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Biliteracy and skills transfer: Literacy skills transfer from Arabic to English focusing on lexical access

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BILITERACY AND SKILLS TRANSFER: LITERACY SKILLS TRANSFER FROM ARABIC TO ENGLISH FOCUSING ON LEXICAL ACCESS

by

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ABSTRACT

This research was designed to gain understanding of literacy skills transfer from a first language involving a particular writing system to a second language which uses another, divergent writing system. The author has worked in adult literacy in an area of the Sahara desert where the people's first language is Arabic and the majority of adults were illiterate. The present research utilized this setting to study literacy skills transfer from Arabic to English. Specific questions addressed in the research were: what skills transfer from L1 to L2, at what point should instruction in L2 begin, and can lexical access be used as a predictor of success in learning L2?

Thirty individuals who had only studied Arabic previously were recruited to participate in a one month research project in which English would be taught in a classroom setting. The English taught focused on literacy skills. An effort was made to find ten individuals who had from 0 to 3 years of Arabic education, ten who had studied 4 to 6 years of Arabic education and ten who had studied 7 to 9 years. After 3 ½ weeks of English literacy classes, the participants were tested on the English they had learned as well as their Arabic proficiency and lexical access skills. It was hypothesized that participants having a certain significant level of Arabic proficiency would have a noticeably easier time acquiring English literacy. The results of the study support this

hypothesis. Data obtained suggests the positive transfer of lexical access skills and that lexical access skills can be used to predict learning ability in L2.

This paper begins with a review of biliteracy and skills transfer highlighting the broad, multifaceted nature of the subject.

CHAPTER I

INTRODUCTION

Functioning in our world is becoming more and more dependent upon greater literacy skills. At the same time, technologies have enabled people who are frustrated with not having hope of an enjoyable life to affect the lives of multitudes as an outlet for their discouragement. Education must be available to all, enabling each individual in our world to have a reasonable opportunity of an enjoyable life. Language situations which hinder individuals' achievements need to be addressed and strategies implemented which enable these same individuals to excel. Not only because segments of society harboring great deals of frustration and unemployment can lead to crime and terrorism, but because the world needs to benefit from the maximizing of each individual's potential, strategies need to be functioning which allow no student to be excluded from reaching his or her goals and contribute to addressing of the challenges of our world. In order to implement the best educational strategies in a multilingual setting, there needs to be evidence as to what the best strategies are. The purpose of this thesis is to better understand this process of skills transfer in literacy and the optimal strategy to maximize learning potential for the individual. The research was designed and data gathered in an effort to add evidence to support the best practice for biliteracy situations.

The results of this study contribute evidence for the use of first language literacy education until skills are developed which then transfer to the learning of other languages.

Chapter II, Background, presents information necessary for a broad understanding of the complex subject of biliteracy and skills transfer beginning with the subject of *Literacy in a Multilingual Setting.* Evidence for the benefits of literacy instruction in the mother tongue is presented as well as theories supporting this practice, both cognitive theories and educational theories. Classroom-based practices and home-based practices for literacy in multilingual settings are presented. Some of the societal influences on policy making are exemplified through case studies. By highlighting the multifaceted nature of this subject it is hoped that the reader acquires a clear understanding of the problems and issues involved. The context is narrowed with a discussion of Arabic diglossia and some of its effects upon literacy acquisition in the Arab world. Arabic diglossia refers to the Arabic language existing in the form of a continuum from the (H) variety, Modern Fusha, to the (L) varieties, the local colloquial dialects.

A brief description of education in Mauritania provides an introduction to the setting of the present research. This is followed by an overview of the subject of skills transfer referencing papers by Roberts (1994), Ferroli (1991), Chun (2002), Carson (1990), Chikamatsu (1996), Koda (2005), Caplan (1993), August (2002) and Bialystok (2002), leading to needs for further research. The background concludes with *Reasons for Research,* which describes the purposes of the study. Specific questions addressed in

the research were: what skills transfer from L1 to L2, at what point should instruction in L2 begin, and can lexical access be used as a predictor of success in learning L2?

Chapter III, Literacy Skills Transfer from Arabic to English, Focusing on Lexical Access, describes the month long research project done in Nouakchott, Mauritania, during March and April, 2006. The hypothesis which the research will endeavor to support concerning skills transfer from L1 literacy to L2 learning is that there is a point in the amount of L1 education and L1 literacy skills which significantly aid their learning of L2. This point will hopefully be observed by testing L2 literacy proficiency of students who have one month of study in L2. The assumption is made by this author that by testing the participants following only one month of L2 learning, progress observed in L2 will be reflecting a transfer of literacy skills from L1 and not merely the learning of L2 literacy.

The methodology for the study is explained beginning with a description of the participants, the teaching methods used for the English literacy classes, the methodology used to assess the participants' previous education and their literacy skills in L1 and L2, including a description of the instruments used. A brief overview of the final quiz results are followed by some observations made in the classroom and some observations of the results which are not convertible to numerical values. The analysis of the data is in the form of scatterplot graphs and boxplot graphs which demonstrate the relationship of L1 study and skills compared with L2 abilities and skills learned during the month long project. Results of a series of t-tests are then presented to assess whether the results represent statistically significant differences. The conclusion presents the final results of

the research study followed by some recommendations for education in the Arab world, and ends with recommendations for further research. Appendices A through C include the consent form, the instruments used in the study and the English which was taught in the project. Appendix D presents all the data obtained in the research in tables 1 through 7.

CHAPTER II

BACKGROUND

Literacy in a Multilingual Setting

Education is a vital need for everyone in our world today and multilingual settings abound. While common sense tells many people that everyone should have an opportunity for education in the language he or she speaks and understands, political, economical, religious and other social factors influence policy makers so that millions of people living today do not have this opportunity. There is an ongoing need for evidence to support the benefits of education in the first language of the students. Most linguists and educators agree that it is best to become literate first in L1 before becoming literate in L2 because the person's first language is maintained and proficiency is gained, which successfully transfers from L1 to L2. Dutcher (1995), in his paper *The Use of First and Second Languages in Education: A Review of International Experience,* presents a great deal of evidence supporting this recommended order of literacy acquisition (p. 40). Regardless of this and other studies, many of the world's children live in homes where the language spoken is not the language taught in their school.

Mother Tongue Literacy Is Beneficial

Dutcher (1995) reports on studies in Haiti, Nigeria, Philippines, Guatemala, Canada, New Zealand and the United States which have shown that students who

continued their learning in their first language (L1) and later transitioned into their second language (L2) did better than students who began literacy instruction in a second language (L2). These benefits can continue throughout the students' education into college. Current research reveals that children need twelve years to learn their first language. Allowing children to progress in their first language until the sixth grade aids their cognitive development so that when they learn the second language they go on to surpass academically the students who had more exposure to the second language at an earlier age. Dutcher states this is "the most important conclusion" of the study (p. 36). First language development is more important than "time on task" in L2 (Dutcher, p. 40). Hakuta (1986) states that "Bilingual education has been shown to increase cognitive development. In general, these positive effects are reported in additive settings" (p. 28). The term "additive" refers to the study of the second language not diminishing the student's ability in his or her first language. The first language is maintained while the second language is added. Hakuta (1984) states:

> Take any group of bilinguals who are approximately equivalent in their abilities in L1 and L2 and compare them with a monolingual group, matched for age, socioeconomic level and whatever other variables you might think confound your results. Now, choose a measure of cognitive activity, and administer it to both groups. The bilinguals will do better. (p. 71)

Second language learning, in an additive setting, does not interfere with learning in the first language. Studies consistently show that students allowed to maintain L1 will

transition into L2 more quickly and more fully than students immersed sooner into L2. Knowledge of the first language aids in the learning of a second language. These results from research form the basis of the argument for what is known as *maintenance bilingual education*. In maintenance bilingual education the first language of the child is maintained while knowledge of a second language is added.

Siegel (1992) of the University of New England, New South Wales, Australia, has researched the effects of teaching initial literacy skills in Tok Pisin or Melanesian Pidgin English. The formal education is in Standard English. The Tok Pisin Prep-school Program teaches literacy skills in the children's mother tongue before they begin studying in the government school. School teachers from the government schools have been questioned as to the results of the prep-school program. The teachers report that the "ex-prep" students are well adjusted, cooperative, and quick at learning. They are more active in participation in class and have better attendance. With regards to English, the teachers report that there are no interference problems except sometimes in spelling. They say the "ex prep" students are actually faster in learning English than the "no prep" students (p. 59). The similarity between this situation where Pidgin English is spoken and the situation in the Arabic world involving diglossia can be noted. The validity of applying successful remedies such as this to the needs in the Arab world should be considered.

The Native Americans' ordeal at the hands of European Americans was largely associated with their loss of their mother tongue. In Australia there was a similar policy of oppression. Herschell (2004) describes the Australian policy toward the Aboriginal

inhabitants as "…a crunch period lasting for almost two hundred years until the 1970's. During this period indigenous languages were despised and rejected, attempts were made to eradicate them and submerge them in the English speaking dominant society. English was actively used as a means of control and oppression" (p. 4). Following the change of policy in the 1970's, use of Aboriginal languages brought "growing awareness of social and political rights, an increasing pride in Aboriginal identity … consciousness of the political and social value of Aboriginal language and identity" (p. 4).

These are only a few examples of the many research studies and historical situations which demonstrate clearly the benefit of mother tongue literacy and maintenance bilingual education. The benefits of a child learning in their first language contribute to the child's academic success for a lifetime, assist with the child's self esteem, and help to widen the child's occupational possibilities.

Theories Supporting Mother Tongue Literacy

Cognitive Theories

Cummins (Baker and Jones, 1998) has proposed a number of theories to explain aspects of multilingualism. Among the most important are the *threshold theory*, the *underlying proficiency theory* and the *interdependency theory*. In the threshold theory, Cummins describes three different proficiency levels, or thresholds, which have varying impacts upon the language learner. If proficiency in a person's first and second languages does not reach the first threshold, there can be detrimental effects on cognitive development. As proficiency in the student's language reaches another higher threshold there will be no detrimental or beneficial effects of bilingualism. As proficiency in both

languages reaches a third level of fluency there are beneficial results on cognitive development (Baker & Jones, 1998, pp. 74-76). The underlying proficiency theory states that there is a single linguistic capacity of the brain which functions for all the languages a person uses. The specific features of different languages form more surface functions of the brain which are all linked to the underlying proficiency (Baker & Jones, 1998, pp. 81, 82). The interdependency theory states that proficiency in one language will transfer to proficiency in another language.

Colin Baker and S. P. Jones in their chapter titled "The Measurement of Bilingualism" (1998) discuss how measuring bilingualism is a complex matter. Language use is something of interest to sociologists, governments, geographers, etc., as well as educators. The measurement of bilingualism is most concerned with the level of proficiency in both languages. Proficiency is not simply a matter of knowing a language but also being familiar with social aspects of when what is said to whom. Bilingual proficiency is described in a variety of ways. Generally language proficiency is regarded as being divided into oralcy and literacy, oralcy involving listening and speaking, literacy involving reading and writing. There are further subskills related to each of these. Speaking involves pronunciation, vocabulary usage, exactness of grammar, conveying of meaning, style and so forth. Measuring language proficiency can therefore require a very detailed profile. Who is considered bilingual is determined by the reason for the measurement. How much proficiency in the less dominant language is required to be considered bilingual is a matter of debate. The term "incipient bilingualism" has been used to describe people who have limited proficiency in the less dominant language.

Baker and Jones (1998) explain the concepts of *Basic Interpersonal Communication Skills* (BICS) and *Cognitive /Academic Language Proficiency* (CALP). Using these concepts, the authors explain that the reason children sometimes fail when moved into classes using English as the medium of instruction when it seems that they can speak English adequately is because the English they speak is at a Basic Interpersonal Communication Skill (BICS) level of proficiency which is insufficient for cognitive tasks done in the classroom. The student must advance to the Cognitive/Academic Language Proficiency (CALP) level in order to succeed in these tasks. One major difference between these two proficiency levels is that BICS relates to communication embedded into a great deal of contextual information which aids in communication while information referred to in the classroom is often "context reduced" or removed from contextual clues as to meaning. A lecture concerning history or math may speak of a wide variety of topics with few or no external clues to what is being said.

Educational Theories

Skutnabb-Kangas writes about the *enrichment theory* of multilingual education and the *ecology of language paradigm* in her article "Multilingualism and the Education of Minority Children" (1995). Throughout her article she condemns what she calls "linguicism" which she defines as a form of racism which is easier for many to accept than racism based upon genetic differences. She defines bilingual programs as being oriented to seeing the issue as either involving "deficits" or "enrichments" to society. She proposes the 'enrichment theories' as those which lead to high degrees of success. The deficit theories see the issue as a problem. By deficit she means the issue revolves

around viewing the student and his/her environment as lacking what is necessary for them to become successful in society. By enrichment she refers to viewing the minority student as having beneficial qualities which are an asset to the society. In the United States there is at present a swing of public opinion against the enrichment theory. This is not uncommon following a period of high immigration which the U.S. has undergone over the past thirty years. Also, the high dropout rate among Native Americans is very related to her analysis. The enrichment theory and ecology of languages paradigm is a perspective which can only be helpful in multilingual situations.

Cummins, in his article "Empowering Minority Students" (1995), addresses what he considers to be a wrong assumption that the reason for high dropout rates among minority students is explained by either the *mismatch theory* or the *insufficient exposure theory*. One of these two theories is espoused by nearly all those involved in bilingual education. The mismatch theory states that the student should be taught in his/her own language, otherwise the student will not be able to understand. The insufficient exposure theory states that the student does not succeed in acquiring L2 because of insufficient exposure. Cummins states that the poor advancement of minority students is a very complex issue and cannot be explained by either of these views. There are many issues involved. Insufficient exposure does not sufficiently explain the failure of a student to learn because children require relationships and not merely the hearing of language. Cummins describes the situation as involving three sets of relationships. He suggests it is the dynamics involved in these relationships which determine the success or failure of

students more than the simpler explanation as defined by the two theories mentioned. These three sets of relationships are: 1) majority/minority societal group relations, 2) school/minority community relations, 3) educator/ minority student relations. The following quote sums up to a large degree what Cummins is saying regarding the complexity of the issue:

> Although conceptually the cognitive/academic and social/emotional (identity related) factors are distinct, the data suggest that they are extremely difficult to separate in the case of minority students who are 'at risk' academically. For example, data from both Sweden and the United States suggest that minority students who immigrate relatively late (about ten years of age) often appear to have better academic prospects than students of similar socioeconomic status born in the host country (Cummins, 1984; Skutnabb-Kangas, 1984). Is this because their L1 cognitive/academic skills on arrival provide a better foundation for L2 cognitive/academic skills acquisition, or alternatively, because they have not experienced devaluation of their identity in the societal institutions, namely schools of the host country, as has been the case of students born in that setting?
>
> Similarly, the most successful bilingual programs appear to be those that emphasize and use the students' L1. Is this success due to better promotion of L1 cognitive/academic skills or to the reinforcement of cultural identity provided by an intensive L1 program? (p.106)

Cummins goes on to describe the relationships which lead to empowering students rather than disabling students. He states that the following characteristics lead to empowering minority students: additive bilingual education, collaborative community participation, reciprocal-interactive pedagogy, and advocacy oriented assessment. The author then arrives at what I felt was the most important section of his article, which he calls "community participation." What he actually describes, however, is parental participation. He then describes problems which can arise as a result of wrong pedagogy and suggests ways of countering this. Finally he describes how wrong assessment practices can further impair at risk students and makes suggestions for improvement.

Classroom Based Literacy Practices

Skutnabb-Kangas in her article "Multilingualism and the Education of Minority Children" (1995) shares valuable insight and detailed information concerning what is necessary for bilingual education to reach a high degree of success. She lists 16 factors that are crucial in determining the degree of success of a program. The criteria which she uses to analyze bilingual situations are as follows:

1) There are alternative programs available.
2) Pupils are equally placed according to their knowledge of the medium of education.
3) There are bilingual trained teachers.
4) There are bilingual instructional materials available.
5) Cultural content of the materials is appropriate for the pupils.
6) There is a supportive, non-authoritarian, low level of anxiety context.

7) There is a context promoting high internal motivation where the student is not forced to use L2, is sympathetic toward the objectives, and is responsible for his or her own learning.

8) The context promotes high self-confidence; there is a fair chance to succeed; teacher expectations are high.

9) L1 linguistic development is adequate.

10) There is enough relevant and demanding subject matter.

11) There are opportunities to develop L1 outside of school in linguistically demanding formal contexts.

12) L2 teaching supports L1 development.

13) There is adequate linguistic development of L2.

14) L2 instruction is adapted to the student's level in L2.

15) There is opportunity for the student to practice L2 with peers.

16) There is exposure to native speakers of L2 in linguistically demanding formal contexts (p. 49).

The author relates these factors to motives for bilingual education, which she defines as both linguistic and societal. Most situations in the world are condemned by the author as being oppressive and racial. The above list focuses on principles and general practices found in highly successful biliteracy programs.

Roberts (1994) includes in her article "Transferring Literacy Skills from L1 to L2: from Theory to Practice" a list of effective means for teaching literacy including creating a print rich environment, and creating resource centers in the classroom and the home.

She also recommends the language experience approach, in which the student relates a story and the teacher writes it down and then the student reads the story. She suggests using literacy as a tool for research and the teacher learning from the student about the student's culture. She writes that the teacher should keep a portfolio of the student's work. Chun (2002) describes a successful learning environment for children as involving the children with a variety of literacy activities and experiences in a "highly literate environment" where a variety of "language experiences can take place" (p. 9). Unfortunately, these meaningful contexts have generally been inaccessible to linguistically and culturally diverse children. On the contrary, schooling practices often contribute to student's feeling uninterested and disconnected from their learning (p. 9).

August (2002) in her overview of effective transitional English literacy programs begins by describing the problem of a "sorting paradigm" in education where at risk students fall behind and receive a lower quality of education. This paradigm needs to change to a "talent development paradigm" in which assistance and support are provided along with a "rich and demanding curriculum" so that all students receive a high quality education. This paper presents the key role of L1 proficiency and L2 oral proficiency in English (L2) literacy acquisition. She also reviews successful bilingual transition programs, primarily the *Bilingual Cooperative Integrated Reading and Composition* program (BCIRC).

A National Research Council Report and International Reading Association resolution suggest that if the student has not learned literacy in L1 or is receiving instruction, then L2 literacy instruction should be delayed until a moderate amount of oral

proficiency in L2 is obtained. Other researchers and educators propose that reading instruction in L2 can assist in oral acquisition and can proceed at any time. It is clear that knowledge of vocabulary aids in reading comprehension. Background knowledge of a topic is also very important for reading comprehension. Oral proficiency aids in analyzing the print-sound code. Skilled readers can handle a small number of unknown words without effecting comprehension. Children know 5000-7000 words as well as grammar when beginning reading instruction in their home language. These invaluable assets belonging to students studying in their first language do not belong to second language learners' beginning literacy instruction in L2 before gaining oral proficiency in L2 (pp. 9-12).

It is unknown how effective literacy is as a language learning strategy, whether it has consequences for oral proficiency, or at what age or for what types of learners it works best. Other important questions also remain: What are the components of English proficiency that most influence English literacy and writing? And, do the skills and level of skills differ for different age children, classroom task domains, and other child variables such as I.Q., background knowledge, and native language literacy (p. 12)?

August describes the BCIRC and Success for All. The BCIRC is an adaptation of the CIRC, which was developed by Johns Hopkins University. The BCIRC is a transition program for children grades 2-5 where they begin with the CIRC in L1 and transition into CIRC for L2, becoming familiar with the teaching method as it is used in both languages. The CIRC has three main components: reading comprehension, "treasure hunt" activities, and language arts and writing. Treasure hunt activities are done in teams of

four. These activities involve teacher presentation, team practice, independent practice, peer pre-assessment, additional practice and testing. Included also is an extra focus on the student's cultural background, building background knowledge and vocabulary before reading. August summarizes the BCIRC in succinct detail. Very briefly, the text is read by the teacher, reread by the student, and then reread with a partner. Then they practice activities aiding comprehension. Writing skills are taught also working in teams or with partners. Stories are developed and the writing process is followed through to publishing. Spelling is taught by teaching 10-12 new words per week. The program emphasizes the fundamental rule of L1 literacy and L2 oral proficiency. The first two years focus on intensive reading instruction in L1 and developing oral proficiency in L2. Incorporated into the program are times to practice English conversation with English speaking peers. Also, parents are asked to supervise twenty minutes of reading in the evenings. August reiterates in the conclusion that English oral proficiency takes 3-5 years to develop and academic proficiency takes 4-7 years (pp. 12-24). Children who are forced to learn literacy in L2 before learning in L1 can suffer "long lasting negative effects on academic achievement" (p. 21).

Home Based Literacy Activities

Hardman (1998) has spent about six years visiting Cambodian families in Philadelphia and has recorded observations of literacy activities among children and parents. There are two main points he begins the article with: 1) literacy is a family activity with parents and children interacting in various ways, and 2) immigrant families are experiencing cultural change and, therefore, experiencing language change including

new relationships of power and knowledge. This last observation is related to immigrant children becoming more knowledgeable than parents in L2. Hardman observes that while non-immigrant families involved in literacy activities tend to mirror activities as seen in classrooms, with the parents acting as teachers, immigrant homes tend to practice a *funds of knowledge* sharing type of activities: siblings helping younger siblings, children helping parents, parents orchestrating and directing, parents helping in L1, etc. Some of the author's observations include the children code switching between English and Khmer with ease prompted by audience, topic and mood. Some of the children learned Khmer writing in order to write to cousins in Cambodia. Most of the children, however, did not want to learn Khmer writing. They spoke Khmer but considered learning to write Khmer to be an extra challenge they did not want to deal with while they focused on English. Homework was the central activity of the home. The children enjoyed doing homework, helping each other, and were disappointed if for some reason there was none that day. The library also played a key role in the children's after school activities. The author observed four categories of literacy related activities: children-to-children, children-to-parent, parent-to-parent, and parent-to-child. Among these four categories, Hardman lists 29 activities, such as advise, cooperate, compete, consult, etc. Over six months of observing, the author records 150 occurrences in total. The five most frequently occurring activities are: children-to-children, cooperating 20 times; parent-to-child, orchestrating 16 times; parent-to-child, observing 12 times; children-to-children, competing 11 times; children-to-children, advising 9 times. Only one parent-to-parent activity was observed: consulting, 4 times.

Hardman's ethnographic sociolinguistic study of Cambodian families is beneficial in demonstrating the social nature of literacy and biliteracy in particular. It is interesting to see the records which clearly show the importance of parents helping and also children working together in literacy activities. It is discouraging to read that many of the children considered learning to read in L1 was too difficult a task. The social nature of literacy is again demonstrated by the fact that the children who learned Khmer writing did so in order to write to their cousins in Cambodia. That biliteracy is particularly a function of family is in agreement with other studies. Repeatedly the examples of studies of biliteracy situations demonstrate how community and parental involvement are vital for the children's success. Orchestrating, observing, directing, the parents can have vital influence. Helping to locate literacy resources, in a library, for example, is one way parents can be vitally involved. Talking about stories from their homeland and helping connect with relatives are some other ways. Actually teaching the language is dependent upon the parents' level of education. Most of a parent's involvement does not actually require teaching, however.

Some very key points regarding biliteracy are contributed by Giva and Wade-Woolley (1998), who conducted a study of students becoming biliterate in English and Hebrew. In their research they assessed a student's abilities in order to determine predictors of success in biliteracy. They state that a child in preschool is considered a reader if he or she can read more than three words. This description of literacy differs from definitions related to older children and adults. Script awareness was the only predictor of ability to become biliterate. Reading three or more words and script

awareness are skills which are relatively easy to teach before school begins. It appears that this amount of early training can give children an advantage for the rest of their lives (p. 95).

L. Verhoeven and R. Aarts, in "Attaining Functional Biliteracy in the Netherlands" (1998), report on their research comparing biliterate immigrant children with monolingual children in their home country. In both Turkish and Dutch literacy the key factors promoting literacy were self esteem and home stimulation by the parents. Conclusions reached by the authors include the observation that both Turkish and Dutch use a Latin based orthography allowing positive transfer of skills. Also, the authors state: "Home stimulation, parental motivation for schooling, and children's self-esteem strongly predicted the children's literacy level in both Turkish and Dutch, with home stimulation appearing to be a crucial factor" (p. 131).

Societal Influences on Policy Decisions

V. Baker (1998) has researched biliteracy situations all over the world and offers some invaluable insight into the complexity of the issue of multilingualism. In "Literacy in Developing Societies: Native Language Versus National Language Literacy," she writes about nine different locations in the world, examining the variables effecting language policy decisions, bringing focus to the "multidimensional issue of the language of literacy". The article primarily describes the situation in Senegal and Sri Lanka. In Senegal 81% of the parents and five out of six teachers feel that education should be in French. Except for some experimental situations using two years of Wolof, a West African language, as the medium of instruction, the educational program is based on the

French system. While nearly everyone wants education to be in French, this has caused considerable struggle. There is 33.1% literacy; 62.6% of 6-34 year olds have had no formal education (pp. 22-24). In Sri Lanka the British system provided education for the elite for a cost. The education of the poorer was in the vernacular. The vernacular education led to low level employment opportunities and few options for higher education. When the British left, the educational structure remained largely the same, providing English education for those who could afford it. This has led to a class of English-speaking elite who have replaced the colonial rulers and have good options for jobs and higher education while the village population is educated in the vernacular with few teachers knowing English (pp. 24-25). In rural Malawi, children entering first grade must learn two foreign languages. Parents, teachers, school principles, and missionaries have cooperated to "tackle the literacy problem head on" (pp. 25, 26). From rural Ethiopia is another example. The L1 is Anuak, while education is in Amharic. Teachers are Amharic and have little involvement with the community and are better paid than most people in the village. These factors led to poor literacy (pp. 26, 27). In Zimbabwe the school studied had grades 1-3 in the L1, Shona, gradually transitioning into English. Shona has much literature in it and uses a Latin based script. Teachers are Shona tribespeople, and parents are very supportive of the system. Zimbabwe has 76% literacy, the highest on the continent of Africa (pp. 27, 28). A rural Thai school was visited where refugees of Karen, Lisu and Akha people study in a Thai school. The medium of instruction is Thai. Parents are supportive and the school is successful. The villagers hope that some of the children can become teachers (p. 28). In Papua New Guinea the

medium of instruction at the Kuta school is English. There is a constitutional mandate requiring literacy in L1, but there are not funds to implement this strategy. The parents are supportive of English because they are not far from a city where English is useful (p. 29). In Peru, parents want education in Spanish because historically there have not been opportunities for Quechua speakers (pp. 29-30). A similar situation exists among Aboriginal people in Australia (p. 30). Baker refers to Cummins' *Interdependence Principle* stating that native-language literacy is a prerequisite for global language proficiency (p. 31). In conclusion, Baker states that "a colossal gap exists between what the theorists proclaim as ideal and the real-life empirical world of schools in very poor multilingual countries" (p. 33).

Baker's global research into biliteracy situations provides invaluable information to aid in the understanding of and resolving of biliteracy issues. The recurring theme apparent to me is the need for community involvement in the education of the children. Community involvement means parental involvement. This seems to me to be the one most important single factor in the success of L1 literacy and maintenance. It is not an accident that L1 is called "mother tongue". There seems to be two primary needs for realizing this effective teaching force: persuading the parents of the importance of L1 literacy and enabling parents to be involved. Of course parent's education will affect their ability to help their children.

August (2002) states that the fastest academic achievers are children age 8-11 who have had adequate learning in their first language. She states that higher levels of literacy in L1 lead to higher levels of learning in L2 and that children who are forced to

learn literacy in L2 before learning literacy in L1 can suffer long lasting negative effects. Later she writes that educators need to know the best time to transition into L2. It seems apparent that the matter is clear unless politics, economics, religious or other factors are effecting the decision. The method of teaching reading in L1 using the same technique as reading is taught in L2 seems it would be beneficial. August observes that BICS skills do not transfer readily to L2 but that academic level skills do transfer. This observation is in agreement with Cummins' threshold theory.

Arabic Diglossia

The subject of multilingualism in education in the Arab world must include a discussion of Arabic diglossia. Ferguson defines diglossia as

> . . . a relatively stable language situation in which in addition to the primary dialects of the language, which may include a standard or regional standards, there is a very divergent, highly codified, often grammatically more complex, superposed variety, the vehicle of a large and respected body of written literature, either of an earlier period or in another speech community, which is learned largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation. (Ferguson, 1959, p. 336)

Maamouri (1998) has written an excellent overview of Arabic diglossia as it relates to education in the Arab world. In it he notes that

> Ferguson's definition of diglossia describes a situation which includes the following features: a) a differentiation between the written and oral modes; b) a socio-functional differentiation based on the complementarity of two separate sets of functions performed by two linguistic codes where high (H) is used by the superposed variety and the low (L) by the other varieties; c) a rich and dominant (written) literary tradition which embodies some of the fundamental values of the community, and last but not least; d) an element of linguistic relatedness represented in the degree of sameness which exists between the two competing linguistic codes.

> According to Ferguson (1972), diglossia comes into being when: a) there is a sizeable body of literature in a language closely related to (or even identical with) the indigenous language of a community, and b) when literacy in a community is limited to a small elite and a long period of time, of the order of several centuries, has followed the establishment of a literacy and its written literature.
>
> The most important feature of diglossia is the establishment of rigid and complementary sets of exclusive functions where (H) occurs only in situations where it is not appropriate for (L) to occur. This rigid and functional complementarity should give way only to slight and insignificant overlap. The (H) variety is used in formal schooling as the language of instruction and as content for literature, poetry and prose, civics, history, lectures in tertiary education, religious sermons, formal political speeches, newspaper articles and editorials, and news broadcasts. The (L) variety is used in conversation with friends and family at home, at the marketplace and almost everywhere outside the school environment. It is also used in folk literature, in radio and TV soap operas, plays, advertisements, and health messages. (L) is used in common political speeches and meetings and in court discussions and related activities. (p. 32)

Maamouri explains that Arabic diglossia arose after the standardization of Arabic, which began in the 8th and 9th centuries AD. This standardization and its highly codified

norms were called by early Arab grammarians *fusha* (p. 33). This standard form used in literature led to the culturally accepted understanding that the written form was the "real language" and the spoken varieties of the language were "degenerate" and "corrupt" varieties. If the definition of *mother tongue* is the language used in the home, then *fusha* Arabic is the mother tongue of nobody as it is very rarely used in the home (p. 33).

Maamouri describes the struggle that Arab children encounter when going to school "when they first face linguistic discontinuity in the formal school setting" (p. 34).

> The mix of Arabic language patterns in the classroom leads to serious pedagogical problems and even to feelings of linguistic insecurity in formal school communication among high numbers of young Arab learners. This lack of security comes from a general feeling of low understanding of *modern fusha* and of low identification with its norms. It also comes from the failure of the language of Arab education to provide: a) emotionally, the feeling of symbolic meaningfulness and relevance to the child's needs; b) sociologically, the means to identify and bond with the other members of the school community and of the community at large; and last but not least, c) pedagogically, the provision of an easy, joyful, and relevant instruction process.
>
> Young Arab users do not feel they are free to use and innovate in *fusha*. Pupils entering school have to unlearn or even suppress most of their linguistic habits while they try to acquire a new set of rigid rules. The burden of internalizing these new habits is not helped or reinforced by

> classroom practices focused on the exclusive use of the official language of instruction. A clash seems to occur in Arab classrooms between two conflictual practices. On the one hand, teachers deliberately try to neglect and undermine the actual speech habits of the pupils. On the other, the same teachers find themselves often obliged to use the colloquial to communicate with their learners for one reason or another. (p. 41)

Maamouri refers to the practice of Christians to update their instructional material so as to be easily understood by the readers. He explains that in Islamic settings this is not permissible, but religious instruction traditionally must be in the H variety of Arabic.

> Fägerland and Saha (1989:152) showed the importance of updating the language of religious activities, usually the main tool of literacy and education, in their description of the history of literacy reforms in Sweden. They showed that after translating the Catechism of Luther in 1537 and the Bible in 1541 into Swedish, the church authorities in charge of educating the Swedish people, decided less than two centuries later that they needed to update the language of their religious documents. This concern led to another linguistically updated publication of the Bible and of Luther's Catechism in 1689. What worked well in Sweden was and still is totally unthinkable in the context of Arabic. Any decision involving the language or text of the Quran would have transgressed an important taboo of the Islamic belief that the Quran represents *klaam* rabbi, "the words of God." (p.21)

In contrast to the Islamic motivation for preserving the Arabic text of their religious literature, King Alfred the Great wrote that he was motivated to design and implement his literacy program for the English people using the vernacular because of the proliferation of translation work which followed the life of Jesus Christ and the Christian belief in the incarnation, when the Word of God became human flesh. King Alfred writes about his literacy program in his *Preface* to St. Gregory's *Pastoral Care:*.

> Then I remembered how the law was first found in the Hebrew language, and afterwards, when the Greeks learned it, they translated it all into their own language, and all the other books as well. And afterwards in the same way the Romans, when they had learned them, they translated them all into their own language through learned interpreters. And all other Christian nations also translated some part of them into their own language. Therefore it seems better to me, if it seems so to you, that we also should translate certain books which are most necessary for all men to know, into the language that we can all understand, and also arrange it, as with God's help we very easily can if we have peace, so that all the youth of free men now among the English people, who have the means to be able to devote themselves to it, may be set to study for as long as they are of no other use, until the time they are able to read English writing well; afterwards, one may teach further in the Latin language those whom one wishes to teach further and wishes to promote to holy orders. (Sisam, 1994, p. 373)

King Alfred's decision to use the vernacular is especially noteworthy when we consider the position the English language has obtained in the world, more people having learned English as a second language than any other.

I first became aware of the literacy needs of the Arab world while studying Arabic at Middlebury College in 1987. In class I asked whether, as a foreigner, I would be welcome to help with the literacy needs of the Arab world and my professor, Mahmoud AlButl, said that I would be very welcome to help with literacy. In 1990 when I began working on a literacy program for the people of Mauritania, I was very careful to utilize vocabulary which was understood by the illiterate but was from the (H) variety. Most of the vocabulary taught in the first three months of classes is understood by a person only knowing the colloquial. By law, education in the classroom must be conducted in the (H) variety. My idea of making an effort to teach literacy in words understood by the illiterate was a new concept among the Arabic educators and government workers. Although it met with a great deal of skepticism, it produced very successful results. In an area where there had never been a successful literacy program for adults, the year-long classes we offered had over an 85% graduation rate. This literacy program is still being used in 2008. While the method of using modern *fusha* vocabulary understood by speakers of the colloquial saw relative success, I do not consider it to be optimum. I recommend that at least a full four years should be spent learning to read the spoken language used in the home.

It seems apparent to me that the continuum of the Arabic language is very similar to what has developed with the spread of English where local varieties of English languages form a (L) variety in many locations throughout the globe.

Education in Mauritania

The present research was conducted in the nation of Mauritania, West Africa. Prior to a reform which began in the year 1999, individuals were permitted to study for the duration of their education in either Arabic or French. In 1999 the Mauritanian government passed a law requiring French also to be taught in all public and private schools. The educational practices before the reform permitted us to find many people who had only studied Arabic, a key element of this study.

Education in the Islamic Republic of Mauritania has traditionally consisted primarily of neighborhood religious schools in which children learn to recite the Quran by memory. The traditional method used to learn the book length text is to write a portion on a wooden panel from which it is read. The text is then removed and rewritten until the whole is memorized. Although the public school system has now become the primary means of learning, these neighborhood religious schools still play a significant role in the nation's education. The questionnaire concerning the amount of education each participant had, included questions about the amount of informal education. Besides the schools mentioned here, there are also literacy classes for adults who did not attend public school. These classes usually meet for an hour or two each day.

Skills Transfer

Roberts (1994) wrote a very helpful article titled "Transferring literacy skills from L1 to L2: from theory to practice" in which she begins with some startling statistics: 25% of the world's adult population are illiterate; 20% of US adults are functionally illiterate; illiterate immigrants are daily joining other minority groups with low literacy. She goes on to state that the first step in dealing with literacy is to define it. She describes two basic definitions. One is that literacy is the learning of skills used to decode and code language, learning to read and write. The second definition is that literacy is a function of culture. There are cultural powers, influences and understanding that enable literacy and also come inherent in the learning of literacy. Her basic argument is that it is proven beyond question that literacy skills transfer from L1 to L2, if one uses the first definition of literacy. Using the second definition, however, cultural understandings do not necessarily transfer. Roberts states very clearly that "If the issue of literacy is seen in an educational light, the consequences include developing L1 literacy in the non-English proficient population before developing those skills in English" (p. 120). This requires a great deal of effort, financially, administratively and in every other way. Roberts states emphatically that it is proven that literacy skills transfer. She refers to studies involving Spanish, Arabic, Samoan, Navajo and other tribal languages demonstrating the transfer of skills from L1 to L2. Her argument here is that the issue of biliteracy is not merely an educational issue. If it was solely an educational issue, there is overwhelming evidence of the need for maintenance bilingual education. The issue, however, is multifaceted, related to politics, economics, religion, etc.

Ferroli (1991) studied the influences of L1 literacy skills and L2 oral proficiency on students' ability to read and spell in L2 and found that "for the purpose of learning literacy in English the child is gaining at least as much from L1 literacy instruction as she or he is gaining from oral English instruction (p. 83).

Chun (2002) notes the many aspects of L1 literacy which is known to transfer positively to L2 literacy. She lists "academic skills, literacy development, concept formation, subject knowledge and learning strategies." She explains the need for uninterrupted language development in children as allowing children to function at "their actual level of cognitive maturity" (p. 7). Chun states that for students who are non-native speakers of English with no schooling in their first language, it requires 7-10 years or more to reach "age and grade-level norms of their native English speaking peers. Immigrant students who have had 2-3 years of first language schooling in their home country before they come to the US take at least 4-7 years to reach typical native speaker performance." Non-native speakers of English often struggle more after fourth grade when the "academic and cognitive demands" begin to increase; "…students with little or no academic and cognitive development in their first language do less and less well as they move into the upper grades" (pp. 7-8).

There is a wealth of theoretical work supporting the efficacy of mother tongue literacy and the transfer of skills from L1 to L2. There remains a great need for more research, however. One area needing further study is whether or not all combinations of L1 and L2 allow effective transfer of skills. August (2002) writes that studies of skills transfer from L1 to L2 learning help the education process by providing information

about which skills are available to the student and which skills need to be learned. Phonological processes, orthographic skills, word and pseudo-word reading word knowledge (through cognates), and comprehension skills and strategies all have positive transfer. Comprehension skills related to syntax and "high information items" in the text do not transfer positively to L2 literacy. These aspects of language usually differ from language to language. A vital question for further research suggested by August is whether L1 literacy is recommended for all combinations of L1 and L2. Especially in question is the helpfulness of L1 literacy when the orthographies are extremely divergent such as with Chinese and English or when there is little history of literacy in L1. The second question is what precisely is the best proficiency level in L1 literacy for beginning the transition into L2 literacy and how best to assess these skills. Is there a level of proficiency in L1 below which skills will not transfer to L2? Knowing the strengths brought to L2 learning and the difficulties can aid in design and teaching of literacy in L2.

The researchers in Carson's study (1990) intended to discover whether there are discernable correlations between students' writing ability in L1 and their writing and reading abilities in L2, and if there are noticeable correlations in the student's reading ability in L1 and their writing and reading ability in L2. The authors begin with a discussion of Cummins' threshold theory which proposes that proficiency transfers from L1 to L2 for all languages if proficiency in L1 reaches the level of "academic proficiency", meaning the student attains a "proficiency to permit cognitively demanding language use" (p. 246). There is a need expressed for more proof of the transfer of skills.

In particular the authors endeavor recording evidence of a student's L1 reading and writing ability transferring to L2 reading and writing skills. The procedure for the testing was as follows: The participants were Japanese and Chinese college students in the United States. Participants were tested on their writing ability through the writing of essays prompted by topics written at the top of a blank page. Reading skills were ascertained by grading of a cloze test. The method for grading the cloze test was whether the student chose the exact word missing from the original text. The results of the research showed The cloze tests used 7^{th} word deletion with a possible score of about 50. Writing tasks preceded reading tasks so as to not affect the writing by the texts read. Grading the essays involved separating the essays into six piles according to abilities. The raters determined their own system of descriptors, but some were common to all languages: coherence, topic development, and language usage.

The results showed "weak positive correlations" with a greater transfer of proficiency in L1 reading to L2 reading and less transfer of proficiency of writing skills. It appeared to me that the weak skills correlations could lead to much greater skills correlations as years went by reading in L2. Also the lack of the greater correlation of writing skills seems sensible because writing skills generally follow reading skills in language learning. That does not necessarily mean the transfer doesn't happen. The writing skills are possibly transferred in the reading skills and need more time to develop. Another observation is that the testing was done at the college level. I am more interested in beginning literacy acquisition in L2. The need for further longitudinal study is apparent. The authors mention "real cultural differences" between the literacy

practices of Japanese and Chinese, but do not mention anything about the different processes involved in reading the two languages.

Nobuko Chikamatsu (1996) has designed a research project intended to verify skills transfer from literacy in L1 to literacy in L2. Because of the many variables related to research among second language learners, Chikamatsu used students whose L1 was either Chinese or English and who were studying Japanese. Japanese has the characteristic of including both a phonologically based orthography and a logographic based orthography. The author's assumption is that the Chinese speakers will more quickly react to information based on the logographic orthography and the English speakers will more quickly react to the phonologically based orthography. Although the research isolates the variables of L1 skills to a greater degree than previously, there are still numerous assumptions and variables influencing the results of the project. For example, the Chinese students of Japanese are actually learning their third language while the English speakers are learning a second language. Also, the degree to which English speakers use phonologically coded information in reading as opposed to logographically coded information is debatable. Chikamatsu's predictions are formed from the assumptions that L1 skills will be transferred to the reading of L2. The project uses word recognition reaction times to determine which skills are being used. The reaction times are determined by the time elapsing between a word appearing on a computer screen and the moment the participant begins typing the meaning of the word on the computer. The words are categorized by length. Also there are familiar words, unfamiliar words, and nonwords. Chikamatsu's basic assumptions seem to be supported by the data indicating

that there is a transfer of skills from L1 literacy to L2 literacy. The article mentions repeatedly the need for more research in this area.

Koda (2005) writes a summary of fundamental understandings related to the transfer of reading skills from the first language to a second. She states that literacy is considered by many to be first of all a function of identifying, analyzing and manipulating language forms (p. 311). These foundational skills she refers to are differentiated from the actual skill of deciphering a specific text. She considers these fundamental skills as being aware of "particular regularities" of the language spoken in the home and terms this skill *metalinguistic awareness* (p. 311). Koda stresses the relationship between phonological awareness and success in reading stating, ". . . reading progress is significantly enhanced by phonological awareness training" (p. 315). She summarizes the process of literacy in first and second languages by referring to fundamental steps: first, forming an awareness of "regularities of spoken language"; second, learning the connection between spoken language regularities and graphic representations of these regularities; third, the metalinguistic sensitivity of the spoken language helps clarify the exact manner in which oral communication is recorded in the language's orthography. Actual reading then further develops these skills. Finally she refers to the variations in regularities found in different languages represented in their orthographies. In her theory, these variations influence the rate of L2 literacy acquisition (p. 316). Koda's position is to associate phonological skills closely with literacy acquisition. It is interesting that Caplan (1993) considered this matter very controversial: "The question of the relationship between spoken and written language has remained

controversial for almost a century" (p. 162). Personally, as someone who has been an avid reader all my life and studied in graduate school as well as having taught literacy, I agree with Koda that phonology plays a very key role in the early acquisition of literacy. I would theorize also, however, that literacy skills do develop through significant experience in reading that bypass the phonological connection and associate the actual word with the lexical access. These skills require a process needing more research.

Koda's paper repeatedly refers to the need for further research in the area of skills transfer across divergent orthographies: "Further investigations are needed to enhance our understanding of inter-lingual relationships between phonological awareness and decoding skill acquisition in biliteracy development involving orthographically unrelated writing systems" (p. 323).

August (2002) reports evidence of positive transfer of L1 literacy skills to L2 literacy. According to literature since 1980, higher levels of literacy in the first language lead to higher levels of literacy in English as a second language. The fastest academic achievers in a transitional program are children aged 8-11 with adequate learning in their first language. The 8-11 year olds outperformed the age groups 5-7 and 12-15. There are many studies confirming the value of L1 literacy. Studies of skills transfer from L1 to L2 learning help the education process by providing information about which skills are available to the student and which skills need to be learned. Phonological processes, orthographic skills, word and pseudo-word reading, word knowledge (through cognates), and simpler comprehension skills and strategies all have positive transfer. Comprehension skills related to syntax and "high information items" in the text do not

transfer positively to L2 literacy since these aspects of language usually differ from language to language. A question for further research suggested by August is whether L1 literacy is recommended for all combinations of L1 and L2. In question are situations when the orthographies are extremely divergent such as Chinese and English or when there is little history of literacy in L1. A second question is what is the best proficiency level in L1 literacy for beginning the transition into L2 literacy and how best to assess these skills. Is there a level of proficiency in L1 below which skills will not transfer to L2? Knowing the skills which transfer positively to L2 learning and the skills which do not and those which cause interference can aid in design and teaching of literacy in L2 (pp. 1-8). Using L2 literacy instruction to promote oral proficiency is important. Educators need to know when is the best time to begin literacy instruction in L2 and also need to understand the "nature of the cognitive challenge" for students who learn oral and written language skills at the same time.

August's study is up-to-date and presents clearly the areas where further research is needed. A personal e-mail I received from Elizabeth Howard at the Center for Applied Linguistics stated a similar need as mentioned by August:

> Since you have experience with languages other than Spanish, one area that is ripe for research is investigating biliteracy development with English and languages other than Spanish, and in particular, languages that have completely different orthographies. There are a lot of unanswered questions about what does and does not transfer in biliteracy development in general, and when the orthographies are different, these questions are

> even more numerous and complicated. Good luck with your research. (L. Howard, April 14, 2005, personal communication)

Of particular note are the needs to confirm the benefits of L1 literacy when L2 has a completely different orthography and to better define which skills transfer and which skills are needed when learning literacy in L2.

Bialystok (2002), in her review of research involving acquisition of literacy in bilingual children, refers to Herman (1996), who studied the influence of kindergarten childrens' exposure to language in their homes and how this exposure helped the children. The study suggested that a child's language experience in one language does not transfer to a second language prior to literacy acquisition.

> These analyses showed little benefit from one language onto the other. As Herman points out, the specific discourse demands, structures, and nuances in each language require children to learn these conventions individually and build up their literary register for each language separately. It is this literary register that will guide children into literacy in that language. . . the absence of cross-language transfer of skill in the two story tasks points to the conclusion that this aspect of literacy preparation develops individually for children's languages. (pp. 175, 176)

Reasons for Research

It is known that literacy skills transfer once a certain proficiency is gained. August refers to the need to know more concerning the transfer of skills from L1 to L2 when the orthographies differ, the proper time for beginning literacy in a second

language, and when exactly skills begin to transfer from L1 to L2. Specific questions addressed in this research were: 1) whether an observable level of proficiency in a first language predicts a rapid transfer of skills in second language literacy and 2) can lexical access play a key part of determining this level of proficiency, and 3) what skills transfer from L1 to L2 and which do not?

An effort was made to design a research project which would be relatively easy to duplicate in a variety of settings in order to inspire a considerable increase in studies adding to our knowledge of literacy skills transfer from L1 to L2. The focus of this study is the skill of lexical access. During the author's work in adult literacy since 1990, the vital role lexical access has in successful reading has continually been apparent. The method of teaching literacy to adults used by Literacy for All associates a word with an easily recognizable picture. This approach focuses upon deriving meaning from text. There is a tendency of some students to recite by memorization the sounds and ignore the need to understand the meaning of words. Some cultures emphasize the proper sounding out of letters and words to the neglect of comprehension (Wehr, 1976, p. 753).

The English word *read* has at its central meaning the concept of comprehending. *The Oxford English Dictionary* (1989) defines the word *read* as follows:

> 1. a. To have an idea; to think or suppose that, etc. 2. a. To make out or discover the meaning or significance of (a dream, riddle, etc.); to declare or expound this to another. 3. To count, reckon, estimate. 4. To see, discern, distinguish. 5. a. To inspect and interpret in thought (any signs which represent words or discourse); to look over and scan (something written, printed, etc.) with

understanding of what is meant by the letters or signs; to peruse (a document, book, author, etc.); to understand (musical notation). (p. 260)

Common sense tells us that in order for education to be beneficial the words must be understood. In January, 1974, the Supreme Court of the United States ruled in Lau vs. Nichols, "We know that those who do not understand English are certain to find their classroom experiences wholly incomprehensible and in no way meaningful." Previously, reviewing August's study (2002), it was mentioned that children who begin literacy instruction in their home language benefit by knowing 5000-7000 words. For this reason the National Research Council and the International Reading Association drafted a resolution stating that if the student has not learned literacy in L1, then L2 literacy instruction should be delayed until a moderate amount of oral proficiency in L2 is obtained (August, 2002, pp. 9-12). Being aware of the vital role of lexical access in literacy acquisition, it became apparent during the review of biliteracy and skills transfer that there needs to be a focus upon lexical access skills in research. For these reasons the design of this study focuses upon lexical access.

In July, 2005, Steve Waters, a literacy expert with the Summer Institute of Linguistics, explained to me that lexical access is usually tested by having participants choose the correct meaning of a word from three choices (personal communication). The lexical access instrument designed for this present study uses three choices. It is hoped that the simplicity of the present design is apparent and that similar research will be conducted by educators working with a wide variety of languages. The results obtained

here may then be compared with results obtained from studies involving other combinations of languages.

CHAPTER III

LITERACY SKILLS TRANSFER FROM ARABIC TO ENGLISH FOCUSING ON LEXICAL ACCESS

Hypothesis

This research endeavored to confirm the following hypothesis concerning skills transfer from L1 literacy to L2 learning: by testing L2 literacy skills, focusing on lexical access, of students who have one month of study in L2, there will be seen a point in the amount of L1 education and L1 literacy skills which indicate the students' ability in L1 noticeably aids their learning of L2. In order to demonstrate this hypothesis, literacy skills in L1 will be assessed for ten students who have had from 0-3 years of education in L1, ten students who have had 4-6 years education in L1, and ten students who have had 7-9 years education in L1. This information will be correlated with the value derived from an L2 literacy skills assessment quiz in an effort to observe whether the L1 skills noticeably aid in learning L2 after a certain amount of time is spent in L1 learning and also after a certain proficiency is gained in L1. It is proposed that there should be a noticeable benefit to L2 learning among students who have at least four years of education in L1.

The research will focus on the skill of lexical access and writing proficiency. Lexical access skills are universally needed for literacy. While languages utilize a variety

of skills, some unique to particular languages, all languages use lexical access in literacy. Writing proficiency also plays a key role because it is simple to test participants' abilities.

Methodology

Thirty participants were recruited in an Arabic neighborhood of the city of Nouakchott, Mauritania. Participants had previously studied only formally or informally in Arabic. A former employee of Literacy for All living in this neighborhood who had received training as a teacher and who was a friend of mine since the early 1990's living in this neighborhood began finding participants by first interviewing residents, inquiring about the type and amount of education each person had. The results of these interviews were then studied to identify the thirty people representing the three categories desired for the study.

Students who were asked to participate in the study represented three levels of Arabic study: ten from 0 to 3 years, ten from 4 to 6 years, and ten from 7 to 9 years. A desire to learn English is nearly universal in Mauritania and, therefore, it was not difficult to find willing participants. In addition, participants were told there would be a small "encouragement" distributed to those completing the study. Two classes with fifteen students each were conducted daily for the period of one month, meeting five days a week. The students were divided into two classes in order to accommodate the needs of the participants and also for the benefits of smaller class size. The morning class met from 9:00 to 10:30 while the afternoon class met from 1:00 to 2:30. The same material was presented as identically as possible in each class. The study was limited to two classes of fifteen students each in order to allow one teacher and an assistant to instruct

all thirty participants in as identical a manner as possible. Accurate attendance records were kept. The teaching method utilized was well established.[1] Two picture words are introduced to the class in each lesson. After learning to associate the new word with the picture, the new word is then analyzed to learn the sounds of the individual syllables and letters. In this way vocabulary is introduced which is used to create sentences with meanings relevant to the students' daily lives. The lessons were taken from a literacy primer teaching English. Some changes to the lessons were made in order to make the material culturally closer to the students. With this structure providing the bulk of the teaching material, lessons were added introducing additional picture words as well as words denoting emotions, the verb "to be" and words used in numeracy. Near the conclusion of the month of instruction, students' own experience stories were translated into English on the board for use as texts to learn. (See Appendix C for the English taught during the study.)

After completion of the month long study, the students signed consent forms (see Appendix A) and were questioned as to the extent of their education in Arabic, tested to determine their Arabic literacy skills, and tested to determine how much English literacy was acquired during the month of study (see Appendix B for the instruments used in this study). The results of the study were analyzed using the statistical analysis software program Minitab 14 and 15.

[1]The method of literacy instruction is that used by the author implementing an Arabic literacy program in this country from 1990 to 1999 in which approximately 1500 students attended the year of study.

Teaching Method

The English classes which were taught used lessons from the English literacy primer *Firm Foundations: Book 1,* and focused on writing skills. Literacy lessons were chosen in order to study the transfer of literacy skills from L1 to L2. This method also enabled the teacher and the assistant to easily present identical lessons to two classes of students, both instructors teaching in every class period. Each class period began with at least twenty minutes of review using small, personal chalk boards. Following this review, two new pictured words were introduced every day. These new words were analyzed using exercises which broke it down into syllables and then the new letter. The words were then synthesized by going from the letter to a syllable and then to the complete word again. These analysis and synthesis exercises were practiced for all the words used in the reading material used in the class. After introducing the new words, the words were practiced by writing the new words on the blackboard and asking individual students what each word was. Finally, the sentence material was read by each student in the class. After about two weeks of these literacy lessons, a small amount of extra material was added to the lessons, making sure that both of the classes received identical material. The added material included words necessary for teaching simple arithmetic in English, words describing human characteristics and emotions, the verb "to be," and some extra picture words necessary for taking the final quiz. The final week of classes focused on experience stories from the students themselves, which were written on the blackboard and studied as the text. Students each had a notebook recording the material studied in class. In addition, photocopies of all the lesson material were given to

each student in order to better help them review for the quiz and to help them benefit from the month of English instruction.

Methodology of Assessment of Education and Literacy Skills

Following the completion of nearly four weeks of classes, each student participated in a final evaluation administered by the author of this paper. This evaluation included the following:

1. Questionnaire

In order to obtain information about the amount of educational experience each student had, a questionnaire was given to the students during the final quiz. In order to pick the students, interviews were conducted to find ten students with 0-3 years of education; ten students with 4-6 years of education; and ten students with 7-9 years of education. These interviews were limited in scope and were conducted without the written questionnaire.

2. Five-minute Arabic Essay

Students were asked to spend five minutes writing a story from their own life. This was prompted by the sentence at the top of the page which read, "Please write the story of your journey to Meleh," the neighborhood the students lived in. Five minutes were given this essay. The relatively short time of five minutes for the essay was chosen in order to minimize long periods of inactivity for authors with beginning literary skills.

3. Arabic Lexical Access Quiz

This quiz consisted of a list of ten Arabic words which were pictureable from simple to more difficult. More difficult words are longer, more culturally distant and less easy to

differentiate. Each word was followed by three pictures, only one of which depicted the meaning of the word. This instrument was chosen in order to measure students' lexical access skills.

4. Five-Minute English Essay

In an effort to assess English literacy skills learned, the students were asked to spend five minutes writing about themselves in English.

5. English Dictation

Each participant was asked to write three words which I read out loud. The three words were words learned during the study: sun, water, city.

6. English Lexical Access Quiz

This quiz consisted of ten pictureable English words ranging from simple to more difficult. More difficult words consist of more syllables and are less easy to differentiate. Each word was followed by three pictures, only one of which depicted the meaning of the word. This instrument was chosen in order to measure the students' lexical access skills.

7. Arabic Transliterated Words Quiz

This quiz consisted of a list of ten Arabic words transliterated into Latin letters. Each word was followed by three pictures, only one depicting the meaning of the word. This quiz was chosen to compare the transfer of skills needed for reading English with skills needed to read simple transliterated Arabic words.

8. Stroop's Test

This consisted of the word "ahmar" (red) printed in blue ink. Participants were shown the word "ahmar" for three seconds and asked to circle one of four colors marked on a paper representing the correct meaning of the word. This quiz was chosen to supplement the transliterated Arabic words quiz to compare skills needed for learning English with skills needed to read transliterated words.

These instruments were chosen because of the ease of converting them to numerical values as well as the ease of producing them and their validity in assessing literacy skills. The eight instruments listed above which were used for the evaluation were placed previously in individual numbered envelopes with the number of the envelope written at the bottom of each page. The student opened one envelope and the teacher assisted each participant with the evaluation. The goal of the assessment was to obtain numerical data from each student's completed evaluation. While the lexical access quizzes provided clear numerical data, 7 of 10 correct, for example, the dictation and essays needed to be graded in a manner which would result in a numerical value useful for the study. For this purpose I used a value for each of three items: a word spelled correctly and used in context equaled 3 points, a word spelled correctly but not found in context equaled 2 points, a word misspelled but recognizable equaled 1 point, an unrecognizable set of letters equaled 0 points and did not contribute to the score. I used the same points system for grading both Arabic and English essays. Following are examples of grading used for the study showing examples of students' work.

Figure 1. Example from Arabic Lexical Access Quiz

Notice how the pictures for hand, donkey and tent are encompassed by a line drawn by the student. These three answers from the Arabic Lexical Access quiz are correct. The entire Arabic lexical access quiz is found in Appendix B. Each correct answer received three points.

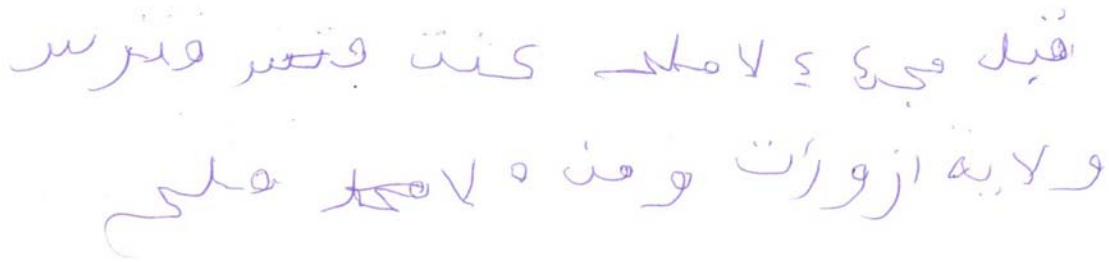


Figure 2. Arabic Essay

This is an example of an Arabic essay from a participant with a beginning level of Arabic education. This essay received a numerical value of 35. Some words are spelled correctly and used properly in context and some words are understandable but misspelled.

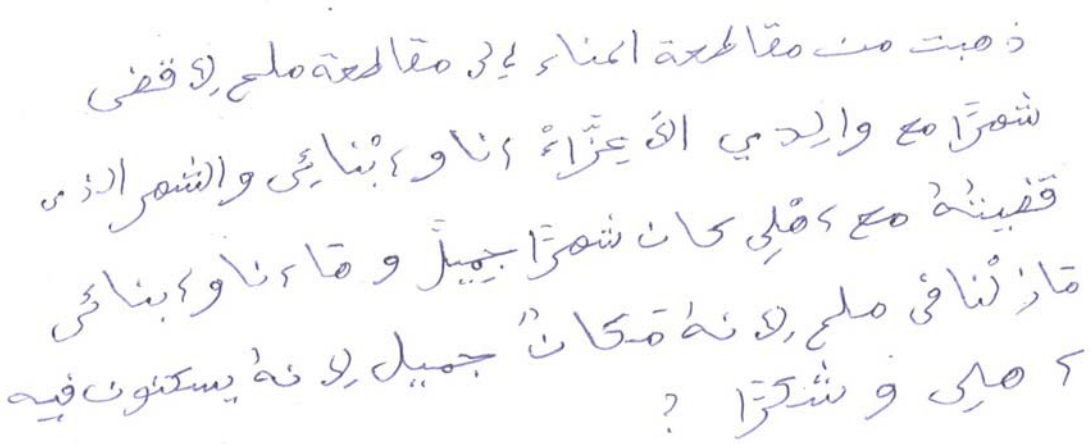


Figure 3. Arabic Essay

This Arabic essay received a numerical value of 156.

Figure 4. Dictation

This is an example of dictation for the words *sun, water, city.* The dictation was graded differently from the essays. Here, each correct letter received 1 point. This student's dictation received a numerical value of 8 of 12.

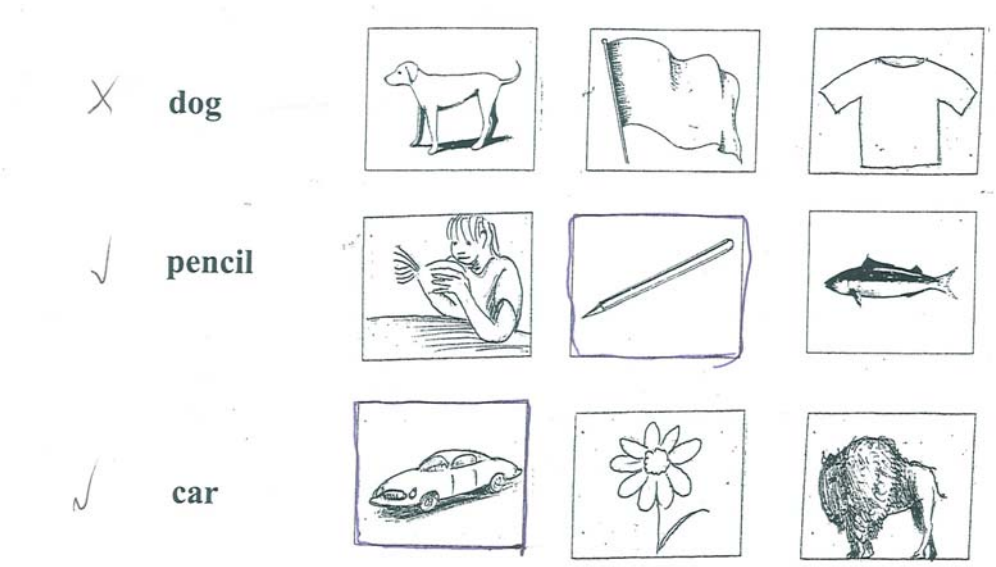


Figure 5. English Lexical Access

This is an example of the English Lexical Access quiz with 2 of 3 correct. Each correct answer equaled 3 points for a perfect score of 30 on the lexical access quizzes.

Figure 6. English Essay Answer

This example of an English essay answer received a numerical value of 18. The words spelled correctly but without context each received 2 points.

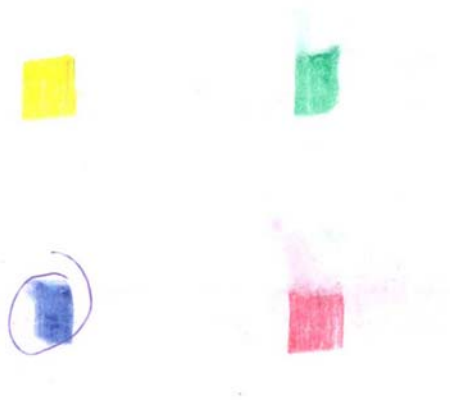


Figure 7. Stroop's Test.

This is an example of an incorrect Stroop's test. The word *ahmar* (red) was shown to the student for 3 seconds. The student was to circle the color which represented the meaning of the word.

Results

Explanation

The study began with only 30 participants because I felt it was the maximum number of students which could be taught while maintaining a relatively equal presentation of the English lesson material. The data from all subjects records the variation from some students with less than perfect attendance. I consider the data resulting from subjects missing les than or one class to be the most accurate regarding skills transfer from L1 to L2.

Observations

Observations from the Classroom

In addition to the numerical data obtained from the evaluation, several notable observations were made in the classroom and on the quizzes which are recorded here.

April 5th, 2006 Wednesday

First day of class. 29 students attended the two classes. The students are attentive and seem to enjoy the learning activity. It is very clear that there is a vast difference in the progress of those who are literate in Arabic and those who are not. (It is interesting that the vast difference in learning ability was noticeable from the first class.)

April 6th, 2006 Thursday

Second day of classes. All 15 students attended the morning class. We are progressing well. Students are happy to study. Again, there is a very apparent difference in the progress of those who are literate and those who are not. Learning for the literate is fairly easy, while for the illiterate progress is a struggle.

April 11th, 2006

A student made a mistake reading from the blackboard today, reading the word *on,* as *no,* twice. This is likely related to her Arabic reading skills interfering (Arabic reads right to left). This is the only time I have noticed a mistake in reading direction.

April 12th, 2006

Today I noticed that when the same student referred to above wrote the equals sign =, the lines were written right to left.

April 13th, 2006

4 of 5 students who read from the board today read *no* as *on*. We have already studied the word *on*. *No* is a new word.

Also, outside of class, 8 year old Mohammad, who was visiting the classroom between classes, wrote on the blackboard. He was showing me that he was learning the Latin letters. He began writing the alphabet from right to left, as in Arabic. This is what he wrote:

Also, a student in class reading words from the blackboard stumbled over the letter *n* and read *nun*. *Nun* is the name for the Arabic letter which sounds like *n*.

Final Quiz and Questionnaire Results

The instruments used in the research were studied and the data recorded. This data was later organized in various sequences. These tables of data were then used to analyze the results by using the statistical analysis software Minitab.

The tables of data obtained from the study are found in Appendix D. First is the data ordered by the Arabic lexical access scores. Second, the data is ordered by total hours of Arabic education, noting the grouping of the hours according to 0-3 years, 4-6 years and 7-9 years of Arabic education. Third, the data from subjects missing less than or only one class is recorded. Fourth, this data is ordered according to Arabic lexical access scores, dividing the data into lower and higher scores. Fifth, this data is ordered according to the total hours of Arabic education. Tables 6 and 7 record the hours in the Mauritanian school system, showing the hours per school year. The information in Table

6 is the information obtained from the students who studied prior to the government reform of 1999. Subsequent to this reform, the government guidelines for classroom hours are shown. Finally, Table 8 records all the data obtained from the study.

Observation from an Essay

The following was written by a student for the English essay from their own life and experience.

Figure 8. English Essay Answer

It appears the intended text is *Fatimatu sad?*. Arabic does not require the verb *to be* in this sentence. This person's name is *Fatimatu.* Notice the missing unstressed vowel. In Arabic, short vowels are only written in a few instances.

Some of these observations reflect some influence of Arabic literacy skills interfering with the learning of English literacy. While such experiences are not rare, I did not observe interference being a great hindrance but seemed to represent a very small influence in comparison to the great deal of ability which is obviously transferred.

Analysis

The one month long research project included three and a half weeks of English instruction after which the participants were quizzed on the English they learned. In a scatterplot, each data point represents a value on the vertical axis and a value on the horizontal axis. Observation will be made first of all the data obtained from the project and second of the data from participants missing no more than one class.

Analysis of All Subjects

The comparison of the Arabic lexical access scores with the English proficiency scores obtained all the subjects completing the project displayed in Figure 9 suggests there is a relationship between better Arabic lexical access scores and success in learning English literacy. The English proficiency score is a total of the results for the English lexical access quiz, the five minute English essay and the 3 words of dictation. The scores obtained from the ten word Arabic lexical access quizzes displayed in the graph reveal that students who had 9 of 10 words correct were able to learn more English during the month of classes. Using the horizontal axis for the English quiz results, it is hypothesized that the result of a line moving upward to the right indicates a general increase in English ability. It is hypothesized that a rapid increase in English scores will indicate a more rapid transfer of Arabic literacy skills at that point. The greatest success in English literacy proficiency came from participants who scored 27 or 30 (90% or 100% correct) on the Arabic lexical access quiz. This result suggests the possibility that L1 lexical access skills are a predictor of success in L2 literacy.

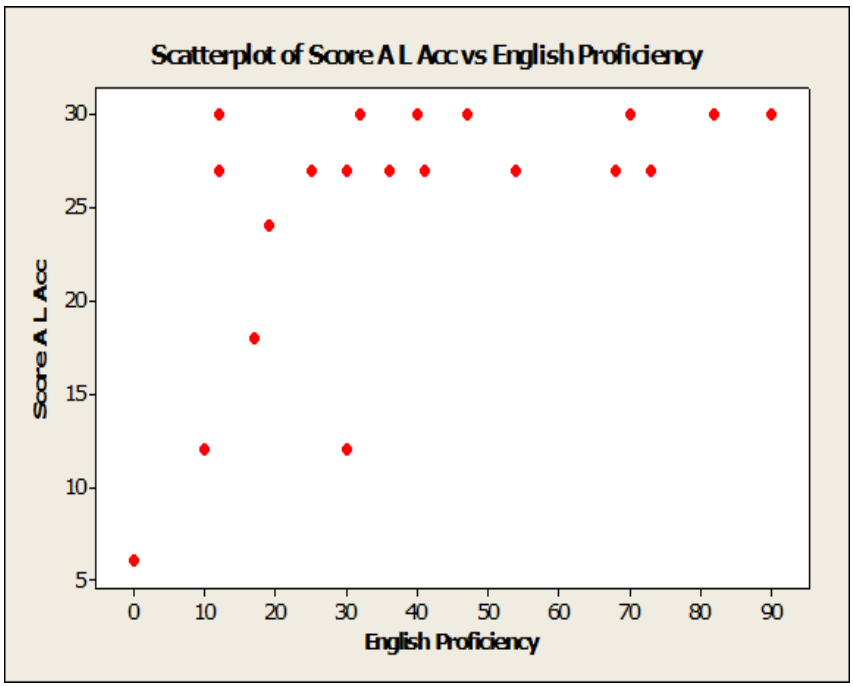


Figure 9. Relationship between Arabic Lexical Access Score and English Proficiency Score—All Subjects

There is a need for more data to confirm this possibility. In order to confirm the results, a more difficult Arabic lexical access quiz is needed in order to obtain more data from participants scoring less than 90% correct on the quiz. The number of subjects scoring less than 27, or 90% correct on the Arabic lexical access quiz is low: n = 5. With a more difficult Arabic lexical access quiz, this number would likely increase and the large number of subjects scoring 27 and 30, 90 and 100% correct, would likely decrease. This result could possibly confirm whether high Arabic skills can predict better L2 English acquisition. While the present results indicate high Arabic skills are needed for better L2 English literacy acquisition, they also show some subjects with high Arabic lexical access scores not acquiring more English.

A similar relationship is exhibited between the Arabic lexical access scores and the English lexical access scores in Figure 10. The graph displays the relationship between the Arabic lexical access quiz scores and the English lexical access quiz scores. The Arabic lexical access scores of 27 (90% correct) and 30 (100% correct) correspond with a greater movement along the horizontal axis indicating quicker and

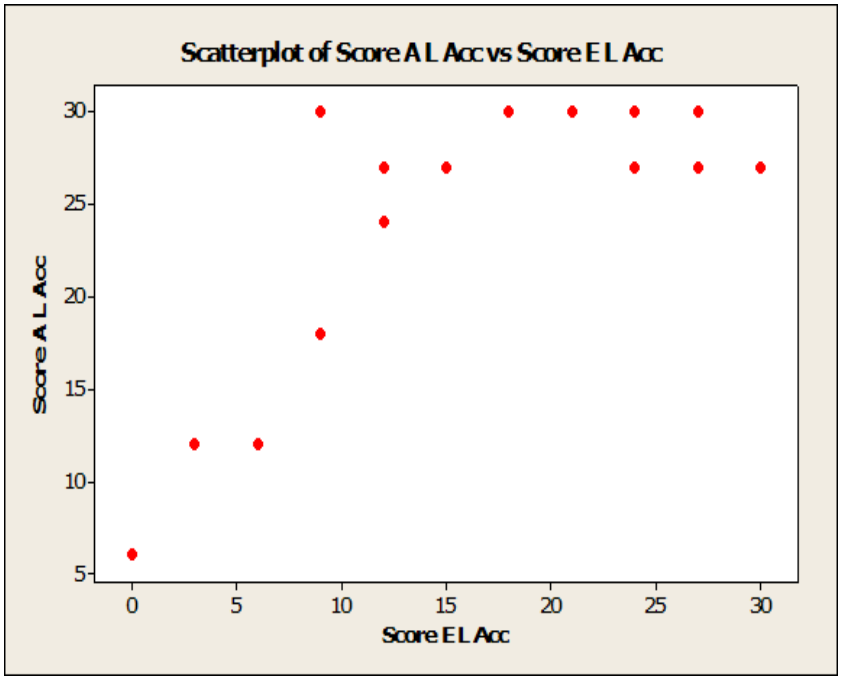


Figure 10. Relationship Between Arabic Lexical Access Scores and English Lexical Access Scores-All Subjects

easier transfer of skills. The data points suggest the possibility that lexical access skills are transfered more rapidly when the L1 lexical access score is 90% or more correct. As mentioned in the discussion of Figure 9, there is a need for more data. The number of subjects scoring less than 90% correct are too few: n = 5. The number of subjects scoring 90% and 100% correct are too many: n = 10. The distribution of subject's scores

in Figure 10 suggest the possibility that Arabic lexical access scores of 90 and 100% correct indicate a more likelihood of greater success in English lexical access. This is true for 6 of the 10 subjects with these scores. There were 4 subjects who did not have noticeably greater success in English lexical access scores. A more difficult Arabic lexical access quiz is needed to form a finer distribution of subject's scores.

In Figure 11 the Arabic lexical access scores are divided into three groups. Group 1 includes the scores of students having 0-3 years of Arabic education; Group 2 includes the scores of students having 4-6 years of Arabic education; and Group 3 includes the scores of students having 7-9 years of Arabic education. Groups 2 and 3 generally consist of scores of 27 and 30, equivalent to 90% and 100% correct. (There is one score of 12, 40% correct, in Group 3.) By combining observations from Figure 10 with these observations, the data suggest that students with 4 years or more of Arabic education will be more likely to benefit from transfer of lexical access skills from L1 to L2. The data in Figure 11 display information obtained in the questionnaires regarding hours of education prior to the government guidelines of 1999. In Figures 11 and 12, the single subject in group 3 scoring 12 on the Arabic lexical access quiz mistakenly circled two pictures on four of the ten words, thus reducing the score. In each case, one of the two circled pictures was correct.

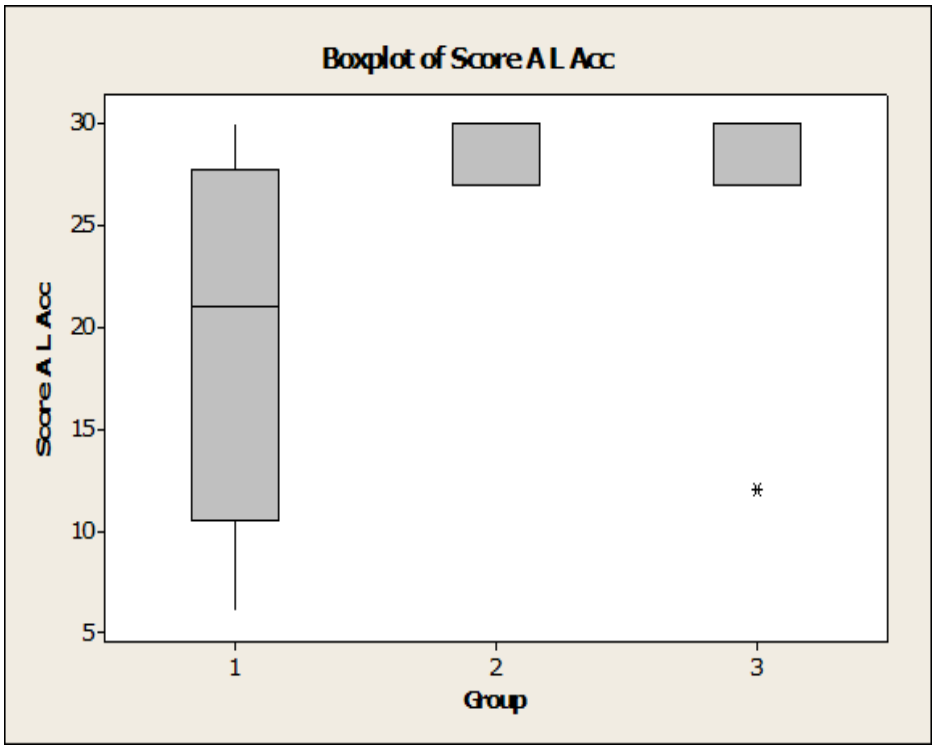


Figure 11. Arabic Lexical Access Scores from the 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects

Figure 12 displays the three groups divided according to the hours of study in the school system, according to the government guidelines of 1999. The division of data, according to the groups 1, 2, and 3, is found in Table 2, and the different hours of study in the school system's pre-government guidelines of 1999 and post government guidelines of 1999 are found in Tables 6 and 7. The discussion of the different hours in the Mauritanian school system after the 1999 reforms is included here because of the context in which this study was carried out.

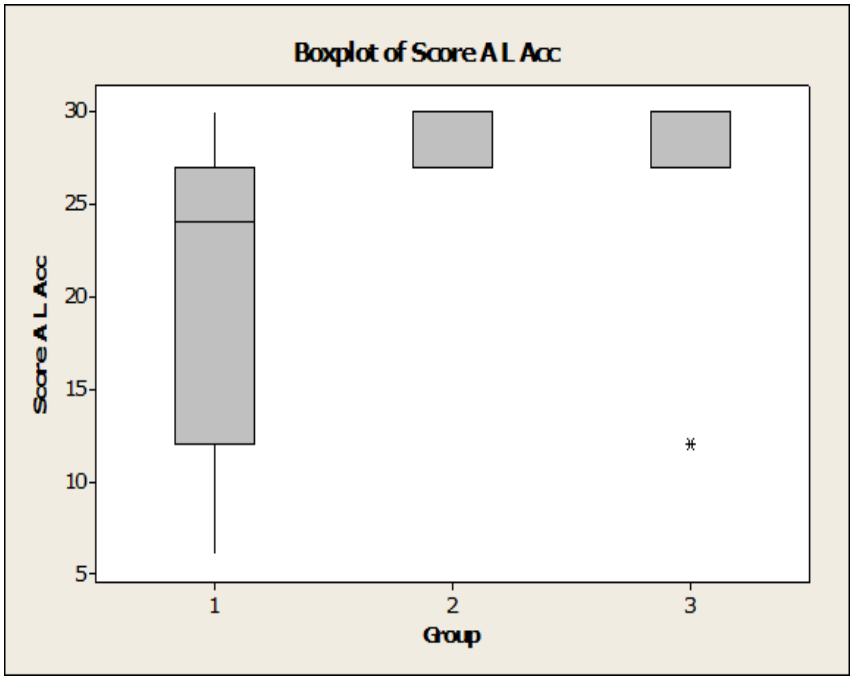


Figure 12. Arabic Lexical Access Scores from the 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects Gov Guidelines for Classroom Hours

Figure 13 compares the sum of all the scores of the Arabic and English quizzes and texts. These sums are referred to as "Proficiency Scores." This comparison suggests a general transfer of literacy skills from Arabic to English. Generally speaking, as Arabic reading and writing ability increases, the amount of English learned also increases. The apparent counter example to this observation represented by the student with the highest Arabic proficiency score, 228, (subject N) only achieving an English proficiency score of 25, can be explained by observing in Table 8 that this student only attended 9 of the 18 English classes.

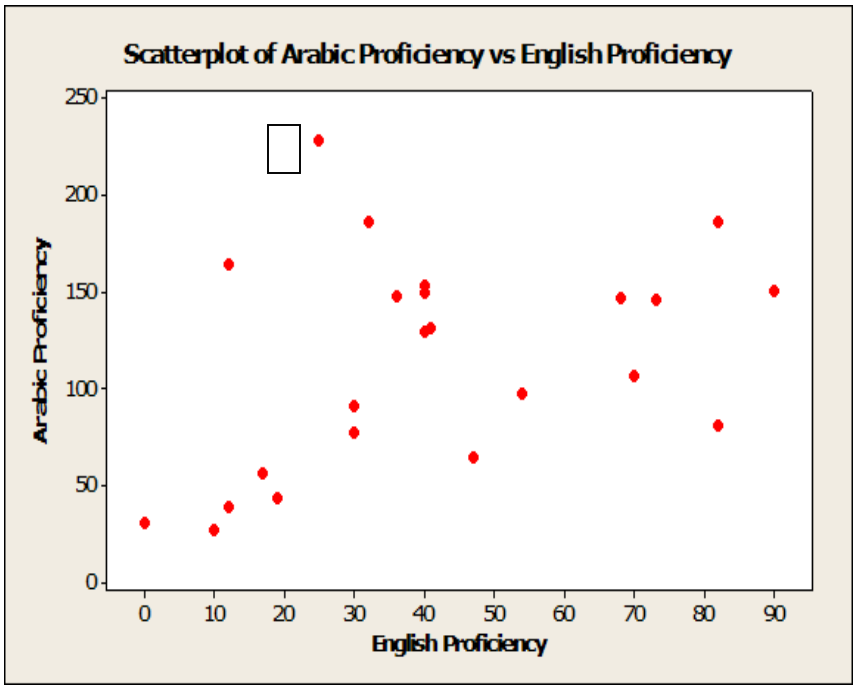


Figure 13. Relationship between Arabic Proficiency Scores and English Proficiency Scores—All Subjects

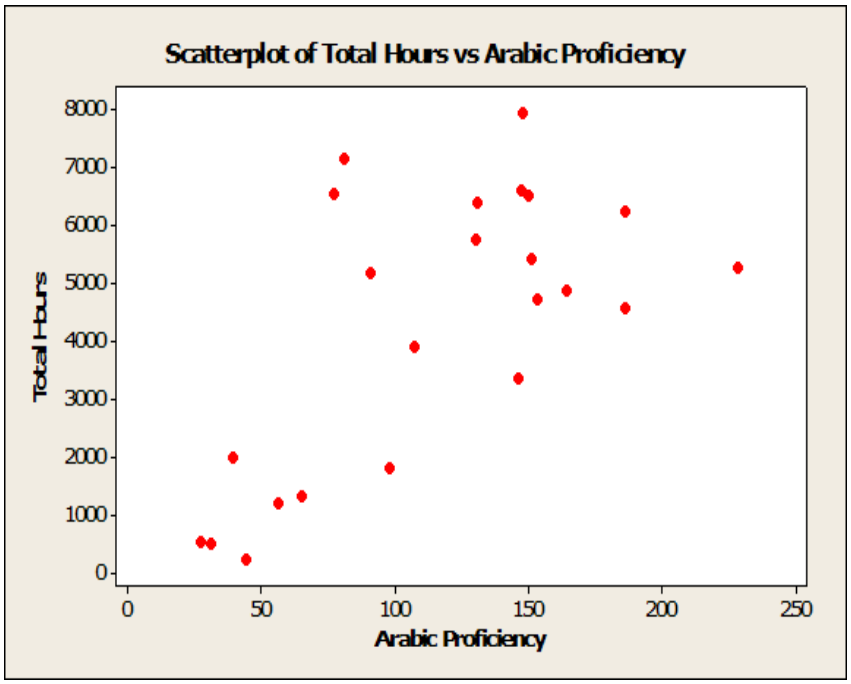


Figure 14. Relationship between Hours of Arabic Study and Arabic Proficiency Scores--All Subjects

Figure 14 suggests a general increase in Arabic skills as time spent studying Arabic increases. Data from Table 8 is graphed comparing the total hours of Arabic study, formal and informal, with the sum of the scores achieved on the Arabic lexical access quiz and the 5-minute Arabic essay, here called the Arabic Proficiency score. The data regarding the total hours of Arabic study were obtained from the questionnaire found in Appendix B. Figure 14 differs from Figures 11 and 12 by including the Arabic essay in the proficiency score and also by looking at the time spent studying Arabic in a linear fashion and not grouping the subjects.

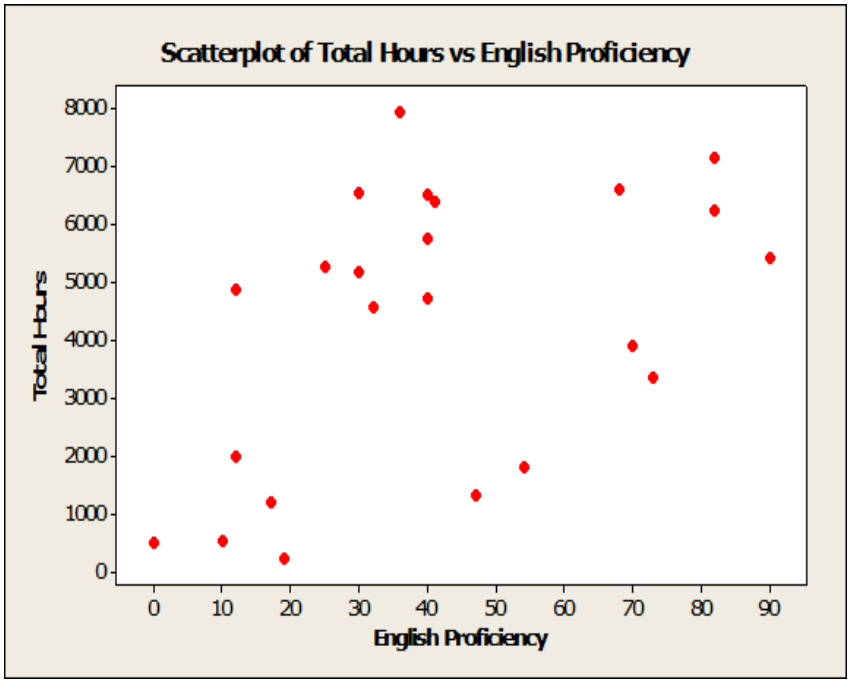


Figure 15. Relationship between Total Hours of Arabic Study and English Proficiency Scores—All Subjects

Figure 15 compares the total hours of Arabic study with the sum of the English scores achieved on the English lexical access quiz, the 5-minute English essay, and the English dictation. The graph displays a general increase of English scores accompanying more hours spent in Arabic study. A t-test comparison of the English proficiency scores obtained by students with 2000 hours of Arabic study or less with English proficiency scores obtained by students with 3000 hours of Arabic or more results in a p value of .02, demonstrating that the amount of English learned by the two groups was statistically significant.

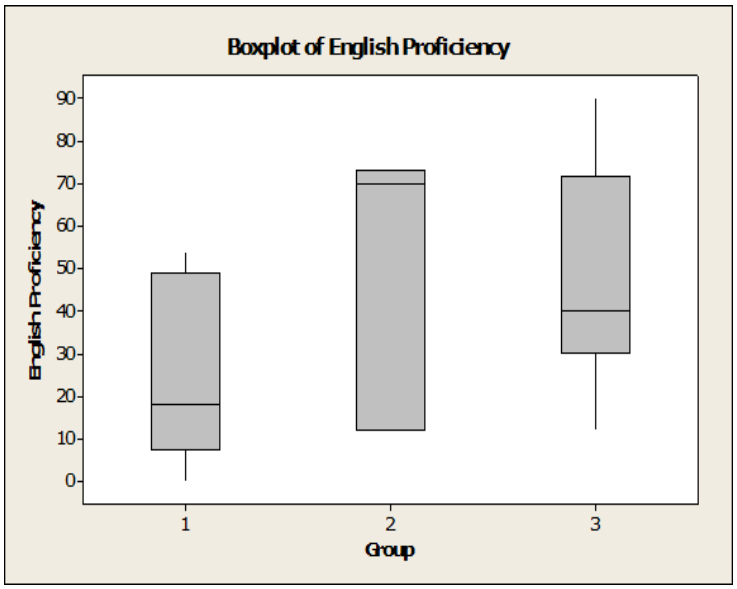


Figure 16. English Proficiency Scores from 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects

Figure 16 divides the English proficiency scores of participants into three groups based upon the information obtained in the questionnaire found in Appendix B and included in Table 6. Group 1 includes the students who have studied 0-3 years of Arabic,

group 2 includes the students who have studied 4-6 years of Arabic, and group 3 includes the students who have studied 7-9 years of Arabic. The graph demonstrates that groups 2 and 3 learned more English than group 1.

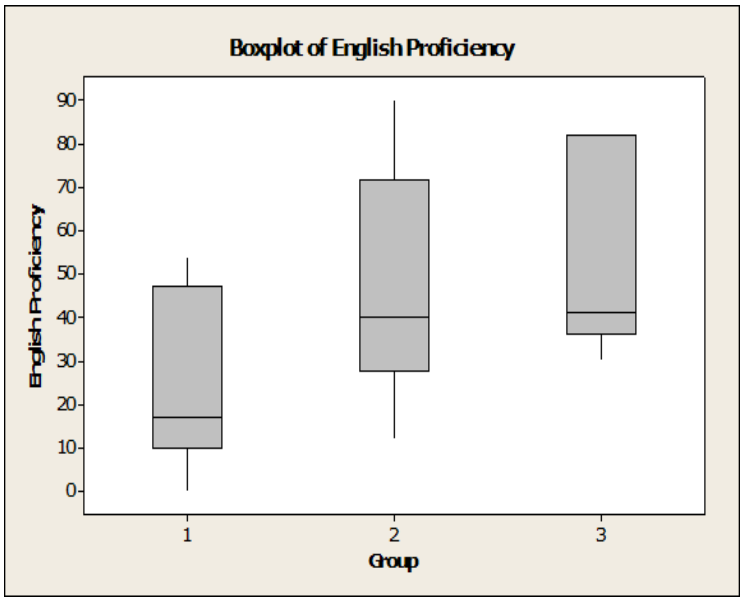


Figure 17. English Proficiency Scores from 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects Gov Guidelines for Classroom Hours

Figure 17 divides the English proficiency scores from participants into three groups based upon the government guidelines of 1999. This information is found in Table 7. Group 1 includes the students who have studied the equivalent of 0-3 years of Arabic, group 2 includes the students who have studied the equivalent of 4-6 years of Arabic, group 3 includes the students who have studied the equivalent of 7-9 years of Arabic. The graph demonstrates that groups 2 and 3 learned more English than group 1. The graph in Figure 17 also demonstrates that there is an observable difference in the improvement

between groups 1 and 2 and the improvement between groups 2 and 3. A further analysis of this observable difference is found in the t-test section accompanying Tables 9 through 12. This supports the hypothesis previously stated that there should be a certain point in the study of L1 where learning of L2 becomes noticeably easier.

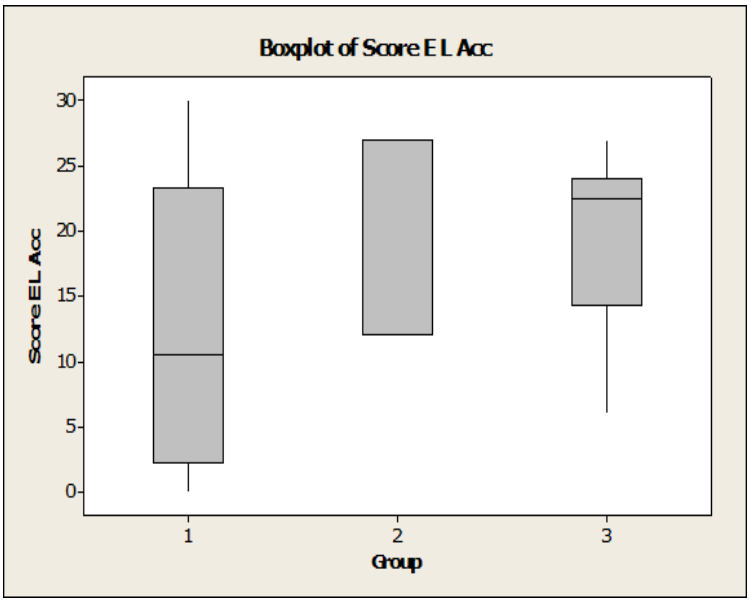


Figure 18. English Lexical Access Scores from the 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects

Figure 18 divides the English lexical access scores from participants into three groups based upon information obtained from the questionnaire found in Appendix B and listed in Table 6. There is a noticeable improvement in the English lexical access skills transferred/learned by participants in group 2 over participants in group 1. This supports the hypothesis that there is a certain point in L1 study where learning of L2 noticeably improves. The data suggest that there is noticeable improvement in L2 lexical access skills acquisition after 4 years of L1 learning. The points of data in the graph extend all the way to the ends of the vertical lines. The box for group 3 is pictured lower than the

box for group 2 as a result of a higher number of subjects in group 3. Group 2 has only 3 subjects, 2 scored 27 (90%). Group 3 has 14 subjects, 2 scored 27 and 5 scored 24.

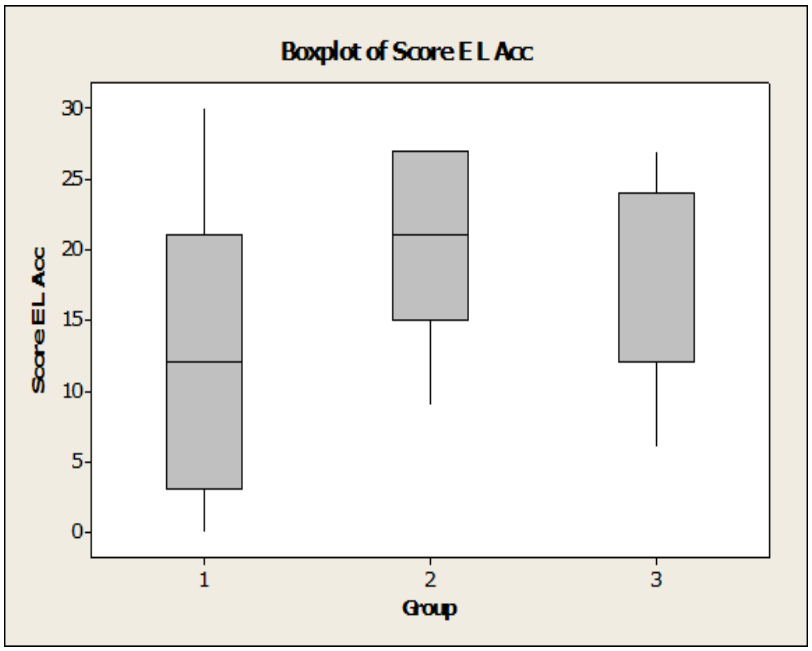


Figure19. English Lexical Access Scores from 0-3, 4-6, and 7-9 Years of Arabic Study—All Subjects Gov Guidelines

Figure 19 divides the English lexical access scores from participants into three groups based upon the government guidelines of 1999 listed in Table 7. The graph demonstrates a noticeable improvement in the learning of English lexical access skills transferred/learned by group 2 over group 1. This again supports the hypothesis that there is a certain point in L1 study where learning of L2 becomes noticeably improved. The data suggest that there is noticeable improvement in L2 lexical access skills acquisition after 4 years of L1 learning. The lower box for group 3 in Figure 19 is a result of a low

number of subjects in group 3. 2 of the 4 subjects in group 3 had poor attendance in the English classes.

By graphing the scores of the Arabic text on the vertical axis and the scores of the English text on the horizontal axis as in Figure 20, we see that there is a general transfer of Arabic literacy skills to English literacy. As Arabic text scores increase, there is a general increase in English text scores. There are more points of data toward the

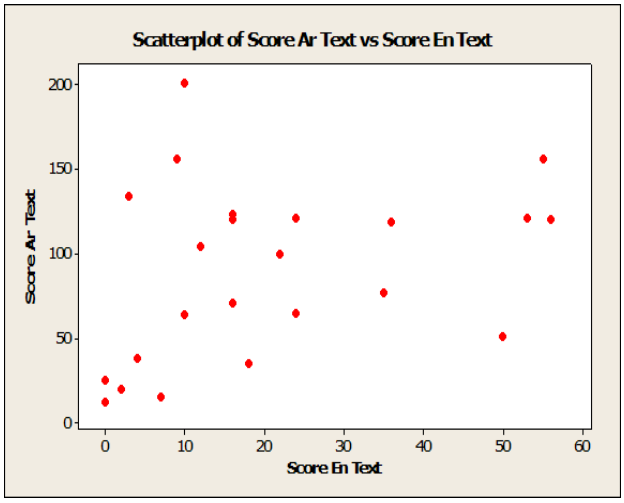


Figure 20. Relationship between Scores for Arabic Text and for English Text-- All Subjects

vertical axis, indicating that the skills needed to write English text tend to transfer more slowly rather than more quickly. Literacy skills needed to write English text tend to be more difficult to transfer. By testing particular literacy skills in L1 and comparing them with literacy skills in L2, as done here, we can observe if the particular skill is transferring more slowly and with more difficulty or more quickly and easily from L1 to L2. Also, it can be seen if there is a point where skills begin transferring easier and faster. In this graph there are more data points closer to the vertical axis until a score of

approximately 120 on the Arabic text, when data points begin moving more rapidly along the horizontal axis.

Analysis of Subjects Missing No More than One Class

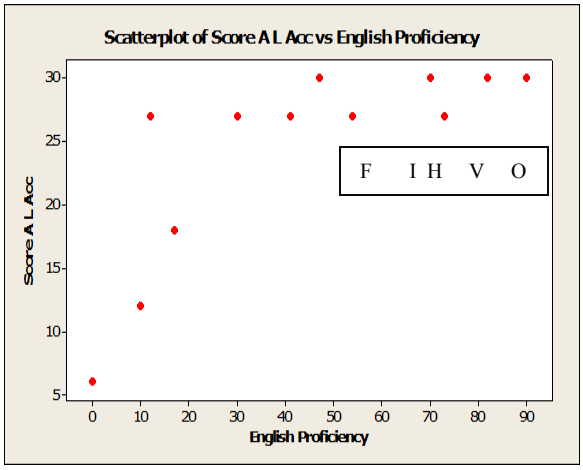


Figure 21. Relationship between Arabic Lexical Access Scores and English Proficiency Scores—Subjects Missing ≤ 1 Class

Figure 21 graphs the same relationship as is pictured in Figure 9, 21 using only data from participants who had perfect attendance or missed no more than one class period. Data suggest that English learned improves as Arabic lexical access scores improve. The graph demonstrates noticeable improvement in English proficiency scores by five of the participants, subjects F, I, H, V, and O, who scored 27 and 30 (90% and 100% correct) on the Arabic lexical access quiz. This data suggest the possibility that participants scoring 90% or more correct on the Arabic lexical access quiz will have a greater likelihood of success in learning English as a second language. These results would need to be confirmed by obtaining data as discussed previously with Figures 9 and 10. The data from subjects missing less than or only one class suggest more strongly that higher lexical access scores indicate a more likelihood of greater success in English proficiency acquired. Of the scores with 90% and 100% correct, n = 9, 7 of these subjects learned noticeably more English. The number of scores below 90% are too few:

n = 3. Again, a more difficult Arabic lexical access quiz is needed to show a finer distribution of scores in order to confirm what these results suggest as a possibility.

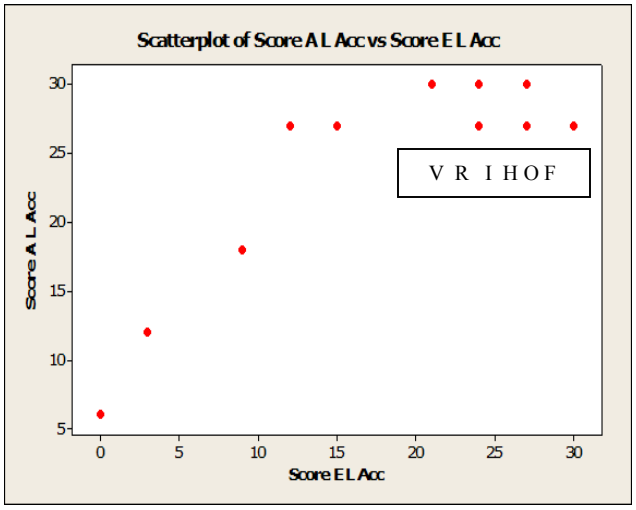


Figure 22. Relationship between Arabic Lexical Access Scores and English Lexical Access Scores—Subjects Missing ≤ 1 Class

Figure 22 demonstrates the same relationship as graphed in Figure 10, 22 using only data from participants who missed no more than one class period. The data in Figure 22 suggest that English lexical access skills improve/transfer as Arabic lexical access skills improve. Six of the nine scores of 27 or 30 (90% or 100% correct) have noticeably improved English lexical access scores, subjects R, H, F, V, I, and O. This suggests the possibility that Arabic lexical access scores of 90% or 100% are more likely to transfer/aid in English lexical access skills. This possibility needs to be confirmed by obtaining more data as discussed with Figure 21. Figure 22 suggests again that higher lexical access skills indicate a greater likelihood of learning noticeably more English. Of

those with scores of 90 and 100% on the Arabic lexical access quiz, n = 8, 6 have noticeably higher English lexical access scores.

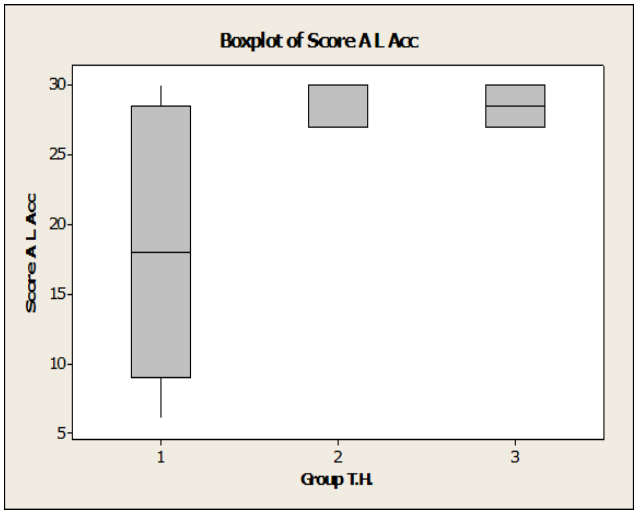


Figure 23. Arabic Lexical Access Scores from the 0-3, 4-6, and 7-9 Years of Arabic Study Groups—Subjects Missing ≤ 1 Class

Figure 23 divides the scores on the Arabic lexical access quiz into three groups based on the information obtained from the questionnaire in Appendix B, using only scores from participants who missed no more than one class period or missed no class periods. The data suggest that participants who had four or more years of Arabic study obtained scores of 27 or 30 (90% and 100% correct) on the Arabic lexical access quiz. This observation is relevant because students scoring 90% and higher on the Arabic lexical access quiz were more likely to demonstrate an observable increase in English.

Figure 24 graphs the same relationship as is graphed in Figure 13 showing the relationship between Arabic Proficiency Scores and English Proficiency Scores, using only data from participants who missed no more than one class period. The data suggest a

general improvement in English learning and Arabic literacy skills transfer as Arabic literacy skills improve.

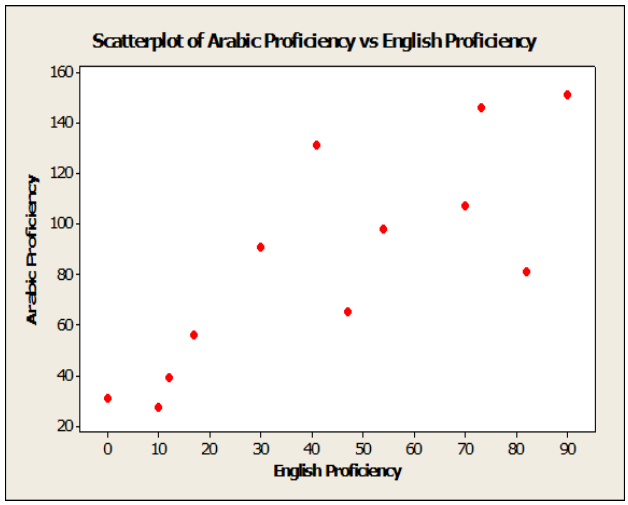


Figure 24. Relationship Between Arabic Proficiency Scores and English Proficiency Scores—Subjects Missing ≤ 1 Class

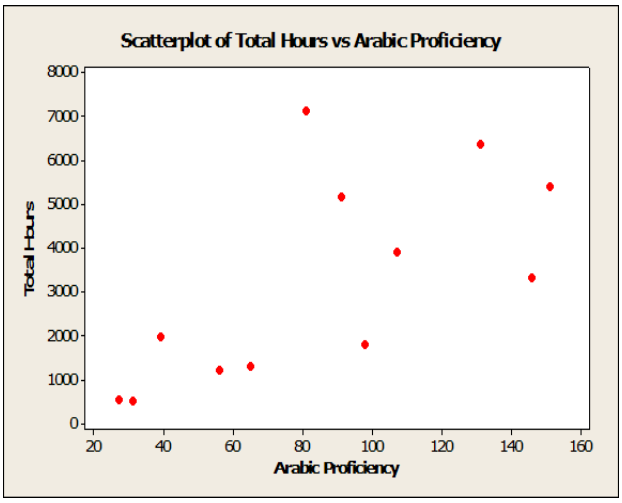


Figure 25. Relationship between Total Hours of Arabic Study and Arabic Proficiency Scores—Subjects Missing ≤ 1 Class

Figure 25 graphs the same relationship as is graphed in Figure 14, using only data from participants who missed no more than one class period. The data suggest a general improvement in English learning and Arabic literacy skills transfer as Arabic literacy skills improve.

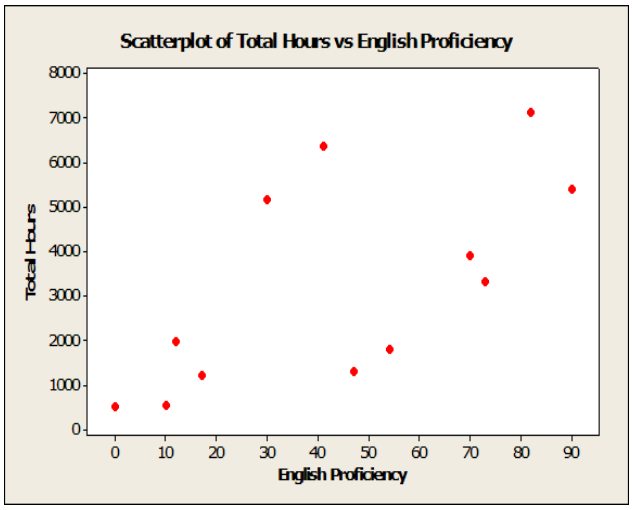


Figure 26. Relationship between Total Hours of Arabic Study and English Proficiency Scores—Subjects Missing ≤ 1 Class

Data in Figure 26 show a general improvement of English literacy skills with participants who had more time in Arabic study. The information represented in Figure 26 is similar to the data graphed in Figure 15, showing only data from students missing no more than 1 English class.

Figure 27 graphs the same groups of data as is pictured in Figure 16, using only data from participants missing no more than one class period. The data suggest a general improvement in L2 English learning/skills transfer by participants who had studied longer in Arabic.

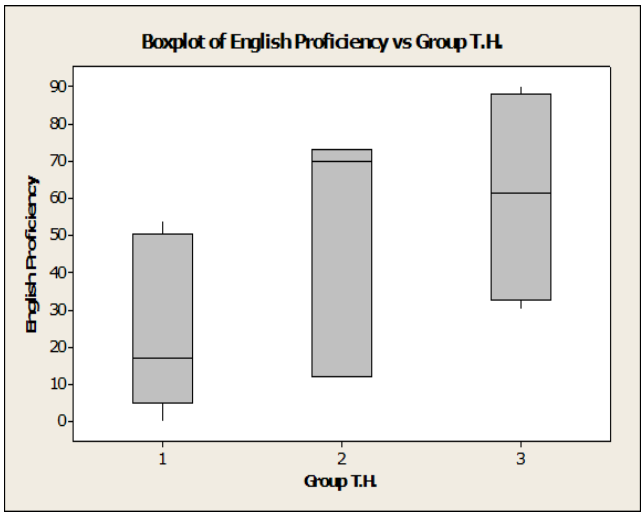


Figure 27. English Proficiency Scores from 0-3, 4-6, and 7-9 Years of Arabic Study—Subjects Missing ≤ 1 Class

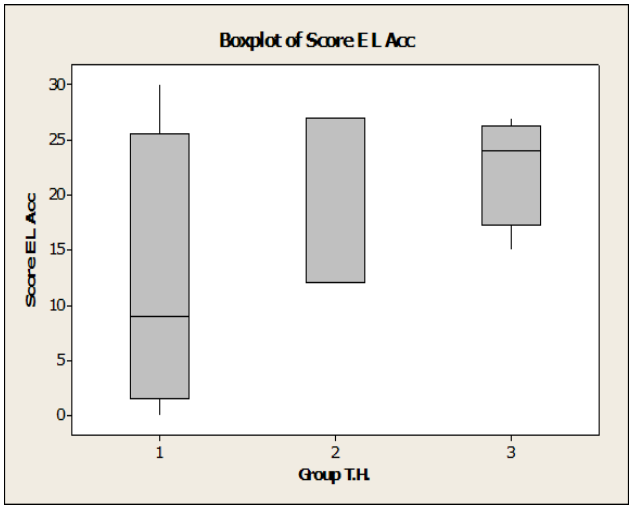


Figure 28. English Lexical Access Scores from 0-3, 4-6, and 7-9 Years of Arabic Study— Subjects Missing ≤ 1 Class

Figure 28 above graphs the same relationship as is graphed in Figure 18, using only data from participants missing no more than one class period. The data suggest a general increase in English learning and transference of literacy skills with more time in Arabic study.

t-Tests

A t-test is a comparison of two sets of data to determine whether differences between them are statistically significant or could be the result of chance. If the t-test results in a value for p which is less than .05, the differences in the two sets of data are statistically significant, indicating that the cause of this difference is probably the reason set forth in the hypothesis. Lawrence Davis (1990) provides clear instructions for doing t-tests and recommends using a particular t-test for studies involving less than 30 subjects (p. 30-31).

The following t-tests analyze the differences between the English Proficiency Scores obtained by two groups of subjects. The first grouping of English Proficiency Scores compared are those of the participants having 0-3 years of Arabic study with those of the participants having 4-9 years of Arabic study. The hypothesis we are exploring in this research is that there will be a point at which the learning of English literacy skills will be noticeably aided by the Arabic literacy skills already learned. This implies the transfer of literacy skills from Arabic to English. The comparison of the hours of Arabic study with the English Proficiency Scores as seen in Figures 15, 16 and 17, suggests that there is noticeable improvement in learning English literacy after at least 3240 hours of Arabic study. For group 1, participants having 0-3 years of Arabic study, $n = 7$. For group 2, participants with 4-9 years of Arabic study, $n = 16$. In this case $p = 0.02$. Since p is les than 0.05 we conclude the difference in the scores from the participants with 0-3 years of Arabic study and the participants having 4-9 years of Arabic study is statistically significant.

In order to further clarify the significance of this observation, a t-test was done comparing English Proficiency Scores obtained from the students having 0-6 years of Arabic and the English Proficiency Scores of the students having 7-9 years of Arabic. For group 1, participants with 0-6 years of Arabic study, n = 9. For group 2, participants with 7-9 years of Arabic study, n = 14. In this case p = 0.35. Since 0.35 is greater than 0.05, the different may be due to chance. We cannot conclude that the difference between the amount of English learned by the students having 0-6 years of Arabic and the students having 7-9 years of Arabic is significant.

The results of the previous two t-tests suggest that participants having four years of Arabic study or more had literacy skills in L1 Arabic which aided significantly in the learning of L2 English. Several more comparisons have been done in an effort to add further evidence of the transfer of literacy skills at a point where the skills have been sufficiently developed. The following comparison uses data from the students who missed no more than one class over the 3 ½ weeks of English study. Group 1 is the English Proficiency Scores from students with 0-3 years of Arabic study, n = 6. Group 2, is the English Proficiency Scores from students with 4-9 years of Arabic study who missed no more than one class over the 3 ½ weeks of English study, n = 6. In this case p = 0.01. Since 0.01 is less than 0.05, we can conclude that the difference between the two groups is statistically significant.

The following comparison focuses on the Arabic lexical access scores by dividing the participants into two groups. Group 1, the lower group, obtained 0-80% correct on

the Arabic lexical access quiz. Group 2, the higher group, obtained 90-100% correct on the Arabic lexical access quiz.

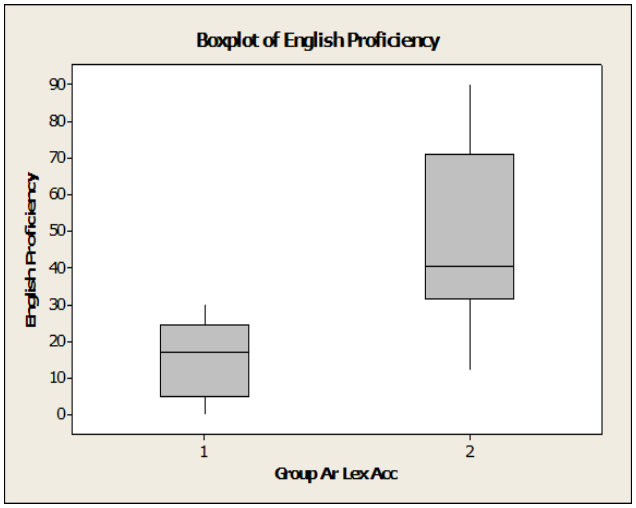


Figure 29. English Proficiency Scores of the Lower Group and the Higher Group of Arabic Lexical Access Scores—All Data

Figure 29 compares the English proficiency scores of participants with 0-80% correct on the Arabic lexical access quiz (Group 1) and English proficiency scores of participants with 90-100% correct on the Arabic lexical access quiz (Group 2). This comparison demonstrates the greater amount of English learned by participants scoring 90-100% correct on the Arabic lexical access quiz. The data suggest that Arabic lexical access skills developed sufficiently transfer noticeably to English literacy. Also, the data suggest that Arabic lexical access skills which are developed sufficiently accurately predict success in L2 English learning. The t-test comparing groups 1 and 2 as graphed above result in a p value less than 0.01 indicating the difference is statistically significant.

Lexical access skills are a clear indicator of performance in L2 learning of English, and, therefore, it is recommended that they be used as a determining factor for the appropriate time for beginning the study of English.

In conclusion, observations made by scatterplot and bar graphs suggest literacy skills sufficiently developed in L1 Arabic transfer to L2 English learning. These observations have been confirmed through t-test comparisons of English proficiency scores obtained by participants having 0-3 years of Arabic study with English proficiency scores obtained by participants having 4-9 years of Arabic study. Comparisons with data from all the participants and also with data from participants who missed no more than one class period resulted in p values of .02 and .01. These studies suggest a notable difference in English performance between participants with at least 4 years of Arabic study and participants with 0-3 years of Arabic study. A further t-test was done comparing English scores of participants having 0-6 years of Arabic study with English scores of participants having 7-9 years of Arabic study resulting in a p value of .35 indicating no statistically significant difference between the English scores of the two groups. These studies suggest there is a point in L1 Arabic literacy skills development where the skills transfer to L2 English learning. This point corresponds in this study with at least 3240 hours of Arabic study. This number of hours corresponds with 5 years of study according to the participants and a little over 3 years of study according to the government guidelines of 1999.

A further t-test comparison was done focusing on lexical access skills. In this comparison English scores of participants scoring 0-80% correct in the Arabic lexical access quiz were compared with English scores of participants scoring 90-100% correct in the Arabic lexical access quiz. The difference between the groups was significant at a level of $p = 0.01$. This result suggests that L1 Arabic lexical which are sufficiently develop transfer to L2 English learning. Participants scoring 90-100% correct obtained notably better English scores.

CHAPTER IV

CONCLUSION

Results of Study

Data from this study as graphed in Figure 9, Figure 10, Figure 21, Figure 22, and Figure 29, suggest that lexical access skills which a student has learned in L1 successfully transfer to literacy in L2. Data as discussed following Figure 29 also suggest that lexical access skills in L1 can be used as a reliable predictor of successful L2 literacy acquisition. Participants in this study who had 9 of 10 correct or better on the Arabic lexical access quiz learned notably more English than participants who had less correct. Data as found in Table 2 in Appendix D and graphed in Figures 16-19, Figures 27 and 28 suggest that the level of L1 proficiency necessary for more successful transfer of literacy skills roughly corresponds with 3240 hours of study. In the data obtained from participants, this corresponds with five years of schooling, while according to the Mauritanian government guidelines enacted in 1999, this corresponds with just over three years of schooling. This lack of clarity exemplifies the benefit of using a predictor rather than years of schooling to indicate the best time to begin literacy in L2. In this case lexical access skills are recommended. Lexical access skills are universally used in comprehending written languages, are a vital skill in successful literacy, are an accurate predictor of ability to succeed in L2 learning, and are easily evaluated while the data

obtained is easily converted to numerical values. One drawback in using a simple lexical access quiz is the possibility of cheating being fairly simple. To avoid this, a number of lexical access quizzes should be created which would accurately record the student's skills while providing enough variety to prevent dishonesty.

Observations made during this research support Cummins' underlying proficiency theory of multilingualism.

Recommendations for Situations Involving a Language Continuum Such as Arabic Diglossia

In Arabic diglossia situations, the (L) variety has low status and is impermissible in formal educational settings. The same is often true where a continuum exists with a (L) and a (H) variety of the language. Since the laws regarding the use of Arabic do not pertain to the home, it is recommended that parents be taught the extreme importance of exposing their children to a high print environment in the colloquial language. It has been demonstrated that the single most important factor in the success of children in multilingual settings is parental involvement (Verhoevan and Aarts, 1998). It has also been demonstrated that if a child learns how to read three words or more before attending school, this can aid in learning for the duration of their education (Geva and Wade-Wooley, 1998). I recommend that parents be taught the efficacy of having a small library of literature in the colloquial language and have lesson material to instruct preschoolers in the home. Often parents themselves have limited literacy capabilities which limit them. As teachers of the vernacular in their home, however, they are uniquely qualified as no other to aid their children to prepare for schooling. I recommend that parents be encouraged to meet together in order to share teaching strategies and share materials.

This could easily be done in a neighborhood library, and it is recommended that small libraries be started which focus on colloquial literature, preschool lesson material and simple Arabic (H) texts. The law does not forbid colloquial literature in libraries, and I know that the Mauritanian government allows libraries as means of utilizing colloquial literature to help new readers. In rural areas lesson material and resources can be distributed using modern technologies to aid the mobilization of parents in their helping prepare their children for school.

Recommendations for Further Research

The need to raise the status of the (L) variety of Arabic is considered by me as vital to improve education in the Arab world. If a similar study as was done here were done where participants had studied in colloquial Arabic the results could be compared to the use of modern fusha, possibly demonstrating the efficacy of initial education in the colloquial. Also, similar studies could be done to research skills transfer with various combinations of languages including situations involving language continuums. Educators teaching English to speakers of other languages could be routinely trained to gather data from beginning students in English in order to research skills transfer from various languages. In doing this, a large amount of data could be obtained in a fairly brief amount of time. Longitudinal studies can be done to further research the nature of skills transfer. Studies following progress of classes below the level of more successful transfer of literacy skills and classes above the level of more successful transfer of literacy skills. Also, as noted by August, studies should be done to discover skills which

do not transfer from L1 to L2. By knowing these specific skills, teachers can be better prepared to teach.

APPENDICES

APPENDIX A

Consent Form

Skills Transfer in Biliteracy with Divergent Orthographies

You are invited to participate in a research study being done by Henry Hauser, Linguistics department, UND, under the supervision of Professor Xiaozhao Huang of the University of North Dakota, Linguistics department. The purpose of this research is to gain information on the transfer of literacy skills from a person's first language to their learning a second language when the writing systems of the two languages are different.

This study will help provide information and a greater understanding of the benefit of having literacy skills in a person's first language for aiding in the learning of a second language. The research involves correlating three sets of data obtained from students who have completed approximately one month of ESL training. The three sets of data refer to the participant's education in their first language, their literacy skills in their first language and their literacy skill in their second language (English). The obtaining of information from the participants involves answering a short questionnaire requiring about five minutes or less, two timed essays of five minutes each, taking a word recognition quiz of two lists of ten words and one list of eleven words. Total time commitment for participants should be under thirty minutes.

There are no foreseeable risks or discomforts to the participants.

A small gratuity will be given to participants who complete the study.

Participants will not be required to reveal any confidential information other than their name on the consent form. The questionnaire requests information concerning the participants amount of education in their first language only and can be obtained without association with the participants name. Any information from this study that can be identified with you (consent form) will remain confidential and will be disclosed only with your permission. All data and consent forms will be kept in separate locked cabinets for a minimum of 3 years after the completion of this study. Only the researcher, the advisor and people who audit IRB procedures will have access to the data. After 3 years the data will be shredded.

Participation is voluntary and your decision whether or not to participate will not change your future relations with the University of North Dakota. If you decide to participate you are free to leave the study at any time without penalty.

If you have any questions about the research, you may call Henry Hauser at 701-775-5053, or professor Xiaozhao Huang at 701-777-6475. If you have any other questions or concerns, please call the Research Development and Compliance office at 777-4279.

You will be given a copy of this consent form for future reference.

All of my questions have been answered and I am encouraged to ask any questions that I may have concerning this study in the future.

Participant's Signature	Date

سجل الرضوان

نقل مهارة القراء والكتابة بين اللغة الأولى واللغة الثانية وللغتين كتابتين مختلفتين

تطلب منك اشتراكك في بحث يتعلق بنقل مهارة القراء والكتابة بين اللغة الأولى واللغة الثانية وللغتين كتابتين مختلفتين. والذي يفعل هذا البحث هنري هاوزر، دائرة الوغويات، جامعة نورث دكوتا، تحت ناظر استاذ شياوشو حوان، من جامعة نورث دكوتا. وقصد البحث ربح معلومات حول نقل قدرة القراء من لغة الى لغة ثانية.

سيساعد هذا البحث بادرك اكبر حول استفاد معرفة القراء باللغة الأولى لتعليم بلغة ثانية. ويشمل البحث نسبة متبادلة من ثلاثة قومات من معلومات أدرك من تلاميذ لهم عربية كلغتهم الأولى ويدرسون لغة ثانية لها خط مختلف. وهذه القومات من المعلومات هي كتالي:

١) مبلغ التعليم في اللغة الأولى عن طريق أسئلة
٢) تقدم في القراء وا لكتابة باللغة الأولى عن طريق مقالة قصيرة واختبار عن معرفة كلمات
٣) تقدم في القراء والكتابة باللغة الثانية عن طريق مقالة قصيرة واختبار عن معرفة كلمات

أدرك المعلومات يلزم ٤٥ دقائق تقريبا.

ليس هناك أي عدم راحة أو خطر للمشترقين ينظر سبقا.

سنعطي جائزة صغيرة للمشترقين يكملون البحث.

ليس من الازم أن يخبروا المشترقين أي شئ سيري الا اسمكم على سجل الرضوان. تطلب الأسئلة معلومات بنسبة الى مبلغ تعليمهم بلغتهم الأولى فقط ليس من الضروري ان يشمل الأسم. سجلات الرضوان مع اسماء التلاميذ تكون محفوظة في صندوقين مغفولين لمدة ثلاثة

سنوات على أقل و بعد ذلك تهلك.

اشتراكك طوعي واختيارك ان كنت تشترق ام لا، لن تغير علاقتك مع جامعة نورث دكوتا. اذ اخترت ان تشترك في البحث تستطيع ان تخرج البحث في اي وقت بدون عقاب. اذ كانت عندك اي اسئلة تستطيع ان تسأل هنري هاوزر عنها.

سنعطيك نسخة بهذا السجل لاشارتك في المستقبل.

قد جاوبت كل اسئلي وافهم انك تشجعني على ان أسئلك عن أي أسئلة أخرة في المستقبل.

_____ _____

اسم المشترك التاريخ

University of North Dakota
Institutional Review Board
Approved on DEC 19 2005
Expires on NOV 30 2006

APPENDIX B

Instruments

Questionnaire
L1 Educational Experience

1. How many years of formal education in your first language have you had?

   <1 1 2 3 4 5 6 7 8 9 10 11 12

2. During this time, how many months of the year did you study in school?

   6 7 8 9 10 other_____

3. During this time, approximately how many hours a day did you study?

   4 5 6 7 8 other_____

4. Did you study at home?

   _____ no

   _____ a little

   _____ regularly

   _____ often

5. Was there encouragement at home for you to study?

   _____ no

   _____ a little

   _____ some

   _____ a lot

6. Did you study in your first language in other places besides school and the home?

أسئلة عن تعليمك بالـغة الأولى

١) بنسبة الى تعليم رسمي، كم من السنوات درست؟

أقل من ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠ ١١ ١٢

٢) خلال هذا الوقت، كم من أشهور السنة درست؟

٦ ٧ ٨ ٩ ١٠ _____

٣) خلال هذا الوقت، كم من الساعة يوميا درست، تقريبا؟

٤) هل درست في الدار؟

_____ لا

_____ قليلا

_____ عدتا

_____ كثيرا

٥) هل قبلت تشجيع ان تدرس في دارك؟

_____ لا

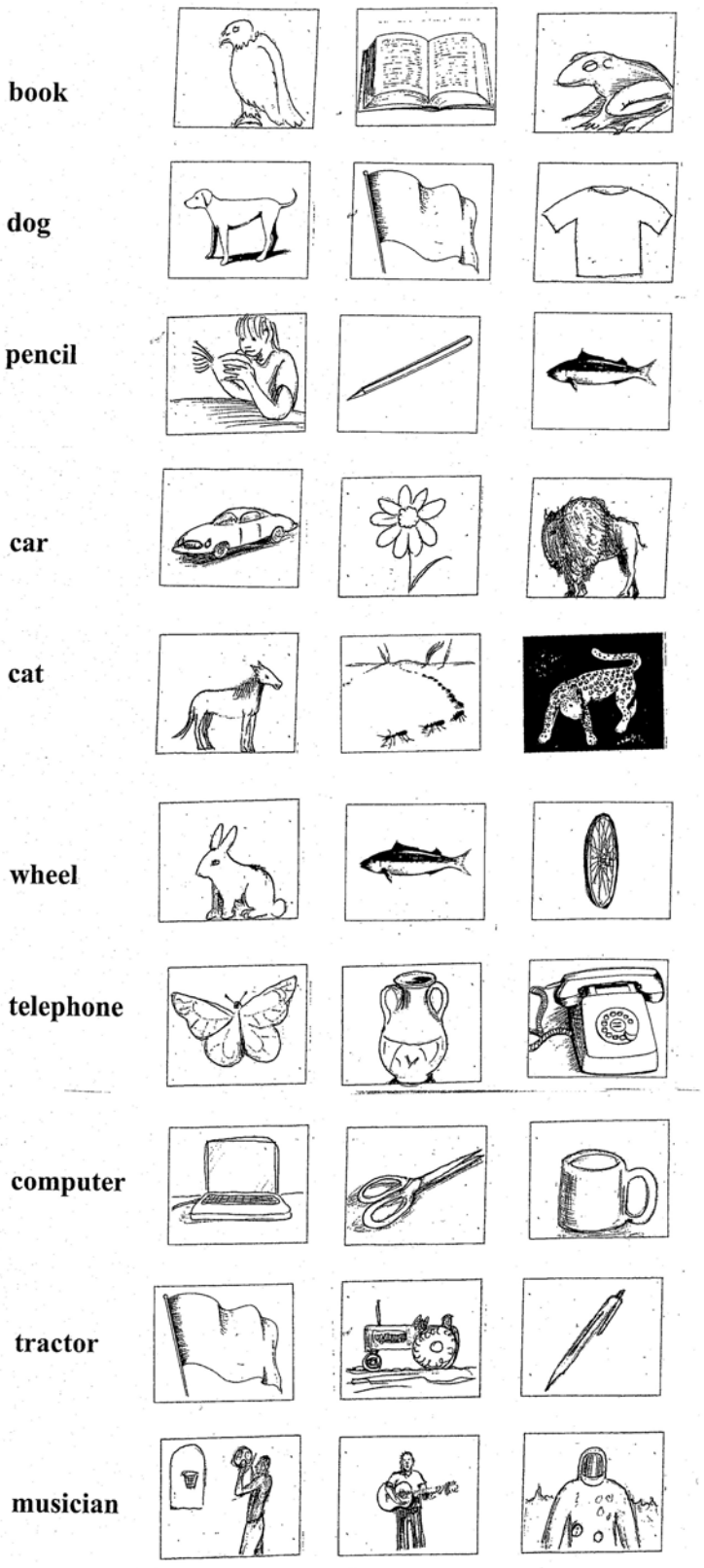
_____ قليل

_____ بعض

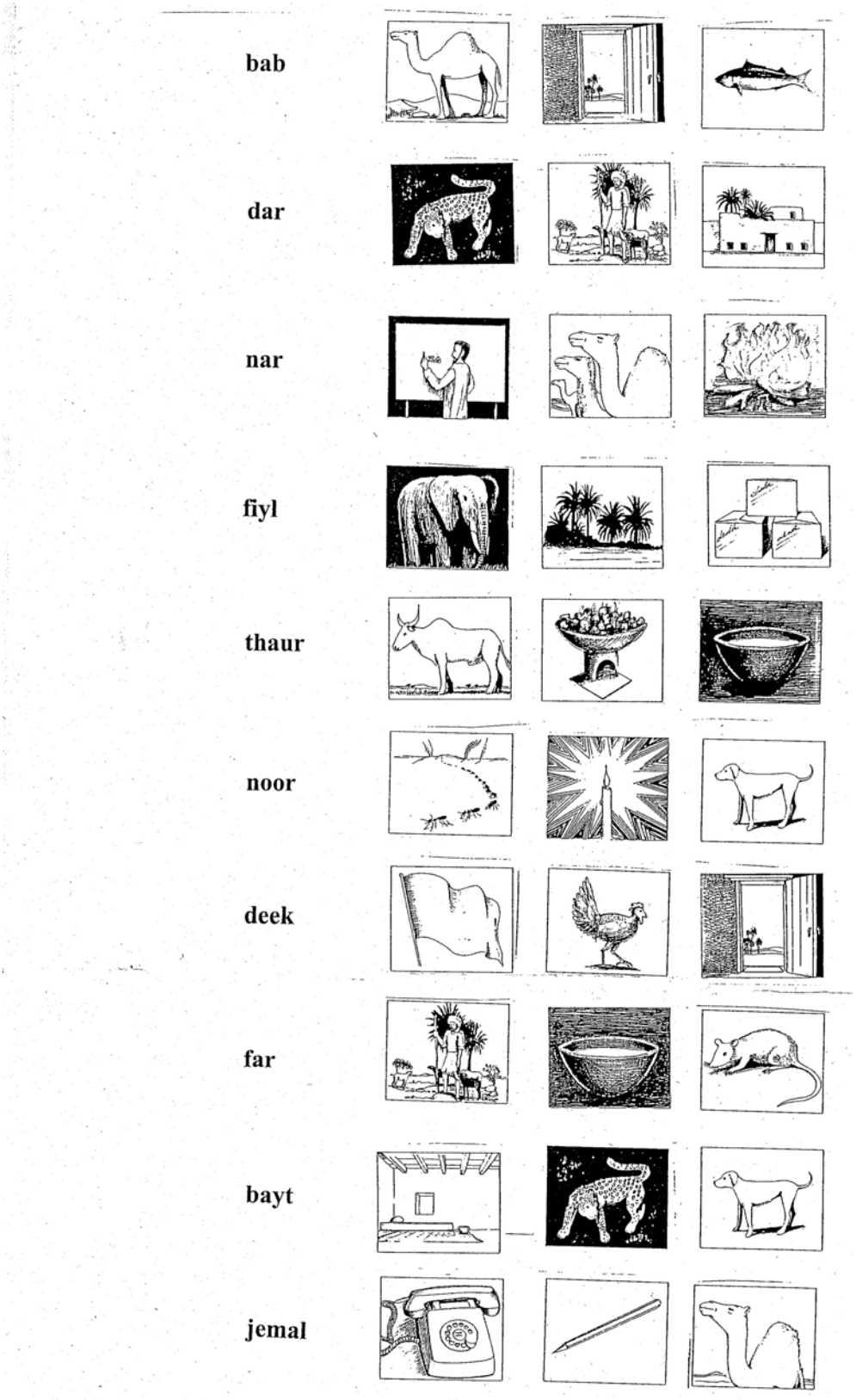
_____ كثير

هل درست بلـغتك الأولى في مكان اخر (خارج تعليم رسمي)؟ اشرح من فضلك.

Arabic Lexical Access Quiz



English Lexical Access Quiz



Arabic Transliterated Words Quiz

من فضلك، اكتب هنا قصة سفرك الى _____. (٥ دقائق)

Five Minute Arabic Essay

Please write the story of your journey to Meleh.

Five Minute English Essay

Stroop’s Test

APPENDIX C
English Taught During the Month-long Project

This is a man.
This is a mat.
This is a hat.
The hat is tan.
The mat is tan.
Where is the man?
The man is on the mat.
Where is the hat?
The hat is on the man.

The man is Dad.
Dad has a can.
It is a tin can.
Dad has a cat.
It is a tan cat.
Where is the cat?
The cat is by Dad.
Is that his cat?
Yes, it is.
Is that his can?
Yes, it is.

The boy is sad.
Where is his hat?
The cat has his hat.
The boy is mad.
The boy is Sam.
The cat is on his hat.
The cat and the hat are on the mat.
They are on the mat.
Sam is mad at the cat.
The cat took his hat.

Sam has a hen.
The hen laid an egg.
Sam got the egg for Dad.
Where is Sam?
Sam is in bed.

The cat is by the bed.
Dad, the bed and the cat are on the mat.

Ann has a pot.
The pot is too hot.
Where is the mop?
Is the mop by the bed?
No, it is by the mat.
Sam and Ann are happy.
Sam got the mop.
Sam and Ann and Dad are on the mat.
The cat and the dog are by the house.

The men dig a well.
They dig and dig.
Dad is digging.
The men are digging.
They are digging a well.
There is water in the well.
The water is for everyone.
The water is for the cat and the hen.
There will be water in the pots.

Mom is on the mat.
Sam and Ann will help Mom.
Ann will get a cup of water for Mom.
She will help Mom because the sun is hot.
The water is good.
Sam and Ann and Mom are happy.
Dad and the men dug a well.

Dad and I were on a bus.
Dad and I were going on a bus to the city.
Men and women got on the bus.
We went to the city.
Mom and Ann are in the house.
They are making dinner.

Dad said, “Here’s a box. It’s a gift for you. It is what you want. Look in the box.” Ann said, “There’s a book in the box. Look at the book, Dad! It’s a nice book. It’s a nice gift.”

Mom goes to the ocean to buy fish. Today she brought a gift for Ann. It is a book. Ann is reading the book. Mom and Ann are happy.

Dad has a job in the city. He goes to work on the bus. He works hard at his job. He has a chair and a desk in his office. Dad is thankful for his job.

one two three four five six seven eight nine ten eleven twelve thirteen fourteen fifteen sixteen seventeen eighteen nineteen twenty

Plus Minus Times divided by equals

to be

Past	Present	Future
I was	I am	I will be
you were	you are	you will be
he, she, it was	he, she, it is	he, she, it will be
we were	we are	we will be
you were	you are	you will be
they were	they are	they will be

Picture Words Studied

man
mat
hat
cat
can
boy
sad
bed
hen
dog
pot
well
dig
cup
sun
bus
city
box
book
bird
frog
flag
t-shirt
reading
pencil

fish
car
flower
bison
horse
ant
rabbit
wheel
butterfly
vase
telephone
computer
scissors
tractor
pen
basketball player
musician
astronaut

I am happy
tired
sad
angry
laughing
excellent
pleased
a teacher
looking
busy
writing
committed
conscientious
faithful

I came to “Melah” four months ago and I was before these times in the state of Brakna. And I was sometimes busy with visiting my relatives in the wilderness which was about 40 kilometers distant from me.

From my birth I was with my family in the region of Boutilimit and for ten years I am married and I went with my husband to the capital Nouakchott and we were living in the section “Dar Naim” near my aunt and about 3 years ago I bought a piece of land in “Melah” and I live on it. To God be the praise.

I was in my youth in the care of my father and I was provided with a good upbringing until I came in the care of another man until he brought me to “Melah” and behold I myself am today with you in class. And this is from the grace of my Lord upon me.

Before coming here I was living in a village called “Al BatHa” and I was practicing the traditional life like planting and riding the donkey and making butter from milk. And I attended school seven years. Afterward I came to “Melah”. Thank you.

I was, before coming to “Hay Saad”, living in Gerou. I did not know the car but I knew the donkey. And I did not know fish but I knew milk and meat and dates. But, when I came here I knew cars and fish and I became acquainted with the capital. Thank you.

Before coming to Nouakchott I was living in the wilderness of the Adrar and I was practicing traditional medicine. In the season of summer we prefer the meal of “luksur” and fine cous cous with milk in it. And in the season of spring we inhabit the tents and we prefer meat and milk and in the fall cereal drink and “bilgmaan.”

Before coming to Nouakchott we were living in “Tagada al Wassaa” and we were knowing the complete traditional life, like riding camels, and the donkeys, and the horses, and the raising of sheep. And we used from them milk and cream and meat. And we knew gardening also. And we came here to Nouakchott, the capital, and we live here in “Melah”.

Before coming to the capital I lived in _____ and while there I was busy with _____ and _____ and I attended school for _____ years. In _____ my family and I moved to Nouakchott and I live in “Melah”.

Good morning. How are you?
Good morning. I am fine. Thank you.

Good afternoon. How are you?
Good afternoon. I am fine. Thank you.

APPENDIX D

Data Obtained from the Research

Final Quiz and Questionnaire Results

The following tables record the data obtained from the study. First is the data ordered by the Arabic lexical access scores. Second, the data is ordered by total hours of Arabic study, noting the grouping of the hours according to 0-3 years, 4-6 years and 7-9 years of Arabic study. Third, the data from the participants with perfect or near perfect (absent for one class period) attendance is recorded. Fourth, this data is ordered according to Arabic lexical access scores, dividing the data into lower and higher scores. Fifth, this data is ordered according to the total hours of Arabic study. Tables 6 and 7 record the hours in the Mauritanian school system, showing the hours per school year. The information in Table 6 is the information obtained from the students who studied prior to the government reform of 1999. Subsequent to this reform, the government guidelines for classroom hours are shown. Finally, Table 8 records all the data obtained from the study.

Table 1 organizes data from all subjects in the study in the order of lower Arabic lexical access scores to higher. The *Group Arabic Lexical Access* column divides all the participants into two groups. Group 1 includes the participants with Arabic lexical access scores of 6 to 24 or 20% to 80% correct. Group 2 includes the participants with Arabic lexical access scores of 27 and 30 or 90% and 100% correct. This division of the participants and data is visualized with a bar graph in Figure 29 and elaborated upon in the discussion following Figure 29. Following is an explanation of the columns found in Table 1:

Total Hours Arabic: approximate total hours in Arabic education.

Score Arabic Text: the points given for the 5-minute Arabic essay. Words on context spelled correctly—3 pts.; words on context spelled incorrectly—2 pts.; words spelled correctly with no context—1 pt.; incomprehensible group of letters—0 pts.

Score English Text: the points given for the 5-minute English essay. Same scoring is used as on the Arabic essay.

Arabic Lexical Access: score on Arabic Lexical Access Quiz. Each correct answer—3 pts.; 30 = 100%. Arabic Lexical Access quiz scores of 27-30 (90-100%). These groups were derived from the scatterplot graphs in Figures 9 and 10. A bar graph visualization of the data is found in Figure 29.

Table 1. Lower and Higher Groups of Arabic Lexical Access Scores-All Subjects

Subject	Group Arabic Lex Acc	Arabic Lexical Access	Total Hours Arabic	Score Arabic Text	Score English Text	English Lexical Access	Translit. Lexical Access	Dictation	Arabic Profi-ciency	English Profi-ciency
B	1	6	520	25	0	0	0	0	31	0
C	1	12	530	15	7	3	9	0	27	10
S	1	12	6180	65	24	6	21	6	77	30
D	1	18	1145	38	4	9	12	4	56	17
A	1	24	240	20	2	12	15	5	44	19
F	2	27	1740	71	16	30	30	8	98	54
G	2	27	1888	12	0	12	27	2	39	12
H	2	27	3240	119	36	27	30	10	146	73
M	2	27	4960	64	10	15	12	5	91	30
N	2	27	5120	201	10	15	27	8	228	25
R	2	27	6090	104	12	24	21	5	131	41
U	2	27	6240	120	56	24	27	11	147	68
W	2	27	7576	121	24	12	12	7	148	36
E	2	30	1310	35	18	21	9	8	65	47
I	2	30	3768	77	35	27	27	8	107	70
J	2	30	4344	156	9	21	6	2	186	32
K	2	30	4480	123	16	24	24	9	153	40
L	2	30	4632	134	3	9	3	3	164	12
O	2	30	5136	121	53	27	30	10	151	90
P	2	30	5520	100	22	18	21	6	130	40
Q	2	30	5940	156	55	27	30	10	186	82
T	2	30	6228	120	16	24	27	7	150	40
V	2	30	7080	51	50	24	30	8	81	82

English Lexical Access: Score on English Lexical Access Quiz. Each correct answer—3 pts.; 30 = 100%.

Transliterated Lexical Access: Score on Transliterated Lexical Access Quiz. Each correct answer—3 pts.; 30 = 100%.

Group Arabic Lexical Access: data from the project (Table 8) was divided into two groups. Group 1, Arabic Lexical Access quiz scores of 0-24 (0-80%) and Group 2, Arabic Lexical Access quiz scores of 27-30 (90-100%). These groups were derived from the graphs in Figures 9 and 10. A bar graph visualization of the data is found in Figure 29.

Dictation: Score on 3 dictated English words—sun, water, city. Each letter—1 pt.; 12 pts. maximum.

Arabic Proficiency: Sum of Arabic text score and Arabic Lexical Access score.

English Proficiency: Sum of English text score, English Lexical Access Quiz, and Dictation.

Table 2 organizes data from all subjects in the order of lower amounts of hours in education to higher hours in education. The participants are then divided into three groups according to the design of the study. The two columns of groups represent the hours in the educational system according to the participants and the hours in the educational system according to the government guidelines of 1999. The columns in Table 2 not already explained are as follows:

Table 2. Groups 0-3, 4-6, 7-9 Years of Arabic Study-All Subjects

Subject	Group Total Hours GovG	Group Total Hours Arabic	Total Hours Arabic	Score Arabic Text	Score English Text	Arabic Lexical Access	English Lexical Access	Translit. Lexical Access	Dictation	Arabic Proficiency	English Proficiency
A	1	1	240	20	2	24	12	15	5	44	19
B	1	1	520	25	0	6	0	0	0	31	0
C	1	1	530	15	7	12	3	9	0	27	10
D	1	1	1145	38	4	18	9	12	4	56	17
E	1	1	1310	35	18	30	21	9	8	65	47
F	1	1	1740	71	16	27	30	30	8	98	54
G	1	2	1888	12	0	27	12	27	2	39	12
H	2	2	3240	119	36	27	27	30	10	146	73
I	2	2	3768	77	35	30	27	27	8	107	70
J	2	3	4344	156	9	30	21	6	2	186	32
K	2	3	4480	123	16	30	24	24	9	153	40
L	2	3	4632	134	3	30	9	3	3	164	12
M	2	3	4960	64	10	27	15	12	5	91	30
N	2	3	5120	201	10	27	15	27	8	228	25
O	2	3	5136	121	53	30	27	30	10	151	90
P	2	3	5520	100	22	30	18	21	6	130	40
Q	2	3	5940	156	55	30	27	30	10	186	82
R	2	3	6090	104	12	27	24	21	5	131	41
S	2	3	6180	65	24	12	6	21	6	77	30
T	3	3	6228	120	16	30	24	27	7	150	40
U	3	3	6240	120	56	27	24	27	11	147	68
V	3	3	7080	51	50	30	24	30	8	81	82
W	3	3	7576	121	24	27	12	12	7	148	36

Group Total Hours Arabic: the data were grouped according to the hours in public school as described in the questionnaire. These students studied prior to the 1999 guidelines. (In 2000 French was included with Arabic in all public education.)

Group Total Hours Government Guidelines (Group Total Hours GovG): the data were grouped according to the hours of public school issued by the government guidelines of 1999. Group 1, grades 0-3; Group 2, grades 4-6; Group 3, grades 7-9.

Table 3 lists data obtained from subjects missing less than or only one class in the study of English.

The columns in Table 3 are as follows:

Attendance: the number of classes attended of a total of 18 for the month-long project.

Formal Hours Arabic: approximate hours spent in public school.

Informal Hours Arabic: approximate hours spent in Quranic school or literacy classes.

Stroops Test: 0 incorrect; 1 correct.

Subjects Missing ≤ 1 Class: Data from participants who had perfect attendance or who missed only one class period of the month long study.

Table 4 records the data from subjects missing less than or only one class during the month long study. Data is organized from lower to higher hours of Arabic study and divided into the three groups as designed in the study, using the hours of study from participants own experience. Data from Table 4 are graphed in Figures 23, 26, 27, and 28.

Table 3. Subjects Missing ≤ 1 Class

Subject	Attend-Ance	Formal Hours Arabic	Informal Hours Arabic	Total Hours Arabic	Score Arabic Text	Score Eng. Text	Arabic Lexical Access	Eng. Lex. Acc.	Transl Lexica Acc.	Stroops Test	Dicta-Tion	Arabic Profi-ciency	English Profi-ciency
E	18	110	1200	1310	35	18	30	21	9	0	8	65	47
D	17	1080	65	1145	38	4	18	9	12	0	4	56	17
C	18	0	530	530	15	7	12	3	9	0	0	27	10
O	18	5040	96	5136	121	53	30	27	30	1	10	151	90
B	18	0	520	520	25	0	6	0	0	0	0	31	0
R	17	5040	1050	6090	104	12	27	24	21	0	5	131	41
I	18	2520	1248	3768	77	35	30	27	27	1	8	107	70
H	18	1800	1440	3240	119	36	27	27	30	1	10	146	73
V	18	1080	6000	7080	51	50	30	24	30	0	8	81	82
F	17	1080	660	1740	71	16	27	30	30	1	8	98	54
M	18	3960	1000	4960	64	10	27	15	12	0	5	91	30
G	17	1800	88	1888	12	0	27	12	27	1	2	39	12

Table 4. Groups 0-3, 4-6, 7-9 Years of Arabic Study- Subjects Missing ≤ 1 Class

Subject	Group T H	Total Hours Arabic	Score Arabic Text	Score English Text	Arabic Lexical Access	English Lex. Acc.	Transl Lex. Acc.	Stroops Test	Dictation	Arabic Prof.	English Prof.
B	1	520	25	0	6	0	0	0	0	31	0
C	1	530	15	7	12	3	9	0	0	27	10
D	1	1145	38	4	18	9	12	0	4	56	17
E	1	1310	35	18	30	21	9	0	8	65	47
F	1	1740	71	16	27	30	30	1	8	98	54
G	2	1888	12	0	27	12	27	1	2	39	12
H	2	3240	119	36	27	27	30	1	10	146	73
I	2	3768	77	35	30	27	27	1	8	107	70
M	3	4960	64	10	27	15	12	0	5	91	30
O	3	5136	121	53	30	27	30	1	10	151	90
R	3	6090	104	12	27	24	21	0	5	131	41
V	3	7080	51	50	30	24	30	0	8	81	82

Table 5 divides data from subjects missing less than or only one class in the study into two groups, lower and higher Arabic lexical access scores. Data from Table 5 are graphed in Figure 29 which accompanies a t-test demonstrating the difference in the English learned by the two groups is statistically significant.

Table 5. Lower and Higher Groups of Arabic Lexical Access Scores - Subjects Missing ≤ 1 Class

Subject	Group Arabic LexAcc	Total Hours Arabic	Score Arabic Text	Score English Text	Arabic Lexical Access	English Lex. Acc.	Transl Lex. Acc.	Stroops Test	Dictation	Arabic Prof.	English Prof.
B	1	520	25	0	6	0	0	0	0	31	0
C	1	530	15	7	12	3	9	0	0	27	10
D	1	1145	38	4	18	9	12	0	4	56	17
E	2	1310	35	18	30	21	9	0	8	65	47
F	2	1740	71	16	27	30	30	1	8	98	54
G	2	1888	12	0	27	12	27	1	2	39	12
H	2	3240	119	36	27	27	30	1	10	146	73
I	2	3768	77	35	30	27	27	1	8	107	70
M	2	4960	64	10	27	15	12	0	5	91	30
O	2	5136	121	53	30	27	30	1	10	151	90
R	2	6090	104	12	27	24	21	0	5	131	41
V	2	7080	51	50	30	24	30	0	8	81	82

Table 6. Hours of Study in the Mauritanian School System According to Participants

Group	Year	Hours of Study
1	1	540
1	2	1080
1	3	1800
2	4	2520
2	5	3240
2	6	3960
3	7	5040
3	8	6120
3	9	7200

Table 6 lists the hours of school according to interviews/questionnaires with participants in the study. The hours in the school system are divided into years 1-9. The column *Group* refers to the three groups of participants in the study: Group 1, 0-3 years; Group 2, 4-6 years; Group 3, 7-9 years.

Table 7. Hours of Study in the Mauritanian School System According to Government Guidelines of 1999

Group	Year	Hours of Study
1	1	1035
1	2	2070
1	3	3105
2	4	4140
2	5	5175
2	6	6210
3	7	7245
3	8	8280
3	9	9315

Table 7 lists the hours in the Mauritanian school system following the guidelines of 1999.

Table 8. All Subjects

Subject	Attend-ance	Formal Study	Hours	Informal Study	Hours Inf.	Total Hours	Score Arabic Text	Score Eng. Text	Arabic Lexical Access	Eng. Lex. Acc.	Transl Lex. Acc.	Stroops Test	Dicta-tion	Ar. Prof.	Eng. Prof
E	18	<½ yr.	110	6 yrs.	1200	1310	35	18	30	21	9	0	8	65	47
D	17	2 yrs.	1080	65 hrs.	65	1145	38	4	18	9	12	0	4	56	17
C	18	0 yr.	0	530 hrs.	530	530	15	7	12	3	9	0	0	27	10
S	14	8 yrs.	6120	60 hrs.	60	6180	65	24	12	6	21	1	6	77	30
O	18	7 yrs.	5040	4 mo.	96	5136	121	53	30	27	30	1	10	151	90
P	15	6 yrs.	3960	1560 hrs	1560	5520	100	22	30	18	21	0	6	130	40
B	18	0 yr.	0	520 hrs.	520	520	25	0	6	0	0	0	0	31	0
R	17	7 yrs.	5040	1050 hrs	1050	6090	104	12	27	24	21	0	5	131	41
W	12	8 yrs.	6120	1456 hrs	1456	7576	121	24	27	12	12	0	7	148	36
I	18	4 yrs.	2520	1248 hrs	1248	3768	77	35	30	27	27	1	8	107	70
L	13	6yrs.	3960	672 hrs.	672	4632	134	3	30	9	3	1	3	164	12
K	11	6 yrs.	3960	520 hrs.	520	4480	123	16	30	24	24	1	9	153	40
H	18	3 yrs.	1800	1440 hrs	1440	3240	119	36	27	27	30	1	10	146	73
V	18	2 yrs.	1080	6000 hrs	6000	7080	51	50	30	24	30	0	8	81	82
F	17	2 yrs.	1080	660 hrs.	660	1740	71	16	27	30	30	1	8	98	54
A	16	0 yr.	0	240 hrs.	240	240	20	2	24	12	15	1	5	44	19
M	18	6 yrs.	3960	1000 hrs	1000	4960	64	10	27	15	12	0	5	91	30
J	16	6 yrs.	3960	384 hrs.	384	4344	156	9	30	21	6	0	2	186	32
U	10	8 yrs.	6120	120 hrs.	120	6240	120	56	27	24	27	1	11	147	68
T	16	7 yrs.	5040	1188 hrs	1188	6228	120	16	30	24	27	1	7	150	40
Q	14	7 yrs.	5040	900 hrs.	900	5940	156	55	30	27	30	1	10	186	82
G	17	3 yrs.	1800	88 hrs.	88	1888	12	0	27	12	27	1	2	39	12
N	9	4 yrs.	2520	2600 hrs	2600	5120	201	10	27	15	27	1	8	228	25

Table 8 records all the data obtained during this study through the questionnaire, the quizzes and the essays. Columns in Table 8 are as follows:

Formal Study: time spent in public school.

Informal Study: time spent in Quranic school or literacy classes

BIBLIOGRAPHY

August, Diane (2002). Transitional programs for English language learners: contexual factors and effective programming: report no. 58. Center for Research of the Education of Students Placed at Risk. Baltimore: Publications Dept, CRESPAR/Johns Hopkins University.

Baker, C. & Jones, S. P. (1998). The measurement of bilingualism. In *Encyclopaedia of bilingualism and bilingual education* (pp. 86-93). UK: Multilingual Matters Ltd.

Baker, Victoria J. (1998). Literacy in developing societies: Native language versus national language literacy. In Durgunoglu, A. Y. & Verhoeven, L. (eds.). *Literacy development in a multicultural context* (pp. 21-35). Mahwah, NJ: Lawrence Erlbaum Associates.

Bialystok, E. (2002). Acquisition and literacy in bilingual children: a framework for research. *Language Learning* 52: 1(March 2002) pp. 159-199.

Carson, J. E. & Others (1990). Reading-writing relationships in first and second language. *Tesol Quarterly* 24(2), 245-266.

Chikamatsu, N. (1996). The effects of L1 orthography on L2 word recognotion: a study of American and Chinese learners of Japanese. *Studies in Second Language Acquisition* 18 (4), 403-432.

Chun, Katherine K. Y. (2002). Toward a Theory-based Authentic Literacy Assessment for Chinese Bilingual Elementary Students. Doctoral Dissertation for University of California, Berkely.

Cummins, J. (1995). Empowering minority students. In O. Garcia & C. Baker (eds.). *Policy and practice in bilingual education* (pp. 103-117). UK: Multilingual Matters Ltd.

Davis, Lawrence (1990). *Statistics in dialectology*. Tuscaloosa: University of Alabama Press.

Dutcher, N. (1995). *The use of first and second languages in education: A review of international experience.* Pacific Islands discussion Paper Series, Number 1. Washington, DC: The World Bank.

Ferguson, Charles A. (1959). Diglossia. Word. 15, 325-340.

Ferroli, Louis J. (1991). Developmental Spelling and the Transfer of Literacy Skill among Primary Grade Bilinguals. Doctoral Dissertation, University of Illinois at Chicago.

Geva, E. & Wade-Woolley, L. (1998). Component processes in becoming English-Hebrew biliterate. In Durgunoglu, A. Y. & Verhoeven, L. (eds.). *Literacy development in a multicultural context* (pp. 85-110). Mahwah, NJ: Lawrence Erlbaum Associates

Hakuta, K. (1984). *The causal relationship between the development of biligualism, cognitive flexibility, and social-cognitive skills in Hispanic elementary school children: Final report.* Washington, DC: Office of Bilingual Education.

Hakuta, K., Ferdman, B. & Diaz, R. (1986). *Bilingualism and conitive development: Three perspectives and methodological implications.* Washington, DC: Office of Educational Research and Improvement.

Hardman, Joel (1998). Literacy and bilingualism in a Cambodian community in the USA. In Durgunoglu, A. Y. & Verhoeven, L. (eds.). *Literacy development in a multicultural Context* (pp. 51-81). Mahwah, NJ: Lawrence Erlbaum Associates.

Herschell, P. *Challenging the deficit: Teaching English in indigenous communities.* [Electronic version]. School of Professional Studies: Queensland University of Technology. Retrieved April, 2004.

Koda, Keiko (2005). Learning to read across writing systems: transfer, metalinguistic awareness, and second-language reading development. In *Second Language Writing Systems*, Cook, V. & Bassetti, B. (eds.) (pp. 311-334). Buffalo: Multilingual Matters.

Lau v. Nichols, 414 U.S. 563 (1974)

Maamouri, Mohamed (1998). *Language education and human development: Arabic diglossia and its impact on the quality of education in the Arab region.* Philadelphia: International Literacy Institute.

Simpson, J. A. & Weiner, E. S. C. (1989). *The Oxford English dictionary: second edition.* Vol. XIII quemadero – roaver. Oxford: Clarendon Press.

Roberts, Cheryl A. (1994). Transferring literacy skills from L1 to L2: from theory to practice. *The Journal of Educational Issues of Language Minority Students.* 13 (Spring) 209-221.

Siegel, J. (1992). The Tok Pisin Prep School: Teaching literacy in Melanesian Pidjin English. In J. Siegel (ed.), *Pidgins, creoles and nonstandard dialects in education: Applied Linguistics Association of Australia, occasional paper number 12.* (53-62) Canberra: Australian National University.

Simpson, J. A. & Weiner, E.S.C. (1989). *The Oxford English dictionary: Second edition, volume XIII quemadero-roaver.* Oxford: Clarendon Press.

Sisam, K. (1994). The publication of Alfred's pastoral care. In M. P. Richards (ed.), *Anglo-Saxon manuscripts: basic readings* (pp. 373-381). New York: Garland.

Skutnabb-Kangas, T. (1995). Multilingualism and the education of minority children. In O. Garcia & C. Baker (eds.). *Policy and practice in bilingual education* (pp. 40-62). UK: Multilingual Matters Ltd.

Verhoeven, L. & Aarts, R. (1998). Attaining functional biliteracy in the Netherlands. In Durgunoglu, A. Y. & Verhoeven, L. (eds.). *Literacy development in a multicultural context* (pp. 111-133). Mahwah, NJ: Lawrence Erlbaum Associates.

Wehr, Hans (1976). *A dictionary of modern written Arabic.* Cowen, J. Miton (ed.). Ithaca: Spoken Language Services, Inc.