparts in traditional FTF environments, it is necessary to take the age factor into account. Learning English through CBL undoubtedly creates dual difficulties. In addition, since the CBL context has only male students, the conventional context data are also collected from the male students of FTF high schools. Therefore, age and gender are control variables.

1.9.2   Learning Style Preferences

These preferential behaviors in absorbing, processing, and retaining new information and skills are considered as LSs (Riazi & Riasati, 2008; Reid, 1987). Decapua and Wintergerst (2005, p. 2) maintain that different factors such as heredity, educational background, age, requirements, and needs affect the way people comprehend and process information differently. Furthermore, LSs are defined by Keefe (1979, p. 4) as "characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment". Based on this definition of LSs, learners may prefer different ways of taking in information and be different learners such as concrete learners, analytical learners, communicative learners, and authority-oriented learners (Willing, 1988, pp. 156-162).

1.9.3   Language Learning Strategies

Learning strategies are considered a prerequisite for effective learning (for example, Magogwe & Oliver, 2007; Hsiao & Oxford, 2002, Cohen, 1998; Green & Oxford, 1995; O'Malley & Chamot, 1990; Oxford & Crookall, 1989). Oxford, (1992/1993) gives a more comprehensive definition:

[Language learning strategies are] specific actions, behaviors, steps, or techniques that students (often intentionally) use to improve their progress in developing L2 skills. These strategies can facilitate the internalization, storage, retrieval, or use of the new language. Strategies are tools for the self-directed involvement necessary for developing communicative ability (p. 18).

1.9.4   Reading Strategies

Reading is the primary source for getting different information. In some second language programs, the main aim is not 'learning to read' but 'reading to learn'. Reading strategies are considered techniques that not only let the reader interact with a text; they also help the reader to comprehend a text effectively. They are different from skills in that skills are unconscious information-processing techniques. In contrast,

strategies are deliberately chosen actions which intentionally help the reader to attain a goal. Strategies are 'skills under consideration' which can be later transformed to skills by efficient development and practice (Carrell, 1998, p. 2).

1.9.5 Reading Proficiency

There are different tests through which the knowledge and linguistic skills of learners are assessed. The two important tests of language proficiency are IELTS (International English Language Testing System) and TOEFL (Test of English as a Foreign Language). Farhady, Jafarpour, and Birjandi (2006, pp.25-26) point out that these tests evaluate the degree of knowledge that one might have due to language learning, the degree of ability in language components, and the degree of practicality in performing the knowledge of the language. Since the focus of this study is on reading strategies, the Reading Comprehension section with 50 questions and a time limitation of 50 minutes and the Structure and Written Expressions section with 40 questions and a time allocation of 25 minutes are selected from the TOEFL$^{©}$ (Philips, 2003) standardized test. The overall dedicated time is 80 minutes.

1.9.6 Achievement Scores

Achievement is characterized by measuring the student's overall performance on a test or the percentage of students who graduate from schools. In addition, it shows how many students obtain the school-matched language skills while learning English language academically during their attendance in schools (Zacarian, 2013, pp. 1-2). In other words, the English lesson achievement scores can be used to evaluate the extent to which students obtain knowledge and skills in an English course. It can be performed in the form of an achievement test at the end of a course or program such as an academic semester or a whole academic year (nine months). In fact, the results of this achievement test shows not only the success or failure of a student, it also indicates the amount of content, instructional styles, or educational contexts which have been efficacious or vice versa. The-end-of-the-course results would indicate whether the teaching and learning goals are fulfilled (Johnson & Jenkins, 2009).

There are a number of studies in which the relationship between the related variables and achievement were investigated, for instance, the relationship or effect of metacognitive reading strategies on achievement (Zhang & Seepho, 2013; Hanin Naziha Hasnor, Zaiton Ahmad, Norsidah Nordin, 2012; Motallebzadeh & Ghaemi, 2009) or the influence or relationship of LSs on achievement (Tabatabaei & Mashayekhi, 2013; Chen & Chiou, 2012; Zacharis, 2010).

1.9.7 Moderation Analysis

A moderator variable is used to answer questions of "when…an effect operates and establish[es] its boundary conditions or contingencies" (Hayes, 2012, p. 1). Moderation analysis refers to a Multigroup Path Analysis in which some variables called moderating variables which influence the relationship between an independent variable and a dependent variable (Ho, 2006). In other words, doing the comparison of multi-models simultaneously shows the relationship between an independent variable and a

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dependent variable is influenced by other variables of interest (Hair *et al*., 2013). In fact, this moderation effect is a sort of interaction effect.

1.9.8   Traditional Face-to-Face Learning

Traditional face-to-face learning is an instructional setting in which the focus is on the attendance of the learner in classrooms held on campus while listening to teachers' lectures, taking notes, looking at the black or white board written materials or some other means of instructional activities used by teachers. In the traditional classrooms of this study, students are mostly passive and receivers of information and teachers are the authoritarian characters, similar to an encyclopedia which is seen as a source of information. In some Asian countries such as Hong Kong, China as well as Iran at the time of data collection, students are mostly encouraged for their obedience, conformity, discipline, and diligence rather than for their independence (Evans, 1996). These students rely on a surface learning approach and they are not active even at the tertiary level (Chan, Spratt, & Humphreys, 2002, p. 2).

1.9.9   Computer-Based Learning

New developments in technology and computer science, integrated with social changes, have prompted educators to seek for newer and more effective paradigms for education and training. There is no doubt that conventional FTF students are not immediately ready to handle the complete control of their learning process if they are engaged in technology-based learning contexts. Thus, they require rich learning environments with more technological support and well-designed resources (Khan, 2005, p. 1). Khan further explains that the features of a well-designed e-learning program should be meaningfully integrated into an e-learning program to pave the way for achieving learning goals. Nevertheless, the effectiveness of a program relies on how well learning features are incorporate into the program design, feathers such as interactivity, authenticity, learner-control, convenience and ease of use, online support, and cost effectiveness (Khan, 2005, p. 10). However, using interactive multimedia CD-ROMs training tools can provide an appropriate context for using interactive multimedia CD-ROMs training tools can provide an appropriate context for using technology and computers among the high school male seniors. It requires these students to get involved in learning processes while the teacher is absent. Information technology can provide an electronic environment that is suitable for various types of interaction (Warschauer, 1998c). Constructivism can also be considered as a basis for the instructional design of systems (Lebow, 1993, p. 104).

1.9.10   Summary of the Chapter

In this chapter, the researcher described the intention of carrying out the present study and its importance, in particular, to the context of the study: Iran. By means of the background of the study, the problem and the existing gap in knowledge were investigated. The objectives and potential research questions were proposed. The theoretical and conceptual frameworks were also described. Further significance and contribution of this study were highlighted as well. In Chapter 2, the traditional FTF and technology-based contexts, LSs, metacognitive RSs, RP, and achievement scores

would be described in details. Further, the relevant theories would be reviewed. In addition, the related literature pertaining to the relationship between LS preferences and achievement scores, and also the relationship between awareness of metacognitive RSs and achievement scores would be presented.

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