CRITERIA FOR APPRAISING COMPUTER-BASED SIMULATIONS FOR

TEACHING ARABIC AS A FOREIGN LANGUAGE

by

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CHAPTER ONE—INTRODUCTION

New forms of audio-visual media have given rise to new hopes of making the

process of instruction more interesting, less expensive, more broadly available, and

ultimately more efficient and effective. Film, television, and computers have all been

explored for their pedagogical potential. Noble (1991) notes that military research in

information technology has often led the way to the use of new media in public

education. Following the tragic events of September 11, 2001, the Department of

Defense solicited innovative proposals for the war on terrorism, and a proposal to use

video-game technology to accelerate the teaching of Arabic received generous funding

(Wertheim, 2004). This study investigates how to appraise the pedagogical potential of

this new medium of video-game technology for foreign language education not just for a

military audience but also its eventual use in public education.

The Problem

It is likely that the U.S. will be maintaining a large-scale military as well as

civilian presence in Iraq and the Middle East for the indefinite future, requiring the

deployment of large numbers of U.S. military and civilian personnel. These people will

be living in an Arabic-language culture and interacting with Arabic speakers on a daily

basis, but the vast majority of them speak no Arabic. Any language knowledge gained on

the job will be lost when these individuals rotate out of Iraq in a year or less, creating a

huge training need for their replacements that has been largely unfilled. While the

Department of Defense is actively pursuing a number of initiatives to increase the number of Arabic linguists, most recently detailed in Miles (2005), experts in languages and national security continue to point out the shortage (Freedman, 2004; Klaidman & Isikoff, 2003). The shortage underscores the need for rapid, user-friendly language instruction.

The press of urgent security and infrastructure needs precludes assigning military personnel to the sort of classroom training that might ordinarily be used for this sort of language learning. Harding (2004) noted that the Defense Language Institute had 800 students in its 63 week-long full-time basic Arabic course, a luxury of time available only to soldiers in specialized career fields. For the majority of those soldiers who will be deployed to the Middle East, there is a pressing need to find alternative means to provide language training. Prensky (2001) suggested that digital game-based learning would be a pedagogically advantageous and logistically efficient method of filling this sort of need, one which the Department of Defense is pursuing (Jaffe, 2005).

Under the influence of learner-centered educational theories, instructional designers are creating computer programs for self study that give a student considerable control over the learning process. These programs attempt to simulate real world conditions where there is no single correct answer, but rather there are various options each with a range of consequences. According to Schank & Cleary (1995) and Aldrich (2004), to the degree a simulation is realistic, the learning that occurs within it is less managed. For a computer-based simulation designed for self-study, the learner's objectives may supersede those of the instructional designer should the learner use a

program in ways unintended. With a really good simulation, you cannot be sure what will be learned or how it will be learned though learning may well take place.

This study investigates how to appraise computer-based simulations designed for self-study by focusing on real-life language immersion and prototypes for virtual immersion. Evaluating such programs would have to consider not only learning outcomes but also subjective criteria, such as how enjoyable the program was, as this might influence how the program was used. Only with a thorough understanding of the target audience could such a program be effectively developed, which suggests that the foundation of any evaluation would be a learner analysis. The specific prototypes chosen for this study are computer-based simulations intended for teaching Arabic as a foreign language.

Definitions

There are two sets of terms used in this thesis that in common usage are often used imprecisely. In evaluating educational products and programs, eliciting expert judgment about the worth of something may be referred to variously as assessment, evaluation, or appraisal. In describing particular learning environments or products that incorporate elements of games and/or simulations, the terms game, simulation, and simulation-game are used almost interchangeably. For purposes of this thesis, these terms need to be defined and used more precisely and consistently.

Formative and summative evaluation are critical concepts in the field of

instructional design because systematic instructional design depends on gathering data

throughout the design process to determine whether the product or system being

developed can be expected to produce the desired results. The literature in the field of

instructional design is consistent in distinguishing between and defining formative and

summative evaluation as subsets of evaluation in general. According to Dick, Carey, &

Carey (2001) "Formative evaluations are undertaken to locate weaknesses and problems

in the instruction in order to revise it. Summative evaluations are undertaken to locate

both strengths and weaknesses in instruction and to document the findings for decision

makers who must decide whether to maintain or adopt the materials" (p. 359).

Both formative and summative evaluations may incorporate expert judgments

about the worth of the material. This thesis is primarily concerned with the judgments

made by potential users as they examine the completed product and decide whether or not

to adopt it. The term "appraisal" is used to describe this process in order to distinguish

this form of evaluation from more data-based measurements. Rather than assessing

student learning to determine the value of the material, experts examine the material and

make predictions about its worth. This is parallel to the process whereby real estate

experts *appraise* a property and predict its monetary value; while the actual value is

determined empirically by the price a buyer is willing to pay. The operational definitions

used in this thesis have been synthesized from disparate sources in the literature and are

consistent with dictionary usage and accepted practice in the field of education (M. Molenda, personal communication, April 2, 2005).

Evaluation. Systematic investigation of the worth or merit of a program or product.

Formative evaluation. Evaluation designed and used to improve a program or product, especially when it is still being developed.

Summative evaluation. Evaluation designed and used to reach conclusions about the worth of a program or product after its development for the purpose of adoption or retention.

Appraisal. Expert judgment of the worth or merit of a program or product.

As this thesis proposes criteria to guide the design and selection of computer-based simulations for language learning without proposing a systematic method for gathering data to evaluate them, the term appraisal will be used here.

Simulation and Game Environments

There is considerable variation in education literature regarding usage of the terms "simulation" and "game." Greenblat & Duke (1981) treat simulation and game as ends of a continuum in which reality is modeled in some contrived way. As the authors do not find degree of contrivance to be a useful distinction, they prefer to hyphenate the two terms as "gaming-simulation." Crookall & Oxford (1990), in their examination of simulation and gaming in the context of language learning, also prefer to use the terms simulation-game as a hybrid.

Heinich, Molenda, & Russell (1989) define simulation and game separately, and then include a Venn diagram showing how they can overlap with each other and with the concept of "instruction" so that an activity could be an instructional simulation, an instructional game, or even an instructional simulation game (p. 331). The critical attributes of games are: (1) rules that differ from reality, (2) striving—which usually entails competition—to achieve a goal, and (3) a scoring system to keep track of progress. The first attribute, differing from reality, sometimes referred to as "ludic," is an elusive one. It describes what makes a game "fun" in ways that reality is not. The authors define simulation as "an abstraction or simplification of some real-life situation or process" (p. 443). Reality is then what can be simulated, while a game is generally played for its own sake—indeed as an intentional departure from reality.

In computer-based instruction, a clearer distinction between simulation and gaming may be apparent. Traditionally, computer simulations have referred to instructional programs which modeled reality closely, such as how to fly a plane. The realism of a flight simulator is necessary to promote the transfer of the instruction to its application in a cockpit. On the other hand, computer games have been designed primarily for their entertainment or ludic value. This ludic quality ensures that games are played over and over again, although the application of a game to the real world is generally not apparent or even desired. Given the connotation of computer games as frivolous activities, I prefer to use "simulation" in this dissertation to refer to the instructional use of a simulation with game features, here applied to the computer-based teaching and learning of Arabic as a foreign language.

Purpose of the Study

This was an exploratory study aimed at defining more sharply the pedagogical and practical challenges entailed in designing and creating computer-based game-type simulations for learning Arabic as a foreign language. For those with neither access to study abroad nor classroom instruction, or for those whose classroom instruction emphasizes grammar/translation over communication, the possibility now exists to learn to speak a foreign language in a virtual environment. The basic pedagogical premise of digital game-based learning is that it allows training to occur past the point of mastery to 'overlearning' through the creation of an engaging virtual environment where the learner doesn't tire of the instruction. Kaplan, Sabol, Wisher, & Seidel (1998) suggest that for beginners, speaking a foreign language can be stressful; as stress diminishes the performance of all skills, overlearning is essential for effective use of their limited knowledge. Effective use of the language would foster confidence in the students of themselves as language learners that would ease their subsequent study of more difficult aspects of the language. The latest advances in computer technology have made computer-based language instruction both an ever more authentic approximation of a study abroad experience and something which potentially can be widely and conveniently distributed (Aldrich, 2004; Gee, 2003; Clark & Mayer, 2003).

That said, there remain difficulties inherent in teaching Arabic communicatively that have yet to be fully resolved, such as diglossia (where regional dialects are used in everyday conversation while Modern Standard Arabic is used for reading and writing and in the media), the Arabic writing system, and cultural differences. These difficulties are

especially relevant for virtual environments for teaching and learning Arabic because they require program developers to consider issues that may not be present in other languages (particularly the major European languages) with which they might have some knowledge and experience. These difficulties are further explored in the literature review.

Contributions of the Study

Advances in computer technology have allowed the creation of virtual 3-D environments utilizing animated pedagogical agents and speech recognition technology with the potential of simulating the experience of studying abroad, giving students of a foreign language a non-threatening and engaging opportunity to practice speaking that language in a realistic context most likely to lead to proficiency gains. These advances are so new that their pedagogical implications have not been extensively studied, making it unclear how the investment in developing virtual environments would lead to the most effective possible language learning. This study investigates how to appraise computer-based simulations for teaching Arabic to assist instructional designers in making the most effective programs possible and to guide educators and training professionals in selecting the programs most suitable for their needs.

Limitations of the Study

The use of computer-based simulations for language learning is such a recent development that there are relatively few examples available in any language. Possibly the best of these for Arabic is the Tactical Language program being developed at the University of Southern California, which during the period of my research was only available as a partial prototype. Therefore, this study is largely concerned with the promise of virtual environments for language learning rather than the extensive evaluation of such programs currently in existence.

CHAPTER TWO—LITERATURE REVIEW

One of the primary tasks of the field of Instructional Technology has been to provide educators with guidance, often in the form of guidelines and evaluation checklists, on the use of media for instructional purposes. Without this guidance, Murray & Barnes (1998) found that most educators were influenced by what they called the "wow" factor, the initial reaction (positive or negative) that the product made on them— often a reaction to an innocuous feature like the background music which colored the evaluator's reaction to the entire program. This review begins by considering the problems involved with providing this sort of guidance in general, then focuses on these issues when involved in foreign language education, in computer assisted language learning (CALL) in general, and finally the particular difficulties of teaching Arabic as a foreign language. The purpose of the review is to set the foundation for creating guidance for the appraisal of newly-developed computer-based simulations and games for learning Arabic.

The Appraisal of Instructional Media

Educators have recognized the importance of using media for instructional purposes at least since the time of John Amos Comenius (1592-1670), who is thought to be the first to use pictures in textbooks (Comenius Foundation, 2003). Edgar Dale (1946) analyzed how modern audiovisual materials contribute to teaching and summarized his ideas in the elegant "cone of experience," giving a framework for considering how audiovisual materials could best be utilized in the classroom. The post World War II

explosion in the quantity and types of audiovisual materials made it increasingly difficult

for educators to select appropriate materials. Mendel Sherman (1955) was a pioneer in

the systematic use of checklists for evaluating instructional media, and checklists

proliferated to the extent that variations filled the Woodbury (1980) three volume

compendium *Selecting Materials for Instruction.* Four authoritative sources of guidelines

and checklists for computer-based media are described and analyzed below.

Hannafin & Peck Evaluative Criteria

In response to the increased use of microcomputers in the classroom, Hannafin &

Peck (1988) wrote *The Design, Development and Evaluation of Instructional Software*.

In the section on evaluation, the authors included model evaluation forms/checklists with

accompanying elaboration to clarify their use. This material was organized in four basic

categories: instructional adequacy (how well a lesson met its own objectives), cosmetic

adequacy (appearance), program adequacy (technical features), and curriculum adequacy

(how well the program fit in larger educational goals). Under each category, 10-25

descriptive items were given which could be rated on a five-point scale ranging from very

poor to very good, plus a box for comments. In order to increase uniformity among

different evaluators, the authors gave definitions for each of the five points.   The

intended audience for these evaluation materials seems to be members of a school

software selection committee, as the use of uniform five-point scales seems designed to

create comparable scores among different reviewers.

Expanding on his previous analysis of the use of all types of media in the classroom, Romiszowski (1988) in his second edition of *The Selection and Use of Instructional Media* included a chapter on interactive computer-based learning. This chapter is divided in two parts, with the first part providing a decision framework to help a teacher decide if he/she would be best served by a computer-assisted instruction component for their lesson plan or if another form of media would serve equally well or better. The second part assumes that having chosen to use computer-assisted instruction, the teacher could use a framework for selecting among the available options.

Romiszowski's selection framework has five categories of generic questions to ask of any type of courseware: objectives and content (how well a program meets its objectives), alternative materials (again consideration if a computer-based program is the best option), useful life/probable return (pragmatic cost/benefit considerations), hardware requirements, and design requirements (largely ease of use considerations). This is followed by suggested questions specific to different modes of computer-assisted instruction, such as drill and practice exercises, programmed tutorials, and computer-based simulations.

What is evident is that Romiszowski had doubts about the wisdom of using much of the computer-assisted instruction available at that time, and he expanded on this pessimistic view in Romiszowski (1990), a book chapter titled "The Hypertext/Hypermedia Solution—But What Exactly is the Problem?" Romiszowski has provided a more critical set of questions for evaluating software than provided by any

other creator of guidelines and checklists—it is rare for evaluation criteria to consider that alternatives to computer-based media might be better in some situations.

CALICO Journal Courseware Review Criteria

The <u>C</u>omputer <u>A</u>ssisted <u>L</u>anguage <u>I</u>nstruction <u>Co</u>nsortium (CALICO) has been publishing reviews of computer programs for language learning since its founding in 1983, though these reviews were only systematized with the publication of Hubbard (1988) "An Integrated Framework for CALL Courseware Evaluation." As Courseware Review Editor for the CALICO Journal, Hubbard mandated that reviews conform to a consistent framework with three major components: operational description, teacher fit, and learner fit. The operational description has been standardized so that the same technical features are detailed in each review; teacher fit is primarily concerned with the pedagogical features of the software, while learner fit is concerned with usability features. The sections on teacher fit and learner fit are presented as reviewer opinion essays and can include references to the relevant literature. Each review concludes with an overall summary judgment on a scale of 1 (low) to 5 (high) on the issues of pedagogical features, ease of use, and value for money. The usefulness of this evaluation framework was confirmed by a later CALICO courseware review editor in Burston (2003) and is evident by how it is copied by other related academic journals such as *Language Learning & Technology* and *ReCALL.*

ASSURE Model Appraisal Criteria

The mnemonic ASSURE (Analyze learners, State objectives, Select methods, media and materials, Utilize materials, Require learner participation and Evaluate and revise) lesson planning guide found in Smaldino, Russell, Heinich, & Molenda (2005) contains ready-to-photocopy-or-download selection rubrics for a variety of media including multimedia. The two page form for multimedia begins by asking for descriptive information, objectives, entry capabilities required, strong points, weak points, and recommended action on the front page. The second page presents the rubric, a grid where rating areas such as "match curriculum," "accurate & current," and "clear & concise language" are examined as to whether the multimedia product is of high, medium, or low quality. For each quality rating, a single sentence descriptive characterization is given. The inclusion of a selection rubric seems aimed at members of a software selection committee in the same way as Hannafin & Peck checklists, although the grouping of comment blocks on the first page might be useful for a teacher who would need to justify to someone unfamiliar with the product why it should be purchased.

Common Deficiencies in Appraisal Guidelines and Checklists

The bases for the above checklists and guidelines seem to be the reasoned opinions and expertise of the authors. McDougall & Squires (1995) investigated 19 software evaluation checklists and found that likewise there was neither independent validation of the criteria nor empirical evidence of effectiveness. Tergan (1998) added

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that the primary purpose of checklists was to discriminate among similar products rather

than determine suitability for local conditions. Real world experience with checklists and

guidelines suggests that they are rarely used without adaptation to local circumstances.

For example, Nisanci (2000) describes how a committee from the Turkish Ministry of

National Education consulted published sources before assembling their own software

evaluation checklist; Lee (2001) describes the author's creation of a specialized checklist

for the evaluation of CALL for English as a Foreign Language materials for instructors

located in a country where English is not an official language. The value of a checklist

seems to be in the process of its creation rather than the physical result, as the checklist

reflects the consensus of those responsible for selecting educational software for a

particular purpose.

This checklist approach is unlikely to be suitable for evaluating a computer-based

simulation for language training. The reason is that as the underlying technology has

become more multi-dimensional, a single checklist may have become inadequate.

Tergan (1998) noted that: "Major problems in educational software evaluation arise when

hypermedia learning environments are in focus. Hypermedia-based learning tasks often

involve more complex learner-system interactions, for which the usual criteria are no

longer relevant. The problem relates to the fact that future instructional programs may no

longer fit well-defined categories of types of programs like tutorials, simulations, etc.,

and, thus, may not be evaluated by simply using different sets of criteria that match

different instructional goals" (p. 17). This difficulty in classifying advanced computer-

assisted language learning (CALL) programs was also noted by Gamper & Knapp

(2002), who predicted that future CALL programs will take a comprehensive approach that support semantics, pragmatics, cultural knowledge and social abilities.

The value of most published reviews is also questionable. The constant revisions of instructional software make them a moving target to review—by the time a review is published, that version has been improved, possibly invalidating parts or all of the review. For example, Corsbie & Gore (2003) reviewed the 2.0 version of the Spanish pronunciation tutorial *Pronunciación y fonética* and described several technical problems that had been fixed in the 2.1 version reviewed by Elliot (2003). Some of the publication time lag is reduced when software reviews appear online, as was the case with the Corsbie & Gore review which was posted on the CALICO website roughly one year before appearing in print. It seems that relevant print journals are including fewer software reviews while lengthening those that do appear, in essence using the subject software in an extended discussion of pedagogical and technical issues [for example, the Lafford (2004) review of *Tell Me More Spanish*]. This discussion likely has greater long-term value than the description of the "perishable" software; to better understand these issues, the next section of this chapter discusses the pedagogical issues of the ideal language learning environment, followed by a discussion of the technical issues of implementing this ideal in a computer-based environment.

Evaluating Foreign Language Education

This section investigates the most effective means of teaching a foreign language and how to measure that effectiveness. The best computer-based simulation for language

learning would presumably be modeled after the best environment(s) for language learning. This section considers the evidence that foreign language study in a place where that language is commonly spoken is that best environment, which is what the best foreign language classrooms and computer programs would try to recreate for their students.

Language Immersion Programs

There is considerable anecdotal evidence that successful language learners have found their study abroad experience to be essential in speaking a foreign language fluently (Farber, 1991; Stevick, 1982). This is backed by quantitative evidence such as Brecht, Davidson, & Ginsberg (1993), who found that of 658 students with two to five years of college-level Russian, only 13% received an 'advanced' score on an oral proficiency test before departure, while 40% received this score after one semester of study in Russia. Granted, this also shows that not all students who study abroad benefit equally from the experience. Rivers (1998) described the tendency of students abroad to associate primarily with other speakers of their native language, managing to spend their time abroad almost unaffected by that experience. It is therefore necessary to detail how and why the successful learners benefited from their study abroad experience.

Classroom Learning Combined with Immediate Use

In a qualitative study of the same Russian students described above, Brecht & Robinson (1993) showed that successful learners abroad were generally those who

combined classroom learning with the immediate use of that knowledge in conversations with speakers of the foreign language. The authors noted that the student self-reports were full of examples of 'episodic learning,' with long term memory of words, phrases, and grammar enhanced by particular circumstances. For example, one student commented "that was the first time anyone's ever used the word [for 'insulted'] with me and actually *been* insulted at the same time" (p. 13). This suggests that an effective virtual environment could combine classroom-style learning with dramatic opportunities for reinforcing that learning.

Time Spent 'Hanging Out'

Brecht & Robinson also reported that these students felt that the activity abroad that most contributed to their increase in fluency was 'hanging out' with Russian friends, defined as visiting, eating, and watching TV. The authors analyzed that the benefit of hanging out corresponded to the degree of intimacy of that context, decreasing from activities with a close Russian friend, with Russian friends, with mixed Russian and American friends, and with Russian service people (p. 10). It seems that hanging out with a close Russian friend was effective precisely because it was such a non-threatening context, one in which there were unlikely to be any negative consequences to speaking the language. A virtual simulation also offers a non-threatening context for language learning, as any negative consequences occur within a simulation that can always be restarted.

Transformation of Anxiety into Useful Tension

For students who are not able or choose not to study abroad, one alternative are immersive programs such as offered by Middlebury College, where intensive classroom instruction in a foreign language is combined with an extensive array of activities involving the use of that language. Spielmann & Radnofsky (2001) conducted an ethnographic study of a beginning and a second year class of French students at Middlebury, who during a seven-week summer program transformed their initial anxiety at using the language into a useful tension. This tension was a sense of confidence in conversing in French based on what they had learned and an understanding of what more they needed to learn in order to communicate better. What gave them this confidence was the ability to practice speaking in French in those selected activities which they found appealing, thereby expressing a reduced version of their native personalities while using a foreign language. This indicates that language learning in a computer-based environment might be enhanced if students could choose simulations that allowed them to express that which they found meaningful while speaking a foreign language.

Training in Language Learning Strategies

Those students with no prior experience learning a foreign language might benefit from training in foreign language learning strategies in order to gain as much as they possibly could from study abroad [see Oxford & Ehrman (1995) for a taxonomy of possible learning strategies]. Paige, Cohen, Kappler, Chi, & Lassegard (2002) have developed a comprehensive instructional program for providing this training to students planning to study abroad consisting of various culture and language learning strategies.

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The students use a variety of assessment devices for understanding their own preferred strategies and then discuss with the instructor and other students their options for maximizing those strategies and also taking advantage of other strategies when appropriate. Cohen & Shively (2003) reported that preliminary analysis of data collected on students who underwent this training showed that they derived significant benefit from this preparation. This indicates that students might also benefit from preparation in language learning strategies before entering a virtual language learning environment.

Experienced Language Learners

Those students with prior experience studying a foreign language could benefit from instruction which built on that experience while learning a third. Thomas (1988) found that that prior bilingualism was an advantage only when a second language was formally studied rather than acquired informally as a child, and that the formal study gave students a metalinguistic awareness that helped them learn a third language. Rivers (2001) also found that experienced learners were well aware of how they best learned a language and would pursue that strategy along with or even in spite of a prescribed program of instruction. This suggests that an effective virtual environment would be most engaging for experienced students if they could chose within that environment the instructional method that most closely matched their preferred learning strategy.

Summary

The purpose of this section was to deepen an understanding of the ideal study abroad experience as it might be replicated in a virtual environment. The salient characteristics of this simulation would include the following:

- Learner options for structured tutoring on aspects of language and culture combined with opportunities to practice this newly-gained knowledge in a realistic context;

- Engaging activities in a non-threatening environment, such as role-plays with dramatic elements, to encourage conversation practice and build confidence though successful uses of the foreign language;

- Opportunities for learners to express themselves, such as their needs, interests, and personalities, so that learners invest positive emotions in the foreign language;

- Reflective activities to promote meta-cognition of language learning strategies;

- Easy navigation among different activities and modes of exercises to optimize opportunities for learner choice.

The next section considers how the ideal foreign language learning experience might be created in a computer-based environment.

Computer Assisted Language Learning

This section reviews the history of computer-assisted language learning (CALL), highlighting the interrelationship between the prevailing pedagogy and the available technical means. Warschauer (1996) has divided this history into three phases:

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behavioristic CALL, communicative CALL, and integrative CALL. Each of these phases

will be covered below, followed by an in-depth look at the technological challenges

involved in creating integrative CALL.

Behavioristic CALL

According to Saettler (1990), during the 1960's the field of educational

technology was dominated by the behaviorist theories of B. F. Skinner, in particular his

theory of operant conditioning. Operant conditioning was the basis of programmed

instruction, with its reduction of complex information into simple steps, each of which

could be mastered through the use of positive reinforcements. Skinner (1964) described

the use of mechanical "teaching machines" which could be used to provide individualized

programmed instruction for any subject including verbal skills. These mechanical

devices were gradually replaced by early computers whose programs mimicked the

workings of the teaching machines.

Most early computer-based language instruction relied on grammar and

vocabulary substitution drills, applications for which early computers were well suited.

These drills were at the heart of the audio-lingual method of foreign language instruction,

which Larsen-Freeman (1986) described as a process of mechanical habit formation that

valued accuracy through memorization and repetition. Although second language

acquisition research has generally discredited audio-lingualism in favor of the

communicative approach, drills are still frequently featured in computer-based exercises

to improve student accuracy on particular points of grammar and vocabulary.

The communicative approach to foreign language teaching encompasses pedagogies that attempt to put language knowledge to immediate use in as authentic a situation as can be simulated in a classroom (Richards & Rodgers (1986). These pedagogies are derived from cognitive perspectives in psychology, which Winn & Snyder (1996) described as a reaction to the inability of behaviorism to account for internal, non-observable mental processes. Wildman (1981) stated that for educators influenced by cognitive psychology, learning occurs when students assimilate new information with what they already know. Foreign language instructional designers have built a variety of instructional permutations on this foundation, such as "Content-Based Instruction" by Stryker & Leaver (1997) and the "Cognitive Academic Language Learning Approach" by Chamot & O'Malley (1994). To evaluate these permutations, research has been conducted to compare some method associated with the communicative approach with a method associated with a 'traditional' approach, usually mechanical grammar or vocabulary drills. Krashen (1999) conducted a meta-analysis of several of these comparative studies and concluded that grammar drills result in, at best, very modest gains in conscious knowledge which in any case faded quickly from memory. Wong & VanPatten (2003) similarly found that drills are not necessary and in some cases can even impede acquisition in those instances where drills substitute for other "meaning-based approaches" which would more quickly lead to acquisition.

The classroom instructional technique most often associated with the communicative approach is dramatic role-playing. Newmark (1979) remarked: "By

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creating a dramatic situation in a classroom—in part simply by acting out dialogs, but also in part by relabeling objects and people in the room (supplemented by realia if desired) to prepare for imaginative role-playing—the teacher can expand the classroom indefinitely and provide imaginatively natural context for the language being used" (p. 163). Small variations in the dramatic situation can take the place of structural drills and help prepare the student for the unpredictability of reality. The classroom offers the flexibility of choosing the dramatic situation and the possibility of repetitions involving minor variations until the student is comfortable with the vocabulary and grammar needed for real-world situations.

Communicative CALL attempts to permit dramatic role-playing in a computer environment. Schank & Cleary (1995) described "Dustin," a multimedia program to teach English as a foreign language which simulated the process of arriving at Chicago O'Hare airport and taking a taxi to St Charles, Illinois, actions that the learners would actually have to perform in the near future. Multimedia elements included in Dustin were made in the places and with the people that the trainees would actually experience, familiarizing the trainees not only with the target environment but also with the speech patterns of Chicagoans. Ohmaye (1992) reported that 25 foreign trainees who tested an early version of Dustin, "thought that Dustin would have helped them improve their ability to interact with people in O'Hare and St. Charles and that the exposure to the St. Charles environment prior to their coming to the United States would have put them more at ease in that environment" (pp. 153-154). Schank & Cleary explained that programs such as Dustin "work well with situations in which there is a prescribed path of behavior. The small interchanges we use to get through our daily activities tend to follow such

prescribed paths" (p. 82). Dustin was created for a very specific group of students who benefited from its tailoring; more recent programs aim for a wider audience and feature a variety of generic situations likely to affect many from that audience.

The greatest difficulty of the communicative approach is testing that learning has indeed occurred, in that a teacher must evaluate not only linguistic accuracy but also fluency in the proper context. This is most commonly done by giving the foreign language student a role play problem to solve or task to accomplish and observing how well it was performed. Bachman (2002) observes that this raises two critical issues: precisely how these tasks are selected and then how they are assessed, as "vagueness in task specification inevitably leads to vagueness in measurement" (p. 458). To make this testing more rigorous, the American Council of Teachers of Foreign Languages (ACTFL) has developed proficiency guidelines and testing methods that are the academic standards for the field. Mislevy, Steinberg, & Almond (2002) note that the most reliable form of this testing requires a personal interview and is therefore the most expensive and time consuming, while any other form of testing requires an evaluation of the trade-off between reduced reliability and reduced cost.

Integrative CALL

While still the dominant form of foreign language instruction in the United States, the communicative approach has been reassessed by some educators who disagree with what they see as its emphasis on the development of the compartmentalized skills of reading, listening, speaking, and writing. These educators prefer what has been called an

integrated pedagogy, more exclusively one using a learner-centered, real-world task or

project-based approach. Larsen-Freeman (1997) and Mallows (2002) use metaphors

from chaos theory to justify this preference, observing that second language learning

occurs in a non-linear fashion marked by seemingly random leaps of understanding that

with time and effort lead to ever closer approximations of native speech; since it is

impossible to predict what 'pebble will unleash an avalanche' for a particular student,

instruction has to be learner-centered rather than teacher-centered.

As with the cognitivist vs. constructivist controversy in educational psychology

[for example, see Molenda (1991) and Reigeluth (1991)], the distinction between

communicative and integrative CALL seems to be more a matter of perspective or

emphasis rather than embodying significant differences. Hannafin & Hill (2002) describe

a continuum of epistemological beliefs ranging from positivism to relativism, with the

cognitivists supporting a positivistic instructional design philosophy that could include

the defined instructional objectives and generally teacher-directed methodologies

common in communicative CALL; in contrast, constructivists see learning goals as

negotiated between teachers and students, with teachers facilitating the learning process

as with integrative CALL. While not yet fully developed, integrated CALL has combined

task-based approaches with the enthusiastic embrace of the following technological

developments.

Advanced Speech Recognition

The development of advanced speech recognition (ASR) has allowed the

possibility of more 'authentic' interaction with a computer, in that learner inputs can be

spoken rather than typed or through mouse clicks—typing and clicking having only served as poor substitutes for speaking. LaRocca, Morgan, & Bellinger (1999) noted that there are two types of ASR: discrete speech recognition and continuous speech recognition. Discrete speech recognition uses a pattern-matching methodology that makes it particularly suited for training pronunciation of individual words; continuous speech recognition uses probability calculations that make it better suited for understanding larger units of speech, though with a reduced ability for analyzing errors within those larger units. With either type of speech recognition, ultimately what the computer is doing is performing a mathematical calculation on the degree of closeness between the detected learner speech and either with stored patterns or with probability calculations.

The greatest difficulty faced by ASR is that the range of acceptable speech in any but the most constrained conversation is nearly infinite. To keep the computer program size manageable and to reduce the computational burden, all instructional programs using ASR can only accept a limited range of speech inputs. In addition, by design the mathematical calculations must tolerate some degree of error as there is too much variation among individual speech patterns for exact matches to occur. Mostow & Aist (1999) argued that these difficulties limit the types of feedback that a computer program can give: "Using automatic speech recognition means never being able to say you're certain. Therefore, both corrective and confirmatory feedback must be phrased to avoid explicitly stating that the student was wrong (or right)" (p. 419). An essential element of any appraisal of computer-based simulations is an analysis of the strategies employed by the program to deal with the difficulties associated with ASR.

Life-like Pedagogical Agents

While there are a number of means of giving feedback to a learner in a virtual environment, possibly the most effective is when it comes from a life-like on-screen character. Moreno, Mayer, & Lester (2000) conducted a series of instructional experiments in which identical feedback was provided as text and also spoken aloud, for the experimental groups as if given by an animated on-screen character and for the control groups without the character. Students with the pedagogical agent produced significantly more correct solutions on transfer problems and rated their motivation and interest in the material as higher than the groups without the on-screen character. The authors suggested these results show students with the pedagogical agent viewed their contact with the on-screen character as social interactions, an effect which reinforced learning.

The artificial intelligence that guides a pedagogical agent in a computer-based simulation can enhance this effect through the character's visual emotive communication. Lester, Towns, & FitzGerald (1999) detailed the range of possibilities for this channel of communication, finding that nonverbal feedback can enhance or even substitute for verbal feedback much as it would in a normal conversation. Johnson, Rickel, & Lester (2000) expanded on this theme, finding that animated agents can also have many other uses such as for interactive demonstrations, to provide navigational guidance through a microworld, for using gaze and gesture as attentional guides, and to serve as virtual teammates for solving complex tasks that require the coordinated actions of multiple team members. One application that is especially important for foreign language learning is that pedagogical agents can model culturally appropriate gestures while speaking.

3-D Virtual Environments

Continuing technological advances and developments in cognitive psychology, especially constructivism, strongly support the use of virtual simulations for CALL (McLellan, 1996; Hubbard, 2002). Rieber (1992) addressed the then recent development of computer-based microworlds: "Although microworlds are a constructivist invention, they can provide *goal-oriented* environments in which learning is achieved through discovery and exploration. The compromise is reached largely through a *guided-discovery* orientation to learning in which the nature of the learning activity and experience is naturally imposed by the parameters of a particular microworld" (p. 94). [Italics in original]. Similar ideas were expanded on in Schank & Cleary (1995), who stated: "The reason why simulations are so effective is that they give students a way to learn by doing. By using computer-based simulations, we can vastly broaden the range of things students can learn by doing" (p.77). Schwienhorst (2002) explicitly connects these developments to CALL, declaring that "(v)irtual reality is a necessary concept for CALL, in that it can bring language learners closer to the target language community and its speakers while also providing an array of tools for awareness-raising activities and critical reflection" (p. 206).

Rieber (2001), Winn (2002), Decoo (2003), Roblyer & Knezek (2003), and Strudler (2003) are among the many voices calling for further research on how video games can be used for instructional purposes. Gee (2003) found 36 learning principles in the video games that he studied, finding positive values in even the most violent games. In a review of Gee's book, Prensky (2003) agrees with Gee's principles though Prensky chides Gee for his use of academic jargon in describing those principles. Prensky

considers video game designers to have a better (if inarticulate) grasp on effective

teaching than academic instructional designers and in order to promote communication

between the two groups a common language needs to be found. The widespread

popularity of video games shows that 3-D virtual environments can be fun and

educational, even when (or especially because) the players are not consciously aware that

they are learning.

In the next sections, this review turns to the language and cultural problems faced

by native speakers of English who attempt to learn Arabic.

Particular Difficulties with Teaching Arabic as a Foreign Language

There is widespread agreement that Arabic is a difficult language for English

speakers to learn.   The single greatest difficulty in learning Arabic is usually termed

diglossia: there exists a formal, written form of the language common to all Arabic

speakers, while conversation is normally conducted in a local dialect. Said (2002)

describes how educated Arabic speakers switch between formal Arabic and dialect as

needed: "It's a common enough thing to be chatting with a newspaper or television

reporter in the colloquial and then, when the recording is switched on, to modulate

without transition into a streamlined version of the classical language, which is inherently

more formal and polite" (p. 224). Conversation in dialect faces the impediment that the

further the geographic separation of the dialect speakers, the less likely that the dialects

will be mutually intelligible.   This impediment forces educated Arabic speakers to use

MSA or a European language such as French or English for communication when these are available, which may not be possible for those with less education.

Elgibali & Taha (1995) describe speaking in MSA as a specialized skill learned by those who would need to deliver speeches, lectures or sermons, limiting its suitability for communicative purposes and making some recognition of the various dialects a necessary part of an Arabic language program. According to Belnap (1995), most Arabic language courses in the United States teach MSA and possibly incorporate exposure to one or more dialects (usually Egyptian). Learning MSA, with its unfamiliar writing system and complex grammar, delays those who would need to learn to speak Arabic in a hurry, so an accelerated training program would likely be tailored to the specific dialect in which the student would need to converse. The trade-off is that the dialect training might only be of use in a limited geographical area.

The Arabic writing system poses significant challenges to the student of Arabic as a foreign language. The difficulties associated with learning the Arabic system of writing have little to do with the 'mechanical' training of reading from left to right or the formation of the letters, tasks that can be mastered relatively easily. Rather what causes trouble is that Arabic is usually written without the 'short vowels,' which are semantic and morphological markers that affect the meaning of words and the grammatical functions of the words in sentences. Abu-Rabia (2002) found that "presenting a list of words without short vowels would be nonsense for the Arabic reader, because many of the words would be visually identical yet could carry several different meanings" (p. 302). The absence of the short vowels forces the reader of Arabic to seek comprehension at the sentence level, as it is only in this larger context that the meaning and function of

individual words can be deciphered. For the beginning reader of unvoweled texts, it is helpful to also hear a text spoken aloud in order to understand it, as when a text is read aloud the experienced reader automatically adds the unwritten short vowels by applying grammar rules. This help is easily provided to the beginning reader using hypermedia, as text can easily be linked to audio files.

Yet when Arabic script is read aloud, what is heard is the literary or MSA pronunciation of the text—Arabic dialects generally lack a written form, making the Arabic script unsuitable for indicating the dialectical pronunciation of the text. Stevens (1996) explained that for the student of Arabic wanting to speak in dialect, it is usually best to present text in a transliterated form using Latin letters as the transliteration can more accurately indicate the proper pronunciation. Unfortunately, there is no commonly accepted system for transliterating Arabic or its dialects, particularly for sounds for which there is no equivalent in English, forcing the student to have to learn various transliteration systems in addition to learning the language. For communicative tasks conducted in dialect, this difficulty can be sidestepped in a virtual learning environment by having all dialogs conducted aloud rather than as something to be read and having written responses, with student input analyzed using voice processing technology.

Cultural Proficiency in Arabic

Fluency in a foreign language is more than just knowledge of vocabulary and grammar; it is also necessary to understand when and where this knowledge should be used. This pragmatic component of fluency is sometimes called cultural proficiency,

which Mueller & Daubach (1998) note is often missing in U.S. military foreign language training. Al-Batal (1988) outlines several cultural objectives related to Arabic that should be part of an Arabic language curriculum, including: geography of Arabic countries; major historical events of these countries; recognition of major Arabic cultural achievements in literature, architecture and the arts; knowledge of common courtesy phrases and appropriate use; knowledge of significant issues concerning politics, education, and the relations between the sexes in the Arabic world; knowledge of the main principles of Islam; and an understanding of the appropriate use of Modern Standard Arabic and the various dialects of Arabic. Al-Batal recognizes that there are several difficulties in implementing these objectives, including encompassing the cultural diversity in the Arab world, the difficulty of diglossia (noted above), and the issue of time, as Arabic requires a long period to master and the addition of culture would seem to extend that period. However, Al-Batal concludes his article by stating: "A speaker of Arabic should not really be considered proficient without at least a minimal understanding of Arab culture" (p. 447).

For the soldiers stationed in Iraq, the military provides an "Iraq Culture Smart Card," a laminated fold-up pocket culture guide with 16 panels of information on the country's geography, history, ethnography, religious traditions, cultural norms and language. Edidin (2005) quotes the U.S. Marine colonel responsible for the development of the card as saying "(The cards) are meant for the 19- or 20-year-old soldier, moving door to door in a hostile environment. This will help him stay out of trouble." Most of the card contains "Do this" and "Don't do that" instructions designed to prevent causing inadvertent offence. While thousands of these cards have been distributed to service

members deployed to Iraq, I could find no evidence that the cards have been useful as intended. My suspicion is that the wealth of information presented in condensed form is likely to be bewildering and might therefore be ignored.

Summary

There are unique difficulties in teaching and learning Arabic as a foreign language for native English speakers, which as a less-commonly taught language in the United States these difficulties have not been extensively studied. The ideal immersive language learning environment described above was based on American students of Russian who attended language programs in the former Soviet Union, so it may not be applicable to the target audience of this dissertation. In addition, the technical problems of recreating virtually this ideal environment have not been full resolved. In order to establish criteria for evaluating a computer-based simulation of an immersive language learning program for Arabic, more information would be needed on the pedagogical features of such a program, on the learner characteristics of the target audience, and on the technology that could support this program. The research questions in the next chapter have been developed to provide this needed information.

CHAPTER THREE—METHODOLOGY

The literature review suggests that the foundation of any appraisal of a computer-based simulation for teaching Arabic as a foreign language would be its learner analysis. This analysis would seek to thoroughly understand the target audience by detailing the factors critical to learning Arabic under ideal conditions. The appraisal would then consider how those factors could be effectively incorporated into computer-based simulations of those ideal conditions. The learner analysis and consideration of the technical challenges of simulating ideal learning conditions are the basis of my research questions.

Research Questions

Within the context of appraising computer-based simulations for teaching Arabic, my research questions are:

1. What are the special needs and interests of an American military audience when learning a second language for immediate use?

2. What are the unique linguistic challenges for young adult Americans learning Arabic?

3. What are the pedagogical features found in existing computer-based games for Arabic and how do those features compare with the pedagogical features considered critical to success by experts and actual learners?

4. What are the engagement and realism features that are required in computer-based simulations for learning Arabic as a foreign language?

Procedures

This study employed a naturalistic methodology consisting of five inter-related procedures.

Participant Observation of an Intensive Arabic Language Program
(Question 1, 2 and 4)

I attended an intensive summer Arabic program at Al-Akhawayn University in Ifrane, Morocco in May-June 2004 along with twelve cadets from the U.S. Air Force Academy (USAFA) and one cadet from the ROTC program at the University of Michigan. This program was intended to provide the equivalent of one semester of college-level study of Modern Standard Arabic in a four-week period, with an additional hour per day devoted to the Moroccan dialect as well as cultural programs and excursions related to Moroccan and Arabic/Muslim culture. My purpose in attending this program was to better understand what some consider an ideal language learning environment and how it could be adapted as a computer-based simulation. I especially benefited from the advice and encouragement provided by the two USAFA faculty escorts, Dr. Salah-Dine Hammoud and Major Steven Campbell, with whom I discussed my observations on a nearly daily basis while in Morocco.

Interviews

(Questions 1, 2, and 4)

I interviewed the 13 military participants in Morocco in June 2004 during the second week of the immersion program. The interview consisted of the questions in Appendix A and a demonstration of the Tactical Language program so that the cadets would have a concrete example of a computer based simulation for learning Arabic to consider. To reduce the number of demonstrations, I usually tried to show the program to two or three cadets at a time, so many of the comments about the program were the consensus of these mini-groups. The voice recognition component did not function in the 'video game' mode of the program and there were other minor technical flaws; for example, the military video game characters were missing their boots/feet. The cadets seemed able to disregard these technical difficulties in order to discuss the underlying premises, which all of them found promising. Their responses and comments were recorded and analyzed with a focus on how they would recommend adapting their experience in the intensive program in Morocco to a computer-based environment.

Observation of the Field Evaluation of the Tactical Language Program

(Questions 1, 2 and 4)

During July 2004, I observed a field evaluation of the Tactical Language program was conducted at Fort Bragg, North Carolina. The lead evaluator was Dr. Carole Beal of the Information Sciences Institute of the University of Southern California; she was

assisted by Dr. Lewis Johnson, director of the Center for Advanced Research in

Technology for Education (CARTE) and Ursula Lauper of Micro Analysis & Design.

The 24 Special Operations soldiers who volunteered for the evaluation were excused

from regular duties so that they could spend approximately one hour for an orientation,

one hour a day for three days for using the program, and one hour for the final test and

survey questionnaire. None of these soldiers had studied Arabic previously (though

many spoke other foreign languages) and none expected to be deployed to the Middle

East in the near future; they were the closest approximation of the target audience as was

available at that time. One solider had to be excused from the evaluation due to a family

emergency and two others failed to show on the final day, leaving 21 who completed the

post-session questionnaire.

Questionnaires Created by Others

(Questions 1, 2 and 4)

I analyzed the scores and written comments made on questionnaires made by

others given to the two groups that I observed. Twelve of the participants in the intensive

Arabic program in Morocco filled out a 56-item end-of course student questionnaire

[Appendix B] which was devised by escorts Dr. Salah-Dine Hammoud with input from

Major Steven Campbell, both from the USAF Academy. Also, 21 of the soldiers at Fort

Bragg completed a post-evaluation questionnaire [Appendix C] which was devised by Dr.

Carole Beal of the Information Sciences Institute of the University of Southern California

with input from Ursula Lauper of Micro Analysis & Design and the author. The purpose

of this analysis was to compare my observations and interview responses with the written comments made by those I had observed and interviewed.

Examination of Instructional Materials for the Self-study of Arabic

(Questions 3 and 4)

I examined a variety of materials designed for the self-study of Arabic using an abbreviated version of the Hubbard (1988) software review guidelines for the *CALICO Journal,* which concentrates on technological features (ease of use?), activities (effectively designed?), teacher fit (good theoretical approach?) and learner fit (appropriate/motivating?). The materials were a convenience sample based on items in my personal collection; a listing of these materials is found in Appendix D.

Theoretical Basis of the Research

Fundamentally, this study is most nearly like a design experiment in the sense envisioned by Cobb, Confrey, diSessa, Lehrer, & Schauble (2003) and Lobato (2003), where an instructional intervention is created and tested both for the pragmatic benefit of improving the intervention and for the development of pedagogical theory to explain the intervention's usefulness. In this study the intervention was not my own creation; rather with the kind permission of the program developers I used the Tactical Language prototype program for Arabic developed by the Center for Research in Technology for Education (CARTE) at the Information Sciences Institute of the University of Southern

California. This use consisted of demonstrating the program during individual interviews and in front of small groups in order to collect feedback on how well it accomplished its learning objectives. While I was also able to observe a formative evaluation of the Tactical Language program conducted by CARTE at Fort Bragg, my purpose throughout has not been the evaluation of this specific program but rather how this novel form of instruction could be made more effective and why it would be useful as an instruction medium.

Methods of Data Analysis

This mixed method study relied on both qualitative and quantitative methods of data analysis. The purpose of these methods was to uncover patterns among the data from which tentative findings could be composed and analyzed. While the findings are my own, the conclusions that I have derived from the findings have been shaped in discussions with experts in teaching Arabic as a foreign language and designers of computer-based instruction. My gratitude to those who have contributed to the development of my study is expressed in the preface to this dissertation.

Working with People

To the extent possible, I treated the cadets and others that I talked to not as research subjects but rather collaborators in the design of a game or simulation in the action research sense described by Heron & Reason (2001). I explained to them the

purpose of the interview and demonstration and I solicited their thoughts and opinions on

what would make a game or simulation effective for this specific purpose. The cadets'

prior study of Arabic at the USAF Academy and University of Michigan gave them some

insight into the difficulties in learning Arabic and they were able to make valuable

recommendations about the development of a game or simulation that would be of use to

the target audience. The others that I spoke to were able to make similarly valuable

recommendations concerning a more general audience of young adults studying Arabic

as a foreign language.

Working with Documents

In my analysis of interview notes and questionnaire responses, I paid particular

attention to frequent comments and those items that were marked "strongly agree" or

"strongly disagree" on the questionnaires. I considered the strength more important than

the agreement or disagreement, as this indicated to me that the item was important to the

respondent and should possibly be a criterion for evaluating similar programs. Simple

descriptive statistics were calculated when possible.

CHAPTER FOUR—FINDINGS

I have organized my findings in this chapter according to the research questions posed in chapter three, with each response given a separate section. The conclusions derived from the findings are presented in chapter five.

The Needs and Interests of an American Military Audience

The findings in this section answer the first research question: What are the special needs and interests of an American military audience when learning a second language for immediate use? The findings were obtained from observations, interviews, and the analysis of questionnaires made by others. These findings are organized according to a lesson framework proposed by Hannafin & Peck (1988) and expanded on by Hannafin, Hannafin, Hooper, Rieber, & Kini (1996) which includes the following elements: orienting the learner, presenting the lesson, cognitive support, error feedback, lesson sequencing, motivation, applying knowledge and skills, and contextual factors. These elements seem particularly relevant for the design of realistic computer-based simulations using the latest technology, in that they are consciously learner-centered rather than teacher-centered. The findings are separated according to the two research populations, the participants in the intensive summer Arabic program in Morocco and the participants in the field evaluation of the Tactical Language program at Fort Bragg.

I attended an intensive summer Arabic program at Al-Akhawayn University in Ifrane, Morocco in May-June 2004 along with twelve cadets from the U.S. Air Force Academy and one cadet from the ROTC program at the University of Michigan. Al-Akhawayn University is the only institution of higher education in Morocco that uses English as the language of instruction and most of the staff and all of the Moroccan students attending other summer classes could communicate in English. The modern campus is relatively distant from the major Moroccan cities on account of its pleasant but isolated location high in the Atlas Mountains; while the conditions were excellent for concentrating on the intensive Arabic academic curriculum, the students had few opportunities for unstructured contact with Arabic-only speaking Moroccans.

Orienting the Learner

The cadets recognized that some sort of orientation was necessary or inevitable, with some expressing a desire that it be kept brief. The immersion program included three days of orientation lectures concerning the academic program and cultural information about Morocco, among other topics; due to their travel arrangements, the cadets only attended the second and third days of the orientation, although they also received briefings in the U.S. from their faculty escorts prior to departure. Questions #1, 2, and 3 of the post-program questionnaire [Appendix B] explicitly dealt with this orientation, which elicited little reaction from the cadets: three had no opinions at all; six did not express a strong opinion, and only three had a strong opinion mostly concerning

the length of time devoted to the orientation. Representative comments included: "We're cadets, we're used to people taking 5 hours to say what could be said in 10 minutes," and "Most of the information that we needed was before we left the US. We missed most of the orientation and we didn't miss that much. Everything important could have been covered in one or two hours." [Emphasis in original].

Despite the orientation lectures, most cadets were not convinced of the value of the program. The immersion program instructors were under pressure to cover fixed amounts of material each day, which left little flexibility for adapting the classroom hours to local circumstances. Questions #8, 9, 10, and 24 concerned how the cadets perceived the academic program. The preponderance of scores and many of the comments expressed dissatisfaction or strong dissatisfaction with the academic program. The fundamental cause of this dissatisfaction was likely that the cadets didn't share the teaching objective. Representative comments included: "I would have enjoyed more immersion and less time in the classroom (especially since I didn't learn much in class)" and "Class could have been conducted anywhere in the world (although the teaching assistants at lunch and in the homework help room were very helpful) and it felt like we missed out some on being in Morocco."

It seems clear that cadet expectations did not match the instructional objectives of the language immersion program in Morocco. The expectations were of multiple opportunities for practicing the Arabic they had studied, with some additional instruction to build their conversation skills. Instead they were faced with a rigorous academic program modeled on a U.S. university course for Arabic as a foreign language in an environment that many found isolated them from the opportunities they desired.

Presenting the Lesson

The major teaching objective of the immersion program was to cover one semester of college Arabic in four weeks, or one year of study in eight weeks. To match this objective to the standards of the U.S. colleges with which the immersion program had bilateral agreements, the academic program used the *Al-Kitaab* textbook series by Brustad, Al-Batal, & Al-Tonsi (1995) which is widely used in the USA. On the end-of-program questionnaire, the cadets expressed heartfelt dismay and disappointment that the focus of the immersion program was this textbook and the associated homework. Representative comments included: "(The) chapters in *Al-Kitaab*…were not always conducive to conversations outside the classroom" and "I could have studied by myself at my own pace and gotten the same thing out of it, probably more." Cadet disappointment was largely a reflection that the academic program seemed disconnected from their real-world experience of being in Morocco.

Cognitive Support

The instructional periods of the immersion program were packed with a forced march through the textbook and related exercises, leaving little time for students to ask questions during class. The program compensated for this by staffing a homework help room which had generous operating hours and capable teaching assistants able to answer questions about both the academic program and life in Morocco. In addition, the cadets could have their individual questions addressed during their instructors' office hours and by meeting with their USAF Academy faculty escorts. The students also had access to an adequate library, although I never observed any of the cadets using the building for

research. In their responses to the end-of-program questionnaire, the cadets indicated that they were basically satisfied with this aspect of the program. Apart from the cognitive support provided by staff members, the cadets turned to their peers for help. The cadets spent a significant portion of every evening studying together in pairs or small groups completing the homework assignments, reinforcing the lesson material, and comparing observations and experiences.

Error Feedback

The immersion academic program was structured around weekly tests plus a comprehensive final exam, which elicited little reaction from the cadets, most likely because the results of the tests had no impact on them. There was a system for handing in daily homework so that students received written corrections the following day, although it appeared that little use was made of this feedback as no further action was required. Consequently, the formal feedback provided by the immersion program had little impact on cadet learning.

Informally, cadets seemed to regard a successful use of Arabic as the appropriate use and/or comprehension of as little as a single word or phrase in a conversation with a Moroccan. For example, the purchase of a carpet might be deemed a successful use of the language when the purchaser understood the Arabic for the asking price. The remainder of that transaction might have been conducted in French or English or even just by pointing, but if one bit of it was conducted in Arabic (other than standard pleasantries and courtesies), it was a success. Most cadet conversations with Moroccans were a blend of MSA, dialect, French, English, body language and contextual cues; as

long as each side was able to basically understand the other, then the desired outcome was achieved (item purchased, location found, etc.) These conversational successes (and occasionally failures) with taxi drivers, shop keepers, and passersby were vivid experiences for the cadets, the details of which were regaled and rehashed among themselves and with anyone who would listen. What made the experiences so vivid was the correlation of language use with desired outcomes in a foreign environment.

Thinking back on my own language learning experiences, I can often remember where I learned key phrases. It had never occurred to me that the where might itself be significant, but a comment made by a cadet and then a comment I heard during a documentary about the Palestinian poet Mahmoud Derwisha has caused me to rethink that. The poet made an explicit connection between his homeland and the language he spoke there, so that when he speaks Arabic he is connected to that place even if in exile. Granted for a Palestinian that has political significance, yet even just linguistically it might be true. Poetry is the manipulation of the associations people have to words, and those associations are often to places. The question remains if as rich an association can be made to a place recreated virtually.

Lesson Sequencing

The formal lesson sequencing for the cadets was textbook driven according to their level of placement. Part of the orientation program included a written and oral placement test; the placements were treated flexibly during the first few days of the academic program so that adjustments were possible. Questions #4, 5, 6, and 7 concerned how the cadets perceived the placement testing, an important issue as they all

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had studied Arabic previously. Although four cadets expressed satisfaction with their placement, the remainder expressed dissatisfaction or strong dissatisfaction with their level. A representative comment was: "I was placed in a level too high for me…I learned more from the weekend trips and from studying on my own…" One cadet commented that it would have been better to have been placed according to learning objectives, so that those who needed a strong academic program would have been separated from those whose primary interest was in developing conversational skills.

Away from the formal instructional setting, the cadets practiced their Arabic in blended conversations with Moroccans as best they could. What helped the most in these blended conversations was knowing and correctly pronouncing a key word or phrase in Arabic (MSA or dialect). At least at the street survival level, knowing vocabulary was more important than knowing or correctly using grammar. Again at the survival level, the Arabic that the cadets needed to know most was how to find shelter, food, water, the bathroom, shopping and directions. Of these, buying food was the most common concern, followed by obtaining bottled water. In the month spent in Morocco, most cadets only used Arabic with non-faculty Moroccans to satisfy these survival needs, yet their academic study poorly prepared them for this.

Motivation

Most cadets reported high intrinsic motivation to learn Arabic. They saw knowing the language as being useful in future military assignments and in civilian life. Questions #14, 15, and 16 concerned how well the teachers were able to motivate the cadets to learn, and here it seemed that the cadets were inclined to view their teachers

kindly. One difficulty is that these questions do not distinguish between the primary

instructors and the teaching assistants, and some of the cadets wrote in comments to split

their responses between their primary instructors or to compliment the teaching

assistants. Still, most of these responses were positive or strongly positive, showing that

the cadets were appreciative of the efforts made on their behalf—even if those efforts

were in the service of an immersion program they viewed less favorably.

Applying Skills and Knowledge

When asked to rate the overall immersion program experience, many cadets

expressed the sentiment that despite the immersion program they were glad that they

were able to come to Morocco and felt they learned a lot. The learning that they

appreciated was what occurred during the non-instructional hours, particularly during the

weekends. Some representative comments:

- "After getting sick, I just couldn't keep up with understanding what went on in class very well. I did however learn a ton on the weekend trips and from my vocab cards."

- "I would recommend more interaction with the local populace on future trips…I found that to be most rewarding."

- "Frankly, except for the excursions, had this program been held in the US, I do not think I would have noticed a large difference."

These comments indicate that most of the cadets managed to make the best of the

situation and found opportunities to engage in those language and culture learning

activities that they found useful. What is difficult for the cadets is that the only measure

of learning that the U.S. military recognizes is the Defense Language Proficiency Test,

which for Arabic consists of multiple choice listening and reading tests of the Modern

Standard Arabic primarily used in the news media. Any other value gained from the immersion experience will not appear in a cadet's military record.

Contextual Factors

For the cadets, broad categories within these contextual factors included campus atmosphere and facilities. The reactions to the campus atmosphere generally ranged from neutral to negative, as many felt the campus isolated them from the 'real' Morocco and that too much English or French was spoken there. Reactions to the facilities ranged from neutral to positive; while the facilities were of a high standard for Morocco, the facilities sometimes suffered in comparison to those of the USAF Academy.

Fort Bragg Field Evaluation

During July 2004, a field evaluation of the Tactical Language program was conducted at Fort Bragg, North Carolina. The lead evaluator was Dr. Carole Beal of the Information Sciences Institute of the University of Southern California; she was assisted by Dr. Lewis Johnson, director of the Center for Advanced Research in Technology for Education (CARTE) and Ursula Lauper of Micro Analysis & Design. The prototype of the Tactical Language program for Levantine Arabic that CARTE had developed at that point had two modes: a "classroom" mode called the Skill Builder which taught courtesy phrases and conversational basics needed to accomplish the single lesson mission of finding the person in charge of a village, and a "video game" mode called the Mission Practice Environment, which was a 3-D virtual simulation of a Lebanese village where

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the student could practice speaking the language learned in the "classroom" mode of the program.   What was particularly interesting about the program was its sophisticated voice processing capability, by which student speech in the Skill Builder could be analyzed and provided with tailored feedback such as reinforcement in pronouncing guttural Arabic sounds not found in English; in the Mission Practice Environment, characters inhabiting the virtual Lebanese village appeared to understand and respond to student speech.

Experimental Groupings

What was complicated about analyzing the Fort Bragg observations and questionnaire responses was that the experimental design of that field evaluation involved splitting the 24 participants into four groups of six soldiers each. Each group reacted to a somewhat different instructional treatment; for ease of reference, each group was called by a different common Arabic name.

Hasan. Full functionality – Both the Skill Builder ("classroom" mode) with tailored voice feedback and the Mission Practice Environment ("video game" mode).

Saiid. Skill Builder without tailored voice feedback (voice recording and playback only) and Mission Practice Environment.

Chalabi. Skill Builder only with tailored feedback.

Daud. Skill Builder without tailored feedback (voice recording and playback only).

For this evaluation, the Daud group acted as the control—their experience was seen as the most comparable to the best available of other computer programs for

learning Arabic. The other groups added different combinations of the advanced features

of the Tactical Language program in order to see if these produced any differences in

learning results or participant satisfaction.

Orienting the Learner

For the soldiers, the initial orientation was provided by the evaluators verbally

rather than as part of the computer program; the evaluators were also present throughout

the use of the program and answered any questions as needed. The soldiers were

basically unresponsive during the initial orientation and they asked few questions

immediately afterwards. Their questions came during their use of the program, and while

most questions concerned technical glitches, the remaining questions were largely

directed at understanding what aspects of the computer-based lesson were testable.

Presenting the Lesson

The Skill Builder operated in standard audio-lingual fashion, with the prompt both

heard and seen in transliterated Arabic and English. In addition, a small video showed a

close-up of a young Lebanese man voicing the prompt and a small animation showed a

transparent skull to demonstrate placement of the tongue and teeth. This wealth of cues

could be repeated without penalty until the student was ready to repeat the prompt. I

observed that several soldiers made written notes (primarily vocabulary lists) for later

study while in the Skill Builder mode, which was not encouraged or even suggested.

These soldiers commented that they needed to write out the words in order to remember

them. This might be significant in that a preliminary finding from the final learning test

was that the vocabulary score was the strongest predictor of conversational proficiency (C. Beal, personal communication, August 17, 2004); possibly it was those soldiers who made notes who were the most conversationally proficient, although there is no way to verify this.

Cognitive Support

For those groups which had the Mission Practice Environment, while in this mode the primary form of cognitive support was provided by the character of the aide, who on demand could translate the last phrase heard or suggest what to say next. The post-session questionnaire [Appendix C] asked how useful the aide was, with most responding "pretty useful" or "very useful." In their comments, the soldiers elaborated: "At the beginning I got pretty stumped and the aide helped a lot" and "I think with more time I could go through without the help but it's great to have." The prototype being evaluated was still under development and did not have a robust help function in the Skill Builder mode, so the on-site evaluators filled this role. Even when the evaluators were available, during the field evaluation the soldiers (who were working at adjacent computers in a language laboratory setting) often turned to each other for assistance with the program.

Error Feedback

One of the major innovations of the Tactical Language program is its ability to provide tailored feedback through an advanced voice recognition processing capability, although only some received this feedback depending on the experimental group to which they belonged. By design the Daud control group did not have access to this capability

and in the questionnaire item comparing the program to working with a one-on-one tutor, these soldiers responded either "much less effective" or "less effective," which was reasonable given their total lack of feedback.

The Chalabi group also only had the Mission Skill Builder, though with the voice recognition capability switched on. This combination drove the soldiers to focus on pronunciation, often repeating the same word 20 or more times until it was registered as having been said correctly. One commented: "I found myself concentrating very hard on pronunciation to please the computer rather than learning the meanings of the words." This same individual added: "An individual instructor would recognize individual variations in tone/pitch of voice, etc. that the computer missed and kept saying 'can you repeat that, please?'" She wondered how well the program was calibrated for female voices, if the expectation of the target audience was that it was mostly male.

For the Saiid group, the Skill Builder did not provide tailored feedback, though the soldiers could access the "video game" Mission Practice Environment which used the speech recognition capability. If the soldier spoke appropriately and the speech was correctly understood by the program, it would appear that the characters in the virtual environment were carrying on a conversation that moved the game story forward. The game could be restarted at any time without penalty. The Saiid group only had this 'natural' but limited feedback from the program. Their responses to the questionnaire indicated that they found the interaction within the game a convincing simulation of a conversation. Still, their responses to the questionnaire indicated that they found the program from "much less effective" to "about the same" as a one-on-one tutor. One

commented: "Getting immediate feedback and working one-on-one with a native speaker would be much more effective."

The Hasan group had the fully functional Tactical Language program. Their responses indicated that they appreciated its feedback capabilities: the average response on the questionnaire indicated that this group felt the program was slightly higher than "about the same" as a one-on-one tutor, although the range covered the spectrum from "much less effective" to "much better." Their comments emphasized the untiring and personalized nature of computer feedback compared to that provided by a human teacher.

I demonstrated the Tactical Language program to three professors of Arabic who had experience in developing multimedia computer programs for teaching Arabic at the college level. During the demonstration all three professors zeroed in on the voice recognition capability of the program and found it unsatisfactory. Their logic was if they as native speakers of Arabic on occasion could not have their speech recognized by the program, then students of Arabic would find it even less useful. All of the professors thought the concept of using a video game interface was intriguing but recommended concentrating the development effort first on the voice recognition component, which they felt had to function at a nearly perfect level before it would be acceptable for instructional purposes.

The deficiency of the voice recognition program was evident during the field evaluation of the Tactical Language program at Fort Bragg. Most of soldiers whose version of the program included voice recognition feedback seemed to become obsessed with correct pronunciation. This seemed a waste of effort as to my ear the pronunciation was adequate and the speech recognition engine had difficulty recognizing this,

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particularly for single words and short phrases. Although this was frustrating for those soldiers, at least they seemed engaged; those experimental subgroups of soldiers without feedback seemed bored with the program.

Based on my observations during the evaluation period, the Hasan group with the complete Tactical Language program was the liveliest and most vocal—it seemed like they were enjoying the experience. In stark contrast, the Daud control group with no interactive elements of the program was listless, barely awake and nearly silent. The other two groups fell somewhere in between. The soldiers reflected this in their questionnaire responses: The Hasan group's average score for questionnaire item concerning how interesting it was to work with the program was solidly "pretty interesting", while for Daud it was between "not very interesting" and "it was okay." The Chalabi and Saiid groups responded to this question similarly to the Hasan group, possibly indicating that any sort of interactivity was enough to deem the program interesting.

Lesson Sequencing

For the field evaluation of the Tactical Language program, the soldiers were only given a single lesson. The contents of this lesson were basic courtesy phrases and asking for directions with minimal possible variations; future program development plans are to increase the number of lessons and the possible variations within the lessons. For those groups with both the "classroom" and "video games" modes, there was the expectation that the soldiers would learn the material in the Skill Builder and practice it in the virtual environment. One soldier decided to skip the Skill Builder activities and focused entirely

on the practice environment, completing the tasks using the aide character at first until he

had mastered all the responses. It is unknown if this approach was effective as his record

wasn't tagged for analysis separately from his group.

Motivation

None of the soldiers expected to make any use of the Arabic they learned during

the field evaluation. Indeed, some military members may perceive a disincentive to learn

Arabic or any other language of the Middle East on account that knowing the language

could place them at risk of being sent to an active war zone.

Applying Skills and Knowledge

The developers of the Tactical Language program attempted to add realism by

having the customers in the café scene reacting positively or negatively to the intrusion of

U.S. forces depending on how polite they perceived the Americans to be in their search

for information. Unfortunately, the soldiers using that program prototype did not

understand that there was a danger of a negative reaction; most didn't encounter the

negative outcome, and the few that did, did not understand what had happened.

The field evaluation included a final learning test involving conversational tasks,

the responses to which were recorded and later scored by native speakers of Arabic. A

surprising preliminary finding was that the Hasan group performed poorest on all the

learning test measures compared to the other groups (C. Beal, personal communication,

August 17, 2004), which was contrary to expectations in that the Hasan group had the

complete fully-interactive Tactical Language program and was also the group observed to

be the liveliest and most involved during the evaluation period. It is possible that having

the practice environment distracted the Hasan group from the learning objectives in the

Skill Builder which were also the focus of the final learning test. One Hasan group

member commented: "I didn't really get as much out of the game. I learned more using

the skill builder." It could also be that the final learning test used in this evaluation did

not adequately capture what was learned. Another Hasan group member commented:

"(The practice environment) helps you take what you learn and apply to your job and real

life. It helps place it all in the proper context. It also helps make the whole learning

process more enjoyable and entertaining while you learn." This soldier seems to have

grasped the ultimate learning objectives of the Tactical Language program; further

research is needed on how to improve the evaluation process so as to capture all learning

objectives.

Contextual Factors

The computer stations for the field evaluation were located next to one another,

allowing the students to learn from each other either directly (asking each other

questions) or indirectly by copying. However, there were also negative consequences of

this proximity, such as a loud voice being picked up by a neighboring microphone, which

interfered with the voice processing software and also the concentration of some of the

soldiers. All groups suffered from numerous technical glitches that forced the soldiers to

have to reboot the computers and/or restart the Tactical Language program several times

during each session.

Summary

It seems that a 3-D simulation could capture the essence of the ideal language immersion experience. That essence is the context of learning, which includes cultural, sensory, and emotional overlays that intensify the learning experience. At its simplest level, the argument might be that an appropriately decorated classroom would be a superior place for learning than a neutral room. Even better than appropriate decorations would be actually say sitting in a café in Morocco, which if not practically possible, might be virtually possible in a 3-D simulation. Should the student be able to suspend disbelief about the simulation, then that added benefit of place should aid learning.

This research involving the best available representatives of the target audience for computer-based simulations for teaching Arabic as a foreign language reveals that these cadets and soldiers are similar in how they want to be taught, essentially demanding to control their learning by choosing and successfully accomplishing real world tasks that are meaningful to them. Advances in computer technology have made it ever more possible for students to control their own learning. This is especially true in a computer-based simulation where a student might be able to accept or reject some or all of the intended objectives and learn what he or she chooses within the virtual environment. The challenge of providing such instructional opportunities within the context of the known difficulties of learning Arabic is covered in the next section, followed by an analysis of existing examples of computer-based programs for Arabic. From these three sections I derive some required engagement and realism features for computer-based simulations for teaching Arabic as a foreign language.

Linguistic Challenges of Learning Arabic

The findings in this section answer the second research question: What are the unique linguistic challenges for young adult Americans learning Arabic? The findings were obtained from observations, interviews, and the analysis of questionnaires made by others. This section describes the experiences of the cadets and the soldiers according to the major linguistic challenges of learning Arabic identified in the literature review: diglossia, the Arabic writing system, and cultural proficiency. The findings are separated according to the two research populations, the participants in the intensive summer Arabic program in Morocco and the participants in the field evaluation of the Tactical Language program at Fort Bragg.

Intensive Summer Arabic Program

All of the cadets participating in the intensive summer Arabic program had studied Modern Standard Arabic at the college level for at least two years prior to their arrival in Morocco. A few of the cadets had been tutored in the rudiments of the Moroccan dialect.

Diglossia

For the cadets in Morocco, the linguistic situation was complicated by the not only the complementary use of Modern Standard Arabic (MSA) and dialect but also the simultaneous widespread use of French. It was particularly disheartening for them to

learn that the Army and Air Force attaches at the U.S. embassy in Rabat spoke no Arabic at all, relying instead entirely on French for both official and personal communication. In addition, their immersion program was located on the campus of the single institution of higher education in Morocco which used English as the language of instruction. The Moroccan students on campus spoke to each other in dialect, MSA, French and English, often using all of these languages in the same conversation and sometimes even in the same sentence! It was impossible for the cadets to interact with the Moroccan students on an equal level in any language except English.

The only people with whom the cadets interacted who did not also know English were the cafeteria workers, cleaning staff, and security personnel on campus; off campus, those who often dealt with tourists would know some English though not always. These Moroccans generally spoke to each other in dialect but would automatically address any European in French. As few of the cadets had any French, they were forced to communicate as best they could in MSA or in dialect. Most cadets found it difficult to make themselves understood in MSA, which was frustrating as even when saying the correct word or phrase it was often mispronounced (MSA has nine phonemes that are not found in English). My impression is that teachers of Arabic as a foreign language are accustomed to the mistakes made by Americans speaking in MSA and so do not always insist on proper pronunciation, while Moroccans are generally used to hearing MSA spoken properly in the news media and in official situations where correct delivery is highly valued. Consequently, the cadets found that in conversations where using English was not an option, it was best to speak in dialect. Some cadets embraced this discovery and rapidly developed a survival-level command of the dialect, while others resisted on

the premise that they didn't know when if ever they would return to Morocco and use the dialect again.

The Arabic Writing System

For the cadets in Morocco, outside the classroom they found they could be lazy about reading Arabic signs and instructions as almost always these also appeared in French. In addition, Morocco uses the familiar "Arabic" numerals rather than the "Persian" numerals more commonly used in Egypt and the Middle East, which helps in understanding especially prices. Even not knowing French, there were sufficient cognates that it was usually still easier to read the French than to decipher the Arabic. In cases where it was necessary to know specific French vocabulary that wasn't a cognate such as the name of a dish on a menu, a cadet might try to read the Arabic—though often this vocabulary was unknown as well. Several cadets carried pocket phrase books, which usually included a transliteration of the desired Arabic word or phrase and the Arabic writing. Although the cadets had Arabic to English dictionaries, they rarely used them as the process of translating a word in that direction is so cumbersome—it was easier to ask someone than to look it up. The cadets never had to write in Arabic outside the classroom, as any forms that might have to be filled out were always bilingual and the Roman alphabet is readily understood.

When shown the Tactical Language program, the cadets (who already knew how to read the Arabic script) found the use of transliteration in the program to be unhelpful. Since they had previously studied MSA, the cadets would have preferred to know how to translate from MSA to the dialect as well as translating from English.

Cultural Proficiency

Morocco is one of the most Westernized of the Arabic-speaking countries and even still within it the cadets were largely insulated from direct contact with Moroccan culture by their participation in the immersion program. Consequently, the cadets mostly learned about Moroccan culture in program lectures and excursion tour guides rather than through direct experience, with one exception being a weekly opportunity to sing, dance, or practice calligraphy. Even still, there was some room for misunderstandings. For example, Americans use the euphemism "bathroom" when what they really need is to use a toilet, not take a bath. In Arabic, there are distinct words for a place to take a bath and a place to use a toilet and in their buildings these places are not usually combined (the toilet is usually in a sort of closet with a door to separate it from the sink and shower area, as is done in the facilities connected to my dorm room). One cadet asked a passerby where to find a bathroom in Arabic and was led to a public sauna/steam bath. This example is partially a linguistic issue and partially a cross-cultural issue, which is why it is such a challenge for students of Arabic as a foreign language.

Fort Bragg Field Evaluation

None of the soldiers participating in the field evaluation had any prior knowledge of Arabic, although most of them had previously studied another foreign language. The assumption of the Tactical Language program was that the user would be a complete beginner.

Diglossia

The soldiers in the field evaluation of the Tactical Language program were only taught Levantine Arabic in their experimental lesson. Although it was mentioned that this is a dialect, this fact was not emphasized and the differences between the dialect and MSA were not explained. As the soldiers had no prior exposure to Arabic, this lack of explanation caused no concern or confusion.

The Arabic Writing System

The soldiers using that prototype of the Tactical Language program were not taught nor were they expected to read or write using the Arabic script. All of the Arabic words and phrases that they had to learn were transliterated using English letters, with the Arabic-only phonemes expressed as capital letters, numbers, or a dollar sign. Although it was necessary for the soldiers to learn this transliteration system, once mastered the soldiers were able to pronounce the Arabic words and phrases reasonably well.

Cultural Proficiency

For the soldiers, didactic instruction in Levantine culture was available though a navigation bar option. What was especially interesting about the program design was the indirect knowledge that might be obtained in the video-game like Mission Practice Environment, where the realism of the visual and audio elements might provide some cultural understanding even at a subconscious level.

Summary

There is no easy solution to the challenge of diglossia in Arabic. Learning a dialect of Arabic does aid conversation in the locality where that dialect is spoken; however, knowledge of Modern Standard Arabic is more widely useful and necessary for reading the written language. Ultimately it is best to know both MSA and a dialect to successfully communicate at multiple levels in a specific location. When it is known that conversational skills in a dialect are needed to accomplish a specified purpose, then when time is limited it would make sense to begin by learning that dialect and adding MSA if and when possible. In all cases, an understanding of local culture and customs is needed to ensure proper use of the language.

Instructional Materials to Aid the Self-Study of Arabic

Despite being one of the less-commonly taught languages, a great variety of computer-based materials have been produced to help an English-speaking student learn Arabic outside of a classroom. Parkinson (1992) mentions the work of pioneers in this effort, such as Victorine Abboud at the University of Texas at Austin and Roger Allen at the University of Pennsylvania, while detailing his own work at Brigham Young University. These pioneers developed programs for teaching the Arabic script, vocabulary and grammar drill programs, and language games such as Hangman. These early efforts matured through greater attention to pedagogy; for example, Alosh (1997) details his own efforts to create computer-assisted language programs for Arabic that

were grounded in the communicative approach to language learning, resulting in materials to supplement his textbook *Ahlan wa Sahlan* (Alosh, 1991) that gave students considerable choice and emphasized real world applications. Bush & Browne (2004) show how similar work at Brigham Young University to develop supplementary materials for the textbook *Elementary Modern Standard Arabic* (Abboud & McCarus, 1983) has led the ongoing creation of high quality computer-based materials to teach Arabic to English speakers.

The findings in this section answer the third research question: What are the pedagogical features found in existing computer-based games for Arabic and how do those features compare with the pedagogical features considered critical to success by experts and actual learners? This section categorizes these materials according to the pedagogical methods that underlie them and reviews the available evidence as to their effectiveness. Appendix D lists representative titles of these materials categorized according to methods employed, including the year of publication and a source for the materials when known.

Audio-Lingualism

The most common pedagogical method in materials for self-study is that of hearing a native speaker pronounce a word or phrase followed by a pause during which the student is expected to repeat aloud what he/she had heard.   There are many variations to this method, including 'read phonetically and repeat,' 'combined reading and hearing, then repeat,' and 'hear and repeat while recording, then compare.' The method and its

variations are most closely associated with audiolingualism, an approach generally seen

as useful for developing pronunciation and intonation but not comprehension. Lightbown

& Spada (1999) commented: "[Beginning learners] could recite bits of perfectly accurate

language, but the lack of practice in struggling to understand and make themselves

understood in genuinely meaningful interaction left many learners with little more than a

collection of sentences, waiting for the moment when those sentences would be useful!"

(p. 162). Successful memorization of language that does not require deep comprehension

such as common courtesy phrases may increase learner confidence and motivation for

further study.

Hear and Repeat

        This method uses the recorded voices of native speakers of Arabic on a variety of

media, most commonly cassette tapes, CDs, and computer-based audio files. The

recorded speech can be in Modern Standard Arabic (MSA) or one of the Arabic dialects.

Often the audio recording is supplemented with a written transcript of the words and

phrases, though its intended use is as a reference rather than an instructional aid.

        A military/governmental variation on this has been the development of software

such as *Talker* by Transparent Language that can be downloaded to a laptop or handheld

device; this software allows the user to select audio files of words and phrases in Arabic

and to play them rather than speaking them in a form of one-way communication. The

Rapid Rote software also by Transparent Language teaches users to say these words and

phrases themselves and to understand typical responses, though the two programs can be

used independently.

Read Phonetically and Repeat

This is the method commonly adopted in phrase books, where the Arabic script is presented in English letters so as to be more easily read aloud; sometimes symbols are introduced to represent peculiarly Arabic phonemes. Another variation is to include the Arabic script as well, sometimes with the addition of the short vowels as an aid to pronunciation.

Combination of Hearing and Reading, then Repeat

This variation combines the above methods, so that the student has the opportunity to read a word or phrase while hearing it spoken.

Hear and Repeat while Recording, then Compare

This variation allows the student to record words or phrases and then compare the recording to one made by a native Arabic speaker. It is up to the student to determine how to improve the match between his/her recording and that of the native; an additional variation is to present a graphical representation of the student's utterance with an overlay showing the native pronunciation, giving the student some sense of the difference though without any feedback as to how to reduce that difference.

Hear and Repeat while Singing

In this variation, students learn the alphabet and other vocabulary as lyrics to songs which they are expected to repeat while singing. *Musical Arabic* by Zovi (2004) is a combination songbook and compact disc which teaches vocabulary-themed songs such as on the days of the week, colors, and numbers in Arabic; the songs and additional written exercises in the songbook are intended to reinforce the memorization of the themed vocabulary in an entertaining fashion. Mora (2000) notes research studies and her personal experience as a teacher that students memorize vocabulary more easily when it is set to music, speculating that music brings affective and unconscious factors into play in fixing the words in memory.

Vocabulary

The two primary methods of increasing a student's vocabulary are by learning words in isolation and by learning words in an authentic context. Self-study materials generally treat vocabulary words in isolation as it is easy to create flashcards and to design computer-based games to test a student's memory of particular words. Proponents of content-based instruction such as Stryker & Leaver (1997) argue that learning vocabulary from authentic materials makes it more likely that students will know when it is appropriate to use the words that they have learned.

Vocabulary Drills

This sub-category refers to all the methods for learning vocabulary words in isolation, most commonly either paper flashcards or their electronic equivalents. Vocabulary drills are especially useful when the objective is to learn all the words of a particular type, such as all the colors, all the fruits, etc.

Reading in Context

This sub-category refers to all the methods for learning vocabulary words in context. For example, in Wightwick (1990) students are shown photographs of advertisements so that students can guess the meanings of words from their placement and the accompanying pictures. It can be difficult to find suitable authentic materials for all the vocabulary a student would need to learn.

Grammar

The two primary methods of increasing a student's knowledge of grammar are by learning grammar in isolation and by learning grammar in an authentic context. Self-study materials generally treat grammar in isolation as it is easy to design exercises to test a student's memory of grammatical forms. Many foreign language educators such as Krashen (1999) and Wong & VanPatten (2003) argue strongly against this approach, noting that a student's abstract knowledge of a grammatical form is rarely evident when speaking.

Grammar Drills

This sub-category refers to all the methods for teaching grammar as isolated units. The most common of these are grammar substitution drills, where a single element of a sentence is changed and the student is expected to determine the corresponding grammatical changes in that sentence. The purpose of this substitution is to draw the student's attention to the grammatical form.

Grammar in Context

This sub-category refers to all the methods for teaching grammar in context. This approach tolerates grammatical inaccuracies when they do not impair communication. These methods are particularly found in materials that support academic textbooks developed according to the communicative approach such as the Brustad et al. (1995) *Al-Kitaab* series.

Grammar as Linguistic Patterns

The traditional method for Arabic speakers to study their own grammar, especially the grammar of the Qu'ran and Classical Arabic, is to memorize complete conjugational patterns. This traditional method has been adopted by some educators for teaching Classical Arabic as a foreign language, which has some transfer for learning the grammar of Modern Standard Arabic and Arabic dialects. I have not been able to find any published evidence as to the effectiveness of memorizing complete conjugational patterns for learning to speak Arabic.

Explicit Cultural Instruction

Information about Arabic culture is rarely a significant component of self-study

materials for learning Arabic. Al-Batal (1988) noted this was also true of classroom

instruction: "[M]any of our students spend a few years studying the language without

developing an adequate understanding about the culture and without acquiring the

minimum sensitivity required to function in the culture" (p. 444). Suleiman (1993) and

Rammuny (1996) have also argued that cultural proficiency should be considered as

important as knowing vocabulary and grammar. Rammuny described an introductory

Arabic course at the University of Michigan which equally balanced language and

cultural instruction as a possible model. A straightforward conclusion is that knowing

when to say something is as important as knowing what to say.

The cultural elements in a virtual environment (audio and visual), to the degree

they are realistic, have a practical utility of preparing the student for the real world. Also

to the degree that these elements are foreign, that foreignness will also heighten

apprehension which successful communication could then reduce. The modulation of

apprehension might make the foreign less scary while making the lesson that much more

effective.

Multimedia Programmed Instruction

This category refers to computer-based multimedia programs that include some

sort of testing and tracking function. The most advanced commercial product among

these, *Tell Me More Arabic* from www.auralog.com, makes extensive use of speech recognition not only to improve pronunciation but also to engage students in mini-dialogs, although students are limited to reading aloud exactly the correct response from given written choices. The dialogs are conducted in MSA and the corresponding vowelized Arabic text is highlighted as words are spoken. Links within the mini-dialogs allow the learner to look up the meaning of a word or obtain an explanation of the grammar. Supplementary materials cover Arabic culture and include exposure to various dialects, though these are not the focus of any of the exercises. A strength of this program is that it can be covered either in a prescribed order or in any desired order, so that students could tailor their learning to their needs from the 97 available lessons organized in eight levels; either way, the program tracks student progress. In a review of an early version of this program, Wachowicz & Scott (1999) commented that the major underlying pedagogy was imitation and correction, with the correction supplied by the questionable practice of comparison of graphical representations of acoustic wave forms, noting that "many educators have questioned whether second language learners can benefit from seeing acoustic features of their utterances compared with acoustic features of a native utterance" (p. 268). Wachowicz & Scott prefer a more natural feedback such as found in the prototype Arabic microworld of the Military Language Tutor [described in detail in Kaplan et al. (1998)], where the student uses voice commands to direct an agent through a series of virtual rooms in search of critical documents; incorrect commands cause the agent to go in the wrong direction or ask for clarification. An explicit goal of virtual learning environments is to provide more natural feedback.

Virtual learning environments attempt to permit authentic language use in a realistic context through advanced technical features such as voice recognition technology. Given the contention that study abroad represents the ideal language learning environment, then this would be the best available computer-based simulation as it would create situations where the learner would encounter Arabic-only speakers and provide engaging practice in the language skills needed to effectively deal with those situations.

A commercial product, *Virtual Conversations* by Interactive Drama, developed a computer interface where the user appears to have a conversation with a native Arabic speaker. The user speaks aloud one of the three displayed sentences or questions; using voice recognition technology, the program appears to understand what the user said and advances the conversation by then playing a video file linked to the selected sentence or question—this video is the Arabic speaker responding naturally to what the user said or asked. Three new sentence or question choices appear and the process continues, with the user learning information that answers objectives created for each 'interview.' In this fashion, Harless, Zier, & Duncan (1999) report that "…most users come away from the experience with the distinct feeling that they have been talking with a real person" (p. 314). This authenticity suffers in that users cannot formulate their own questions.

The Center for Advanced Research in Technology for Education (CARTE) at the University of Southern California's Information Sciences Institute has developed a prototype video-game type program for the Levantine dialect of Arabic in which player

input is through speech and gesture selection in an animated 3-D environment.   This

prototype is being developed under a military contract and features a peacekeeping

scenario in which a team of U.S. soldiers provide assistance to a village in Lebanon.

The learner plays the role of the leader of this team, assisted by an aide character who can

provide hints as needed. This 3-D environment recreates virtually an interpretation of the

ideal immersive language experience with video-game elements that make it highly

engaging.

There are, however, some limitations. The voice processing feature makes

mistakes as to what it heard, resulting in false positive and negative reinforcement. The

feature does seem to catch the most common errors a native English speaker would make

when learning to speak in Arabic and provide tailored feedback for those errors. It is also

significant that a student could not learn Levantine Arabic exclusively within the 3-D

environment. Different points within the 3-D environment, like the café, are scenes which

correspond to different lessons. These lessons are presented in a separate 2-D standard

audio-lingual lesson workspace, with pronunciation repetition drills and quizzes to test

vocabulary and grammar.

The lessons are based on materials provided by U.S. Army Special Forces, which

is reasonable as Special Forces would be a likely target audience for the Tactical

Language Training System. However, the project developers could be creating a

technological marvel that might be rejected by the target audience, if the video game

interface creates an expectation of an action/strategy game rather than an arena for

practicing conversation skills. It should be emphasized that this program is a research

prototype currently under active development, so its final form may differ significantly from its current shape.

<div align="center">Required Engagement and Realism Features</div>

The findings in this section answer the fourth research question: What are the engagement and realism features that are required in computer-based simulations for learning Arabic as a foreign language? There are several features to virtual simulations, each of which has implications for foreign language pedagogy. A useful taxonomy of these features can be found in Bethke (2003), which divides them into design parts, coding parts, art parts, and audio parts. Each of these parts is considered in detail below.

<div align="center">*Design Parts*</div>

Design parts are the decisions that are made before any portion of a virtual simulation is made, which rest on a needs analysis of the target audience. The first decision is to determine what sort of Arabic to teach and what skills to highlight for that sort of Arabic. If a specific need can be identified for communicating in a single locality, then the choice of learning the dialect spoken in that locality is logical. However, military members could be deployed to different localities, possibly making it desirable to focus on developing a core competency in MSA that could be expanded as needed to encompass different dialects. MSA and/or dialect, based on the experiences of the cadets

in Morocco it seems that the most important skills are those of listening and speaking with some cultural sensitivity rather than reading and writing.

Evaluating culturally sensitive speaking fluency is a difficult design problem. The best available means are personal oral interviews, which despite their cost in time and energy are a fairly crude measure in that only five broad levels of proficiency can be distinguished. Military members will be keenly interested in knowing how they will be evaluated and will focus their attention on the testable parts of a lesson. Military members will continuously question why they need to learn each part of a lesson, and the only answer they will likely find acceptable is that the knowledge is needed to perform a task they consider valuable. If a part of a lesson isn't testable, the assumption will be that the designers didn't consider it sufficiently important and the military members can also disregard it.

The selection of a computer-based simulation as the means for delivering the instruction is one that military members would likely appreciate. The cadets would require little to no orientation to using a computer-based simulation for language learning. All of them are experienced language learners who have used other computer programs for learning Arabic in a language laboratory setting (primarily *al-Mumtaaz*, a comprehensive multimedia program) and all of them had played video games at some point growing up, although only about half said that they were currently avid players. Several cadets commented that the Tactical Language interface reminded them of other video games that they had played, and three of the cadets had even played *Unreal Tournament* (the video game used as the base for the Tactical Language program) while others had played *America's Army* (the source of some of the Tactical Language

characters). Persons without this background might require a substantial amount of explanation and direction for what these cadets would know almost instinctively.

Coding Parts

These are the unseen parts of a simulation and primarily refer to the artificial intelligences (AI's) that guide the behaviors of objects within a virtual environment. This is why feedback in a computer-based simulation has the potential to be richer than the tabulation of numbers of right and wrong responses. Through their guidance, AI's provides the feedback given to a user's inputs and behaviors.

The clearest example of this sort of feedback is in the ability of an AI to cause the characters in a simulation scenario to respond positively to a user input or behavior. A real life example from Morocco is that most cadets reported conversing with the cafeteria staff, which is how they learned the names in Arabic for Moroccan dishes. What seems interesting is that the cadets could recall which of the servers told them the name of whatever it was that was being served. The servers were generally a friendly bunch, which made it easy to talk to them and they provided a lot of positive reinforcement for attempts to use Arabic. If the name of a Moroccan dish is associated not just with the plate of food but also with the friendly person who served it, then perhaps in designing a computer-based lesson for teaching vocabulary it would be more effective if the positive reinforcement were seen as coming from a sympathetic person, rather than say by just showing the number of correct answers.

Not just reinforcement but also direct assistance could be provided by an aide character, whose actions could be determined by an AI that was monitoring user inputs and behaviors. The monitoring could allow the aide character to be proactive in making suggestions to the user, rather than merely waiting to be asked for assistance. The monitoring might also allow the aide character to make the most applicable recommendations based on the AI analysis of the user's profile.

A computer program that combined an AI with advanced voice recognition technology could function much like a human tutor. All of the cadets were strongly interested in a computer program that would help them build their conversational skills. They were impressed by the idea that a computer program might provide them tailored feedback on their speech rather than just recording and playing back what they had said, leaving them to figure out how their speech differed from the native speaker prompt. Cadets were very interested in knowing just how accurate the voice processing capability was in the Tactical Language program, since their own experience with voice processing suggested that it was unlikely to work perfectly.

An AI might also help maintain the illusion of reality in a simulation by monitoring environmental factors. Regardless of whatever else the cadets were trying to accomplish in Morocco, they constantly needed to find food, drink, and the nearest public restroom. One cadet suggested including a "Health-o-Meter" in a simulation so that main character satisfaction would drop over time as he or she gets hungry and thirsty, something like what is found in the "Sims" worlds. This would be fairly realistic as no matter what the mission, those involved would have to take care of basic personal needs.

Finally, an AI can be used to make a simulation entertaining. One of the developers of the Tactical Language program described a game they are creating (K. LaBore, personal communication, June 17, 2004)

> [A] technique for reinforcing learning is repetition, which can be very boring in the classroom or language lab, but which can be made interesting in the context of a game. For instance, we are building a game now that helps the learner understand and use vocabulary related to giving and clarifying directions, and way-finding. In this game, you may hear directions and have to follow them, racking up points along the way for making the correct moves. Or, you may use your voice to command a 3D character to go this way or that, picking up objects along the way and again, racking up points for using the correct word or phrase. We hope to make the game very compelling, so that you'll play it over and over, until you've mastered all of the vocabulary and can quickly and correctly use it in that context.

There may be gender differences in how games are perceived. Several male cadets commented on the need for urgency, with the suggestion that a game should have some sort of deadline. A few males thought that there should be rewards for completing each mission, with the suggestion that the character of lead soldier could advance in rank or possibly receive medals or other military decorations. None of the female cadets felt the need for urgency was important or that there should be some system of rewards.

The coding parts of a simulation must work reliably or the users may quit. During the field evaluation of the Tactical Language program at Fort Bragg, there were frequent technical glitches that would freeze the program and force a delay while the program was restarted. Soldier reactions to these glitches ranged from minor annoyance to frustration with the program. The evaluators were always present to fix the glitches and to ask the soldiers to excuse the glitches as part of the development of the prototype that was in the process of being fixed. Without this assistance and reassurance it is highly unlikely the

soldiers would have been able to or would have wanted to continue to work with the program.

Art Parts

While the design and coding parts of a simulation help make it engaging, the realism of the art and audio parts are also needed to make it compelling. The art parts are the visual aspects of a simulation which help foster the suspension of disbelief. Visuals are also important means of conveying cultural information that helps the student associate language with an authentic context. This is one of the great benefits of an in-country language immersion program, in that the foreign language is associated with the places it is actually used. A 3-D virtual environment is a way of recreating this essential aspect of place, which to the degree the environment was realistic it would seem authentic--although it could also be drawn in a way that highlighted the association between place and language objective.

The following are comments made by the USAF Academy cadets in response to the visual parts of a demonstration of a developmental prototype of the Tactical Language program:

- Half of the Air Force cadets studying Arabic in Morocco were female and only one regularly played video games; when asked, the women said they would prefer the option of having a female lead soldier but that having a male lead would not discourage them from trying the program.

- Only a minority of the students thought that having the Americans in the story in uniform was appealing. Some men and almost all women felt that the soldier characters should be in civilian clothes.

These comments are representative of the feedback that should be collected from a target audience in order to make the visual parts more appealing to potential users.

Audio Parts

These are the parts of a simulation that are heard, which are especially important in virtual environments for foreign language learning as the student must hear and comprehend an utterance to respond and maintain the illusion of a dialog. The audio parts can also help create an authentic feel to the virtual environment when they are linked in order to sustain an interesting narrative. Students might better remember words or phrases because they were used in the context of a narrative that interested them.

An effective simulation can also employ an expectant silence. The practice environment of the Tactical Language program recreates the experience of walking into an unfamiliar place and having to speak in a foreign language. A feeling of apprehension comes from the expectant silence, in that nothing happens until the character of the lead soldier says something. There are no visual clues as to what to say, although the soldier can turn to his interpreter for advice. Still the soldier must say something for the situation to move forward, which if resolved successfully will lift the apprehension and that lifting gives the language practice an emotional overlay which might magnify its effectiveness.

Summary

        Based on the reactions of the USAF Academy cadets who attended the language

immersion program in Morocco and the Special Forces soldiers who participated in the

field evaluation of the Tactical Language program at Fort Bragg, military members

would be highly interested in using a computer-based simulation for developing their

conversational skills in Arabic. I have summarized the main conclusions derived from

my findings in three parts: the qualities needed in a real-world immersive language

environment to promote the learning of Arabic, the qualities needed in a virtual

immersive language environment to promote the learning of Arabic, and the qualities

needed in a video-game type environment necessary to attract attention, engagement and

repetitive play.

Real-World Immersive Language Learning Environment

- Where language is learned [the physical environment] can enhance its retention and transfer if the place is vivid to the learner.

- The ideal learning environment contains multiple opportunities for practicing the Arabic studied in the classroom.

- Learners benefit from having someone willing and able to answer their individual questions.

- Successful use of Arabic in accomplishing a task important to the learner cements learning and builds confidence.

- The most important Arabic that the students wanted to learn was the vocabulary needed to satisfy personal needs such as food, water, shopping and directions.

- Cultural knowledge is as important as linguistic knowledge in knowing when and what to say.

Virtual Immersive Language Learning Environment

- Students would want to know why they needed to learn each lesson and how they would be evaluated.

- Where language is learned [the virtual environment] can enhance its retention and transfer if the place is vivid to the learner.

- The ideal learning environment contains multiple opportunities for practicing the language studied in the classroom mode.

- Learners benefit from having a sympathetic pedagogical agent able to answer their individual questions.

- Successful use of Arabic in accomplishing a virtual task important to the learner cements learning and builds confidence.

- The quality of the feedback provided by the program is the single most important feature of a virtual immersive language learning environment.

- Technical glitches may cause learners to abandon the program.

- What learners will focus on is how they will be evaluated by the program.

- As experienced video game users, they would expect a program would behave like other games that they have played.

- Some male military would prefer that a simulation include game elements that would increase its sense of urgency.

    In the next chapter, I synthesize these conclusions to create a set of guidelines that might be generically useful in appraising computer-based simulations for the teaching of Arabic.

CHAPTER FIVE—CONCLUSIONS

This thesis has used a developmental prototype of the Tactical Language program as if it were a fully realized computer-based simulation for learning Arabic for the expedient reason that at the moment it is the only program of its type available for any language. This use may not seem fair as the Tactical Language program is still under continual development and many of the problems which surfaced with earlier prototypes have either been corrected or further development work is planned. That said, I begin this chapter by comparing the developmental prototype of the Tactical Language program available in late March 2005 with the major conclusions from the literature review and research findings. This comparison is then followed by a synthesis of these conclusions together with other information gleaned during this research into a set of guidelines which might guide the appraisal of similar programs in the future.

Appraisal of the Tactical Language Program

This appraisal of the developmental prototype of the Tactical Language program available in late March 2005 is organized according to the conclusions drawn in the literature review on the nature of the ideal language learning environment and the conclusions drawn in the research findings on a real-world immersive language learning environment and the desired simulation and game features for a virtual representation of that environment.

Table 1. *Appraisal of the Tactical Language Program*

Study Conclusions	Tactical Language Program Features
The Ideal Language Learning Environment	
Learner options for structured tutoring on aspects of language and culture combined with opportunities to practice this newly-gained knowledge in a realistic context.	Yes. The Tactical Language Program is designed for this purpose through its combination of the Skill Builder and Mission Practice environments.
Engaging activities in a non-threatening environment, such as role-plays with dramatic elements, to encourage conversation practice and build confidence though successful uses of the foreign language.	Yes. The Mission Practice environment is designed for this purpose.
Opportunities for learners to express themselves, such as their needs, interests, and personalities, so that learners invest positive emotions in the foreign language.	No. The Tactical Language program has lessons concerning military missions, not personal interests.
Reflective activities to promote meta-cognition of language learning strategies.	No. These activities are not part of the program, although there is an effort to incorporate them into orientation materials.
Easy navigation among different activities and modes of exercises to optimize opportunities for learner choice.	Yes. Logically designed menus make it possible to easily access all activities.
Simulation Elements	
Where language is learned [the physical environment] can enhance its retention and transfer if the place is vivid to the learner.	Yes. The realism and vividness of the Practice Environment are exceptional.
The ideal learning environment contains multiple opportunities for practicing the Arabic studied in the classroom.	No. The developmental prototype of the Practice Environment had only one possible path.

Learners benefit from having someone willing and able to answer their individual questions.	Yes. The Practice Environment features an interpreter able to translate what was just said or suggest what to say next. However, the interpreter cannot answer why questions.
Successful use of Arabic in accomplishing a task important to the learner cements learning and builds confidence.	Yes. Knowledge of Arabic is necessary to accomplish the tasks in the Practice Environment. However, these tasks may not be considered important by the learner.
The most important Arabic that the students wanted to learn was the vocabulary needed to satisfy personal needs such as food, water, shopping and directions.	No. Although some of this information is presented, personal needs are not the focus of the lessons.
Cultural knowledge is as important as linguistic knowledge in knowing when and what to say.	Yes. Cultural information is presented throughout the lessons.
Students would want to know why they needed to learn each lesson.	Yes. A rationale for each lesson is given in the form of a military mission.
The quality of the feedback provided by the program is the single most important feature of a virtual immersive language learning environment.	Problematic. The voice processing feature only worked intermittently in the various developmental prototypes examined during this research.
Technical glitches may cause learners to abandon the program.	Problematic. Technical difficulties were a constant irritant in the developmental prototypes examined during this research.
Game Elements	
What learners will focus on is how they will be evaluated by the program.	Problematic. Evaluative measures were still under development in the observed prototypes.
As experienced video game users, the learners would expect a program to behave like other games that they have played.	Yes. This was especially true as the Tactical Language program is a modification of a commercial video game.
Some male military would prefer that a simulation include game elements that	No. While learners found the video game interface initially engaging, some then

would increase its sense of urgency.	found the lack of action to be demotivating.
Game elements should be sufficiently attractive to elicit replay.	No. Video arcade-type games have been added to later prototypes to reinforce learning in a more compelling fashion.
Games should be portable so that they could be played whenever desired.	Problematic. The Tactical Language program demands highly advanced computing power to run properly, limiting its portability.

This comparison shows that the Tactical Language program has the potential to be a highly effective means for teaching Arabic as a foreign language. The technical features of the program and especially the reliability of the voice recognition capability were problematic, although this is to be expected in a developmental prototype and further improvements are ongoing. There is, however, a tension between the demands for realism in its simulation elements and the need for game elements to make it fun so that the program gets used. As an instructional program, there is an additional possible tension between the design of the program as a military training device for in a peaceful civil affairs scenario and the personal needs and interests of the intended audience. This is especially true if the program is used in a self-study setting where the evaluative components of the program have no direct consequences. As the Tactical Language program adds learner options to its various modes, users may be able to choose those portions that satisfy their personal interests and be motivated to learn in a self-study setting.

Finally, the Tactical Language program is primarily designed to build conversational skills in either the Levantine or Iraqi dialects of Arabic; as such, it fails to incorporate Modern Standard Arabic and exposure to the Arabic script. These design

decisions concerning choice of dialect and linguistic skill help focus the program on

Arabic for specific military purposes and locations while limiting its usefulness in a

broader context. These design trade-offs are not part of the criteria although they are

certainly decisions with significant consequences for the end user.

Generic Appraisal Criteria

The following sections synthesize the conclusions into the form of criteria for the

appraisal of computer based simulations for the teaching of Arabic similar to the Tactical

Language program. The expectations for such programs of the military members studied

in this research, combined with the insights gained from the examination of existing

computer programs to teach Arabic as a foreign language, are the basis of the appraisal

criteria detailed below and condensed as Appendix E. This checklist subsumes the

qualities identified in literature review and the summary of Chapter Four.

The criteria are organized according to the same framework begun in Hannafin &

Peck (1988) and expanded in Hannafin et al. (1996) used to organize the findings in

Chapter Four. The criteria are presented within this framework as a range of options in

recognition that the most recent computer programs for teaching Arabic bring together a

variety of approaches and give the learner considerable choice in how to use them. The

options are not treated as ranging from 'worse' to 'better;' rather ideally all would be

incorporated into the program simultaneously and to the same degree. Therefore, those

using the criteria to appraise a computer-based simulation for teaching Arabic would be

searching for evidence of the relative presence or absence of each of the options for each

criterion.   Ultimately, the significance of this presence or absence is a value judgment

made by the appraisers in light of their own objectives for the program; the criteria

primarily serve to make the appraisal as thorough and complete as possible.

Learner Orientation

This section refers to attempts made by program designers to let users know what

the designers expect the users to accomplish as the users go through the program as well

as instruction on how to use the features of the program. The criteria related to this

section are found in Table 2 below.

Table 2. *Criteria for Appraising Learner Orientation*

Does the program take into account the following types of learners:		
No background in playing video games/low computer skills.	Some experience with video games and educational software.	Avid video game players/high technical proficiency.
Recognizing that learners may disregard information intended to orient them to the program's goals and objectives, the program:		
Makes it easy to return to this info should the learner recognize its value.	Has a condensed form of this information available.	Makes it possible to benefit from the program without explicitly knowing its goals and objectives.

Overall, my research found that most learners disregard explicit information

intended to orient them to the objectives of a program and instructions on how to use its

features. This was especially true of experienced video game players, who expect a

program that looks like a video game to follow the conventions of that genre. However,

most users disregard any explicit attempts at orientation as they prefer to use a game or

simulation's reset capability to experiment using trial and error in order to discover how the program will evaluate their performance. It is when the program fails to respond as expected, or for those unfamiliar with video games, that the orientation material is consulted. The ideal program would take into account the various types of users and adapt the orientation to their needs.

<div align="center">

Lesson Presentation

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The program objectives that are covered during the orientation must then be divided into lessons. The contents of each of the lessons can be presented using a variety of approaches, which learners can then choose from based on their preferred learning style, prior knowledge, and personal objectives. The criteria related to these choices are found in Table 3 below.

Table 3. *Criteria for Appraising the Lesson Presentation*

Does the program take into account the following types of learners:			
Visual (prefer to see language written)		Audio (prefer to hear the language spoken)	Kinesthetic (prefer to write down language, etc.)
For dialect instruction, is support provided to learners with:			
No Classical or Modern Standard Arabic (MSA)	Some MSA	Fluent in MSA	Other Arabic dialect(s)
The program recognizes that learners will use the language:			
For "survival" in a country where it is spoken.		For specific job-related purposes.	For academic purposes.
Recognizing that learners may disregard formal lesson presentations in favor of exploring other aspects of the program, the program structure:			
Makes it easy to return to this info should the learner recognize its value.		Has a minimal form of this information available.	Makes it possible to benefit from the program without explicitly knowing the lesson presentations.

The cultural information presented:		
Prevents causing unintentional offence.	Provides guidance on when and what to say.	Improves communication by giving context.

As learner personal objectives and the program objectives may only partially overlap, an ideal lesson presentation is both multi-faceted and flexible. My research indicates that learners are not neutral as to the contents of a lesson--they have their own ideas about what they want to learn and how they want to learn it. They may realize this information could be embedded in lessons created for other purposes, so the lesson structure may be disregarded at least initially while the desired information is ferreted out. To the extent this is possible, the ideal lesson presentation would facilitate rather than dictate learning.

Cognitive Support

This section deals with how the program responds to user questions related to the lesson content. These questions could be requests for clarification, for information beyond the minimum required by a lesson (interest in this information was anticipated by the program designers and linked to the lesson), to requests for extensive additional information not directly anticipated by the program designers. The criteria related to cognitive support are found in Table 4 below.

Table 4. *Criteria for Appraising Cognitive Support*

Does the program take into account the following types of learners:		
Wants extensive additional information about language and culture; wants guidance to search outside program (on the Internet, etc).	Wants additional information, but unwilling/unable to search outside the program.	Wants only the minimum (all significant info embedded in lessons).
When the learner has a question, the question:		
Can be addressed to a sympathetic character within the program.	Can be entered in a search function.	Can be found in a help menu.
Recognizing that learners may fail to ask for the help they need, the program:		
Should provide explicit guidance in language learning skills.	Should provide hints in trouble spots.	Makes it possible to benefit from the program by embedding language learning skill training in the lessons.

The ability of a program to answer learner questions may be more important than its lesson presentation. My experience indicates that student learning occurs when something in a lesson prompts a question and that question is satisfactorily answered. The difficulty is that some students may not be asking the right questions to master the lesson content, in which case the ideal program may need to incorporate guidance in language learning skills.

Error Feedback

The ability of a program to correct learner errors may be its critical function according to language teaching experts. The criteria for appraising error feedback can be found in Table 5 below.

Table 5. *Criteria for Appraising Error Feedback*

Does the program provide the following types of feedback:			
Morphological (word level-vocabulary, spelling, gender, etc.)	Syntactic (sentence level grammar)	Semantic (paragraph or longer level)	Pragmatic (conscious of the relationship between speakers)
When providing feedback on pronunciation, the program:			
Provides tailored feedback for difficult phonemes.	Provides sentence level feedback (intonation, etc.)		Allows good-enough (accented) speech.
When providing feedback, the program:			
Adapts its responses to concentrate on a learner's problem areas.	Individualizes its responses according to learner's wishes.	Is highly accurate so as to provide a minimum of false positive and negative responses.	
Recognizing that learners may disregard its error correction features, the program should:			
Track learner progress through the program and allow return to problem areas.	Provide multiple forms of feedback.	Allow the learner to experience the 'natural consequences' of this disregard in a virtual environment.	

The error feedback capability of a program is what tells the learner what is important about the contents of a lesson. My research shows that students disregard all other indications of content importance in a lesson presentation and home in on how they are being evaluated by the program; those portions of a lesson which are not evaluated are generally ignored. Even then, students may only respond to some of the error feedback, especially when that lack of response has no consequences. Therefore the ideal program would track student responses and otherwise make it difficult for them to disregard its error feedback.

Most language instruction takes a 'building block' approach to its lesson sequencing, with earlier lessons setting the foundation for later learning. The criteria for lesson sequencing are found in Table 6 below.

Table 6. *Criteria for Appraising Lesson Sequencing*

The lessons in the program:		
First focus on language most needed by the target audience.	Can be accessed according to learner interests.	Build a foundation for later learning.
Recognizing that learners may disregard the preferred lesson path, the program should:		
Make it easy to return to the preferred path should the learner recognize its value.	Provide a condensed form of the skipped information.	Allow the learner to experience the 'natural consequences' of this disregard in a virtual environment.

The goal of lesson sequencing may be in conflict with learner interests, as students may want to skip ahead along the preferred lesson path. My research indicates that in a self-study mode, students will naturally gravitate to those portions of a language program that correspond to their personal objectives. The ideal program would allow students this freedom while making it possible for them to return to the preferred path when they recognize its value.

This section refers to the features of a program which enhance student motivation to continue learning. The criteria for these features are found in Table 7 below.

Table 7. *Criteria for Appraising Motivation*

The interactive features of the program should be:		
Seen as communicating with a sympathetic character in a virtual environment.	Within contexts that the learner would find useful and appealing.	Highly accurate.
Recognizing that learners may lack intrinsic motivation, the program might:		
Include game elements that increase sense of drama and urgency.	Include some sort of reward system.	Emphasize its responsiveness to learner interests.

Students who are intrinsically motivated to learn Arabic seem to find the interactive features of a computer-based simulation as the most highly engaging. Students seem to anthropomorphize the computer program, treating it much as they would a tutor who they turn to for information, advice and support—this is especially true when the program includes an animated pedagogical agent. Students lacking intrinsic motivation may find a pedagogical agent irritating as they don't want to interact with the program. An ideal program for these students would incorporate a variety of externally motivating rewards for learning the lesson content.

Program objectives are ultimately concerned with the transfer of knowledge and skills learned using the program to real world tasks and situations. Criteria for appraising the application of knowledge and skills are found in Table 8 below.

Table 8. *Criteria for Appraising the Application of Knowledge and Skills*

The tests within the program should:		
Capture technical competence in the language (vocabulary and grammar).	Capture fluency in the language (appropriate use).	Capture affective influences of the program (enjoyment).
The form of the tests:		
Should require handling of realistic tasks.	Permit a wide variety of outcomes.	Should be tied to accepted proficiency guidelines.

The ability of computers to evaluate the handling of realistic language tasks and situations is in its infancy. My research indicates that computers are generally only used to evaluate technical competence in language use. The virtual environment of a computer-based simulation is inevitably a simplified version of the real world yet is still too complex to anticipate all the possible interactions that it might contain. Research is continuing on how to deal with this complexity so that computers might be useful in evaluating the transfer of knowledge and skills in realistic tasks and situations in the near future.

This section is concerned with the technical issues associated with using computers as it seems inevitable that problems will occur. The criteria for appraising contextual factors are found in Table 9 below.

Table 9. *Criteria for Appraising Contextual Factors*

The technical features of the program:			
Should operate as flawlessly as possible.	Should be easily fixed if problems occur.		
Recognizing that learners may have access to different operating platforms, the program should:			
Be compatible with the major operating systems. (Mac/Windows)	Operate in handheld appliances such as Gameboy, etc.	Minimize program size.	Minimize technical requirements.

User tolerance for technical difficulties may impede learning if those difficulties cannot be minimized. My research indicates that students will make a few attempts to deal with technical difficulties if they can be fixed relatively easily, such as by restarting the program. An ideal program would of course operate flawlessly on all platforms and appliances.

Looking Ahead

The criteria presented above are intended as guidelines to assist those interested in appraising computer-based simulations for learning Arabic. It is expected that users would shape the criteria to their particular circumstances so as to create a checklist or rubric that would be most helpful to them.   Although the criteria have been assembled

based largely on the developmental prototype of the Tactical Language program for Levantine Arabic, it seems likely that more such computer-based simulations will be developed in the future. As of the writing of this dissertation in March 2005, Jaffe (2005) reports that CARTE has begun field testing a variant of the Tactical Language program for Iraqi Arabic. In addition, a "First Annual Artificial Intelligence and Interactive Digital Entertainment Conference" is scheduled for June 2005 in CARTE's hometown of Marina del Rey, California largely to explore other applications of the developmental work on the prototype. The conference is perhaps the greatest sign of collaboration between video game developers and academics in creating new computer-based simulations for instructional purposes, and may lead to a need for criteria such as those presented in this dissertation in order to appraise this new medium.

Areas for Future Research

This thesis has considered how the features of an ideal immersive environment could be recreated as a computer-based simulation. Were it possible, these would be as identical as say a *Star Trek*-style holodeck is to reality; as this is a technical impossibility at the moment, the areas for future research are largely concerned with how the available technology could be adapted to create the closest virtual approximation of the ideal. My suggested areas for further research include the following:

The permutations of language that are possible in most any conversation are nearly infinite. Both to reduce the computer processing burden and the cognitive load on learners, more research is needed to specify more exactly what Arabic military members need to know, especially when time is limited. The first level of specification is under what circumstances is it more advantageous to study Modern Standard Arabic, a dialect of Arabic, or some combination of MSA and dialect. Then it is necessary to specify the content to be learned, including the linguistic, cultural and pragmatic parameters of that content. The best sources of data for this research are field observations of and interviews with those soldiers who need to speak Arabic in the performance of their duties.

Structure in an Open-Ended Microworld

Just as the language on which a simulation is focused needs to be specified precisely, so too the time and expense of creating the visual and audio parts of a virtual environment dictate their judicious design and creation. Once created, more research is needed on internal and external elements which would increase the effective use of the virtual environment. Among the internal elements are game-like features which could be used to increase student engagement with the content as well as provide a method of assessment through a scoring system. External elements such as prizes or contests might also be useful; in the military personnel system, performance in the simulation might be

somehow tied to advancement. Further study could reveal what are the ideal combinations of internal and external elements for increasing the effectiveness of a simulation.

Computer-Based Assessment of Communicative Proficiency

One of the findings in my thesis is that the more realistic the simulation, the harder to know what has been learned—especially in a computer program designed for self-study. More research is needed on how to know if instructional objectives have been achieved in a virtual environment. In a computer-based simulation for language learning, this research has to consider more than just technical proficiency with grammar and vocabulary; simulations can be intended to also change learner attitudes and motivation, changes that can be difficult to discern under any circumstances. At the moment, these changes can best be determined during the course of a skilled debriefing; the challenge in the future is to develop automated means of coming to similar determinations.

The Use of Checklists and Guidelines to Select Computer-Based Media

Finally, more research is needed on determining the most efficient way of informing those responsible for selecting or designing computer-based simulations for learning Arabic of criteria that could guide their evaluations or project development efforts. The criteria presented in the conclusions of this thesis attempt to be comprehensive of all possible considerations; however, it is left to the users of these

criteria to choose among them according to their own preferences. This approach, while

expedient, does not provide a systematic manner of making these choices. Further study

could reveal the validity of the criteria presented in the thesis and how the criteria might

better be communicated to potential users.

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Appendix A

Initial Interview Questions for USAF Academy Cadets while in Morocco.
[Devised by the author.]

I. Please describe your first conversation, however brief, with someone who only spoke
      Arabic.
    A. Context/situation
    B. Exact words spoken, if possible.
    C. Describe your thoughts during this conversation, to the extent possible.
        1. What aspects of the language caused you the most difficulty?
        2. What aspects of the language were easy for you?
    D. Describe the nonverbal reactions of the person to whom you were speaking at
    different points during the conversation.
    E. What would you have liked to have known to help you in this conversation?
    E. At the conclusion of the conversation, would you characterize the experience
    as positive or negative, and why.

II. What other significant contacts with Arabic-only speakers have you had? (Same
      questions)

III. Consider how well your Arabic studies have prepared you for the experience of
      being in Morocco.
    A. How long have you being studying Arabic (formally/informally).
    B. Have you studied MSA, one or more Arabic dialects, or a combination
    (details).
    C. Now that you're in Morocco, how helpful have your studies been in preparing
    you to be here?
        1. Knowledge about the Arabic language.
        2. Strategies for using the language.
        3. Knowledge about Moroccan culture.
    D. What would you like to know about language/strategies/culture that would
    help you here in Morocco?
    E. If you could go back in time, what would you change about your studies?

IV. Have you used the language lab while studying Arabic? (details)
    A. How useful do you think the language lab activities were to your studies?
        1. What was most useful?
        2. What was least useful?
    B. What would you like to do differently in the language lab?
    C. Have you used other language learning computer programs on your own?
    (details)
    D. Have you tried to access any Arabic language websites on the Internet?
    E. Do you play video games? (details)
    F. Can you imagine how a video game could help you learn Arabic?

V. What do you imagine that you'll do with the Arabic that you've studied? (professionally/personally)
   A. Will you continue to study Arabic through your senior year at the USAF Academy?
   B. What do you imagine doing, if anything, to maintain or improve your proficiency in Arabic when you stop taking language classes?
   C. What, if anything, would motivate you to want to study more Arabic?
      1. Career opportunities
      2. Financial incentives
      3. Personal reasons

VI. What other languages have you studied? (details)
   A. Compared to these languages, how would you rate Arabic?
   B. How do you approach studying Arabic differently than studying these other languages?
   C. Have you ever tried to teach yourself a foreign language? (details)
   D. What use have you made of these other languages?
   E. Did you want to study Arabic at the USAF Academy? If not, which language did you want to study, and why?

Appendix B

Student Questionnaire.
[Devised by Dr. Salah-Dine Hammoud with input from Maj Steven Campbell for the USAF Academy cadets attending the Arabic language immersion program at Al-Akhawayn University in Ifrane, Morocco, in May-June 2004.]

Please circle the choice which best corresponds to your opinion. Write your comments for each section legibly. [To conserve space, these choices for each item do not appear below though they were included in the original.]

SD = Strongly Disagree
D = Disagree
N/O= No Opinion
A = Agree
SA = Strongly Agree

I. PROGRAM ORIENTATION

1. I think the program orientation included useful information

2. Important aspects of the program were left out and should have been part of the orientation.

3. The orientation was too long and the time spent there should have been devoted to class.

Comments on the Orientation:

II. ACADEMIC ASPECTS OF THE PROGRAM:

4. The placement test was an effective assessment instrument for determining my level in Arabic.

5. I was placed in a class that was too high for my level of Arabic.

6. I was placed in a class that was too low for my level of Arabic.

7. I was placed in a class at just the right level.

8. Instruction was paced adequately.

9. There was a balance in presenting and practicing listening, reading, speaking and grammar.

10. Teachers were effective in presenting the material.

11. Teachers integrated skills in a meaningful and useful way.

12. Teachers made every effort to help with Arabic practice in and out of class.

13. Teachers answered questions adequately.

14. Teachers were enthusiastic and seemed to enjoy working with our class.

15. Teachers treated everyone with respect and dignity.

16. Teachers seemed well trained, caring and professional in their work with us.

17. The textbook was adequate for my level and needs.

18. Other materials besides the textbook were used in my class.

19. The amount of homework assigned was adequate.

20. I spent too much time doing homework.

21. The type of tasks assigned for homework were helpful for learning and improving proficiency in Arabic.

22. Teaching Assistants and teachers were available for extra instruction.

23. Tests were fair, and assessed what was learned effectively.

24. Listening , reading, speaking, writing and grammar were smoothly integrated and practiced every day.

25. Darija dialect initiation helped me with communication in and out of class.

27. The whole experience has given me more confidence in using Arabic outside of class.

28. I have had some success using Arabic in shopping, with cafeteria, house cleaning and other campus staff.

29. I now feel I can communicate at least at survival level in Arabic.

30. I enjoyed the communal lunches on Fridays (both at the faculty club and in the homes at the nearby village).

31. The Mahmoud Darwish film and the lecture on "Henna" were enjoyable activities.

32. I feel computer-assisted multi-media activities would have improved my learning.

33. I prefer self-paced modules rather than classroom time for intensive learning.

COMMENTS ON ACADEMIC ASPECTS OF THE PROGRAM:

III. STUDENT LIFE AND EXTRA CURRICULAR ACTIVITIES

32. The interaction with students from other U.S. programs was enjoyable.

33. I made successful attempts at interacting with Moroccan students on campus.

34. The dorm facilities were adequate.

35. Food at the cafeteria was adequate.

36. The housing staff was helpful.

37. The infirmary staff was helpful.

38. The cultural excursions went well.

39. The trip to Fes was beneficial.

40. The trip to the Desert was beneficial.

41. The trip to Marrakesh was beneficial.

42. I participated in the homestay week-end.

43. I did not feel like staying with a Moroccan family over the week-end.

44. The atmosphere on the Al-Akhwayn campus was just right for language study.

45. The atmosphere at Al-Akhawayn was not conductive to intensive language study.

46. I used the library and think it is adequate.

47. I used the gym and or pool facilities and think they are adequate.

COMMENTS ON STUDENT LIFE AND EXTRA CURRICULAR ACTIVITIES:

IV. GENERAL COMMENTS, RECOMMENDATIONS:

48. I would recommend Morocco, for future Cadet Summer Language Immersion.

49. If given the chance I would return to Al Akhawayn for language study myself.

50. From what I know about Arabic language immersion, I recommend that future cadets go to another Arab country.

51. I would feel safe attending language immersion in Fes.

52. I would feel safe attending language immersion in Marrakech.

53. I feel the whole experience has been beneficial to me.

54. I feel I learned a lot of Arabic in the program.

55. I feel I learned a lot about Morocco.

56. I am glad the opportunity to participate in the program was available.

V. ADDITIONAL OVERALL COMMENTS:

Appendix C

Tactical Language Project/Ft. Bragg NC/July 2004/Post-Session Questionnaire.
[Devised by Dr. Carole Beal of the Information Sciences Institute of the University of Southern California with input from Ursula Lauper of Micro Analysis & Design and the author.]

Please enter your **user name** _____
(The name that you were assigned to use with the software)

Thank you for participating in the evaluation of the prototype instructional software for Levantine Arabic. We would like to get your impressions of the software.

Please respond to the questions, and include your explanations and comments in the "Comments" area. We are especially interested in your ideas about other features that we could add to the software, and your suggestions for how we can improve it in the future.

****
How well did the software work for you this week? (For example, did you have technical problems such as having to restart it frequently, etc.?)

1	2	3	4	5
it did not work at all	many problems	a few problems	worked pretty well	it worked very well

Comments:

How useful do you think the software is for learning to *understand* Arabic?

1	2	3	4	5
not at useful	sort of useful	OK	pretty useful	very useful

Comments:

How useful do you think the software is for learning to *speak* Arabic?

1	2	3	4	5
not at useful	sort of useful	OK	pretty useful	very useful

Comments:

How interesting was it to work with the software?

1	2	3	4	5
not at all interesting	not very interesting	it was OK	pretty interesting	very interesting

Comments:

How helpful was the feedback and assistance provided by the software?

1	2	3	4	5
not at all	not very	it was	pretty	very
helpful	helpful	OK	helpful	helpful

Comments:

How do you think the software would compare to learning a foreign language in a traditional whole-classroom situation (many students with one teacher)?

1	2	3	4	5
much less	less	about	a bit	much
effective	effective	the same	better	better

Comments:

How do you think the software would compare to learning a foreign language one-on-one with an individual tutor?

1	2	3	4	5
much less	less	about	a bit	much
effective	effective	the same	better	better

Comments:

Skill Builder

The following questions refer to the Skill Builder component of the software (the application that included lessons in Arabic phrases, vocabulary, and pronunciation).

How easy was it to use the Skill Builder component of the software?

1	2	3	4	5
not at	not very	it was	pretty	very
all easy	easy	OK	easy	easy

Comments:

 After working through the Skill Builder lessons, how easy was it to complete the lesson quizzes?

1	2	3	4	5
not at	not very	it was	pretty	very
all easy	easy	OK	easy	easy

Comments:

How useful were the additional resources (links to Pronunciation, Grammar, Culture) in the Skill Builder?

1	2	3	4	5
not at	not very	they	pretty	very
useful	useful	were OK	useful	useful

Comments:

Participants in this project worked with slightly different versions of the software. The next questions are about specific features of the software that you may or may not have used. If you did not work with a particular feature, circle "No" and move on to the next question.

Reading Wizard

Did you use the Reading Wizard (on the Grammar link) in the Skill Builder?   Yes   No

If yes: How easy was it to use the Reading Wizard component of the Skill Builder?

1	2	3	4	5
not at	not very	it was	pretty	very
all easy	easy	OK	easy	easy

Comments:

How helpful do you think the Reading Wizard would be for learning Arabic grammar?

1	2	3	4	5
not at all	not very	it was	pretty	very
helpful	helpful	OK	helpful	helpful

Comments:

Speech recognition

Did your version of the software include speech recognition that provided feedback on your Arabic pronunciation?   Yes   No

If yes: How helpful was the feedback provided by the speech recognition feature?

1	2	3	4	5
not at all	not very	it was	pretty	very
helpful	helpful	OK	helpful	helpful

Comments:

Practice Environment

Did your version of the software include the Practice Environment (the computer game simulation of the Levantine village with the café)?   Yes   No

If yes: How easy was it to use the Practice Environment?

1	2	3	4	5
not at	not very	it was	pretty	very
all easy	easy	OK	easy	easy

Comments:

How natural did you find the interaction (conversation, gesture, speech, etc.) in the Practice Environment?

1	2	3	4	5
not at	not very	it was	pretty	very
all natural	natural	OK	natural	natural

Comments:

How useful was the aide character in the Practice Environment?

1	2	3	4	5
not at	not very	he	pretty	very
useful	useful	was OK	useful	useful

Comments:

How much does the Practice Environment add to the overall effectiveness of the software for learning Arabic?

1	2	3	4	5
does not	does not	can't say	makes	makes much
help at all	help much		it better	better

Comments:

Are there any other features that could be added or changes that could be made to improve the software?

Thank you for participating in this evaluation of the prototype software! Your input will help us to improve the system and make it an effective resource for rapid language learning.

Appendix D

Summary of Instructional Materials to Aid the Self-Study of Arabic

[This listing is not exhaustive; the purpose is to provide examples of the major categories of such materials.]

Method: Hear and repeat. [Audio CD's or cassette tapes]
For business/tourism: *In-Flight Arabic* (2001) by Living Language/Random House [www.randomhouse.com/livinglanguage/]. *Pimsleur Quick & Simple Egyptian Arabic* (2001) by Simon & Shuster Audio [www.pimsleur.com]; also available for the Eastern Arabic dialect. *Language 30/Arabic* (1994) by Educational Services Corp. [www.audioforum.com]. *Getting by in Arabic* (1985) by Barron's [www.barronseduc.com].
For military/government: *Rapid Rote/Talker* (2003) by Transparent Language [not commercially available]. *FSI Modern Written Arabic* (1997?) by the Foreign Service Institute [www.audioforum.com]; also available for the Saudi, Egyptian, Levantine, Eastern, Iraqi, and Moroccan dialects.
Variation: Read phonetically and repeat. [Phrase books]
For business/tourism: *Let's Speak Arabic* (2002) by S.A. Rahman [www.ProductsOfIslam.com]. *Moroccan Arabic Phrasebook* (1999) by Dan Bacon [www.lonelyplanet.com]; also available for Egyptian.
For military/government: *Modern Standard Arabic Basic Language Survival Guide* (2002) by the Defense Language Institute [not commercially available]. *Iraqi Basic Language Survival Guide* (2003) by the Defense Language Institute [not commercially available].
Variation: Combination of hearing and reading, then repeat. [Book and audio CD]
For business/tourism: *PDQ Arabic Quick Language Course* (2000) by Linguaphone [www.linguaphone.com].
For military/government: *Basics of Iraqi Arabic* (2003?) by the Foreign Service Institute [not commercially available].

Variation: Hear and repeat while recording, then compare. [CD-ROM's; also may available online]
Rosetta Stone Arabic (2002) by Fairfield Technologies [www.rosettastone.com]. *Al-Mumtaaz* (1997) by the Federal Language Training Laboratory [www.ntis.gov].
Variation: Hear and repeat by singing [Book and audio CD]
Musical Arabic (2004) by Lonnie Dai Zovi [www.vibrante.com].
Method: See and copy [learning the Arabic writing system] [Books/workbooks; may be supplemented by audio materials]
Learn the Arabic Alphabet Through the Beautiful Names of Allah (2002) by Assad Nimer Busool [www.ProductsOfIslam.com]. *Teach Yourself: Beginner's Arabic Script* (1999) by John Mace [www.teachyourself.co.uk]. *Arabic Phonology and Script* (1999) by Salman H. Al-Ani and Jacob Y. Shammas: Bloomington, IN: Iman Publishing House.
Method: Vocabulary drills. [May be paper or computer based]
Al-Kitaab Vocabulary (2004) by David Edginton [www.flashcardexchange.com] *Arabic Vocabulary Cards* (not dated) by Visual Education [www.vis-ed.com].
Variation: Reading in Context.
Let's Read the Arabic Newspapers (1997) by Howard D. Rowland: Troy, MI: International Book Center.
Variation: Reading for religious purposes.
Al-Qari Plus (2004) by Sound Vision [www.soundvision.com] *The Holy Quran* (1996) by Eagle Enterprises [no longer in business]. *Help Yourself in Reading Qur'an* (1995) by Qari Abdus-Salam; Riyadh, Saudi Arabia: Maktaba Dar-Us-Salam.
Method: Grammar drills. [May be paper or computer based]
EMSA Companion (1995?) by Dilworth Parkinson and Kirk Belnap [http://creativeworks.byu.edu/hrc/]
Variation: Grammar in context.
Mastering Arabic (1990) by Jane Wightwick and Mahmoud Gaafar; New York: Hippocrene Books.
Variation: Grammar as linguistic patterns. [Classical Arabic]
Fundamentals of Classical Arabic, Volume I: Conjugating Regular Verbs and Derived Nouns (2002) by Husain Abdul Sattar [www.faqirpublications.com].

Method: Explicit cultural instruction. [May be paper or computer based]
The Travelers' Guide to Middle Eastern and North African Customs & Manners (1991) by Elizabeth Devine and Nancy L. Braganti; New York: St. Martin's Griffin. *Understanding Arabs: A Guide for Westerners* (1987) by Margaret K. Nydell; Yarmouth, ME: Intercultural Press.

Method: Multimedia Programmed Instruction. [CD-ROM's; may also be available online]
Tell Me More Arabic (2002) by Babel Technologies [www.auralog.com]. *Learn Arabic Now! Version 8* (2000) by Transparent Language [www.transparent.com]; a version 9 was recently released.

Method: Virtual Learning Environments. [CD-ROM's]
Virtual Conversations-The Arabic Series (1999?) by Interactive Drama [www.idrama.com] *Tactical Language Program for Levantine Arabic – Developmental Prototype* (2004) by the Center for Advanced Research in Technology for Education [www.isi.edu/isd/carte].

Appendix E

Criteria for Appraising Computer-Based Simulations for Teaching Arabic as a Foreign Language

(All options may be possible.)

Learner Orientation

Does the program take into account the following types of learners:		
No background in playing video games/low computer skills.	Some experience with video games and educational software.	Avid video game players/high technical proficiency.
Recognizing that learners may disregard information intended to orient them to the program's goals and objectives, the program:		
Makes it easy to return to this info should the learner recognize its value.	Has a condensed form of this information available.	Makes it possible to benefit from the program without explicitly knowing its goals and objectives.

Lesson Presentation

Does the program take into account the following types of learners:			
Visual (prefer to see language written)	Audio (prefer to hear the language spoken)	Kinesthetic (prefer to write down language, etc.)	
For dialect instruction, is support provided to learners with:			
No Classical or Modern Standard Arabic (MSA)	Some MSA	Fluent in MSA	Other Arabic dialect
The program recognizes that learners will use the language:			
For "survival" in a country where it is spoken.	For specific job-related purposes.	For academic purposes.	
Recognizing that learners may disregard formal lesson presentations in favor of exploring other aspects of the program, the program structure:			
Makes it easy to return to this info should the learner recognize its value.	Has a minimal form of this information available.	Makes it possible to benefit from the program without explicitly knowing the lesson presentations.	
The cultural information presented:			
Prevents causing unintentional offence.	Provides guidance on when and what to say.	Improves communication by giving context.	

Cognitive Support

Does the program take into account the following types of learners:		
Wants extensive additional information about language and culture; wants guidance to search outside program (on the Internet, etc).	Wants additional information, but unwilling/unable to search outside the program.	Wants only the minimum (all significant info embedded in lessons).
When the learner has a question, the question:		
Can be addressed to a sympathetic character within the program.	Can be entered in a search function.	Can be found in a help menu.
Recognizing that learners may fail to ask for the help they need, the program:		
Should provide explicit guidance in language learning skills.	Should provide hints in trouble spots.	Makes it possible to benefit from the program by embedding language learning skill training in the lessons.

Error Feedback

Does the program provide the following types of feedback:			
Morphological (word level-vocabulary, spelling, gender, etc.)	Syntactic (sentence level grammar)	Semantic (paragraph or longer level)	Pragmatic (conscious of the relationship between speakers)
When providing feedback on pronunciation, the program:			
Provides tailored feedback for difficult phonemes.	Provides sentence level feedback (intonation, etc.)		Allows good-enough (accented) speech.
When providing feedback, the program:			
Adapts its responses to concentrate on a learner's problem areas.	Individualizes its responses according to learner's wishes.		Is highly accurate so as to provide a minimum of false positive and negative responses.
Recognizing that learners may disregard its error correction features, the program should:			
Track learner progress through the program and allow return to problem areas.	Provide multiple forms of feedback.		Allow the learner to experience the 'natural consequences' of this disregard in a virtual environment.

Lesson Sequencing

The lessons in the program:		
First focus on language most needed by the target audience.	Can be accessed according to learner interests.	Build a foundation for later learning.
Recognizing that learners may disregard the preferred lesson path, the program should:		
Make it easy to return to the preferred path should the learner recognize its value.	Provide a condensed form of the skipped information.	Allow the learner to experience the 'natural consequences' of this disregard in a virtual environment.

Motivation

The interactive features of the program should be:		
Seen as communicating with a sympathetic character in a virtual environment.	Within contexts that the learner would find useful and appealing.	Highly accurate.
Recognizing that learners may lack intrinsic motivation, the program might:		
Include game elements that increase sense of drama and urgency.	Include some sort of reward system.	Emphasize its responsiveness to learner interests.

Applying Knowledge and Skills

The tests within the program should:		
Capture technical competence in the language (vocabulary and grammar).	Capture fluency in the language (appropriate use).	Capture affective influences of the program (enjoyment).
The form of the tests:		
Should require handling of realistic tasks.	Permit a wide variety of outcomes.	Should be tied to accepted proficiency guidelines.

The technical features of the program:			
Should operate as flawlessly as possible.	Should be easily fixed if problems occur.		
Recognizing that learners may have access to different operating platforms, the program should:			
Be compatible with Mac/Windows	Operate in handheld appliances such as Gameboy, etc.	Minimize program size.	Minimize technical requirements.

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Projected Next Assignment:

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Previous Assignments:

Jan 99 – Jun 01 Instructor of Russian and Spanish, Department of Foreign Languages, USAF Academy, Colorado Springs, CO. Taught first and second year classes in both languages.

Oct 96 – Dec 98 Director, Russia, Central Europe and Central Asia Orientation Course, USAF Special Operations School, Hurlburt Field, FL. Seminar on history, language and culture.

Jun 93 – May 95 Operations Officer, Arms Control Implementation Unit, US Embassy Moscow, Russia. Coordinated with Russian authorities to verify treaty compliance.

Education:

M.A. in National Security Affairs, concentration in Special Operations/Low Intensity Conflict, US Naval Postgraduate School, Monterey, CA, 1995.

B.A. in Social Science, concentration in International Affairs, Michigan State University, East Lansing, MI, 1980.

Defense Language Institute for Basic Polish (1982), Intermediate Polish (1986) and Basic Russian (1990-91).

Languages:

Tested 3/3 on DLPT: Russian, Polish, and Spanish. I've also studied French, Italian, Portuguese, German, Serbian/Croatian and Arabic.

Publications:

Dabrowski, R. (2002). Language education and the war on terrorism. *Dialog on language instruction, 15*(1 & 2), 27-34.
Dabrowski, R. (2003). Survey of USAF officers who speak a foreign language. *Applied language learning, 13*(2), 161-182.