

THE INSTRUCTIONAL DEVELOPMENT OF A HANDBOOK
ON COMPUTER-ASSISTED LANGUAGE LEARNING

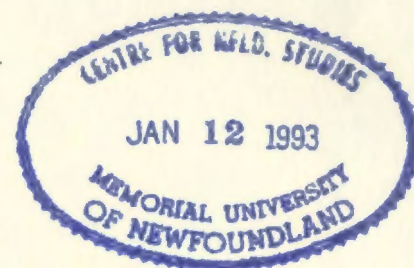
CENTRE FOR NEWFOUNDLAND STUDIES

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THE INSTRUCTIONAL DEVELOPMENT
OF A HANDBOOK ON
COMPUTER-ASSISTED LANGUAGE LEARNING

by



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Abstract

Rapid developments in technology have fostered the introduction of the microcomputer into many areas of education including the teaching of French language. Many software materials ranging from drill-and-practice to game and simulation programs have been developed to meet the needs of second language students. Yet, a survey of Newfoundland French Language teachers by Hoskins (1988) revealed that only 5.6% of these teachers were using the computer as an instructional tool. Teachers identified a need for computer knowledge and experience, and for instruction on the application of computer-assisted language learning (CALL) and on selection and evaluation of software.

Based upon the needs identified in the survey by Hoskins (1988), a handbook was developed to serve as a reference source for second language teachers interested in applying CALL to their classrooms. The development of this handbook was based on the "4-D" model of instructional development.

The handbook consists of six major sections. The components and operation of the computer are presented in two sections: a) The Microcomputer System (Basic), and b) The Microcomputer System (Advanced). The third section presents some of the inherent features of the

microcomputer. Various aspects of CALL software including types and application of CALL software, and the evaluation and selection of software are presented in section four. Section five presents some of the limitations of CALL and section six presents some of the future prospects of computer-assisted language learning.

The handbook was tested through use with a sample population of 14 French teachers enrolled in a summer session methodology course at Memorial University. Teachers were given a criterion-referenced test in a pretest/post-test situation in order to evaluate the effectiveness of the package. Results of the testing indicated that the handbook was successful in meeting its objectives. In general, 80% of teachers reached 80% or better performance in the post-test.

The thesis concludes with some recommendations for use of the handbook, as well as for the development of further instructive material to aid French teachers in the province to improve their knowledge and ability to use CALL in the classroom.

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CHAPTER ONE

RATIONALE FOR THE STUDY

Introduction

Computers have become an exciting intrinsic element of our modern world. Business, entertainment and travel are but a few of the many areas which depend upon computers to function and progress. Rapid advances in technology, especially the development of the microchip, have seen the computer spread to small businesses and homes. Of necessity, the field of education has become involved with this growing phenomenon. Computers have become an integral part of all aspects of education from administrative uses, such as record keeping and electronic gradebooks, to use by students in the classrooms and laboratories. Subject areas from mathematics and science to social studies and second language learning have found a new role for computers in their curriculum.

Canada, as an officially bilingual country, has become a leader in research into the field of second language teaching. Computers, as part of this research, have become widely recognized as an innovative tool in helping create a bilingual nation. Books and articles on computer-assisted language learning (CALL) are increasing in quantity as growing numbers of researchers and theorists become involved in this impelling new development.

Canada has also witnessed the development of another trend in second language teaching - the "communicative approach". This approach places emphasis on the use of a second language in true and meaningful situations of communication. The learner and the message assume prime importance as opposed to past structural methods, such as the grammatical, audio-lingual and audio-visual approaches based on Skinnerian behaviourism.

Some second language educators have had difficulty in reconciling the communicative approach with computer use. Often, the role of the computer in language learning has been perceived as a provider of drill-and-practice, long associated with the structural approach. However, many language theorists, including Krashen (1981), and Widdowson (1984), acknowledge the role of drill-and-practice as an important function in the acquisition aspect of language learning. Moreover, the appropriate use of various types of software permit many other applications to the language classroom.

Computer-assisted language learning (CALL) has found diverse applications to the classroom. Along with the traditional role of drill-and-practice, the computer has become available for tutorials, simulations, problem solving, and fun and games. Tool uses, such as word processing, databases and spreadsheets, have also found their way into the second language classroom (Craven & Sinyor, 1987; Harvey, 1987).

These varied uses of the computer have brought benefits to the language classroom. The computer may be appropriately applied in keeping with the principles of the communicative approach to create meaningful interaction - a key concept in language learning. Interaction may take place between the computer and the student, or between students working in pairs or groups.

When screen instructions are displayed, somebody in the group often reads them aloud quite unprompted and the reading usually sounds a good deal more animated than 'reading round the class'. As the group discusses their moves, they tend to introduce more and more of the language which has been used in the program.

(Higgins & Johns, 1984, p. 37.)

Authenticity, another cornerstone of the communicative approach, is another benefit of computer use in teaching a second language. As well as presenting authentic situations for communication, authentic materials may be used. These materials include programs for francophones, authentic text, and aural documents from which the student must answer questions or make choices on the computer. Newly developing technologies, such as video and audio disc, promise even more benefits from the use of authentic materials and computer-assisted language learning (Obadia, 1986).

Cultural awareness can also be promoted through CALL. As well as computer communication with students of other cultures, packages are available to promote knowledge of

other cultures. The Treasure of Ile Madame, a simulation game which promotes knowledge of Acadian culture, takes students on a treasure hunt throughout Acadia (Sakamoto & Ullmann, 1987).

Cognitive benefits of computer-assisted language learning include possibilities for enhanced quality and speed of learning (Chapelle & Jamieson, 1986; Ahmad, Corbett, Rogers, & Sussex, 1985). Choice of programs as well as multiple levels of difficulty accommodate individual needs and styles of learning. The student is encouraged to work on an enjoyable topic at a suitable level and speed.

Anxiety is an important factor in all second language classrooms.

In light of current theory and research in second language acquisition, the problem of anxiety and the accompanying beliefs about language learning... represent serious impediments to the development of second language fluency as well as to performance.

(Horwitz, Horwitz & Cope, 1986, p. 126)

Through computer use, anxiety is reduced as the student is free to make errors without the knowledge of the whole class. A better self-image is thereby maintained.

Students are also highly motivated by the computer. Novelty, sophistication, diversity and fun and games are among the many attractions of computer-assisted language learning (CALL). Motivation resulting from computer use has contributed to lower drop-out rates and longer

attention spans in second language classes (Ahmad et al., 1985).

Statement of the Problem

The benefits of computer-assisted language learning are many and varied. Newfoundland and Labrador, as a developing province, must keep up with improvements and innovations in second language teaching. One of these innovations is computer-assisted language instruction.

A questionnaire survey by Hoskins (1988) of Memorial University was conducted in the fall of 1986 to determine the actual use of computers in Newfoundland and Labrador French language classrooms. The survey was also intended to determine the training, needs, and interests of both computer users and nonusers among teachers. The results of this survey are included in her thesis, The use of the computer as an instructional aid in teaching French in Newfoundland (Hoskins, 1988).

These results indicate that only 5.6 percent of a total of 211 respondents to the questionnaire used the computer in teaching a second language, in this case French. The results also demonstrated a very high level of interest on the part of French teachers in using the computer in their classrooms. One hundred percent of users and eighty percent of nonusers reported an interest in improving their knowledge of computers and their application to second language teaching.

The level of computer knowledge reported in the survey was very low. Only fifty percent of computer users and thirty percent of nonusers had received instruction in the use of computers. Teachers in Newfoundland and Labrador need information on the basic concepts of the computer, as well as hands-on experience with them.

The survey also demonstrated a need on the part of Newfoundland and Labrador teachers for more information on the application of computers to second language teaching. Knowledge of computer operations does not necessarily imply knowledge of suitable applications for the teaching of French.

Finally, many of the users complained of a lack of suitable software. This lack is due in part to teacher choice of software and partly to a need for information on where to purchase suitable software. Both users and non-users expressed a need for a guide to effective software evaluation before purchasing.

The needs of Newfoundland teachers with respect to CALL are numerous. Experience with computers is needed in order to become confident in their application. Teachers need information on the basics of the computer as well as information on its application to second language teaching. Location and evaluation of suitable software is also a problem for many teachers. The fulfillment of the needs of these teachers would help maximize the benefits of computer use in the French language classroom.

Meeting the Need

Consideration of the needs of French language teachers in Newfoundland and Labrador has resulted in the preparation of this thesis based upon the development of a handbook to meet these needs. Although this handbook cannot replace hands-on experience, it can serve as a reference source for teachers wishing to apply the computer to their second language classroom. Needs identified in the thesis by Hoskins (1988) were addressed, as well as other needs apparent from a review of the literature.

The handbook was developed following the 4-D model created by Thiagarajan, Semmel and Semmel (1974). The instructional development process consisted of a front-end analysis, learner analysis, concept analysis, instructional objectives, a criterion-referenced test, an evaluation plan, and a diffusion plan.

The handbook responds to the needs of computer users and nonusers. Hoskins (1988) divided the nonuser group into those already motivated to use the computer in their classrooms (nonuser - high interest), and those not expressing an interest in applying the computer to their classrooms (nonuser - low interest). Although the handbook is available to all teachers, it is intended primarily for users and nonusers with a high interest in applying the computer in teaching French. Non-users are provided with basic computer concepts as well as a

description of basic components and functions. Users are provided with the latest ideas in computer advancements. The handbook also deals with the application of computers to second language learning. Current theories of CALL are discussed, including various uses and benefits. Software evaluation forms another feature of this handbook. Lists of useful terms and addresses are also provided for easy access to new material and information. These components provide a basis from which the French language teacher in Newfoundland and Labrador can launch into new directions in computer-assisted language learning.

Limitations of the Handbook

Although it is hoped that this handbook will be of great value to Newfoundland and Labrador second language teachers, some limitations do exist. One of the most prominent of these limitations is a result of the large variety of hardware and software on the market. This variety of hardware and software is often not compatible. It is therefore impossible to provide the beginning computer user with exact directions for turning on a computer and running a program; however, this information is often included with the computer manual and the program.

Rapidly developing technology also places a limitation on this handbook. Present components may be joined or replaced by new and improved components to

further enhance computer-assisted language learning. Changes may also occur in the types and availability of software. As a result, this handbook will need revision at various points in the future.

Another limitation of the handbook was revealed through a learner analysis based on the survey by Hoskins (1988). This survey revealed that 19 percent of the nonusers had low interest in using the computer in second language classrooms. The survey indicated that these teachers were missing the necessary motivation to make effective use of this tool. Hoskins therefore suggested that information or resource material on CALL be aimed at the computer user and the nonuser-high interest groups. The writer has therefore prepared the handbook in accordance with this suggestion.

A final limitation of the handbook is that hands-on experience will not be provided for the non-computer user. This handbook is meant as a reference source and as a basic introduction to computers and their application to teaching second languages. However, the writer strongly urges that the Department of Education, in conjunction with the school boards, provide workshops for the many teacher who would benefit greatly from first hand experience with computers but need the extra guidance and reassurance of an instructor.

Definition of Terms

A definition of terms has been provided to clarify some of the terminology present throughout this thesis.

CALL - Acronym for computer-assisted language learning.

Communicative Approach - an approach to language learning which places emphasis on real and meaningful communication based upon the needs and interests of the learner. This is in contrast to past structural approaches, such as the grammatical, audio-lingual and audio-visual approaches common in many educational programs of the last two decades.

Computer - used in this thesis to refer to a microcomputer system consisting of a Central Processing Unit and any combination of input and output devices.

Handbook - used in this thesis to refer to an information/reference book on a topic, in this case, computer-assisted language learning.

Nonuser - refers to a second language teacher with no previous hands-on experience with computer use.

Second language - refers in this thesis to the teaching of French; however, the concepts involved may apply to other languages as well.

User - refers to a second language teacher with previous hands-on experience in computer use.

Summary

Computer-assisted language learning is a valuable new component of second language pedagogy and offers many benefits to the students and teachers of French in Newfoundland and Labrador. The many uses of CALL including drill-and-practice, simulation, tutorial, and games reap benefits such as improved speed and depth of learning, motivation, lowering of the affective barrier and cultural awareness. Yet, a survey of Newfoundland second language teachers revealed that only six percent were using computers in their classrooms.

The survey also revealed a great interest on the part of both computer users and certain nonusers in finding out more about the computer and its application to teaching a second language. Teachers also required more information on software evaluation to help avoid the purchase of inappropriate software for their classes. The writer has therefore prepared a thesis based upon the development of a handbook to meet the needs of both computer users and interested nonusers. This handbook provides the beginner

with a basic introduction to the components and operations of a computer. It provides both the user and interested nonuser with guidelines to the use and benefits of CALL. The handbook also provides guidance in the area of software evaluation to aid teachers in making the best choice of computer software for their students. Appendices contain useful lists of names and addresses of software manufacturers, computer companies, useful magazines and French computer terminology.

It is the aim of this handbook to make teachers aware of the potential of CALL and to facilitate the use of computers in the second language classroom. The information and suggestions provided will help make this process less difficult and more enjoyable. Computers can be a beneficial and exciting addition to language classrooms. This handbook will enable students to profit from the stimulating and worthwhile innovation of computers in the learning and teaching of second languages.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

Computer-assisted language learning has been a topic of research and growth for over a quarter of a century. Recent developments in technology have made reasonably priced hardware and software available in substantial quantity. These advancements hold much potential for today's second language learner; however, a survey by Hoskins (1988) reported that only six percent of Newfoundland French teachers were using the computer in their classrooms. Teachers in this survey identified a need for more information on and experience with computers, information on the application of computers to second language teaching, and guidelines for the selection and evaluation of software.

In response to the needs of these teachers, the writer has chosen to develop an instructional package on computer-assisted language learning. A variety of media were examined to determine the most appropriate medium for the instructional material. A booklet or handbook was selected as the most appropriate medium. This choice was

based upon a number of factors including availability of the handbook as a reference material and software evaluation guide, absence of requirements such as computer experience or audio visual equipment, and cost. The time frame available for the development of the package, as well as the expertise of the writer, were also factors contributing to the final selection of a handbook. In preparation for the development of the handbook, the writer conducted a review of the literature to determine current theories and applications. Current problems and future trends are also examined to provide a complete picture of the status of CALL.

Brief History of Computers

Recent decades have witnessed the emergence of the computer as an integral part of our society. Information storage and processing, prediction, and simulation are but a few of the many computer capabilities which permit society to function and improve. Incredible advances in technology, notably the development of the silicon chip, have led to the production of smaller, cheaper and more powerful computers. The size, price and capabilities of the new computer have fostered its introduction into the

classroom -- an impossibility just a few decades ago with the size and expense of large mainframe computers.

The Mark 1, developed in 1944 by scientists of Harvard and IBM, was the forerunner of the first generation of computers (Bitter & Camuse, 1988). Fifty-one feet long, with 1,000,000 components, it worked on a series of mechanical switches. These moving parts were soon discarded with the development of vacuum tube technology and the creation of ENIAC --Electronic Numerical Integrator and Computer (Ahmad, Corbett, Rogers & Sussex, 1985).

Computers continued to get smaller and less expensive as transistors and silicon chips were developed to replace vacuum tube technology. By the mid 1970's, Large Scale Integration (LSI) technology had contributed to the development of the micro-computer, thereby placing the computer in the hands of more and more people (Bitter & Camuse, 1988).

New developments, such as multi-processing and bubble memory, foreshadow the invention of yet greater computers in the future.

Computers in Education

The ever-decreasing size and cost of computers along with dramatically increased capabilities, has led to their increased use in the field of education. Dunkel (1987) cites Skinnerian behaviourism as a strong influence in the development of "the teaching machine". Proponents of this philosophy believed that the classroom did not provide sufficient reward and saw the computer as a possible remedy for this situation.

Computer-assisted instruction (CAI) has evolved around three instructional ideals:

1. Individualization - students can work alone and at their own pace.
 - Possibilities for remediation and enrichment exist.
 - A systems approach consisting of a learning hierarchy with a diagnostic mechanism is used.
2. Data collecting and record keeping - collection of data on any interaction between the student and the computer.

3. Answer judging - the computer informs the student if his answer was right, wrong or somewhere between. Information is often kept on these answers. (Chapelle & Jamieson, 1986).

Taylor (1980) divided the role of the computer into three characterizations: tutor, tool and tutee. "Tutor" sees the computer as the master to teach or drill the student. The student may have some choice of material or duration of a session; however, the computer presents the material. The computer as "tool" does not teach or provide drill material. Rather, it uses software, such as word processing, databases and spreadsheets, as tools for working on a topic within a particular area. No content is presented through the software. The computer as "tutee" envisages the student teaching the computer. An example is the LOGO Programming language developed by Seymour Papert of MIT. One aspect of LOGO is the famous "turtle graphics" where the student teaches the turtle to perform different tasks by typing in a set of commands.

Papert (1980) suggests two fundamental ideas of computer-assisted instruction:

1. It is possible to design computers so that learning to communicate with them can be a natural process, more like learning French by living in France than like trying to learn it through the unnatural process of American foreign-language instruction in classrooms.
2. Learning to communicate with a computer may change the way other learning takes place. The computer can be a mathematics-speaking and an alphabetic-speaking entity.

(p. 6)

These statements indicate that students can achieve mastery of the computer in a painless manner which may change the focus of many aspects of present education.

Student behaviour in computer-assisted instruction consists of two aspects - analysis and production (Lessard, 1986). In analysis, the student comments on or finds items already on the screen. In production, the student produces a response of his own. This may be done through input devices such as a keyboard or mouse. Production may also be oral or written on paper.

Although the application of computers to education was discussed in the 1940's, actual development of programs began in the 1960's at universities such as Stanford, University of Michigan, and the University of Illinois (Ahmad et al., 1985; Dunkel, 1987). Today, computer programs are available for most areas and levels of the curriculum.

English has seen computers used to improve comprehension through question and answer exercises and to improve writing skills through the use of word processing (Feely, Stickland & Wepner, 1987). Mathematics has benefited from uses of courseware such as spreadsheets which permit students to handle advanced levels of mathematics and business (Dyrli, 1986; Dwinell, 1986). Social studies has benefited from the use of databases to accumulate and access large amounts of data on many peoples and areas of the world (Mendrinós, 1986). Subjects such as physical education and home economics use the computer to record track and field times or to plan a household budget. Indeed, there are many possible applications of the computer to all areas of the curriculum. Teachers of second languages, then, should explore the role of computers in their field of education.

Development of CALL

Computer-assisted language learning (CALL) began in the 1960's with a Russian program developed at Stanford University and a German program developed at the University of Stony Brook (Holmes & Kidd, 1982). The program at Stanford superseded the teacher entirely; at Stony Brook the teacher was responsible only for

audiolingual drills with the computer program taken from a text already in use. Both ultimately failed as piles of research data gathered and no markets were found for the programs which were run on large mainframe computers (Decoo, 1986).

These programs were followed by the ELSE project for French at Dartmouth College, New Hampshire (Ahmad et al., 1985). This project was among the first to provide a time-sharing (interactive) facility and also developed the BASIC computer language for beginning computer programmers. A similar program for German was developed at the University of Minnesota (Holmes & Kidd, 1982). These programs differed from the earlier programs at Stanford and Stony Brook in that they saw computer use not as complete instructional programs but as components of the language course.

Two other well known projects were the PLATO project at the University of Illinois (Ahmad et al., 1985) and the FRAND project at the University of Alberta (Holmes & Kidd, 1982). Following a developing trend, the role of these programs was that of a supplement to the overall language program. PLATO and FRAND incorporated large amounts of technology including audio components, the use of slides, and light pens. However, machinery problems, program costs and conflicting evidence of effectiveness led

educators to question whether their goals might not be better served through other means of instruction.

The trend from the middle to late 1970's was toward less complex and less expensive programs. These were often designed to meet particular teaching needs and were based on more current pedagogical theories. In accordance with the structuralism prevalent in language learning at this time, computers filled the traditional role of drill and practice. Examples from this era include the DECU and TUCO projects at Ohio State University (Holmes & Kidd, 1982). At this stage, some language teachers also began to assume the role of programmer and develop their own materials.

The microcomputer invasion of the late 1970's and early 1980's led to a growing interest in the use of CALL as a valuable language experience; however, many of the software materials still exhibited features of programmed instruction or the behaviourism of Skinner (Higgins & Johns, 1984). This posed a problem for language teachers who were witnessing another trend in language teaching - the "communicative approach."

The communicative approach to language learning proposes an emphasis on true and meaningful situations of communication where importance is accorded to the learner and the message (Germain & Leblanc, 1986). The goal of

the communicative approach is to equip the student with a communicative competence - the ability to use the language rather than know the language. Savignon (1983) listed four components of communicative competence:

1. grammatical competence,
2. sociolinguistic competence - understanding of the social context of language use,
3. discourse competence - the connection of a series of sentences or utterances to form a whole,
4. strategic competence - strategies one uses to compensate for imperfect knowledge of rules.

Milot (1981), states that "globalement, la pédagogie de la communication vise à communiquer et non la connaissance des règles ou des lois de la communication" (p. 8). What then, is the place of the drill-and-practice programs so prevalent in the late 1970s and early 1980s?

A response to this question is provided by Krashen (1981) in his theory of language acquisition and learning. He proposes acquisition as an unconscious process through which one learns a system of communication little by little as a result of true communication experiences. Learning, on the other hand, is a conscious process of studying the language, its rules and forms. This learning acts as a monitor, standing by to correct errors in speech which emerges from the acquisition aspect of one's language capability.

Widdowson (1984), makes a similar distinction. He refers to the teaching of language **as** communication and the teaching of language **for** communication. He states,

Drills which provide repetitive practice for sound discrimination or for the absorption of sentence patterns into habitual behaviour do not of their very nature deal with authentic language **as** communication. But they could provide an indispensable service in developing language **for** communication. (p. 219)

Drill-and-practice exercises which are ideally suited to a computer, therefore, have a place in the communicative approach to language teaching. However, many teachers remain dissatisfied with this important though minor role of CALL.

Researchers and teachers, therefore, set out to create more varied materials and find more uses for CALL, at the same time keeping in mind the communicative approach. Today, there are many categories of CALL activities ranging from the traditional drill-and-practice to simulation, problem solving and tutorials.

CALL Activities

CALL activities in the 1980s have varied between two extremes (Mydlarski, 1985). At one extreme are activities such as drill-and-practice and tutorials. These activities represent the more traditional image of CALL and are based on the behaviourism inspired by Skinner. At the other extreme are activities such as games,

simulations, and adventures which can be used to give students the opportunity to communicate freely with the computer. These activities are based on a more holistic approach to language teaching and were inspired by researchers such as Papert of MIT and Higgins and Johns of Britain (see Figure 1).

Computer-Assisted Language Learning

* non-directed (student has control and choice)	* teacher or system directed
* non-tutorial (discovery mode)	* structured; imitates Programmed Instruction
* holistic (inseparability of language skills)	* sub-skills taught separately
* cognitive approach	* behaviouristic approach
* inspired by Seymour Papert (M.I.T.)	* inspired by Skinner
* individual or small group mode	* individual mode
- games	- drill-and-practice
- problem solving	- tutorials
- simulations	- early CALL program, such as the work of Patrick Suppes (Stanford), using mainframe computers.
- "adventures"	
- exploratory CALL	
- work of John Higgins (British Council) and Tim Johns (University of Birmingham), using microcomputers	

(Mydlarski, 1985, p. 76).

Figure 1. Extremes of CALL.

Drill-and-Practice

Computerized drill-and-practice reflects the activities often associated with past trends in second language teaching. They often consist of providing correct endings, agreement, or some other aspect of grammar or syntax. Higgins and Johns (1984) describe the most commonly used structure for drill-and-practice activities as follows:

1. Select task or question
2. Display question
3. Accept student's answer
4. Match answer against acceptable answer(s)
5. Report success or failure
6. Adjust student's running score
7. Return to (1). (p. 39)

Drill-and-practice exercises are devoid of communicative context, yet many writers feel they are a valuable language learning experience. Drill-and-practice can be used to internalize the linguistic aspects of the language so that they may serve as monitor to our language production.

FRELEM, a supplemental program of drill-and-practice for elementary French grammar, was developed at the University of Iowa (Hope, 1982). This well known drill-and-practice program emphasizes linear progression in following the scope and sequence of the first year text book. Exercises consist of fill in the blanks or

translation. This program also makes use of visual cues, such as underlining and arrows, to highlight mistakes and give clues. Capitalization, extra spaces, and punctuation are edited out so as not to be considered as mistakes. A survey conducted by Hope revealed positive reaction on the part of first year students to the program (70-80% of students reported enjoyment of FRELEM).

Tutorial

A tutorial program combines elements of drill-and-practice with presentation of new material. One-to-one teaching is often impractical in a classroom situation; however, the computer can make a patient and attentive teacher. The subject matter is divided into a series of small steps with students mastering a step before moving to the next. Higgins and Johns (1984) describe the process of constructing a tutoring lesson plan as follows:

1. Identify the skill or block of subject matter to be taught.
2. Identify a criterion, a piece of behaviour which will show that the student has mastered the skill or subject matter.
3. Divide the subject into a series of very small steps, each of which requires at most one new concept or decision.
4. Present each step in the form of a "frame" containing any necessary exposition and a

question. The question in the last frame or frames will embody the criterion behaviours.

5. Make the student give an overt answer to each question, usually by writing down a letter or word.
6. Then let the student check that answer against the right answer before continuing. (p. 51)

Students have some choice in the material they learn and in how far they proceed. This permits individualization of learning in accordance with students' interests and abilities.

A series of six thematic beginning French tutorial programs is available from D.C. Heath and Company. These include drill-and-practice exercises as well as the introduction of new vocabulary and grammatical structures (Cox, 1985).

Simulation

A simulation is "an 'intervention model', a representation of a process during which one can intervene and change some of the values which affect the process" (Higgins & Johns, 1984, p. 63). Simulation has been used in many areas from training pilots and astronauts to popular video games which capture the attention of so many of today's youth. Kearsley and Hunter (1982) report three critical attributes of the holding power of simulation video games:

1. Video games are challenging because of a clear goal whose achievement is uncertain.
2. Video games stimulate curiosity by offering the right level of complexity.
3. Video games evoke some degree of fantasy.
(p. 42)

Simulation also has a role to play in computer-assisted language learning. Simulation can be broken down into "real-time" and "move-based" simulations (Higgins & Johns, 1984). Although "real-time" simulation may be useful, it is "move-based" simulation which has the greatest potential for second language learning.

"Real-time" simulations involve continuous action; the user may be penalized or fail for reacting too slowly to a situation. This type of simulation does not have much application for language learning except for reading simple directions or in group use where others would read or give directions to complete the simulation.

"Move-based" simulations will wait for user responses so students have time to discuss possible moves or ramifications. Although students may at first be tempted to talk in their mother tongue, Higgins and Johns (1984) suggest that continued use of the program results in an eventual switch to the target language in which the problem was presented.

This type of simulation should have great potential for the future as it clearly promotes thinking and decision-making in the foreign language; this is a skill that is generally regarded as extremely difficult to obtain in foreign language instruction. (Cox, 1985, p. 7).

An example of a simulation program is GRANVILLE, produced at Homerton College, Cambridge (Jones, 1985). This program takes students on an imaginary vacation to Normandy where they must manage a budget for the length of their stay.

A similar simulation program using a videodisc (combining video with sound track and computerized interaction) is MONTEVIDISCO. This program takes students on a simulated visit to Mexico. Students see and hear Mexicans speaking to them and are then required at certain points to make decisions and feed them into the computer. These decisions may place the students in jail or in any number of other situations (Gale, 1983).

Future developments in computers and synthesized speech hold even more promise for interactive cultural activities of this type.

Games

Games are a favourite activity of children and adults alike. They have always held an important place in second language pedagogy and, today, there is an abundance of computer games designed for the second language learner.

Ahmad et al. (1985) divides these games into two types: competitive and collaborative. Competitive games have the player either winning or losing against an opponent or the computer, based upon a system of points. Collaborative games have the students and perhaps the computer working together toward some common goal, for example, building a bridge.

Games in second language learning usually provide an opportunity for reinforcement of vocabulary or grammar skills in a humorous way although knowledge or cultural based games do exist. These games serve to motivate students and provide moments of relaxation from concentrated work sessions. An example is the famous HANGMAN which exists in many languages.

Games often take the form of simulations.

Problem Solving

Problem solving can be developed and exploited in the second language classroom through the computer. This exploitation is often accomplished through the use of simulations; however, other aspects of problem solving also exist. One possibility is through the use of computerized story or word problems. After reading a specified amount of text, the student is required to make decisions to help solve a problem. This decision may be an individual one or a decision reached through discussion with others, thereby requiring meaningful communication.

Thrush and Thrush (1981) refer to a different type of problem solving which they call "problem solver". This type of problem solver "serves as a linguistic database, answering any variety of linguistic questions" (Cox, 1985, p. 8). An example of a problem solver program is THE LINGUIST by Gessler. This is an electronic dictionary which can be used in 20 different languages.

Tool Uses

A final use of the computer in the second language classroom is a "tool" use to help facilitate other activities. Programs which function in a tool capacity present no content themselves. Examples of tool uses include word processing programs, database programs, spreadsheet programs and graphics programs.

Word processing was the most frequently used software in classrooms observed by Canale et al. (1985). The ability of these programs to edit, cut and paste, add new information and format makes them an invaluable tool in activities such as dictation and composition. Harvey (1987) writes, "It (the computer) comes with frailties and marvelous benefits, the sum total which adds up to better essays developed through a process, not just a free-write session (p. 175)".

Databases can be used to collect or access information on people or events, other cultures or to serve as a springboard for discussion of one's own

culture. One might, for example, access databases to compare a list of family names in Québec to family names in St. Pierre.

Spreadsheets are used to work with collections of numerical data. A spreadsheet could be used to compare the percentage of the population who are fishermen in Quebec and in Newfoundland.

Graphics can be used to create interesting and imaginative designs. These designs can be used as a topic for discussion or as a visual aid to classroom presentations.

Authoring Packages

Much of the available software is "stand-alone" software; that is, it has been prepared by a developer and cannot be changed by teacher or student. Some software exists, however, which permits modification or addition by the teacher. This "teacher-supplemented" software involves a process known as "authoring".

Craven and Sinyor (1987) report that 60 percent of computer-assisted language learning users rely totally or partially on authoring systems for their courseware.

According to Holmes (1983):

An authoring system consists of ready-made computer programs that constitute precast formats into which the course-writer/teacher can insert his own pedagogical materials. No programming skills are required of the coursewriter; the system provides the coursewriter with a series of prompts to which he responds. (p. 22)

Although teachers cannot control the form of the material, the ease with which the tutorial can be created compensates for this lack of control. Authoring systems may involve most types of software including drill-and-practice, tutorial, simulation, games, and problem solving.

Frequency of CALL Activities in CANADA

A survey by Craven and Sinyor (1987) of CALL use in Canadian universities revealed that 33 percent presently use computers and another 45 percent are interested in using them in the near future. Of the 33 percent who use computers, the following percentages were reported.

Table 1

CALL Use in Canadian Universitites

Category	Percent
Drill-and-practice for remedial purposes	41%
Tutorials	25%
Games and simulations	8%
Word processing	12.5%
Other	13.5%

Craven and Sinyor (1987) suggest the use of games, simulations and word processing is more common in public schools where students work in groups with the teacher to develop communicative skills. This finding was supported by Canale et al. (1985) who found word processing to be the most commonly used software in observed classrooms.

Availability of Information on CALL Activities

Information on the application of the various types of software and their application to second language learning is available in Canada from a variety of sources. Articles often appear in journals such as CONTACT and The Canadian Modern Language Review. These sources offer information on some of the newest trends in CALL and also present reviews of software. Information is also available in foreign journals such as the CALICO Journal and The Foreign Language Annals.

Reviews of software materials are also available from digests of software reviews. Examples include an American publication entitled the Digest of Software Reviews and a database prepared by the Council of Ministers of Education, Canada, entitled CMEC Database for Educational Software.

Several books and booklets are also available to provide guidelines to the different types of software and their application to second language learning. The

booklet, Microcomputer Software for Language Arts: Survey and Analysis by Canale et al. (1985) provides information on the various types of software and a "Computer-Assisted Language Learning Materials Evaluation Form" to help evaluate and select software.

Sources such as these are useful in informing the second language teacher of the various CALL activities which can be used to improve students' language skills. These activities may be applied in areas such as grammar, vocabulary, reading comprehension, translation, aural comprehension and oral proficiency (Holmes & Kidd, 1982). Together, these areas constitute the components of a good language program.

Benefits of CALL

The variety of CALL activities suggest many ways of using the computer in the second language classroom. These activities may benefit students in different ways and to a variety of degrees (Chapelle & Jamieson, 1986; Robinson et al., 1985). Many skeptics of CALL wonder if the benefits of the computer could not be achieved more successfully and cheaply through other means. The literature suggests, however, that many benefits may be directly and uniquely attributed to computer-assisted language learning.

Cognitive Benefits

Although early experiments on students' use of computers for drill-and-practice revealed little difference in achievement scores and those of fellow language learners not using computers, improvements in available software and the advent of the microcomputer are changing these findings.

Chapelle and Jamieson (1986) report that the use of computers may actually lessen the time required on a task for the mastery of target skills. Ahmad et al. (1985), while citing a lack of conclusive evidence, agree that material can be better and more quickly learned through the use of CALL.

Individualized instruction, as provided by computer-assisted language learning, is recognized as a valuable aspect of learning. Students sitting at a computer have the complete attention of that computer. The student, working alone, has some choice in the content to be covered and the length of time to proceed. Features such as branching permit review and revision when necessary so that the student's particular needs are fulfilled. Papert (1980) states, "The computer is the Proteus of machines. Its essence is its universality, its power to stimulate. Because it can take on a thousand forms and can serve a thousand functions, it can appeal to a thousand tastes" (p. 3).

Affective Benefits

Anxiety Reduction

Anxiety level has been a long time concern of teachers and students in second language classes. "I feel that my French teacher is some kind of Martian death ray! I never know when he'll point at me!" (Horwitz, Horwitz & Cope, 1986, p. 125), is a none too uncommon reaction on the part of many students. The patience and user-friendliness of the computer helps reduce this anxiety in the classroom. Individual use of the computer permits interaction which is not subject to ridicule by the whole class. Mydlarski (1985) reports that computer use in the classroom helps lower the affective barrier by providing students with the privacy to explore language. They are free to make errors without appearing stupid, and can learn from their errors. This sense of control over the language enhances the learner's self image.

Motivation

Reduced anxiety results in increased motivation on the part of second language students. Other aspects of computer-assisted language learning are also highly motivational. Ahmad et al. (1985) report that students rated CALL highly for its novelty, diversity, sophistication, competition, fun and games. This motivation has contributed to lower drop-out rates and longer attention spans in second language classes.

Inherent Benefits

The varied features of the microcomputer bring many inherent benefits to second language learning. Along with motivational benefits of computer use, students benefit from the wide range of activities which can be handled quickly and efficiently on the computer (Ahmad et al., 1985). Ahmad et al. list the following inherent features of the microcomputer which benefit language learners:

1. The computer is interactive; it can assess student response.
2. The computer is accurate and precise.
3. The computer does not tire or falter.
4. The computer is as impartial and unbiased as the material typed in.
5. The computer can handle large volumes of interaction.
6. The computer can deliver feedback at more frequent intervals than would be possible for a human teacher.
7. The computer has more flexible use of time.
8. The computer can accommodate different speeds of learning.

The computer, by its nature, is extremely well suited to certain classroom activities such as drill-and-practice. Scheduling of computer time outside class time to fulfill these functions frees the teacher to work in

situations where teacher/student contact is more desirable (Ahmad et al., 1985).

The computer can also be used as a research tool to determine which programs are most effective. On a more individual scale, computers can be used to evaluate students and diagnose problems which may exist (Robinson et al., 1985; Edwards, 1985). The record keeping abilities of the computer enable teachers to analyze student answers and patterns of errors as an aid in planning future lessons and remedial work.

Communicative Benefits

Well prepared and evaluated lessons are beneficial to students, yet many educators still question the computer's ability to provide a communicative experience for the learner of a second language.

Interactivity

One of the cornerstones of the communicative approach is interaction - the successful transmission of messages from a sender to a receiver. Computer use enables the student to benefit from interaction between the student and the computer (Higgins & Johns, 1984). A message sent by the computer usually requires some kind of response on the part of the student, thereby letting the computer know if it was successful in sending the message. A message sent by a student will be analyzed by the computer to

determine the correctness of a response and feedback will be provided. "The computer begins to show its versatility and potential as a learning tool when it shuns a stock response and selects the most appropriate feedback to an incorrect answer from an array of pertinent comments" (Holmes & Kidd, 1982, p. 507).

These comments may point out errors, provide assistance, branch into a remedial loop or automatically provide the answer. Programs may also provide multiple interactive processes to facilitate individualization of lessons (Higgins & Johns, 1984).

Higgins and Johns (1984) present seven types of possible interaction:

1. Student commands/machine obeys and acknowledges,
2. Student commands/machine reports why command cannot be obeyed,
3. Student enquires/machine answers,
4. Student enquires/machine fails to understand,
5. Machine asks/student answers and machine agrees,
6. Machine asks/student answers and machine disagrees,
7. Machine asks/machine answers.
(p. 78)

Authenticity

These types of interaction present an authentic situation for communication. They may also be based on

the use of authentic materials. Authenticity is another cornerstone of the communicative approach.

Authentic text can be entered into or outputted from the computer. The teacher can also use authentic aural documents as sources of dictation to be done using word processing. Authentic aural documents can provide information from which students must answer questions or make choices on the computer. "In the case of aural documents, some applications permit the use of regular cassette recordings; others depend on technology that is not yet readily available" (Mydlarski, 1985, p. 77).

The use of authentic documents can be used to place emphasis on the socio-cultural aspect of language learning. Students can benefit from exposure to other cultures through the use of these materials; however, an authentic communication setting is also established in the classroom where students work in groups or as a class on a computer project. Group work is especially profitable in provoking widespread communication.

Computers are very good at stimulating people to talk and listen A lot of language arises out of practical necessity, since only one member of the group can comfortably operate the keyboard. The others will want to play their part in the task but can do so only by ordering, suggesting, reminding or persuading, all language functions for which natural contexts may be awkward to create in the classroom. (Higgins & Johns, 1984, p. 37)

Computers may also be used to promote communication with members of the target language. Sayers and Brown

(1987) set up a system of computer networks so that students in New England who were studying Spanish could actually communicate by computer with Spanish speaking schools in Mexico and Puerto Rico. Among other information, students exchanged articles for school newspapers and cultural items such as family proverbs. This information was transmitted over telephone lines through the use of modems. Information was sent to electronic bulletin boards and forwarded at the least expensive times so that large batches of student writings were transmitted for less than a dollar.

Finally, authentic communication takes place between the computer and the learner as discussed in the types interaction noted by Higgins and Johns (1984). The student must make authentic use of commands, statements and questions in order to interact with the computer.

Student-based Learning

The communicative approach to language learning suggests that the use of authentic documents, as well as any other learning experience, be based on the needs and interests of the learner. "C'est à partir d'une analyse des besoins et des intérêts des apprenants que les objectifs d'enseignement/apprentissage sont maintenant définis. De fait, cette notion est une des pierres angulaires de l'approche communicative" (Boucher, 1986, cited in Boucher, Duplantie & Leblanc, 1986, p. 147).

CALL responds to the needs and interests of students in various ways.

Perhaps the most striking method of capturing student interest is through the use of computer games and simulations. Video games have captured student interest both at home and in the arcades (Mydlarski, 1985). These games have been adapted to the language learning classroom so that even activities such as drill-and-practice can hold interest for the learner.

CALL programs may be selected to match students' interests in certain topics as well. Health, music, travel and sports are topics which appeal to a wide variety of learners.

As previously mentioned, networking systems have been set up to allow students from different areas and countries to communicate. Students are encouraged to explore their interests in other cultures by sharing stories, ideas and questions with other students of similar age groups. This exchange permits students of different cultures to discuss not only differences but also common interests and concerns.

Students' intellectual needs are answered by the many possible routes offered through a computer program. Any learner who needs a review of a past topic in order to proceed with the present exercise can branch into a remedial loop in many programs (Higgins & Johns, 1984). This remedial loop presents a meaningful learning

situation for the student who needs this knowledge in order to proceed, and also prevents frustration on the part of students who do not need revision on the topic.

Many computer programs also present a HELP facility for students having difficulty. An example is the "Assistance" facility of the program THE TREASURE OF ILE MADAME by Sakamoto and Ullmann (1987). Students position a trackball over the "Assistance" square which is on screen at all times, in order to receive hints and example commands. The use of such facilities responds to student needs to succeed and not to feel frustration in learning a second language.

Some students need extra challenge in learning a second language. This challenge can be provided in class time through programs containing multiple levels of difficulty. Students can also take advantage of these and more difficult programs outside class time in order to pursue interests in various topics or activities.

It is therefore possible to provide a communicative experience for students through computer-assisted language learning. Interaction is possible "with the computer" on topics related to their needs and interests. Interaction is encouraged "through the computer" with students in the target language. Interaction is also encouraged "between" students using the computer as stimulus, thereby creating a meaningful situation for communication.

Problems With CALL

Despite the benefits and advantages of computer-assisted language learning, problems do exist. These problems may be classified into four categories: teacher problems, software problems, technology problems, and administrative problems.

Teacher Problems

Many language teachers attempting to introduce computers to the classroom encounter incredulous and defensive colleagues (Ahmad et al., 1985). These fellow teachers wish to protect precious computer time for their subject areas and cannot envisage the role of the computer in a language class.

Indeed negative attitudes on the part of language teachers themselves are an inhibition to the more widespread use of CALL. This may be due in part to a lack of computer knowledge and in part to ignorance of the theory and applications of computer-assisted language learning. Higgins and Johns (1984) report that many teachers feel anything done on computer can be done with pencil and paper and with much less work. Teachers also worry that programs deal with word or sentence level meaning and ignore context and discourse features.

Hoskins (1988) reported that the greatest need among French teachers in Newfoundland and Labrador interested in using CALL was for computer knowledge and experience. At

present, less than six percent of teachers are using computers in the second language classroom; however, 87 percent were interested in doing so in the future. As well as a need for computer knowledge and experience, many of these teachers expressed a need for suitable guidelines and information on the use of computer-assisted language learning. Effective evaluation of suitable software was also an area of great concern. A major problem, then, is a lack of in-service and lack of materials to help language teachers realize the full potential of the computer in their classrooms (Cox, 1985).

Software Problems

Education of language teachers in new aspects and theories of CALL will solve some of the existing problems; however, other problem areas also exist. One of these is a lack of suitable software (Ahmad et al., 1985). Much of the computer material available for second language is drill-and-practice. Although drill-and-practice does have a place in language learning, CALL can offer much more.

Decoo (1986) suggests that limited programming skills and limited theoretical knowledge of computer-assisted language learning cause developers to create materials based on past teaching experiences that did not include computers. These include activities such as multiple choice and missing word exercises. Educational creativity is frustrated by an absence of knowledge of the rich

potential and teaching strategies appropriate for computer-assisted learning.

Co-ordination of software with teacher manuals or programs is also a cause for concern (Decoo, 1986). Many of today's software packages are developed independently of any background or program which the student may have previously experienced. Students, especially those having problems, need confidence and a feeling of security in order to receive maximum benefit from a program. CALL software should therefore correspond to vocabulary and topics covered in the language program and form an integral part of the overall French curriculum.

Error correction has received much attention in recent language learning research (Richards, 1984; Perez, 1986). Teachers are also concerned with the correction of errors in computer-assisted language learning. Decoo (1986) reports that "an overemphasis on correction of faults can have a negative effect on learning, especially if the computer is always stopping to correct" (p. 21). At the same time automatic and rapid correction is a major attribute of the computer. Decoo suggests a "middle of the road" approach where mistakes would be brought to students' attention but follow-up would be rapid and easy without too much indepth study.

Literature suggests that many of the problems with software can be remedied through better education and programming skills on the part of developers; however,

there are technological problems which are not as easily solved.

Technology Problems

Speech

The most obvious and common objection to computer use in second language learning is the inability of the computer to input and output oral communication. Many teachers fear that computers inhibit fluency and wonder if we should wait for talking computers (Higgins and Johns, 1984). Some voice synthesizers and voice recognition packages are available; however, these are not yet sufficiently perfected to be of use in the second language classroom (Henry, Hartman & Henry, 1987).

Literal Mindedness

Computers are very literal-minded machines. Because a computer does not possess intelligence and records only knowledge entered through a binary system, there is not much leeway for error in student answers. A misplaced comma or space can severely influence the computer's response to a student's input. The longer and more complex the input, the greater the range of possible errors (Holmes & Kidd, 1982). Although new inventions such as "fuzzy matching" and "pattern mark-up" are an improvement, attempts at spontaneous creative language use cannot be processed by the computer (Ahmad et al., 1985).

Incompatability of Materials

Although a variety of software is available for use in the second language classroom, compatability of software and computers poses a problem. The amount of material available for use in schools is greatly reduced when one is forced to buy for a particular brand of computer. The program THE TREASURE OF ILE MADAME mentioned previously was created for use with ICON computers which are not used in the schools of Newfoundland and Labrador where Commodores predominate.

The computer is, however, a quickly developing phenomenon. The next few years promise technological advances which may overcome many of the problems presently associated with computer-assisted language learning.

Administrative Problems

Computers have declined drastically in price over the last decade; however, insufficient budgets still prevent the widespread availability of computers in the classrooms (Mydlarski, 1985). Group and class work are desirable aspects of CALL; however, increased availability of computers would also promote valuable individual use.

The buying of new computers would nevertheless compound an already existing problem - space in the classroom and school. "Some institutions simply do not have room for a computer lab, particularly one which will encourage small group use" (Mydlarski, 1985, p. 81).

Co-ordinated guidance in software development, use, and evaluation is also a concern of computer-assisted language learning (Canale et al., 1985). School boards need microcomputer resource centres to provide workshops and to help teachers find, evaluate and make the best use of computer courseware in their classrooms. Canale et al. suggest that these centres also serve as a bank from which desired software may be borrowed.

Although CALL programs exist at the teacher, software, technological and administrative levels, much can be done with present programs and conditions. Ahmad et al. (1985) suggest concentration on the existing capabilities and benefits of the computer in second language learning:

We should not regard the use of the computer in a negative way because of the things it cannot do as well as human beings. Instead, we should concentrate on some new things which it can offer, or even some old things to which it can give a new lease on life if used imaginatively.
(p. 103)

Future Trends of CALL

Many of the problems of CALL are being overcome as technology progresses at an unprecedented rate. Advances, such as artificial intelligence, video and audio discs, and voice synthesizers, are constantly being improved for use in computer-assisted instruction. Breakthroughs in these areas promise improved computer-assisted language learning in the next few years.

Artificial Intelligence

Artificial intelligence leads the way in research on computer-assisted language learning. "Artificial intelligence is the part of computer science concerned with designing intelligent computer systems, that is, systems that exhibit the characteristics we associate with intelligence in human behaviour - understanding language, learning, reasoning, solving problems and so on" (Feigenbaum & Barr, 1982, p. 3). A simpler definition is supplied by Paramskas (1986), as "a system capable of pattern recognition" (p. 619).

One of the most promising areas of research in artificial intelligence is "parsing". This involves "the use of syntax and other sources of knowledge to determine the functions of the words in the input sentence in order to create a data structure ... that can be used to get at the meaning of a sentence" (Feigenbaum & Barr, 1982, p. 256). Many of the intelligent CAI programs for language learning are parsers. A well known example is DEREDEC 2, a combination of several programs for automatic textual analysis in French (Paramskas, 1986).

FAMILIA, a program for Spanish, also uses artificial intelligence to encourage communication with students (Underwood, 1982). This program employs simulated conversation strategies that allow students considerably more freedom in their responses. Programs such as these are able to provide students with truly communicative

reading and writing experiences. At present, their use is not widespread; however,

Progress is so rapid that it is not impossible to conceive of interactive programs which allow any user - expert or total beginner - to consult the computer like one can consult any expert in any field, be understood, and receive answers or information in everyday language - oral or written. (Paramskas, 1986, p. 627)

Random-Access Audio

Random-access audio is another area of research which holds great promise for computer-assisted language learning. Several means of presenting audio in connection with computer use are available, including: (a) a standard linear slide-tape recorder, (b) a random-access audio disc, (c) a random-access cassette recorder, (d) compact disc, (e) a digital audio tape cassette, (f) a speech synthesizer, and (g) an interactive video-disc (Dunkel, 1987).

Random-access audio services are of particular interest to language learners. They present almost instant access to approximately 600 possible messages. These are available at given points of a lesson and include hints, translations, cultural notes and slower recordings of natural language segments (Henry, Hartmann & Henry, 1987).

Random-access audio, in the form of discs or cassettes, also offers recording and editing capabilities (Henry, Hartmann & Henry, 1987). Opportunities exist for

authentic listening at speeds appropriate for different students. These can be used in drill-and-practice or tutorial modes or in the creation of an interactive story where the student chooses which path to take (Henry, Hartmann & Henry, 1987). Another approach suggested by these authors is the use of "hyperspeech". This consists of presenting the learner with real language spoken by native speakers in a natural context, presented in small sections with aids to help the learner understand.

Random-access audio devices such as INSTAVOX do exist; however, at present they are expensive to buy. It is also expensive to store and duplicate the magnetic floppy discs (Dunkel, 1987). Bulkiness of the device and noise when accessing a particular speech are also problems cited by Dunkel as factors delaying the widespread use of the random-access audio disc; however, the future holds much promise in this area.

Video-Disc

The video-disc combines the features of the random-access audio with video pictures. A video-disc stores up to 55,000 frames on each side of a disc with any frame being accessible in two to three seconds (Ahmad et al., 1985). Film, slides, etc. present material in a linear fashion. The video-disc, on the other hand, permits a "multi-dimensional" presentation, thereby ensuring a more interactive situation (Obadia, 1986). Students can

proceed at their own pace and indirections determined by their answers to certain questions. MONTEVIDISCO, the simulation program discussed by Gale (1983), allows students to make choices in response to speech from Mexicans seen on the screen. These choices may land the student in jail or in a hospital if the student makes certain inappropriate choices. Students respond through a keyboard or some other input device, thereby facilitating interactive communication. Obadia reports that a Japanese company now produces an interactive video-disc in 3-D.

This medium is gaining ground in educational circles. In 1985, 88,860 units were sold. By 1990, sales are expected to reach 404,336 (Obadia, 1986). The price of video-discs is still high (Ahmad et al., 1985), and problems such as "impossibility of tape-over" have yet to be solved; however, technological advances promise to make the video-disc a cultural and educational phenomenon of the future.

Voice Synthesizers

Synthesized speech has long been awaited by the proponents of computer-assisted language learning. In an era of language education where oral speech is of great importance, computer-produced speech can provide a whole new dimension to language learning and increased opportunities for communication.

Synthesized speech is produced by storing speech as a set of numbers (digital). Words or phrases can then be used in the same way as textual data (Ahmad et al., 1985). Computers could then be used to display and/or say the correct answers.

Another way of producing synthesized speech is through phoneme synthesis using such technology as the Votrox chip (Higgins & Johns, 1984). Unfortunately, neither of these systems has perfected native speech (Dunkel, 1987).

The problem is that all such devices currently sound like computers. While they are more or less comprehensible, they would not do to teach listening comprehension of any foreign language where precise pronunciation of accents, tones, intonation, and cadence is important. (Henry, Hartmann & Henry, 1987, p. 257)

Voice Input

Voice input has had more success in computer development. This process involves speaking into a microphone which is connected to a special circuit board. This circuit board converts analog signals into digitized signals for storage and then reconverts them to analog for playback (Ahmad et al., 1985). This can be very useful for CALL programs where sound may be added to regular monitor displays and where sound in the form of questions or statements may replace monitor displays. An example would be a program where a student listens to words

containing the sounds "r" and "w". The student then presses a key to indicate which letter each word contains.

Voice input is presently limited to the recording and playback of voice as opposed to interactive functions.

Other Advances

Other promising advances in computer-assisted language learning include the use of the computer as a dictionary to retrieve meanings or give translations, and the use of a computer to store running text (Ahmad et al., 1985). The student of a second language could scan a running text to find examples and uses of new phrases or words.

Technological advances in computer-assisted language learning may influence other areas of second language study including second language pedagogy and administration.

Pedagogical Implications

Linguistics may benefit from advances in computer technology. Data can be collected and stored on the path taken by a learner through a branching program, the time taken to give responses, and the nature and pattern of errors. This information can then be used by linguists to discover problems and devise appropriate treatments.

The development of new and varied computer programs may also encourage researchers to discover new learning strategies which may be applied to CALL.

Researchers and educators must continue to describe the strategies used by good language learners and to assess cognitive/affective characteristics that are important in L2 acquisition. In this way, our understanding of L2 acquisition can be reflected in the intelligent use of computerized lessons and ultimately in the development of more "intelligent" lessons. (Chapelle & Jamieson, 1986, p. 42-43)

The development of computer-assisted language learning may also provide pressure on teachers to change roles. The teacher has traditionally been the centre of attention in the language classroom. The increasing use of computers may encourage teachers to take on new and challenging roles (Dunkel, 1987). Mydlarski (1985) sees the role of the CALL teacher as that of a motivator or facilitator rather than a purveyor of information.

Future teachers may also need to develop some programming skills. Higgins and Johns (1984) state that teachers need some understanding of how computers work and how they can best be applied to language teaching. This includes some knowledge of programming. Brink (1986) suggests that teachers could learn some programming in order to evaluate available software and to understand problems which may develop. Brink also states that some programming knowledge may have a "demystifying effect" and

remove many of the computer fears possessed by second language teachers.

Hoskins (1988) reports that teachers need training in the application of computers to second language teaching. As well, teachers need guidance in the selection and evaluation of suitable software.

Administrative Implications

Increased use of computer-assisted language learning as a result of advances in computers will also have an effect on administrative procedures at the school and board levels. The teacher will have to adjust teaching time to make room for computer-assisted instruction. The principal will have to devise time schedules and find facilities to permit students access to computers. Canale et al., (1985) suggest school boards set up microcomputer resource centres, which could serve as software libraries and electronic bulletin boards to disseminate information and software to schools.

School boards could also make use of teachers who already use second language software to provide workshops for other teachers seeking to use computers. Boards could also assist in co-ordinating evaluations and purchases of software and hardware.

Future developments in computer-assisted language learning will have implications at all levels of the educational system. Teachers, principals and school

boards will all be involved in bringing about changes in second language pedagogy in an attempt to better meet the needs of future students.

Summary

Computers have quickly become a part of today's society. Beginning with their introduction in the 1940s, computers have steadily improved and found a role in most aspects of life, including education. Although computer use was previously employed in other subject areas, the 1980s have seen a great increase in the development of courseware for second language learning. Use of this courseware is not intended to replace the teacher for "there is a warmth and immediacy in contact with another human being which no amount of electronics could ever replace" (Higgins & Johns, 1984, p. 8). Rather, computer-assisted language learning is intended to provide a "richer learning environment" in which the student can benefit from new techniques and challenges (Mydlarski, 1985).

Although much of the early courseware was constructed in the drill-and-practice or tutorial modes, new material is moving into other directions which permit more authentic and communicative use of the target language. Students are benefiting in many ways including motivational and cognitive gains.

New advances in technology including artificial intelligence and speech simulation are bringing us ever closer to the day when students will carry on intelligent oral and written communication with computers. Until these advances are perfected, today's teachers of second languages should constantly strive to present students with enjoyable and educational computer experiences already available. "Computers can make a useful contribution to teaching a wide spread of subjects including language, applying a very broad range of methodologies" (Ahmad et al., 1985, p. 1). Second language teachers should not reject a valuable tool which could be of great benefit to our students.

Conclusion

A review of the literature suggests that computers have contributed to many new developments in the area of second language learning. The uses and benefits of CALL appeal to the needs and interests of students and educators alike. Future trends promise even more rewards from computer use in the second language classroom as current problems are solved and new capabilities are developed.

However, second language teachers in Newfoundland and Labrador are not benefiting from this innovation in education. These teachers point to an absence of computer knowledge and experience, poor comprehension of the

application of computers to second language learning, and a lack of guidelines for the evaluation of software as problems impeding the advent of computers in Newfoundland second language classrooms.

The writer has therefore responded to the needs of these teachers by creating a handbook to serve as a reference source for teachers who wish to explore CALL. This handbook is not intended as a replacement for in-service training which would provide hands-on experience. It is intended as an information handbook which would provide the beginning computer user with a basic introduction to key computer concepts including hardware, software and their operations. The more experienced user is informed of some of the latest advances in computer use involving second languages. Guidelines for the application of computers to the second language classroom, as well as guidelines for software selection and evaluation, are also included. In this way, the needs of both the user and nonuser are met. This handbook provides teachers with the necessary information to introduce the computer to their second language classrooms. The provision of supplementary sources of information will enable teachers to pursue further research into this new development in language learning.

CHAPTER THREE

PLANNING AND DEVELOPING THE INSTRUCTIONAL PACKAGE

Outline Of Procedures

A review of the literature on computer-assisted language learning indicated the growing importance of computers in the second language classroom. The literature also demonstrated that 94 percent of Newfoundland and Labrador second language teachers were not using the computer as an educational tool (Hoskins, 1988). One hundred percent of computer users, along with 87 percent of nonusers, expressed a need for information on computers and their application to the second language classroom. A need for guidelines for effective evaluation of software was also indicated.

The writer, in response to these needs, developed a handbook to provide information about computer-assisted language learning to teachers of French language.

The development of this handbook was based on the 4-D model of Define, Design, Develop, and Disseminate as developed by Thiagarajan, Semmel and Semmel (1974). See Figure 2. Thiagarajan's process provides a guide for the development of any instructional package by supplying the developer with directions for the critical components, the process and the requirements by which they should be undertaken. Following is a brief description of the process.

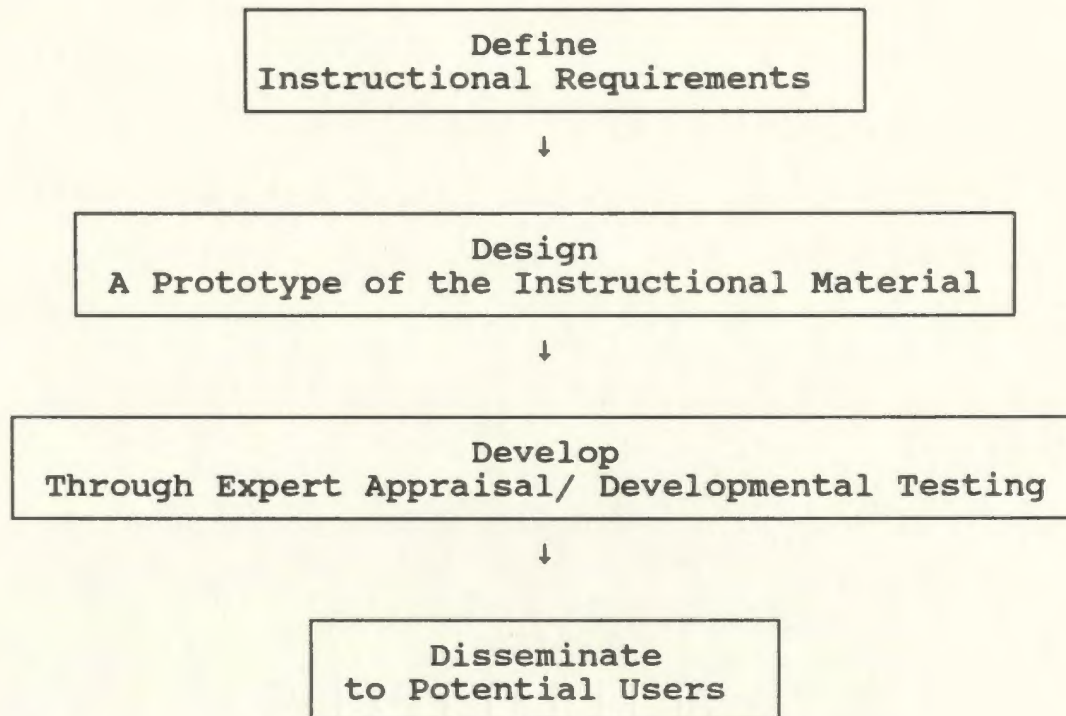


Figure 2. The 4-D Model for instructional development.

Define

Stage one of the 4-D model consists of the following steps which together define the instructional requirements: front-end analysis, learner analysis, task and/or concept analysis, and specification of instructional objectives. Objectives to be achieved, as well as necessary constraints, are identified in this mainly analytical stage of development.

Front End Analysis

The first step is Front End Analysis - an investigation into the need for the instructional package. At this time, the writer looks for existing alternatives to meet instructional needs. Materials already available are examined to see if they are appropriate for the learner and the desired outcome. A failure to find appropriate alternatives or materials suggests a need for the development of instructional materials.

Learner Analysis

This step includes a study of relevant characteristics of the target audience. Age, education and knowledge of the intended topic are some of the characteristics taken into consideration.

Concept Analysis

Major concepts to be taught are identified at this stage. These concepts are then broken down into critical and irrelevant attributes. This step then serves as a basis for the actual creation of the instructional materials.

Specifying Instructional Objectives

At this step, the concepts identified previously are converted into behaviourally stated objectives. These objectives provide a foundation for the construction of

tests and for the instructional design. The objectives also provide guidance for the development of instructional materials.

Design

Stage two of the instructional design process is the design of the prototype material. The four steps in this stage include construction of a criterion-referenced test, media selection, format selection and initial design.

Criterion-referenced Tests

Development of criterion-referenced tests is based upon the behavioural objectives identified at the end of stage one. These tests serve not only to evaluate achievement of the objectives but also to provide a guideline for the development of the instructional materials.

Media Selection

This step involves the identification of the most appropriate medium or media for use in the intended instruction. Identification of these media is based upon a consideration of the concept analysis, target audience characteristics, production resources and dissemination plans.

Format Selection

Format selection is closely related to media selection and involves choosing the most appropriate format for the instructional package. Factors to be considered include the purpose of the package, the intended audience, and cost.

Initial Design

A prototype of the intended instructional package is developed. Appropriate sequencing and selection of suitable media are included. This prototype should be ready for expert appraisal - the next stage of the instructional design process.

Develop

Stage three of the 4-D model concerns the improvement through modification of the prototype developed in the previous stage. This modification is based upon formative evaluation as provided by expert appraisals and developmental testing.

Expert Appraisals

This step involves the appraisal of the package by experts with a view to improving technical and instructional quality. A subject-matter expert, technical expert, learning strategies expert and potential user

evaluate the package and make suggestions for improvements.

Developmental Testing

This step involves the use of the package with a number of actual trainees. Modifications are made where necessary based upon reactions, responses and comments received.

Disseminate

The final stage in the 4-D model is dissemination. The first step in this stage is validation testing - the administration of the package under replicable conditions. Final packaging, diffusion and adoption constitute the final aspects of this model. Contacts are made with appropriate agencies to encourage adoption and utilization of the instructional package.

In the following section, the first two stages in the development of the instructional material on computer-assisted language learning (Define and Design), based upon the 4-D model discussed previously, are described. The third and fourth stages, (Develop and Disseminate), are presented in chapter four. The actual handbook is presented as Appendix A.

Stage One: Define

Front-end Analysis

Background Information

The philosophy of instruction as outlined in the Elementary French Teaching Guide for Newfoundland (1981) states "Due to the nature of the young child, the second language class should be activity oriented" (p. 2). One of the most recent activity-oriented developments in the area of second language teaching has been computer-assisted language learning (CALL). As indicated in the previous chapter, this rapidly developing innovation has revealed many benefits for both students and teachers. Increased motivation and anxiety reduction along with faster and deeper learning make the computer a valuable classroom component. Inherent benefits, such as patience and individual attention of the computer, and communicative benefits, such as interaction and work with authentic materials, further indicate the value of computers in the second language classroom. These computers are not meant to take the place of the teacher. Rather, they are intended as a tool to help the teacher by providing necessary instruction, practice and tool use. The teacher is thereby freed to concentrate on individual needs of learners in situations where teacher/student contact is more appropriate. Although some problems do exist, the technology is sufficiently advanced to indicate

a need for the presence and use of computers in second language learning.

Statement of the Problem

Computers offer a variety of benefits to second language learners, yet a survey by Hoskins (1988) revealed that only six percent of second language teachers in Newfoundland and Labrador were using the computer in their classrooms. Teachers reported a low level of knowledge of, and experience with, computers (Hoskins, 1988). Only 30 percent of nonusers and 55 percent of users had received training in computer use.

Uncertainty as to the appropriate application of computers to the second language classroom has also been an impeding factor in the growth of CALL in Newfoundland. One hundred percent of users and 87 percent of nonusers expressed a need for further information on the suitable application of computers to the teaching of French.

Teachers also expressed a need for guidelines on the effective evaluation of suitable software and a need for help in avoiding the purchase of unsuitable materials.

A lack of instruction about computers, their application to second language learning, and evaluation of software have led to minimal use of CALL in Newfoundland and Labrador schools, with the result that students are being deprived of a potentially beneficial and enjoyable resource in their study of French. The development of the

instructional project herein reported has been undertaken to introduce teachers to the use of computers in the second language classrooms of Newfoundland and Labrador.

Survey of Existing Materials

The Newfoundland and Labrador Department of Education does not presently provide materials on computer use, computer application to second language teaching, or guidelines for software evaluation. Teachers are therefore left to discover their own sources of information to fulfill their needs. Although relevant material does exist, a review of the literature revealed that no one source met all three major needs of Newfoundland second language teachers. Examples of some of these materials are presented below.

Using a Microcomputer in the Classroom by Bitter and Camuse (1988) presents a basic introduction to computers and their general application to schools. Sample lesson plans are also provided and new innovations are discussed. However, this book touches only slightly on the application of computers to second language teaching. Guidelines for effective evaluation of second language software are also absent.

Brownell (1985) in his book, Using Microcomputers also presents the basics of computer use. However, this book concentrates on the hardware and tool uses of software. Other applications of computers are not

discussed and computer-assisted language learning is not mentioned. Evaluation of educational software is also not included.

Computers in Language Learning by Higgins and Johns (1984) presents an insightful look at the applications of computers to teaching second languages. This book presents the various uses and benefits of CALL and discusses some of the software already on the market. Although some computer hardware is discussed, the book assumes "that readers are aware of what computers look like and how they are used." (p. 5). Evaluation of software is also not included in this book.

Computers, Language Learning, and Language Teaching by Ahmad et al. (1985) presents an indepth study of computer-assisted language learning. However, the book "is not written as a manual, but is designed to put CALL ... in its historical and theoretical perspective...." (p. vii). Although this book does discuss hardware, the basic concepts of computer operation are not discussed. Images of microcomputer systems do not represent those most commonly used in Newfoundland and Labrador. Software evaluation is also absent.

Software evaluation is covered in Microcomputer Software for Language Arts: Survey and Analysis by Canale et al. (1985). A useful evaluation form is provided as well as a list of sources of software. However, the basics of computers and their operation are not included.

The application of computers to language teaching is discussed briefly; however, much of the information is based upon the tool uses of computers. Although this book may serve as a valuable resource, it does not satisfy all three needs of Newfoundland teachers as revealed by Hoskins (1988).

A review of available literature and materials revealed an absence of any instructional package which meets the needs of Newfoundland's teachers of French. Guidance is needed in helping these teachers wisely apply the computer to their classrooms. Only then will students fully profit from the benefits offered by computer-assisted language learning.

Proposed Solution

The writer undertook the development of an instructional package to meet the needs of teachers of French while taking into consideration both user and nonuser needs as identified in a thesis by Hoskins (1988). This package provides the non-computer user with an introduction to the basic concepts of computer. It also provides the user and nonuser with information on the application of computers to the French language classroom. Guidelines are also provided for the location and selection of appropriate software.

It is the aim of this instructional package to supply teachers with the information needed to introduce

computers to the second language classroom. The student will, therefore, be exposed to new frontiers in language learning. This exposure will contribute to the achievement of the primary aim of Newfoundland and Labrador French teachers - the development of the student's potential for communication in a second language.

Learner Analysis

Introduction

An instructional package should respond to the needs of the learner. It is, therefore, important to have a clear idea of who the learner is.

One of the key elements of the instructional design process is the need to consider the learners for whom a program is being developed ... Therefore, it is essential, early in planning, to give attention to the characteristics, abilities, and experiences of the learners - as a group and as individuals. (Kemp, 1985, p. 46)

The learners for whom this instructional package was developed are French language teachers in the province of Newfoundland and Labrador. Information on the learners was provided in a survey of 211 teachers conducted by Hoskins (1988). This survey provided profiles of both the computer user and nonuser in terms of sex, age, education, rural/urban distribution, teaching experience, use of instructional aids, needs, knowledge of computers and

their application to second language teaching, and interest in training and in-service.

For the analysis of learner characteristics, these teachers were divided into the categories of computer-user and nonuser as identified by Hoskins. She defined "user" as a teacher who uses the computer as an instructional aid in the teaching of French. "Nonusers", conversely, are teachers who do not use the computer as an instructional aid in the teaching of French. In the following section, the characteristics of both the user and nonuser are described.

The Computer User - General Characteristics

The computer user among second language teachers composed 5.6 percent of the sample of 211 respondents. (See Table 2) Of these 11 users, there were six males and five females. The user sample was fairly young with ten of the eleven under the age of forty.

Six of the eleven users were teachers of the Core French program and five were teachers of the Immersion program. This was not indicative of the total sample where 82 percent were teachers of Core French, thereby demonstrating that on a per capita basis, more teachers of Immersion use the computer in their classrooms.

Table 2

User/Nonuser Distribution In Sample

	<u>No</u>	<u>Percent</u>
Users	11	5.6
Nonusers	192	90.4
Missing cases	8	4
Total	211	100

No rural/urban differences were apparent in the user group. The distribution was representative of the total sample.

The majority of users taught below grade nine, most often at the elementary level. The computer user also tended to have fewer years experience teaching French than total years teaching experience.

The Computer User - Specific CharacteristicsSubject-matter competence

Four of the eleven computer users had only an undergraduate degree and seven had graduate degrees, however only six of the eleven had French as a university major. Over half the users taught French less than half of their instructional time.

Six of the eleven users had been trained in the use of computers; five teachers had completed courses on the use of computers in education. Item Number 9 of the survey questionnaire, concerning the effects of computers in the classroom, provided an indication of teachers' knowledge of computers and their application to second language learning. Hoskins (1988) reported that "although these teachers used the computer as an instructional aid, their knowledge of computers was somewhat limited" (p. 59).

Attitudes

Computer users strongly believed in the use of computers for enrichment and remedial purposes. They also believed, to a lesser extent, that computers would "help individualize instruction, provide drill-and-practice for all students, improve reading comprehension, raise the interest level of all students, improve writing skills and provide activities to develop communicative competence" (Hoskins, 1988, p. 60). Overall, the computer user had a fairly clear picture of the role of computers in the second language classroom and were positive about the benefits of CALL.

The computer user indicated a high degree of interest in learning more about computers and their use in the teaching of French. Many of these teachers expressed a need for in-service training, as well as access to

information on the most effective applications to language learning. Dissatisfaction with available software was a concern of many teachers in this category. Many also felt the number of computers in the schools was an impediment to the growth of CALL. It was felt that the Department of Education should take an active role in providing leadership and information on computer-assisted language learning, particularly in the areas of software evaluation and effective use of the computer in the classroom.

Language

As second language teachers and as computer users, the members of this group possessed some knowledge of the terminology involved in French pedagogy and computer use. However, given the fact that only six of the eleven users had a major in French and almost half the users were self-taught in computer use, a glossary of appropriate terminology was included in the instructional package.

Tool skills

Teachers in the user category were identified as being strong users of instructional aids. This may be related to the use of the computer as an instructional aid in the classroom. However, all of the teachers expressed a need for further training in computer use. Only six of the eleven had received training in the use of computers, thereby suggesting the necessity of instruction on computer operation.

The Nonuser - General Characteristics

The nonuser of the computer in Newfoundland and Labrador second language classrooms composed 94 percent of the total sample. Of these 192 users, 68 were males and 123 were females. Again the majority of the sample was fairly young with over 66 percent under the age of forty.

No rural/urban differences were found. Approximately two-fifths of the nonuser group represented communities with a population of over 5 000 while three-fifths were from communities with populations of less than 5 000.

The majority of nonusers taught below Level Two of the High School Program with a slightly heavier concentration below the junior high level. See Table 3.

As with the computer users, nonusers tended to have more years teaching experience than years of experience in teaching French. Sixty-one percent of the nonuser category had taught French for fewer than ten years.

The Nonuser - Specific Characteristics

Subject-Matter competence

The professional qualifications of the nonuser group were very high. Fifty percent of this group reported having a post graduate degree. Only two of the group did not have a degree. Seventy-two percent of the nonuser group reported French as a major in their university training.

Table 3

Comparison of Total Years Teaching Experience
And Total Years Teaching French

	Teaching French		Teaching Experience	
	Number	%	Number	%
<5	67	35	56	29
5-9	50	26	37	19
10-19	57	30	74	39
Over 20	15	8	25	13
Missing Cases	3			
Total	192		192	

(Hoskins, 1988, p. 64)

Table 4 presents the amount of instructional time spent in the teaching of French. Two groups are indicated in the findings. One group consisting of about 40 percent of the nonuser group, taught French over 75 percent of the instructional time. The other group, consisting of 40 percent, taught French less than 50 percent of their instructional time.

Table 4

Percentage of Instructional Time Spent
in the Teaching of French

Instructional Time	No	Percent
>75	75	39
50-75	39	20
<50	78	40

(Hoskins, 1988, p. 63)

An analysis of the non-user's computer knowledge revealed that 30 percent had received some computer training and 24 percent had completed courses on computers in education. However, it was evident that the overall level of computer knowledge was severely restricted. "The majority of teachers (in this group) reported that they were not well enough informed to state opinions about any aspect of computers queried" (Hoskins, 1988, p. 69).

Attitudes

A survey of attitudes by nonusers with respect to possible effects of computers in the teaching of French was conducted by Hoskins (1988). The following section presents some of her findings.

The majority of nonusers agreed that the computer could be of benefit in providing remediation and

enrichment. They also felt that CALL could provide individualized instruction and would increase the motivation and interest of the learner. (See Table 5).

The teachers in this group also felt that, to a lesser extent, the computer could be useful in providing drill-and-practice, improving reading and writing skills, and developing communicative competence. However, teachers were unsure of the role of CALL with regard to evaluation, teacher workload and speed of learning.

The data indicate that the nonuser needed more information about computers and their application to second language learning. The high response rate in the "unsure" category indicated that their perceptions did not have a strong knowledge base.

Hoskins (1988) found that interest in training and inservice was clearly divided among nonusers who possessed a high interest in training and those who did not. She therefore divided the nonuser into two groups: a) nonuser - high interest, and b) nonuser - low interest. Nonusers - high interest composed 78 percent of the total nonusers and revealed a high level of interest in learning to apply CALL in their classrooms. Nonusers - low interest composed 20 percent of the nonuser sample and demonstrated little interest in applying the computer to their second language instruction. Motivation to learn about or use computers in this group was very low.

Hoskins felt that two separate types of instructional material were needed to meet the needs of these distinct groups. The nonuser - high interest needed materials which presented the basic concepts of computers and their application to the teaching of French. Guidelines for the evaluation and selection of software were also needed. The nonuser - low interest needed materials of a more motivational nature to inspire interest in learning about computers and their application to second language teaching. The developer has chosen the first of these approaches - the development of instructional materials for the user and the nonuser - high interest.

Table 5

Nonusers' Expectations/Beliefs Concerning the Effects of
Using Computers in Teaching French

		Agree	Not Sure	Disagree
		Percent of responses		
1.	Drill-and-practice for all students.	68	21	9
2.	Remedial drill for low ability students.	79	16	3
3.	Enrichment for high ability students.	88	8	3
4.	Increase motivation and interest.	84	14	1
5.	Provide better evaluation.	41	53	5
6.	Provide individualized instruction.	78	17	3
7.	Lessen teacher workload.	18	44	37
8.	Enable teachers to cover more content.	30	53	15
9.	Develop communicative competence.	52	34	12
10.	Reduce student-teacher contact.	29	33	38
11.	Necessitate longer French periods.	24	46	29
12.	Improve writing skills.	50	43	6
13.	Improve reading skills.	67	28	4

(Hoskins, 1988, p. 70)

Language

The nonuser possessed a low level of computer knowledge. Less than one-third of the teachers in this category had received training in computer use. As well, the majority of teachers were situated in the nonuser-high interest category where 53 percent of the teachers had less than five years experience in the teaching of French. The low level of education in computers as well as a lack of experience in the teaching of French again suggests the need for a glossary of appropriate terminology.

Tool skills

In order to introduce the computer efficiently to the second language classroom, the nonuser needed to be familiar with the basic operation of a computer. The low number of nonusers trained in the use of the computer suggested a need for instruction in basic computer operation.

Summary

The overall description of the CALL user, as identified in the survey by Hoskins (1988), is that of a teacher who teaches French only part-time or who began to teach French after several years experience in other fields. The teacher is usually under forty and given the male/female ratio in the total sample, the user is more often male. The teacher most often worked in an immersion

setting. The user may or may not have had instruction on computers since slightly more than half the computer users had received some training in computer use. The computer user felt a need for more information and training on computers and their application to the second language classroom.

In general, the nonuser of computer-assisted language learning identified in the survey by Hoskins (1988), is a teacher who teaches below Level Two of the High School Program with more than 75 percent of instructional time or less than 50 percent of instructional time devoted to the teaching of French. The teacher is usually under the age of forty and possesses an undergraduate or graduate degree. Given the fact that only 33 percent of nonusers were trained in computer use, the teacher is probably not familiar with computers or their application to second language teaching. In the area of interest and motivation, the teacher probably belongs to the nonuser-high interest group. The teacher probably teaches at the elementary level and has less than five years experience in the teaching of French. The nonuser feels a need for inservice training and guidance in software evaluation as well as an increase in the number of computers in the school.

In conclusion, the majority of Newfoundland second language teachers expressed a need for instruction on computers and their application to second language

learning. Both users and nonusers felt the computer could be beneficial to students but were uncertain about the proper application of computers in the classroom.

Teachers were also uncertain as to the procedure for evaluation and selection of software. An instructional package would supply these teachers with the information needed to introduce the computer to the French language classrooms of Newfoundland and Labrador.

Concept Analysis

A concept analysis is used to analyse a set of concepts relevant to the topic of the instructional material. Arrangement of the relevant concepts is then followed by identification of the "critical" and "irrelevant" attributes of each concept. A critical attribute of a concept, as defined by Thiagarajan et al. (1974), is "a characteristic shared by all objects or events in a concept category." (p. 43). An irrelevant attribute, on the other hand, is a characteristic "shared by some but not all members of the concept category." (p. 43).

Concept analysis is used when the goal of the instructional package is acquisition of knowledge. Since the package was knowledge-oriented as distinct from task-oriented, a concept analysis was conducted. This concept analysis was then used to plan future steps in the

development process and provided an overall framework for the handbook.

A quick overview of the package is possible through a brief examination of the concept analysis. This is especially useful for a subject-matter expert at the editing stage or a potential user at the dissemination stage.

The following concept analysis was developed for the handbook on computer-assisted language learning.

CONCEPT ANALYSIS

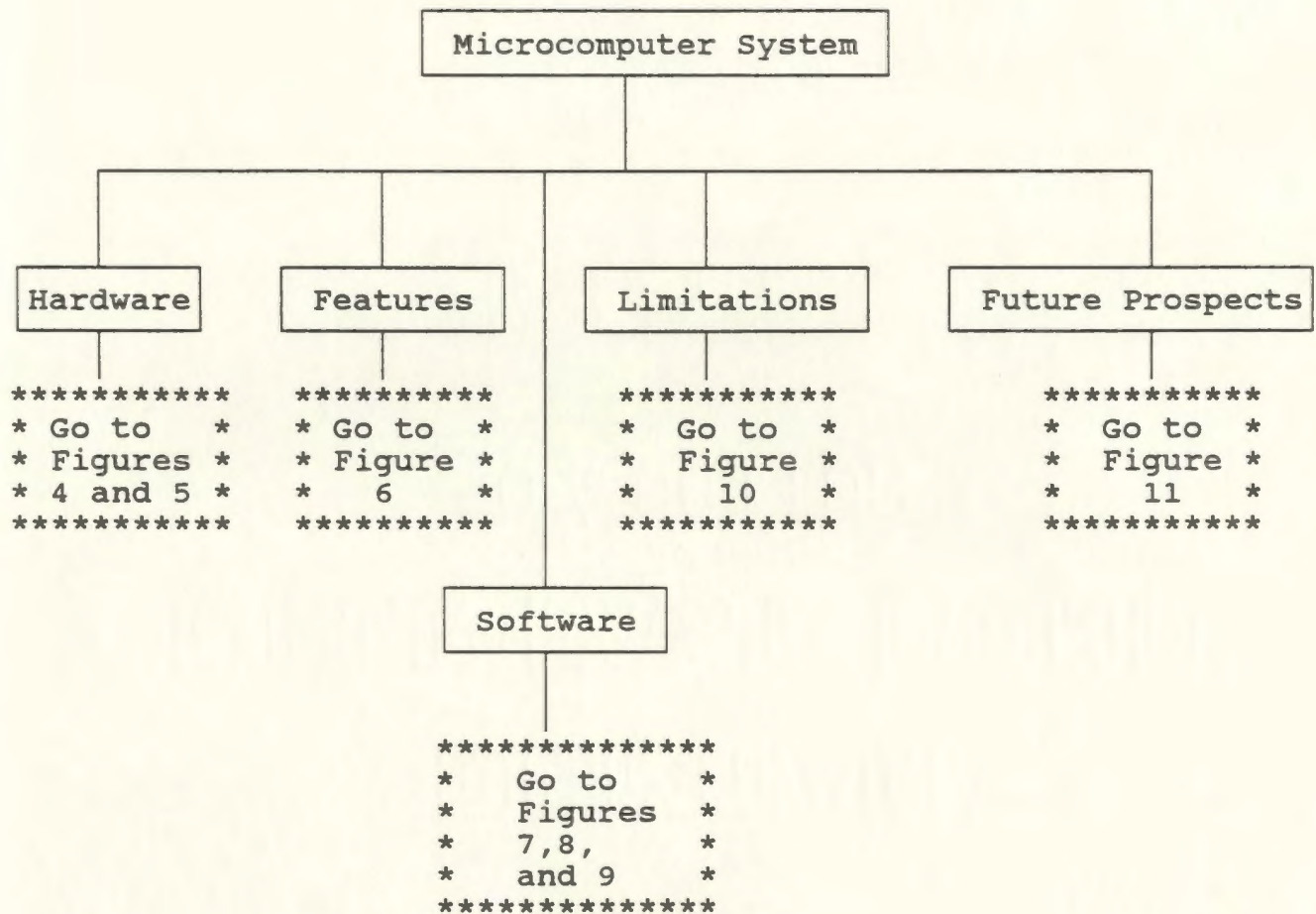
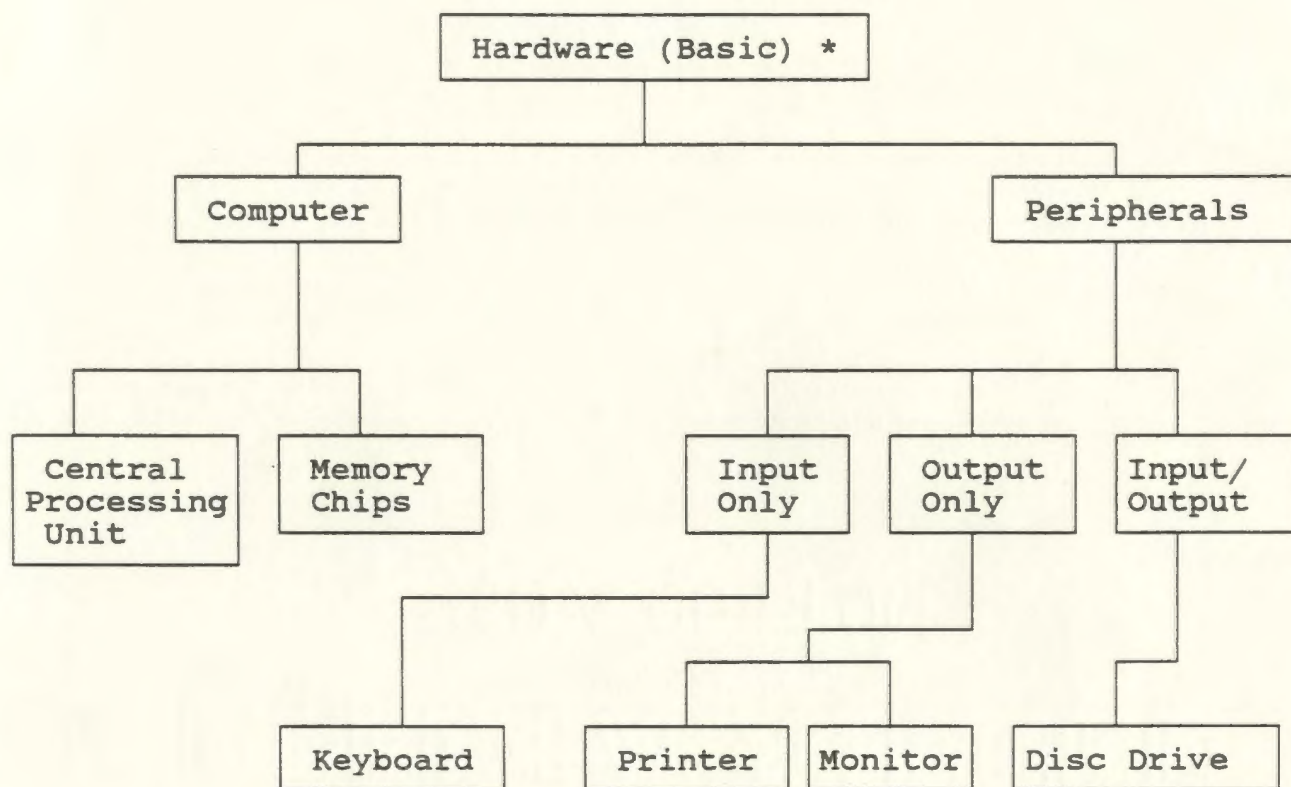
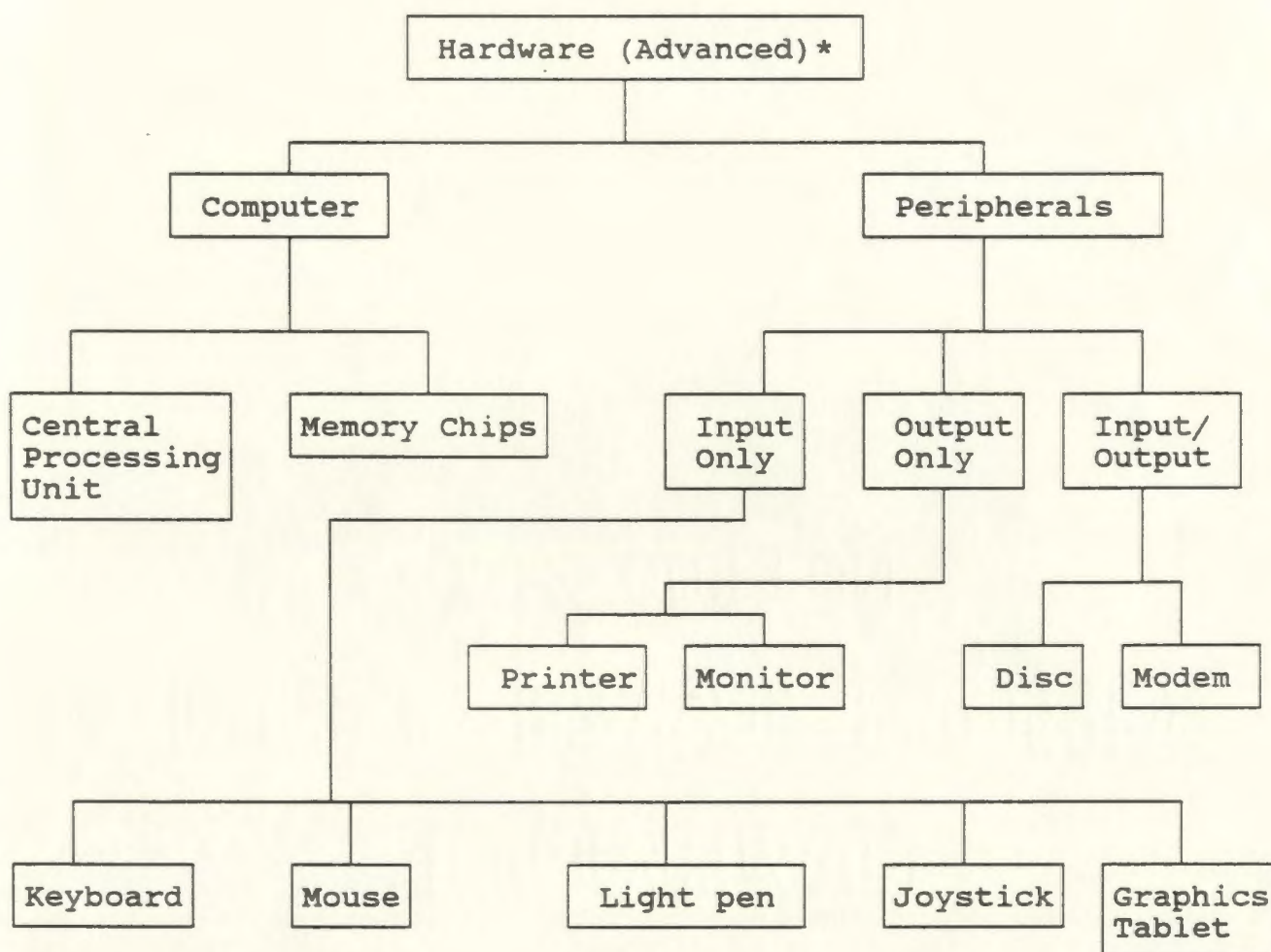


Figure 3. Aspects of a microcomputer system.



* For persons with no previous computer experience.

Figure 4. Microcomputer Hardware (Basic)



* For persons with previous computer experience.

Figure 5. Microcomputer Hardware (Advanced)

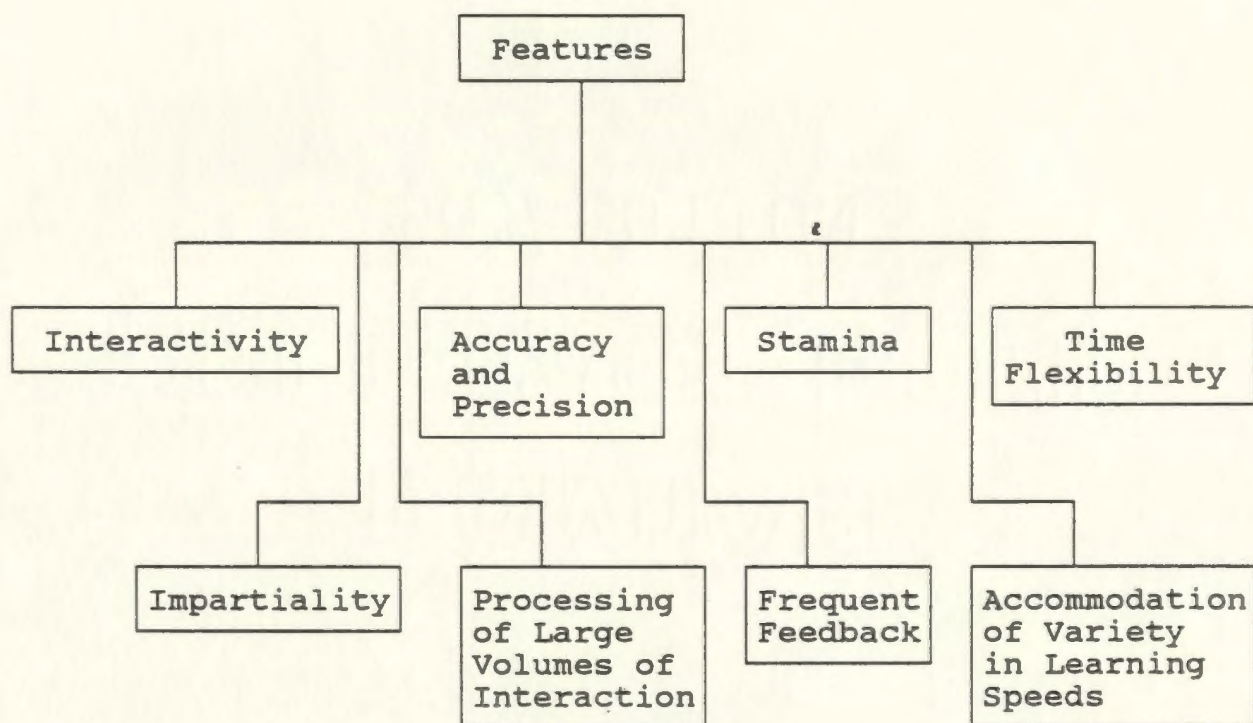


Figure 6. Microcomputer features.

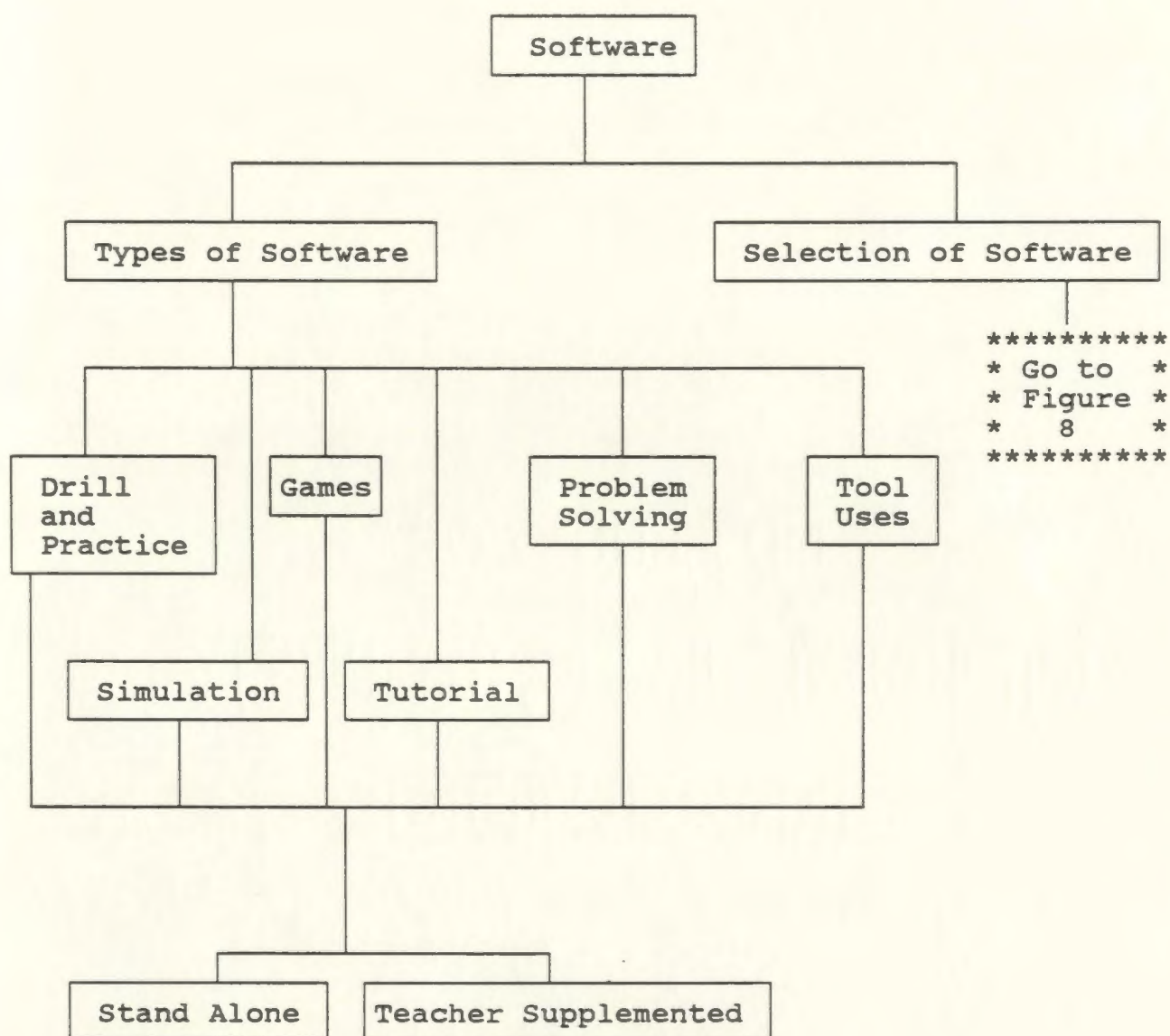


Figure 7. Microcomputer software

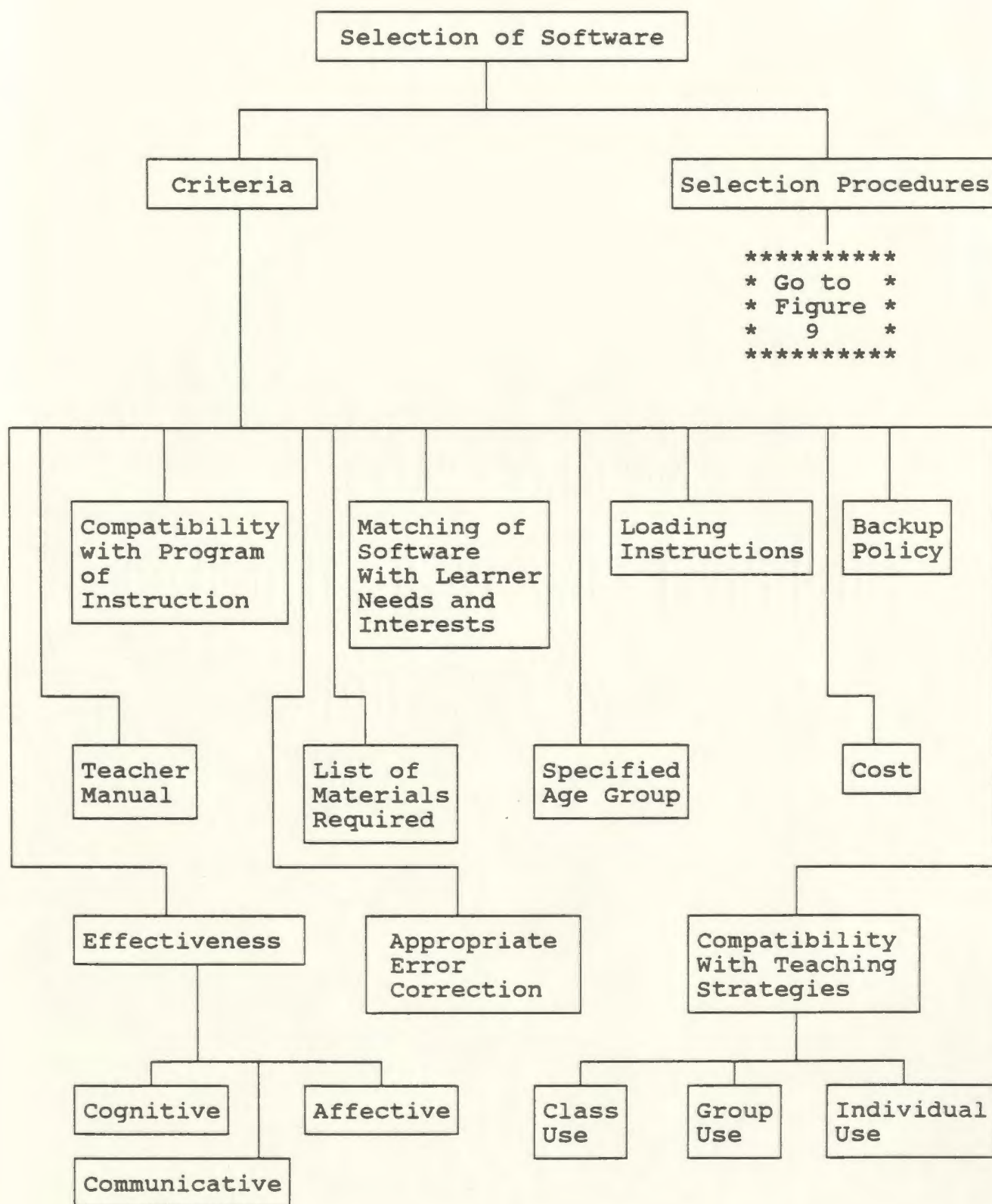


Figure 8. Selection of microcomputer software

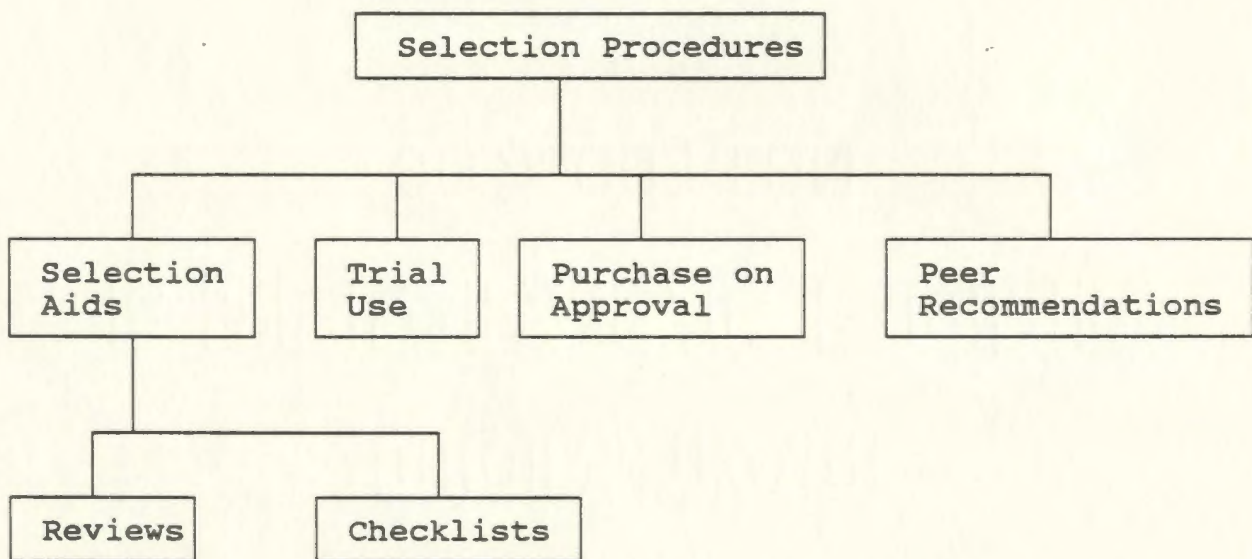


Figure 9. Selection procedures for microcomputer software

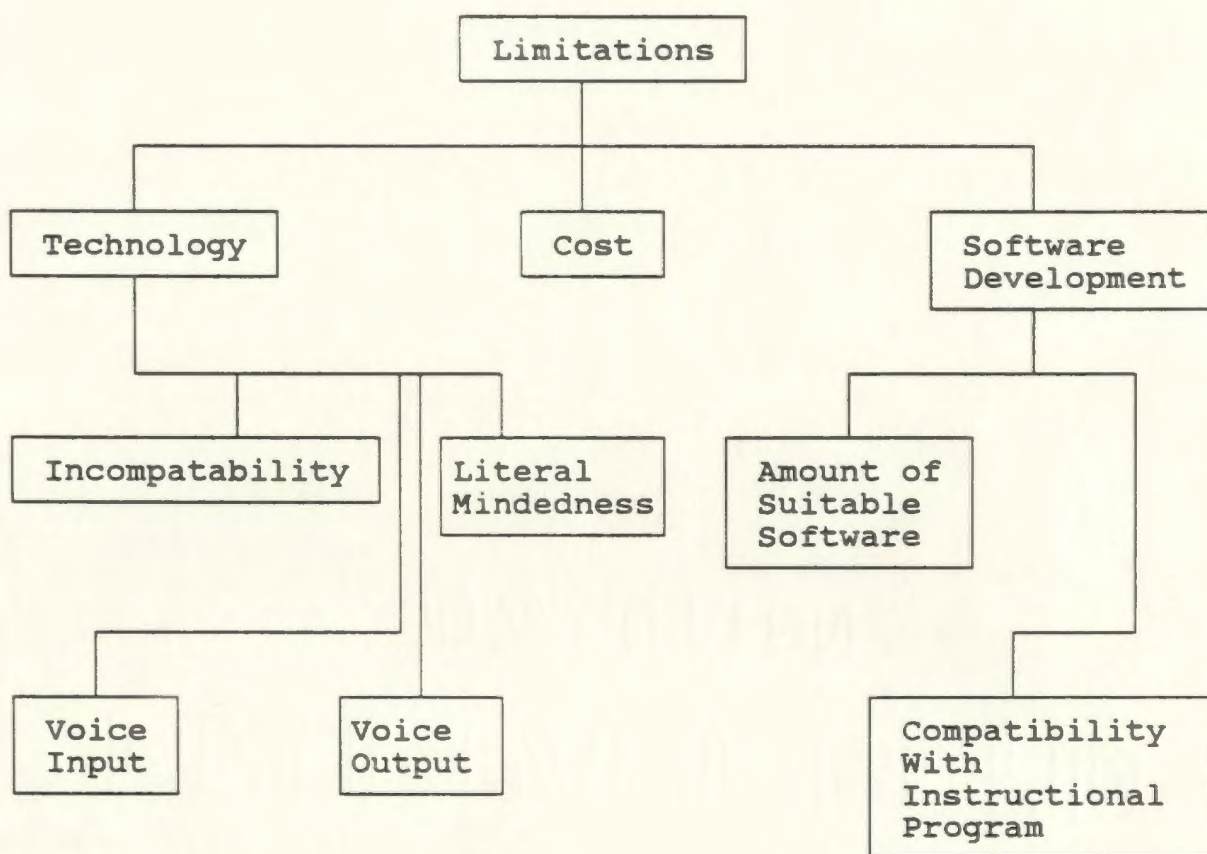


Figure 10. Limitations of the microcomputer with respect to second language learning.

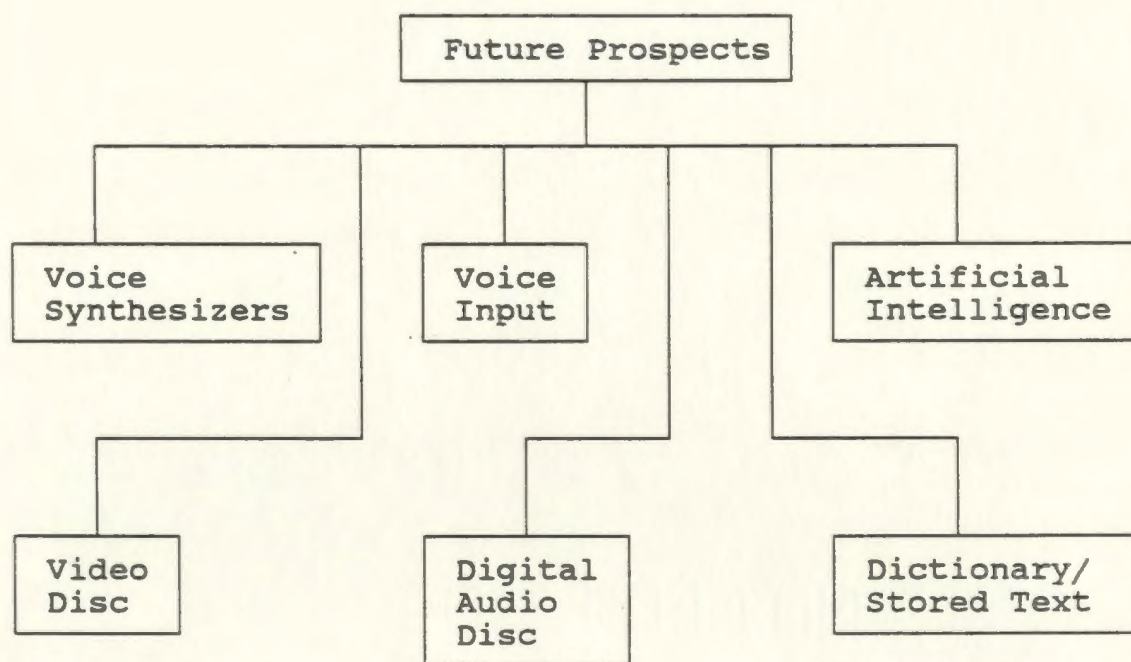


Figure 11. Future prospects of the microcomputer with respect to second language learning.

Specifying Instructional Objectives

The development of instructional objectives enables the writer to arrive at specification of the desired behaviour of the learner after exposure to the instructional package. The objectives are obtained through "the transformation of task and concept analyses into statements of goals for instructional material (Thiagarajan et al., 1974, p. 49). An outline of the instructional package may then be prepared from these objectives. This outline is used to create the package and influences the design including format, media, and timeline selection.

The objectives are also used in the evaluation of the material. Criterion-referenced test items are based upon instructional objectives. As well, the potential user at the dissemination stage may examine the stated objectives to determine their appropriateness in relation to student needs.

The following instructional objectives were developed to delineate the desired goals of teachers using the handbook as a guide to the use of computers in teaching a second language:

Given a copy of the handbook

1. together with a drawing of computer system peripherals, and a list of names of computer system peripherals, the nonuser will correctly label the following peripherals: keyboard, printer, monitor, disc drive.
2. together with a drawing of computer system peripherals, and a list of names of computer system peripherals, the computer user will correctly label the following peripherals: keyboard, mouse, lightpen, joystick, graphics tablet, printer, monitor, disc drive, modem.
3. and a list of computer system peripherals, the nonuser will correctly label the following as in input, output, or input/output: keyboard, printer, monitor, disc drive.
4. and a list of computer system peripherals, the computer user will correctly label the following as input, output, or input/output: keyboard, mouse, lightpen, joystick, graphics tablet, printer, monitor, disc drive, modem.
5. and a list of computer system components, the learner will identify the Central Processing

Unit and Memory Chips as the two central components of a computer.

6. and a choice of possible features of the microcomputer, the learner will correctly select the following: interactivity, accuracy and precision, stamina, time flexibility, impartiality, processing of large volumes of interaction, frequent feedback, and accommodation of a variety in learning speeds.
7. and a description of a software program, the learner will correctly label the description as one of the following: drill-and-practice, tutorial, simulation, game, problem solving, tool use.
8. and a description of a software program, the learner will correctly label the program as "stand alone" or "teacher supplemented".
9. and a list of possible criteria of good software, the learner will correctly select those which are features of good software.
10. and a list of possible factors to be considered in determining the effectiveness of software,

the learner will correctly select the following:
communicative, cognitive and affective factors.

11. and statements describing situations involving class, group, and individual computer use, the learner will correctly identify group use, individual use, or classroom use as appropriate for these situations by stating whether the items are true or false.
12. and various software selection procedures, the learner will identify the following as appropriate procedures in selecting software: use of selection aids, trial use, purchase on approval, peer recommendations.
13. and a list of selection aids, the learner will identify the following as appropriate for use as selection aids: reviews and checklists.
14. and a list of possible factors which limit the use of the computer in second language classrooms, the learner will select technology, cost and software development as limiting factors to microcomputer systems.

15. and a list of possible technological limitations of microcomputers to second language learning, the learner will correctly select the following: incompatibility, literal mindedness, voice input, and voice output.
16. and a list of possible software development problems, the learner will correctly select the following software development limitations: amount of suitable software and compatability with instructional programs.
17. and a list of possible future prospects of CALL, the learner will correctly select the following: voice synthesizers, voice input, artificial intelligence, video disc, digital audio disc, dictionary/stored text.

Minimum success for the material was established as the correct response to 80% of the test items arising from these objectives by 80% of the learners.

Stage Two: Design

Criterion-Referenced Test

A criterion-referenced test was developed, based on instructional objectives, to measure the effectiveness of the instructional material. The results of the test would be an indication of the extent to which the learners had attained the instructional objectives. The criterion-referenced test was designed to be administered as a pre-test to determine learner's present level of knowledge and again as a post-test to measure the attainment of the instructional objectives. During instruction, criterion-referenced tests may also be used to allow the learner to check progress. Questions from the criterion-referenced test were included at the end of appropriate sections in the final version of the handbook. A copy of the criterion-referenced test is included in Appendix B.

Media Selection

The preparation of this instructional package involved an examination of various media in order to determine the most appropriate medium for use under present circumstances. Several media were considered including video, 16 mm film, computer programs, and a handbook. The following section presents the advantages and disadvantages for each and concludes with the selection of the medium for this instructional development material.

Video

Advantages

The video tape, a widely used medium in today's society, was considered for this instructional package on computer-assisted language learning. An important advantage presented by video would be the possibility of demonstrating, on screen, the actual use of a language learning computer program by students. Possibilities also exist for demonstrating the use of basic microcomputer system components to persons with little experience with computers and advanced peripherals to those with previous computer experience. The use of colour and action would also be effective in holding the interest of the learner. As well, easy access to video machines would encourage use of the material.

Limitations

In spite of the various benefits of the video as a medium for this package, there are some problems and disadvantages with its use. As well as an informational package, the work was intended as a reference package which will be available to teachers for easy consultation. The guidelines and checklists for evaluating software, for example, should be available for reference and possible photocopying.

The identification of computer users is also not possible since the questionnaires used in the survey by

Hoskins (1988) were anonymous. Therefore, the filming of actual class use would present a problem.

The production of a video would also require funding and time not presently available to the writer.

A final problem with video is the technical expertise required for such a production. The writer has no experience with video cameras and is not qualified in such technical areas as lighting and sound. The use of video as an instructional medium would require the hiring of a production crew, thereby raising the cost of production beyond the amount that could be obtained for the project.

16 mm Film

Advantages

The advantages of 16 mm film are in some respects similar to those of videotape. The filming of a class or group of students would enable the learner to see a computer-assisted language learning lesson in action. This would permit the learner to make more personal judgements on the use of CALL. Images of computer system components and peripherals would also improve the learners' perceptions of how these objects appear.

Limitations

The 16 mm film presents some problems. The high cost of producing instructional materials using this medium was prohibitive to the developer. The task of finding an

actual classroom which makes use of CALL also presented a problem. Time and lack of expertise on the part of the developer in this medium were further factors which have led to the dismissal of the 16 mm film as a possible medium for this instructional material.

Computer Program

Advantages

A computer program which would meet the needs of second language teachers of Newfoundland and Labrador would constitute a valuable resource material. The learner would gain first hand experience with computers and learn about computer-assisted language learning through actual use. Discs could be kept and used for quick reference and possible print-outs of desired sections.

Limitations

Unfortunately, this medium was not practical for meeting the current needs of French language teachers of Newfoundland and Labrador. Many of these teachers have no previous experience with computers and would have difficulty in running programs. A lack of programming skills on the part of the developer was a final factor in deciding against the use of a computer program as an medium for this package. Use of such a medium could be

appropriate at a future date when a higher percentage of teachers have had experience with computers.

Booklet

Advantages

A booklet introducing French language teachers to computers, computer-assisted language learning, and evaluation of software would have several advantages. The absence of requirements such as previous computer experience made the booklet available to all teachers of a second language. No tools such as projectors, video machines, or computers are required for use with this medium. This absence of a need for tools ensured easy access and also permitted quick reference when a teacher wished to check on some particular aspect of a topic.

Photocopying of specific sections of the booklet is possible with the availability of photocopy machines in many schools and businesses. This feature would be especially useful for certain aspects of the instruction such as guidelines for selection and evaluation of hardware.

The cost of producing booklets was lower than that for most other media. Therefore, the instructional material would be placed at the disposal of more second language teachers.

Time was also a factor which suggested the use of a booklet as choice of instructional medium. The amount of

time required for the development of a booklet was not a deterring factor for the developer.

Limitations

Although the use of a booklet as a medium for this instructional package presented learners with basic computer concepts, the opportunity for hands-on experience with computers was not present. This hands-on experience would help teachers gain confidence and mastery in computer use.

An opportunity for viewing the use of a CALL program by a class of students is also not afforded by the use of the booklet as medium for this instructional package.

Conclusion

An examination of video, 16 mm film, computer program and booklet as possible media suggested benefits and limitations of each medium. Factors such as cost, time, availability of the medium to the learner, and expertise of the developer prohibit the use of certain media for the intended instructional material. After careful consideration of these factors by the developer, the booklet was selected as the medium for use in the instructional package on computer-assisted language learning.

Format Selection

The format for the handbook on computer-assisted language learning was based on the behavioural objectives and concept analysis presented earlier in this chapter. The handbook was divided into five sections: Hardware, Software, Microcomputer Features, Microcomputer Limitations, and Future Prospects. The section on hardware was then sub-divided into two sections, one for the learner with no previous experience with computers, and another section for the learner with previous experience with computers. At the end of each of the five sections, questions were included to allow the learner to self-test the material covered in the previous section. A list of useful terminology of English and French computer terms were included as Appendix C. Also included as appendices were lists of addresses of software publishers and useful computer magazines.

Initial Design

A prototype of the handbook on computer-assisted language learning was developed for examination by various experts and potential users. This prototype was based upon the concept analysis, instructional objectives, and criterion-referenced test as developed in previous sections of this chapter. The format of the prototype handbook was that described in the Format Selection section of this chapter. The illustrations used in the

hardware section were line drawings which could easily be reproduced in the printing of the handbook.

In the next chapter, stages three and four of the instructional development process, define and disseminate, will be described.

CHAPTER FOUR

DEVELOP AND DISSEMINATE

Introduction

The instructional development process, as defined by Thiagarajan, Semmel and Semmel (1974), involved the four steps of: (1) Define, (2) Design, (3) Develop, and (4) Disseminate. An overview of this process, along with a description of the implementation of the first two steps, was provided in chapter three. The final steps of develop and disseminate are described in this chapter.

Stage Three: Develop

A prototype of the handbook on computer-assisted language learning was developed as part of the "design" stage of the instructional development process. This prototype was then submitted to an evaluation process in the "develop" stage with the goal of refining the handbook as much as possible. The evaluation plan for this package consisted of expert appraisals, potential user appraisal, and developmental testing. After each of these steps, refinements were made to improve the handbook.

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Expert Appraisals

Several experts were consulted in an effort to improve all aspects of the package. These experts included a subject-matter expert and a learning strategies expert. For the purposes of this handbook, the subject-matter expert also acted as technical expert to ensure the appropriateness of presentation and format of the handbook. The experts examined the package at various stages of development and provided valuable insight into the construction and design of the package.

Subject-Matter Expert

Identification

The subject-matter expert selected by the developer is highly respected in the area of learning resources, especially in computer education. He has studied at Memorial University of Newfoundland and holds a Doctorate degree from Columbia University. He has taught at both the grade school and university levels and has attended various international conferences on the application of computers to the field of education. The subject-matter expert is also well-known provincially in the area of social studies, particularly history. He has authored and co-authored several books on Newfoundland and Labrador.

First visit

The first meeting with the subject-matter expert was held to examine the concept analysis, instructional objectives, and criterion-referenced test. The expert was enthusiastic about the proposed instructional material and felt it would make a valuable tool in helping teachers of second language avail of a new and beneficial aspect of language learning. The subject-matter expert felt the concept analysis provided thorough coverage of the topic and would provide useful guidelines in the preparation of the instructional material.

Suggestions for improvement

Although the subject-matter expert felt that no new concepts were necessary, he did express a need for a restructuring of certain elements of the concept analysis. In order to avoid overloading the beginner with information on computer hardware, he suggested dividing the hardware section into two sections: basic and advanced. He also suggested the placement of certain concepts which the writer had listed as benefits of computer use in a separate section entitled "Features of the Microcomputer".

The subject-matter expert also suggested that concepts which the developer had considered as cognitive, affective and communicative benefits be included under the criteria of effectiveness in software evaluation.

The expert then recommended that the instructional objectives be revised to reflect the above mentioned changes in the concept analysis. He also suggested the re-wording of the instructional objectives to avoid the repetition of the phrase, "Given a copy of the handbook," for each instructional objective.

The subject-matter expert liked the format of the criterion-referenced test; however, he again suggested changing the questions to reflect changes in the concept analysis and instructional objectives.

Changes made

Each of the suggested improvements was made and copies of the new concept analysis, instructional objectives and criterion-referenced test were re-submitted for examination. The expert felt that the revised editions of these steps presented a clearer picture of the instructional development task.

Second visit

A second visit with the subject-matter expert provided the opportunity to examine the rough draft of the handbook. The expert found that the handbook corresponded well with the concept analysis, instructional objectives, and criterion-referenced tests developed in the previous section. He felt that the handbook would be a success in helping meet the intended objectives.

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Suggestions for improvement

Although the subject-matter expert considered the handbook to be a valuable tool for French language teachers, he suggested several changes to help ensure that teachers derived maximum benefit. These changes included:

1. a revision of the introductory paragraph to avoid information overload on the part of beginning computer users.
2. a revision of the "Microcomputer (Basic)" section to present some of the terminology and hardware before proceeding to the concepts of input, processing, and output.
3. the transfer of information on "hard discs" to the section on advanced hardware.
4. the addition of a separate section on discs.
5. a revision of the "Microcomputer (Advanced)" section to present the images of various hardware components along with their descriptions.

6. the change of the term "terminal" in the "Features" section to "computer" to avoid confusion.
7. the addition of some reassurance for persons with limited or no computer experience that teachers do not need to be "computer experts" in order to use CALL software in the classroom.
8. the deletion of the name of the employee at an address included for reference. The expert pointed out that the names of employees may change.
9. the deletion of various other sentences which the expert considered inappropriate for the level of the handbook.

Changes made

Each of the recommended changes was made to provide improvements and clarification of the handbook. The writer was especially careful to eliminate any section or sentence which might be confusing to persons with little computer experience. The implemented changes have helped improve the package and eliminate points of confusion. The revised package is now more appropriate for both beginning and advanced computer users.

Learning Strategies Expert

Identification

The learning strategies expert selected for this handbook has a broad knowledge of second language teachers and methodologies involved in learning a second language. A graduate of McGill University, and the universities of Saskatchewan and Toronto, she has taught at grade school and university level. Past positions include co-ordinator of the French Language Education section of the Faculty of Education at Memorial University of Newfoundland. She has also served on various curriculum committees and has published several articles on French education and French immersion in Newfoundland and Labrador. For the past five years she has been on the editorial board of the Canadian Modern Language Review and of Contact, and has written several reviews and evaluations of instructional materials for various publishers.

Appraisal of rough draft

The learning strategies expert felt the handbook provided teachers of second language with the information necessary to introduce the computer in their classrooms. She also felt that the approach to computer-assisted language learning presented in the handbook was consistent with current language learning methodology. The learning strategies expert felt that computers could make a valuable contribution to second language learning and that

this handbook would help introduce CALL to students of French language in Newfoundland and Labrador.

Suggestions for improvement

The learning strategies expert felt that although the information presented in the instructional material was appropriate, the pace of the handbook was too fast. She suggested the placement of review questions at various intervals to provide breaks in the material and to provide a quick review of certain sections, and especially at the end of each of the six major sections: (1) The Microcomputer (Basic), (2) The Microcomputer (Advanced), (3) Features of the Microcomputer, (4) CALL Software, (5) Limitations of the Microcomputer with Respect to CALL, and (6) The Future of CALL.

The learning strategies expert also suggested re-formatting the handbook by providing less information on a page. The use of more space would help eliminate any overwhelming effect on French language teachers who knew little of the computer or computer-assisted language learning.

The expert felt that more graphics in the form of diagrams, illustrations, and cartoons would hold the interest of teachers of French language. She also felt the graphics would provide a more pleasant learning environment for the teacher who might be intimidated by computers and information on computers.

The learning strategies expert also suggested the inclusion of a sample lesson plan to provide teachers with an example of how a computer-assisted language learning program might be approached.

Changes made

In keeping with the suggestions of the learning strategies expert, a series of "Self-quiz" questions were added at the end of each of the six major sections. In addition, a series of review and thought-provoking questions was added at various points of the text. These questions help reinforce material included in the text and provide valuable breaks to allow the learner to assimilate the information.

The spacing of the pages was changed to avoid intimidation by overcrowded pages of print. The new pages present a more suitable appearance which motivates teachers to read on.

Diagrams and illustrations have been added to clarify concepts and provide a clearer idea of topics being discussed. As well, cartoons and other pictures have been added to lighten the tone of the work and provide an atmosphere more conducive to learning.

Directions have been clarified in the foreward to give readers a clearer picture of the various sections of the handbook and how to proceed with them.

In place of a sample lesson plan, the writer has provided general guidelines to the use of CALL programs. These guidelines apply to all software as opposed to a particular program and may, therefore, may be of more use to teachers.

The writer feels these changes have made the package easier to follow and easier to read. The re-formatting of the handbook and the inclusion of graphics have resulted in a much improved presentation to the teacher. The inclusion of the review questions, thought questions and quizzes have made the handbook more activity-oriented, thereby enabling the reader to become involved while reading. The addition of guidelines for the application of CALL programs provides assistance in the development of lesson plans. All of these changes and additions have contributed to the production of a greatly improved handbook.

Technical Expert

Identification

The subject-matter expert identified previously also acted as technical expert for this handbook.

First meeting

The first meeting with the technical expert provided an appraisal of the rough draft of the package. The expert liked the package and approved of the over-all

layout. He liked the graphics and felt the pages were fairly well planned.

Suggestions for improvement

The technical expert gave several valuable suggestions for improvement of the handbook. He suggested the placement of the illustrations of various computer hardware components be placed next to their descriptions for more effective representation. He also suggested the clarification of directions for those teachers proceeding to the advanced section as follows: the statement "Persons with previous computer experience may wish to skip this section and go directly to the advanced section on page 8." be changed to ".....the advanced section, pages 8 to 12."

Changes made

In accordance with the changes suggested by the technical expert, illustrations of hardware components were moved to supplement the verbal descriptions provided in the text. Directions were clarified to indicate that the advanced section was not intended for beginners. The directions for persons proceeding to the advanced section were revised as suggested.

Second visit

The second visit with the technical expert provided an appraisal of the revised version of the handbook. The expert felt that the changes made in the revised version were satisfactory and that the handbook was now ready for testing.

Potential User Appraisals

Identification

The potential user selected for an appraisal of this package has had many years of experience in French language education in Newfoundland. She has taught Core French from grades four through twelve. She has also taught immersion French at the grades eight and nine levels. The potential user has also served as French Language Co-ordinator for a provincial school board for a number of years.

A past student of Memorial University, the potential user also holds an International Baccalaureate from Pearson College, British Colombia, and a Bachelor of Arts Degree from Laval Universtiy, Quebec City.

First Visit

The first visit for a potential user appraisal provided a review of the concept analysis, instructional objectives, and criterion-referenced test. The user expressed satisfaction at the development of a package

which would provide the second language teacher with information of the application of computers to the second language classroom. She especially liked the instructional objectives involving the selection of software materials. She felt that the computer could be a valuable addition to her classroom and expressed the hope that she would one day have a copy of the manual on her desk.

Suggestions for improvement

The potential user felt the concept analysis and instructional objectives were appropriate for teachers of a second language such as herself. She did, however, feel that certain improvements would be useful in the criterion-referenced test.

The potential user first noted that "light pen" and "monitor" had been omitted from item 2b. She also noted that a line had been repeated in item 6. The potential user also noted that the the term "voice simulation" in item 13 was repeated instead of the term "voice input".

Changes made

Each of the changes recommended in the criterion-referenced test was carried out. Light pen and monitor were added to item 2b. The repeated line in item 6 was deleted, and the term voice simulation in item 13 was changed to read "voice input" and "voice output", respectively.

Second Visit

The second visit with the potential user provided an appraisal of the rough draft of the handbook. The potential user felt the handbook was "well-written in terms of readability" and "will be an invaluable tool if teaching is to keep pace with technology as it should." She stated that she had always had an interest in computers but still needed a lot of guidance on aspects such as selection of software and sensible buying.

The potential user also found the handbook appropriate for persons with little computer experience. She wrote, "Another thing I like about this handbook is that it is not intimidating. Being a beginner (i.e. I don't know a lot about computers but I can manage to turn one on and load a program), I find it "user-friendly".

The potential user also found that information could be easily located in the handbook and that the use of terminology was appropriate.

Suggestions for improvement

The potential user suggested a more detailed Table of Contents to aid the reader in gaining a quick overview of the contents of the handbook. She also suggested the number 1,000,000 in the section on megabytes not be broken onto two lines; however, the writer pointed out that margin changes in the final draft would eliminate this problem.

Changes made

The Table of Contents was improved to include all sub-headings found in the handbook. Attention was also paid to the use of numbers to ensure that the splitting of numbers on two lines was avoided.

Summary

The evaluation of the handbook by the subject-matter expert, learning strategies expert, technical expert and potential user has led to the production of a much improved package. Their valuable suggestions have contributed to a handbook which is more refined and more easily readable for both the computer user and nonuser. Improvements were made in the organization of relevant concepts, in the instructional objectives, and in the criterion-referenced test. The handbook saw improvements in the areas of content, organization, and format. The result of these changes has been the creation of a handbook which provides more motivation and benefits to teachers of second language.

Developmental Testing

The process of rigorous expert and potential user appraisals, and continuous revisions was followed by the testing of the handbook with a group of target users. These teachers of second language were asked to use the handbook in order to determine its strengths and

weaknesses. The group consisted of a class of 14 French language teachers enrolled in a summer school course in French language education methodology. Thirteen of the teachers were female and one was male. Six of the fourteen reported no previous computer experience while eight had used a microcomputer at some time in the past.

The criterion-referenced test discussed previously was used as a pre-test to determine the level of teachers' knowledge and experience before using the handbook. Teachers were asked to complete the pre-test individually. Although the teachers were a little wary of doing a pre-test on their knowledge of computers, an explanation by the writer that the handbook was intended as a reference source so teachers would be allowed to consult with it during the completion of the post-test, helped ensure the success of the session.

After completion of the pre-test, the teachers were asked to read the handbook. The writer explained that reading of the handbook would consist more of an examination rather than reading to retain all of the information contained therein. Teachers were also permitted to consult with colleagues during the examination of the handbook.

The criterion-referenced test was then used as a post-test to determine the appropriateness of the handbook as a reference source. The writer reminded the teachers that the handbook could be used as a reference in

completing the post-test. The questions at the end of each major section of the handbook were taken from the criterion-referenced test, and so were deleted for the testing of the handbook.

Results

The results showed a significant increase from pre-test to post-test scores. Student response values were calculated as percent of maximum correct items. The individual scores for pre-tests and post-tests, in terms of percent of the maximum, are presented in figure 12.

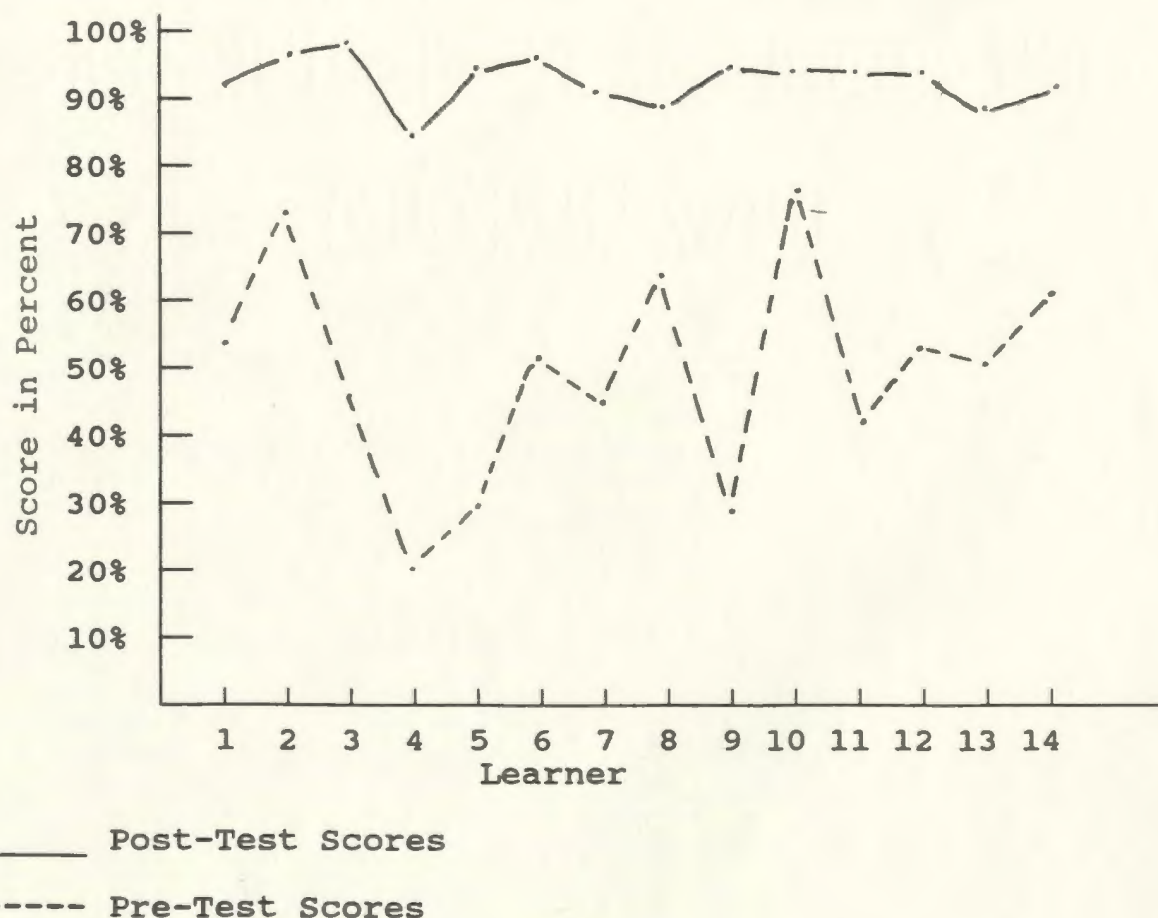


Figure 12 Graph of Developmental Test Scores

The graph of pre-test/post-test scores indicates that all learners improved after having read the manual. All students scored higher than 85%. The mean gain in percentage points was 43.0%. Gain in percentage points from pre-test to post-test scores are presented in Table 6.

Table 6

Percentage Point Gain in Pre-Test/Post-Test Scores

Learner	Percentage Point Gain
1	37.3
2	25.4
3	50.8
4	64.8
5	64.8
6	43.9
7	46.2
8	23.8
9	67.1
10	17.9
11	50.8
12	40.3
13	37.3
14	31.7

The range of scores in terms of percent of possible score is reported in Table 7 below.

Table 7

Range of Pre-test Scores in terms of Percent of Possible Score

	Low	High	Range
Score (%)	21.1	77.6	56.5

The range of the post-test scores in terms of percent of possible score was much narrower; however, the scores were a great deal higher, thereby indicating an improvement in the performance of the students. The range of the post-test is reported in Table 8 below.

Table 8

Range of Post-test Scores in terms of Percent of Possible Score

	Low	High	Range
Score (%)	85.9	98.5	12.6

Co-ordination of Test Scores with Instructional Objectives

An analysis of the scores for each of the instructional objectives is presented in Table 9 below. This analysis indicates that the learners improved on all of the objectives. The range of percent of maximum gain was from 14.4% to 63.8%. Some cases of low gain may be attributed to the fact that learners scored highly on the pre-test whereas some cases of high gain are the result of a lack of knowledge on the part of learners before instruction. Each objective is discussed separately below.

Objective 1

Given a copy of the handbook, as well as a drawing of computer system peripherals and a list of names of computer system peripherals, the nonuser will correctly label the following peripherals: keyboard, printer, monitor, disc drive.

To test the degree to which this objective was attained, four items were included in the test: items a,b,c, and d of question 1a, at a value of one mark per item. Six students, who qualified as nonusers, responded to this question. The maximum mean of 4 for this objective was almost attained with a mean score of 3.8 (95% of the maximum mean possible). 83.3% of the students achieved a score of 3.2 (80%) or higher. This indicated that objective one was successfully met.

Table 9

Comparison of Pre-Test and Post-Test Mean Scores Relating
to Instructional Objectives

Objective	No. of Items	Pre-Test Mean	Post-Test Mean	Mean Gain	% of Maximum Gain
1	4	3.2	3.8	1.3	32.5%
2	9	7.4	8.6	1.3	14.4%
3	4	3.0	3.8	0.8	20.0%
4	9	8.2	8.9	2.8	31.1%
5	1	0.4	0.9	0.4	40.0%
6	10	3.4	9.7	6.3	63.0%
7	6	4.1	5.4	1.4	23.3%
8	2	1.1	1.7	0.7	35.0%
9	13	6.3	12.6	6.3	48.5%
10	1	0.3	0.8	0.6	57.0%
11	3	1.6	2.4	0.8	26.0%
12	1	0.6	1.0	0.4	40.0%
13	1	0.8	1.0	0.2	20.0%
14	1	0.4	0.9	0.5	50.0%
15	1	0.2	0.9	0.6	60.0%
16	1	0.5	0.9	0.4	40.0%
17	8	2.2	7.6	5.1	63.8%

Objective 2

Given a copy of the handbook as well as a drawing of computer system peripherals, and a list of names of computer system peripherals, the computer user will correctly label the following peripherals: keyboard, mouse, lightpen, joystick, graphics tablet, printer, monitor, disc drive, modem.

To test the degree to which objective two was attained, nine items were included in the test: items a to i of question 1b, at a value of one mark per item. Eight teachers, the previous computer users in the class, responded to this question. The mean score for this question in the post-test was 8.6 or 95.5% of the maximum mean of 9. 88.8% of teachers scored 7.2 (80%) or higher, thereby indicating that objective two had successfully been met.

Objective 3

Given a copy of the handbook and a list of computer system peripherals, the nonuser will correctly label the following as in input, output, or input/output: keyboard, printer, monitor, disc drive.

Four items were included in the test to measure the attainment of this objective: items a,b,c, and d of question 2a. Again, six nonusers responded to the question. A post-test mean of 3.8 surpassed the 80% level

of 3.2. Of the fourteen teachers, 83.3% scored higher than 3.2. Objective three was successfully met.

Objective 4

Given a copy of the handbook and a list of computer system peripherals, the computer user will correctly label the following as input, output, or input/output: keyboard, mouse, lightpen, joystick, graphics tablet, printer, monitor, disc drive, modem.

To test the degree to which this objective was attained, nine items were included in question 2b of the test at a value of one mark per item. The mean score for the items testing this objective was 8.9 out of a maximum mean of 9 (98.8% of the maximum mean). One hundred percent of the eight respondents to this question scored higher than 7.2 or 80% of the maximum mean; therefore, objective four was successfully met.

Objective 5

Given a copy of the handbook and a list of computer system components, the learner will identify the Central Processing Unit and Memory Chips as the two central components of a computer.

Question 3, consisting of one item, was designed to test the degree to which this objective was attained. A mean of 0.9 for this item amounted to 90% of the maximum mean of 1. All fourteen teachers responded to this item with

85.7% responding correctly. There was considerable gain on objective five. The mean gain was 0.4/1 or 40% of the maximum gain. Objective five was also successfully met.

Objective 6

Given a copy of the handbook and a choice of possible features of the microcomputer, the learner will correctly select the following: interactivity, accuracy and precision, stamina, time flexibility, impartiality, processing of large volumes of interaction, frequent feedback, and accommodation of a variety in learning speeds.

Ten items, with a value of one mark per item, were used in question 6 to measure the degree to which this objective was attained. The mean score for the items testing this objective was 9.7, or 97% of the maximum mean of 10. One hundred percent of learners achieved a score of 8 or higher, therefore more than 80% of the 14 teachers scored 80% or higher on the items testing this objective.

Objective 7

Given a copy of the handbook and a description of a software program, the learner will correctly label the description as one of the following: drill-and-practice, tutorial, simulation, game, problem solving, tool use.

To test the degree to which this objective was attained, six items were included in question 4 of the criterion-referenced test. Of the maximum mean of 6 for the items testing this objective, teachers attained a mean score of 5.4 or 90% of the maximum mean. Eleven of the fourteen teachers scored score higher than 4.8 (80% of 6). Objective seven was therefore met with 80% of teachers scoring higher than 80% on the items testing the objective.

Objective 8

Given a copy of the handbook and a description of a software program, the learner will correctly label the program as "stand alone" or "teacher supplemented".

Two items, at a value of one mark each, were included in question 5 to test the degree to which this objective was attained. An average mean of 1.7 indicated that teachers had achieved 85% of the maximum mean for these items. Twelve of the fourteen students (85.7%), achieved a score higher than 1.6 (80% of of the maximum mean); therefore, objective eight was successfully met.

Objective 9

Given a copy of the handbook and a list of possible criteria of good software, the learner will correctly select those which are features of good software.

To test the degree to which this objective was attained, thirteen items were included in question 7 of the test. The maximum mean of 13 for this item was almost attained as students obtained a mean of 12.6 (96.9% of the maximum possible mean). One hundred percent of learners obtained a score higher than 10.4 (80% of the maximum mean). The mean score of 12.6/13 on the post-test score suggested that teachers were now familiar with the criteria of good CALL software.

Objective 10

Given a copy of the handbook and a list of possible factors to be considered in determining the effectiveness of software, the learner will correctly select the following: communicative, cognitive and affective factors.

One item, with a value of one mark, was included in the test as question 8 to measure the degree to which this objective was attained. The mean score on this item was 0.8 or 80% of the maximum mean of 1. Eleven teachers (80%) achieved a score higher than 0.8 (80%). The handbook had enabled teachers to identify factors to be considered in determining the effectiveness of CALL software.

Objective 11

Given a copy of the handbook and statements describing situations involving class, group, and individual computer use, the learner will correctly identify group use, individual use, or classroom use as appropriate for these situations by stating whether the items are true or false.

To measure the degree to which objective eleven was attained, three items - with a value of one mark per item - were included in question 9 of the test. The mean for the items in this question was 2.4 (80% of the maximum mean of 3). Eleven students (80%) scored higher than 80% of the maximum mean for the items testing this objective. Objective eleven was, therefore, successfully met.

Objective 12

Given a copy of the handbook and various software selection procedures, the learner will identify the following as appropriate procedures in selecting software: use of selection aids, trial use, purchase on approval, peer recommendations.

One item, with a value of one mark, was included in question 10 to test the degree to which this objective had been attained. One hundred percent of teachers obtained a mean of 1 on the post-test, thereby achieving 100% of the maximum mean of 1. This was in comparison with an average

mean of 0.6 on the pre-test. Objective twelve was therefore successfully met.

Objective 13

Given a copy of the handbook and a list of selection aids, the learner will identify the following as appropriate for use as selection aids: reviews and checklists.

To test the degree to which objective thirteen was attained, one item was included in question 11 of the test. Again 100% of teachers achieved 100% of the maximum mean of 1 on the item testing this objective. This mean of one indicated that teachers could now suggest reviews and checklists as appropriate selection aids.

Objective 14

Given a copy of the handbook and a list of possible factors which limit the use of the computer in second language classrooms, the learner will select technology, cost and software development as limiting factors to microcomputer systems.

One item, with a value of one mark, was included in question 12 of the test to measure the degree to which objective fourteen had been attained. The mean score on this item was 0.9 (90% of the maximum mean of 1). Of the fourteen teachers, 92.8% scored higher than 0.8 or 80% of

the maximum mean; therefore, objective fourteen was successfully met.

Objective 15

Given a copy of the handbook and a list of possible technological limitations of microcomputers to second language learning, the learner will correctly select the following: incompatibility, literal mindedness, voice input, and voice output.

To test the degree to which objective fifteen was met, one item was included in question 13 of the test. The mean score for this item was 0.9 or 90% of the maximum mean of 1. Twelve of the 14 teachers (85.7%) scored higher than 0.8 (80% of the maximum mean) on this item; therefore, the objective of having teachers identify the limitations of the computer in second language learning was successfully met.

Objective 16

Given a copy of the handbook and a list of possible software development problems, the learner will correctly select the following software development limitations: amount of suitable software and compatibility with instructional programs.

To test the degree to which this objective was attained, one item, at a value of one mark, was included in question 14 of the test. The mean score for this item was 0.9 or

90% of the maximum mean of 1. Twelve of the 14 teachers (85.7%) scored higher than 0.8 (80% of the maximum mean). Teachers had improved in ability to identify problems in software development. Students scores attested to a gain of 40% of the maximum gain for this item. Objective 16 was successfully met.

Objective 17

Given a copy of the handbook and a list of possible future prospects of CALL, the learner will correctly select the following: voice synthesizers, voice input, artificial intelligence, video disc, digital audio disc, dictionary/stored text.

To test the degree to which objective 17 was attained, 8 items were included in question 15 of the test, with a value of one mark for each item. The mean score for these eight items was 7.6 or 95% of the maximum mean of 8. One hundred percent of teachers scored higher than 6.4 (80% of the maximum mean). The scores for objective 17 indicated that teachers were now more aware of some of the upcoming directions and future prospects of CALL.

Summary

An examination of the test scores in relation to the instructional objectives revealed that each objective was successfully met. Eighty percent of the learners had mastered at least eighty percent of the items for each

objective and had often exceeded these standards. The handbook, therefore, proved useful as a reference source in providing teachers with a knowledge of computers and computer application to teaching a second language.

Reaction to Handbook

Many of the teachers in the class had positive reactions to the handbook. They felt the handbook would provide valuable assistance in providing their students with an exciting and motivating tool in second language learning. Comments included:

- "A good manual - well written and easy to understand."
- "I've tried to read other computer manuals before - my husband is a computer buff - I've never been able to get past the first chapter. This manual ("Computer-Assisted Language Learning - A Handbook") is easy to follow and precise. A pleasure to read!"
- "A nice project! I think we ought to be using computers more in second language teaching It's the "in" thing with young children so why don't we cash in on it!"
- "Very interesting. I look forward to being able to use this in my school."

One teacher felt the term CALL was confusing and the words behind the acronym should be included more often,

especially at the beginning of new sections. The writer has reviewed the handbook and added the words behind the acronym at various locations throughout, especially at the first mention in each of the major sections.

Summary

The process of developmental testing showed the handbook to be a practical and worthwhile tool for teachers of second language. The handbook responds to the needs of learners as identified in the Needs Analysis,

- specifically, 1) knowledge of computers
2) knowledge of the application of computers to second language learning, and
3) guidance in the evaluation and selection of hardware.

The handbook also provides teachers with information on the limitations of computers in second language learning and on future prospects of CALL. The concepts presented in the Concept Analysis have been covered and the instructional objectives have been met.

The process of expert and potential user appraisals provide valuable suggestions for modifying and improving the handbook. Developmental testing verified that the objectives for which the handbook had been created were met. The result has been the production of a handbook

which meets the CALL needs of second language teachers in Newfoundland and Labrador.

Stage Four: Disseminate

Dissemination constitutes the final step in the instructional process as delineated by Thiagarajan, Semmel and Semmel (1974). Since the testing of the handbook dealt with fourteen students, validation testing was carried out as part of the developmental testing step described in the previous stage. The remaining steps in the "Disseminate" stage include Final Packaging and Diffusion.

Final Packaging

The revised handbook was carefully checked for production standards. A graphic artist was asked to produce some of the illustrations and cartoons for use in the handbook. The pages were also checked to ensure sufficient margins for binding. The handbook was already of a high production standard and the writer felt the quality would be appropriate for duplication.

Written copyrights were obtained for the keyscreen of the software program The Treasure of Ile Madame included in the section on simulation programs, and for the Computer-Assisted Language Learning Materials Evaluation Form included in Appendix A.

Diffusion

The handbook on computer-assisted language learning provides a useful tool for teachers of second language. The writer felt this material should be made available to these teachers in the near future. The writer has therefore decided to place the handbook in the Clearinghouse of Memorial University. This organization provides photocopies of materials placed in their department to interested teachers. The writer also hopes that the handbook will be adopted by the Department of Education of Newfoundland and Labrador. With this in mind, a copy of the handbook will be sent to the provincial co-ordinator of bilingual programs. A letter advising the co-ordinator of the present status of the handbook, and expressing an interest in having the handbook published by the department, will also be included.

Follow-up

The writer plans to follow up the letter to the provincial co-ordinator with a personal visit after the co-ordinator has had time to read and consider the document; however, time does not permit this action before the submission of the thesis.

Conclusion

The stages of "Develop" and "Disseminate" have taken the handbook from the rough draft stage as described in chapter three and submitted it to evaluation, revision, and developmental testing to prepare it for public use. The helpful suggestions provided by the experts and potential user have contributed to the production of an improved work on the part of the writer. The developmental testing provided validation of the success of the handbook in meeting the objectives set forth in the section on instructional objectives. The final packaging and diffusion plans for the handbook take it a step closer to meeting the purpose for which it was created - to meet the needs of Newfoundland and Labrador French language teachers with respect to computer-assisted language learning.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The field of education has witnessed, in the last decade, the introduction of the microcomputer into most areas of the curriculum. Significant advances in technology have made the computer an affordable and effective addition to the classroom. The diverse capabilities of the computer have suggested useful applications in mathematics, social studies, and many other areas including second languages.

Many regions of the world, including Canada, have found a place for computer-assisted language learning (CALL) in their classrooms. Yet, a survey of French language teachers in Newfoundland revealed that only 5.6% of second language teachers in this province were incorporating the computer into their program of instruction (Hoskins, 1988). These teachers reported a need for computer knowledge and experience, for information about computer-assisted language learning and its application to the classroom, and for guidance in the evaluation and selection of suitable software.

In response to these needs, this writer decided to develop instructional material which would serve as a reference source for teachers interested in using CALL. A review of the literature was conducted to determine what

information was already available and to determine the latest findings and trends in computer-assisted language learning. This review revealed many features of the microcomputer and of computer software which could be applied to the French Language classroom. The review of the literature also disclosed some limitations of computer-assisted language learning and some future prospects of CALL with which the prospective user should be acquainted.

Based upon this information, the writer developed a handbook based upon the 4-D model of instructional development as outlined by Thiagarajan, Semmel and Semmel (1974). This model includes the four stages of Define, Design, Develop, and Disseminate.

The "Define" stage included the processes of Front-End Analysis, Learner Analysis, Concept Analysis and Specifying Instructional Objectives. All of the information compiled in the Define stage was used to provide a strong foundation for the development of the instructional material.

"Design", stage two of the development process, consisted of the development of a Criterion-Referenced Test based on the concept analysis and instructional objectives. This was followed by Media Selection which resulted in the selection, by the writer, of a handbook as the most appropriate medium under present conditions.

Format selection, the next step of the design stage, was based upon the concept analysis and instructional objectives. The handbook on computer-assisted language learning consisted of five major sections: The Microcomputer System (Basic), The Microcomputer System (Advanced), Features of the Microcomputer, CALL Software, Limitations of the Microcomputer and CALL, and The Future of CALL. Appendices contained a materials evaluation form for evaluation of CALL software, as well as other information and addresses useful to teachers interested in CALL.

Stage three in the development of the handbook consisted of expert appraisals, potential user appraisal, and developmental testing. The handbook was submitted, at various stages of development, to a subject-matter expert, a learning strategies expert, a technical expert, and a potential user for appraisal. After each visit, revisions were made to the package.

The handbook was then tested in an actual learning situation with a group of French language teachers attending a summer session at Memorial University of Newfoundland. A comparison of pre-test scores, and scores on a post-test administered after the teachers had examined the handbook, demonstrated great improvement in teachers' responses to questions about computer-assisted language learning. Scores on the post-test ranged from 85.1% to 98.5%. The minimum success level of the correct

response to 80% of the test items by 80% of learners was met and exceeded.

Stage four of the instructional development process, "Dissemination", consisted of final packaging, and diffusion. Final packaging involved the addition of several graphics, as well as the final formatting of the handbook in preparation for diffusion. Diffusion consisted of a plan to submit the completed handbook to the Clearinghouse of Memorial University so that it is made accessible to all second language teachers in the province of Newfoundland and Labrador. A plan to submit the handbook to the provincial Department of Education was also developed with the hope that this material would eventually be placed in the hands of all the second language teachers in Newfoundland.

Recommendations

Computer-Assisted Language Learning: A Handbook provides teachers interested in CALL with a useful reference source which answers many of their questions about computers and language learning. Teachers using this handbook are presented with the various computer components and features, with the various types and applications of CALL software, with guidelines to the evaluation of CALL software, and with limitations and future prospects of CALL. The writer feels, however, that along with this information, teachers would also benefit

from hands-on experience with computers and CALL software. Teachers would also benefit from inservice sessions where questions could be asked and ideas shared. With these thoughts as guidelines, the writer has formulated several recommendations regarding the further development of CALL in Newfoundland and Labrador.

Recommendations for Using the Handbook

1. It is recommended that the Bilingual Programs Section of the Department of Education become involved in the application of computers to the teaching of French. This might involve:
 - a) the training of teachers in computer and CALL use,
 - b) the evaluation and selection of available CALL software, and
 - c) the co-ordination of software with programs of instruction.
- 2) It is recommended that school board co-ordinators be trained in the application of computers to the second language classroom. These co-ordinators could then provide guidance on CALL use to teachers within their respective boards and demonstrate CALL lessons with sample classes.
- 3) It is recommended that a series of workshops be conducted by co-ordinators or other designated

persons to provide second language teachers with hands-on experience with computers and CALL programs.

Memorial University of Newfoundland should also become involved in the application of computers to the second language classroom. The following recommendations have been prepared with regard to language and teacher training:

- 1) It is recommended that the French Department of Memorial University integrate computers into the language learning program presently employed.
- 2) It is recommended that Education Faculty of Memorial University of Newfoundland integrate computer-assisted language learning into its teacher training program for teachers of second language. This training would involve the following:
 - a) the role of computers in a second language classroom,
 - b) the role of computers with regard to the communicative approach,
 - c) an examination of some of the available software,
 - d) evaluation of available software, and
 - e) the formulation of sample lesson plans for CALL lessons.

The Modern Languages Council of the Newfoundland Teachers Association could also play a role in the introduction and application of computer-assisted language learning to the teaching of French. The writer, therefore, makes the following recommendations:

- 1) It is recommended that the Modern Languages Council of the Newfoundland Teachers Association set up a special committee to deal with computer-assisted language learning. This committee should have, as its goals, the following:
 - a) the selection and evaluation of CALL software,
 - b) the monitoring of new developments in computer hardware which might influence computer-assisted language learning,
 - c) surveillance of the latest developments and trends in language learning with the intention of identifying the place of CALL within these trends.
- 2) It is recommended that a committee set up by the Modern Languages Council publish monthly or bi-monthly reports of its work, including software reviews, in publications such as the NTA Bulletin or in a special newsletter to members.

Recommendations for Further Research

Although the handbook on computer-assisted language learning provides a valuable tool for language teachers, several other tools could also be developed to aid in the implementation of CALL to French language classrooms of Newfoundland and Labrador. The writer suggests the development of a video tape, a computer program, and an inservice training package to help make teachers more aware of the potential and applications of computer-assisted language learning.

A video tape would enable teachers to witness, through the medium of television, the application of a CALL package under actual classroom conditions. Language teachers could witness individual, group and class use of microcomputers, as well as any interaction which may take place between the computer and the student, between students, or among the teacher and students. A video tape would also permit teachers to preview some of the CALL software available for use in schools. Finally, a video tape would clearly demonstrate the components of frequently used computer systems in Newfoundland schools, along with some of the capabilities and limitations of each system.

A computer program would allow second language teachers to gain first hand experience with computers while at the same time presenting some of the features of computers and of CALL. The writer does suggest, however,

that this computer program be accompanied by a manual which provides detailed instructions on loading and operation of the program for persons with no previous computer experience.

An inservice training package would also provide a valuable tool in the introduction of CALL to teachers of French. This package could be used by co-ordinators and other experienced teachers to present interested teachers with information on computers and on computer-assisted language learning. The in-service package should consist of two separate sections: one for persons with no previous computer experience and one for those with previous computer experience. The section for language teachers with no previous computer experience would include a section on computer components, functions, and features before proceeding to computer-assisted language learning. The section for persons with previous computer experience would focus immediately on CALL to prevent boredom resulting from instruction on an aspect of CALL with which these teachers are already familiar. The section on CALL might concentrate on the following aspects:

- 1) demonstration of the various types of software
- 2) hands-on experience with some of the available programs
- 3) discussion of the role of previously examined programs in the communicative approach to language learning

- 4) discussion of CALL use in relation to class size and available facilities
- 5) discussion of some of the limitations of CALL
- 6) sample group evaluation of a software program.
- 7) development of sample lessons to use CALL effectively

An inservice package of this type would provide a useful tool in the presentation of CALL to teachers of second language.

Computer-assisted language learning (CALL) has added an interesting and valuable new dimension to the second language classroom. Teachers need information on this topic to take advantage of the many benefits and features available. Computer-Assisted Language Learning: A Handbook provides one useful resource to acquaint teachers with some of the computer components and features available with microcomputer systems. The handbook also presents the various types of CALL software available for use in schools. A description of the various types of software is accompanied by a discussion of the application of each type of software to the second language classroom. Teachers are also presented with guidelines and aids for software evaluation and selection as well as some of the limitations and future prospects of CALL.

Other instructional materials could also be developed to present teachers with the benefits and limitations of computer-assisted language learning. Video tapes,

computer programs and inservice training packages would also help meet the CALL needs of French language teachers in Newfoundland and Labrador. All of these instructional packages, whether handbook or video, however, have a common purpose - the provision, to second language teachers, of a useful tool in developing the communicative abilities of our students.

BIBLIOGRAPHY

Bibliography

- Ahmad, K., Corbett, G., Rogers, M., & Sussex, R. (1985). Computers, Language Learning and Language Teaching. Cambridge: Cambridge University Press.
- Bitter, G.G. and Camuse, R.A. (1988). Using a Microcomputer in the Classroom. Englewood Cliffs, NJ: Prentice Hall.
- Boucher, A.M. (1986). A quoi reconnaît-on du matériel pédagogique de nature communicative? In Boucher, A.M., Duplantie, M., and Leblanc, R. (Eds.). Propos sur la pédagogie de la communication en langues secondes. Montréal: Centre Educatif et Culturel.
- Brink, D. (1986). MLJ computer corner. The Modern Language Journal, 70(2), 149-152.
- Canale, M., Barker, G., Bélanger, M., MacRury, K., McLean, R.S., and Ragsdale, R.G. (1985). Microcomputer Software for Language Arts: Survey and Analysis. Toronto: OISE Press.
- Chapelle, C., and Jamieson, J. (1986). Computer-assisted language learning as a predictor of success in acquiring English as a second language. TESOL Quarterly, 20(1), 27-46.
- Cox, R. (1985). Computers in the foreign language classroom: Not just another "fad or frill". Paper presented at the Annual Meeting of the Mid-South Educational Research Association, 14th. Biloxi, MS.
- Craven, M.L. and Sinyor, R. (1987). The current status of Canadian CALL: "Nous sommes encore trop isolés dans nos universités respectives". The Canadian Modern Language Review, 43(3), 507-524.
- Decoo, W. (1986). Ordinateur et didactique: La recherche de la variété et de l'efficacité. CONTACT, 5(4), 17-22.
- Dunkel, P.A. (1987). Computer-assisted instruction (CAI) and Computer-assisted language learning (CALL): Past dilemmas and future prospects for audible CALL. The Modern Language Journal, 71(3), 250-260.
- Dwinell, R.A. (1986). The use of spreadsheet software to teach business and economic concepts. Computers In The Schools. 2(4), 79-85.

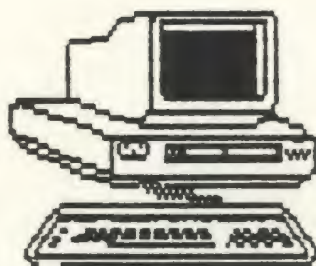
- Dyrli, O.E. (1986). Electronic spreadsheets in the curriculum. Computers In The Schools, 3(1), 47-54.
- Edwards, J.A. (1985). Two applications of computers to second language research. Transcript Analysis, 2(1), 7-16.
- Feely, J.T., Strickland, D.S. and Wepner, S.B. (1987). Computer as tool: Classroom application for language arts. Computers In The Schools, 4(1), 1-11.
- Feigenbaum, E. and Barr, A. (1982). The Handbook of Artificial Intelligence, 1. Stanford: Heuristic Press.
- Gale, L.E. (1983). Montevideo: An anecdotal history of an interactive videodisc. CALICO Journal, 1(1), 42-46.
- Germain, C. and Leblanc R. (1986). La pédagogie de la communication: Essai de définition. In Boucher, A.M., Duplantie, M. and Leblanc, R. (Eds.). Propos sur la pédagogie de la communication en langues secondes. Montréal: Centre Educatif et Culturel.
- Harvey, T.E. (1987). Second-language composition instruction, computers and first language pedagogy: A descriptive survey. Foreign Language Annals, 20(2), 171-180.
- Henry, G.M., Hartmann, J.F., and Henry, P.B. (1987). Computer-controlled random-access audio in the comprehension approach to second-language learning. Foreign Language Annals, 20(3), 255-261.
- Higgins, J. and Johns, T. (1984). Computers in Language Learning. Aylesbury: Hazell, Watson and Viney.
- Holmes, G. (1983). Creating CALL courseware: Some possibilities. System, 11(1), 21-32.
- Holmes, G. and Kidd, M.E. (1982). Second language learning and computers. Modern Language Review, 38(3), 503-516.
- Hope, G. (1982). Elementary French computer-assisted instruction. Foreign Language Annals, 15(5), 347-353.
- Horwitz, E.K., Horwitz, M.B. and Cope, J. (1986). Foreign language classroom anxiety. The Modern Language Journal, 70(2), 125-131.

- Hoskins, V. (1988). The use of the computer as an instructional aid in teaching French in Newfoundland. Unpublished master's thesis, Memorial University of Newfoundland, St. John's, NF.
- Jones, B. (1985). Call for help ... computer-assisted language learning. Modern Languages, 66, 45,47.
- Kearsley, G. and Hunter, B. (1983). Electronic education. High Technology, 38-44.
- Kemp, J.E. (1985). The Instructional Design Process. New York: Harper and Row.
- Krashen, S.D. (1981). Second Language Acquisition and Second Language Learning. New York: Pergamon Press.
- Lessard, G. (1986). The presentation of vocabulary in computer-aided instruction. The Canadian Modern Language Review, 43(1), 94-107.
- Mendrinós, R.B. (1986). Uses of databases in the classroom. Computers In The Schools, 2(4), 65-70.
- Milot, J.G. (1981). La pédagogie de la communication. Programme du Colloque Québec-Belgique, PPMF primaire, Université de Montréal.
- Mydlarski, D. (1985). How communicative can a computer be? The Canadian Modern Language Review, 42(1), 75-82.
- Obadia, A.A. (1986). Le VICF: Un vidéodisque interactif et communicatif de français. CONTACT, 5(4), 2-5.
- Papert, S. (1980). Mindstorms: Children, Computers and Powerful Ideas. New York: Basic Books.
- Paramskas, D.M. (1986). Artificial intelligence in computer-assisted language instruction. The Canadian Modern Language Review, 42(3), 619-628.
- Pérez, M. (1986). Techniques de correction dans les discussions de groupes. Dedactique en Question, Beloeil: Editions La Lignée, p. 210-221.
- Richards, J.C. (1984). Error analysis, interlanguage, and second language acquisition: A review. In The Context of Language Teaching. Cambridge: Cambridge University Press.

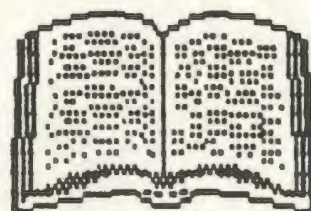
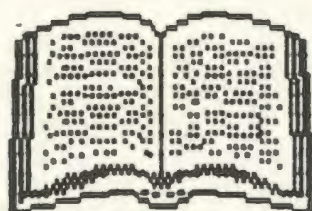
- Robinson, G. and others. (1985). Computer-assisted instruction in foreign language education: A comparison of the effectiveness of different methodologies and different forms of error correction. (Contract No. G008402275). San Francisco, CA: Center for Language and Cross-Cultural Skills. (ERIC Document Reproduction Service No. ED 262 626).
- Sakamoto, E. and Ullmann, R. (1987). Teacher Manual for "The Treasure of Ile Madame". Toronto: Evannah Sakamoto and Rebecca Ullmann Educational Consultant Inc.
- Savignon, S.J. (1983). Communicative Competence: Theory and Classroom Practice. Reading, MA: Addison-Wesley Publishing Company.
- Sayers, D. and Brown, K. (1987). Bilingual education and telecommunications: A perfect fit. The Computing Teacher, 14(7), 23-24.
- Taylor, R.P. (Ed.). (1980). The computer in the school: Tutor, tool, tutee. New York: Teacher's College Press.
- Thiagarajan, S., Semmel, D.S. and Semmel, M.I. (1974). Instructional development for training teachers of exceptional children: A sourcebook. Bloomington, Indiana: Indiana University.
- Thrush, J.A. and Thrush, R. (1984). Microcomputers in foreign language instruction. Modern Language Journal, 68, 21-27.
- Underwood, J. (1982). Simulated conversation as a CAI strategy. Foreign Language Annals, 15(3), 209-212.
- Widdowson, H.G. (1984), Exploration in Applied Linguistics 2. Oxford: Oxford University Press.

APPENDIX A

Computer- Assisted Language Learning



A Handbook



Ivan J. MacDonald

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Foreward

As computers have made continuing inroads into the field of education, many teachers have expressed a need for information on computers and their application to the classroom. A survey of Newfoundland and Labrador second language teachers with respect to computer-assisted language learning (CALL) was conducted by Hoskins (1988). This survey identified three major needs of second language teachers:

1. knowledge of and experience with computers
2. knowledge of the application of computers to second language teaching, and
3. guidance in the evaluation and selection of software

In response to these needs, a handbook has been developed to present the current status of CALL. This handbook is not intended to replace hands-on experience with the computer; rather, it is intended as a reference source to be read and consulted when necessary.

The beginner is provided with some of the basic concepts in microcomputer use. An advanced section, intended for previous computer users, provides information about some of the additional features available for the microcomputer and computer-assisted language learning.

Both users and nonusers are provided with information on the application of computers to the second language classroom. Information is also provided on the evaluation and selection of available software. A short self-test section is provided at the end of each section for those wishing to examine their mastery of the topic.

Appendices contain lists of useful books and articles, addresses, a software evaluation checklist, and a glossary of terminology for quick and easy reference.

Computers can provide beneficial and interesting experiences in the learning of a second language. This handbook presents teachers with information which will be useful in introducing the computer to their second language classrooms.

Ivan J. MacDonald

COMPUTER-ASSISTED LANGUAGE LEARNING

Introduction

The computer is the Proteus of machines. Its essence is its universality, its power to stimulate. Because it can take on a thousand forms and can serve a thousand functions, it can appeal to a thousand tastes.

(Papert, 1980, p. 3).

Computers have become an integral part of our modern world. Virtually all areas of life including travel, business, and entertainment have been influenced by growth in computer technology. The original computers developed in the 1940s were large, expensive, and required highly trained experts to operate. In the 1970s, a far reaching innovation took place in the field with the introduction of small, powerful and relatively inexpensive computers. These "desktop" microcomputers are now found in many homes and most businesses and schools. Most importantly, they can be operated by non-experts who have had only a limited introduction to computers.

The original uses of computers in schools were restricted to mathematics and science classes as computers were seen to be scientifically oriented. Recently, however, computers have moved into most areas of education from social studies and physical education to English and French language instruction. Increasing numbers of

teachers have gained experience and training in computer use.

Computer-assisted instruction (CAI) has evolved around three instructional ideals:

1. Individualization - students can work alone and at their own pace.
 - Possibilities for remediation and enrichment exist.
 - A systems approach consisting of a learning hierarchy with a diagnostic mechanism is used.
2. Data collecting and record keeping - collection of data on any interaction between the student and the computer.
3. Answer judging - the computer informs the student if his answer was right, wrong or somewhere between. Information is often kept on these answers. (Chapelle & Jamieson, 1986).

Computer use has many applications for second language learning. Authentic communication experiences for students are provided through many aspects of computer use. Opportunities exist not only for communication between the student and the computer but also for communication among students working in groups or as a class. The computer can teach new information, supply drill-and practice on previously learned information, or provide useful tools in working with information.

Features such as sound, colour, and graphics provide interesting new formats to enhance motivation and present materials in exciting and innovative ways. As an example, a simulated visit to Normandy would present an engaging supplement to discussions on this area of France. These and other applications of computer-assisted language learning are presented later in the handbook.

The following section "The Microcomputer System (Basic)" contains some of the basic concepts of computer use for persons with no previous experience in computer use. Persons with previous computer experience are asked to proceed to the advanced section beginning on page 14.



The Microcomputer System (Basic)

Note: Persons with previous computer experience may wish to skip this section and go directly to the advanced section, pages 14 to 22.

Components

A microcomputer system is a small, usually desktop computer system consisting of various components - much like a stereo system is composed of speakers, turntable, cassette deck, and so forth. The most common components of personal computers (PC's) are the keyboard, monitor, central processing unit, disc drive, and printer. (See Figure 1).

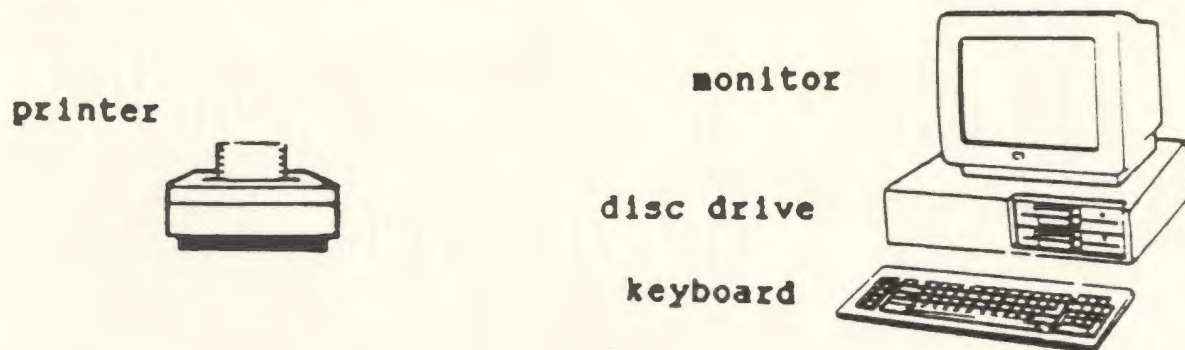


Figure 1. - Common microcomputer configuration.

The keyboard or disc drive may be used to house the central components of a computer: the Central Processing Unit and memory chips. All the components of a microcomputer, except the keyboard, screen and CPU, are referred to as peripherals. A description of the components of a microcomputer system, along with a description of discs, is found below.

Keyboard

A computer keyboard is used to enter information into a computer. Most keyboards consist of three sections:

(i) a typewriter key area, (ii) a special set of function keys, and (iii) a numeric key pad useful in carrying out mathematical calculations.

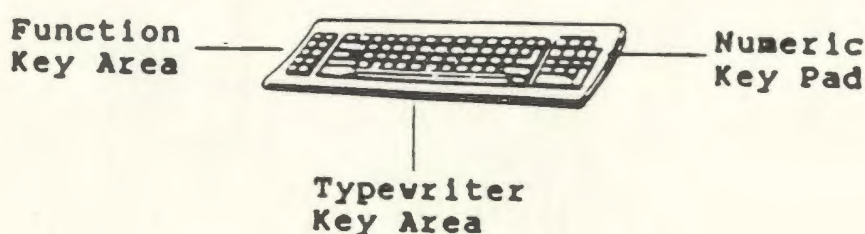


Figure 2. - Computer keyboard.

Disc Drive

A disc drive is a peripheral device used to store and retrieve information on discs.

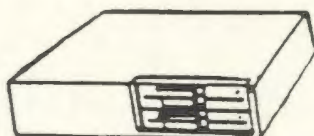


Figure 3. - Disc drive.

Information sent from a disc drive is copied into the computer memory. Information sent from the computer to a disc drive is recorded on discs.

Discs

Information may be output to disc drives to be recorded on memory storage devices called discs. There are several types of discs. The most common of these is the floppy disc. Floppy discs measure 5.25 inches in diameter and are encased in a flexible plastic jacket. (See Figure 4).

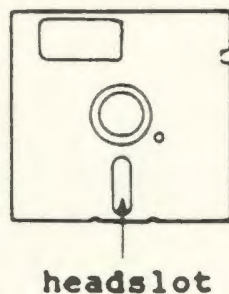


Figure 4. - The Floppy Disc.

Information sent from a disc to the computer is not lost from the disc. A copy has simply been made in the computer memory.

New 3.5 inch discs are also finding a place in the computer disc market. These discs hold three times as much information as the 5.25 inch floppy. Unlike the flexible plastic case of its larger relative, the 3.5 inch disc is encased in a hard plastic container. Much of the commercially available software is available on floppy or 3.5 inch disc.

Central Processing Unit

The Central Processing Unit, (CPU), performs all of the calculations and directs the operation of all the other components of a computer. It is the "brains" of a computer.

The CPU consists of three sections: (i) an Arithmetic Logic Unit (ALU) for carrying out many of the mathematical calculations required in data processing, (ii) memory chips for short term storage of information and software instructions, and (iii) a Control Unit to control input, processing of information, and functioning of the ALU.

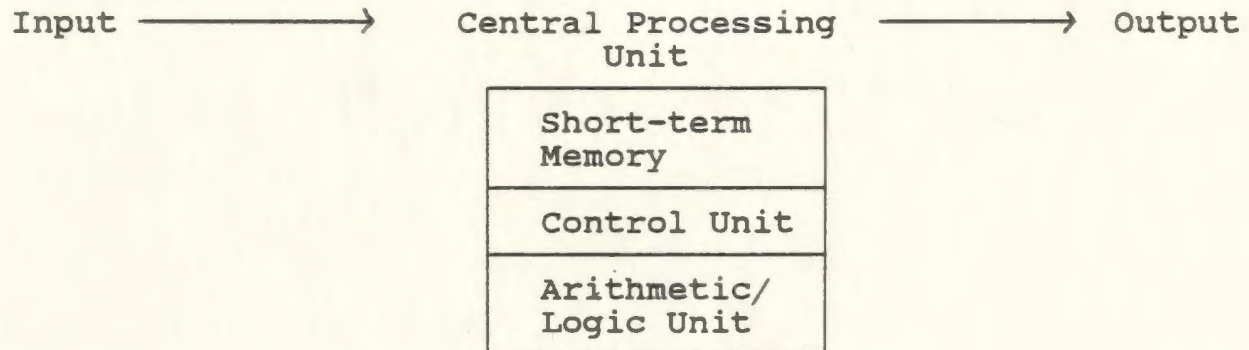


Figure 5. - Central Processing Unit.

Monitor

The monitor is a device for displaying the contents of the Central Processing Unit on a screen similar to a television screen. One of the common features of the monitor is the cursor - a blinking signal indicating the placement of the next character on the screen. Monitors may be either monochrome or colour.

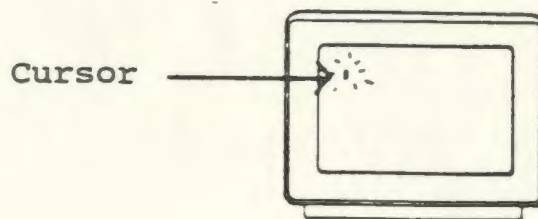


Figure 6. - Monitor

Printer

The printer is another device used to present information from the the computer and from discs. Printers enable the user to obtain a paper copy (hard copy) of the information being sought. The most common printers in school settings are dot-matrix printers and daisy-wheel printers.

Dot-matrix printers print a combination of dots together to form letters. Quality with these printers ranges from a low quality dotty appearance to Near Letter Quality (NLQ) print. Daisy-wheel printers have a print wheel with characters molded onto the edge. This wheel

rotates until the desired character can strike the paper.
The quality of the print is usually similar to that of
print from a typewriter.

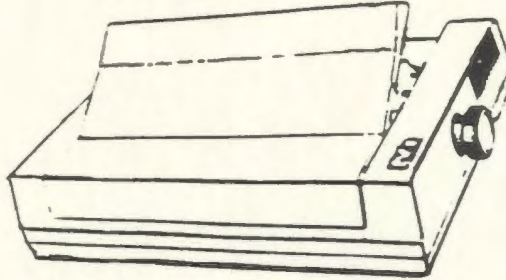


Figure 7. - Printer.

```

*****
*
*   Question:
*
*   Can you name the five common components of a
*   microcomputer system? (You may check your
*   answer in the previous section.)
*
*****

```

The Operating Process

The microcomputer system is used:

1. to enter or "input" information,
2. to process or store information, and
3. to retrieve or "output" information.

Let us look at each of these stages in turn.

Input

Information is usually entered into a computer through a keyboard. The computer operator simply types in the information to be entered. Information may also be "input" to the computer from disc drives through commands entered via the keyboard.

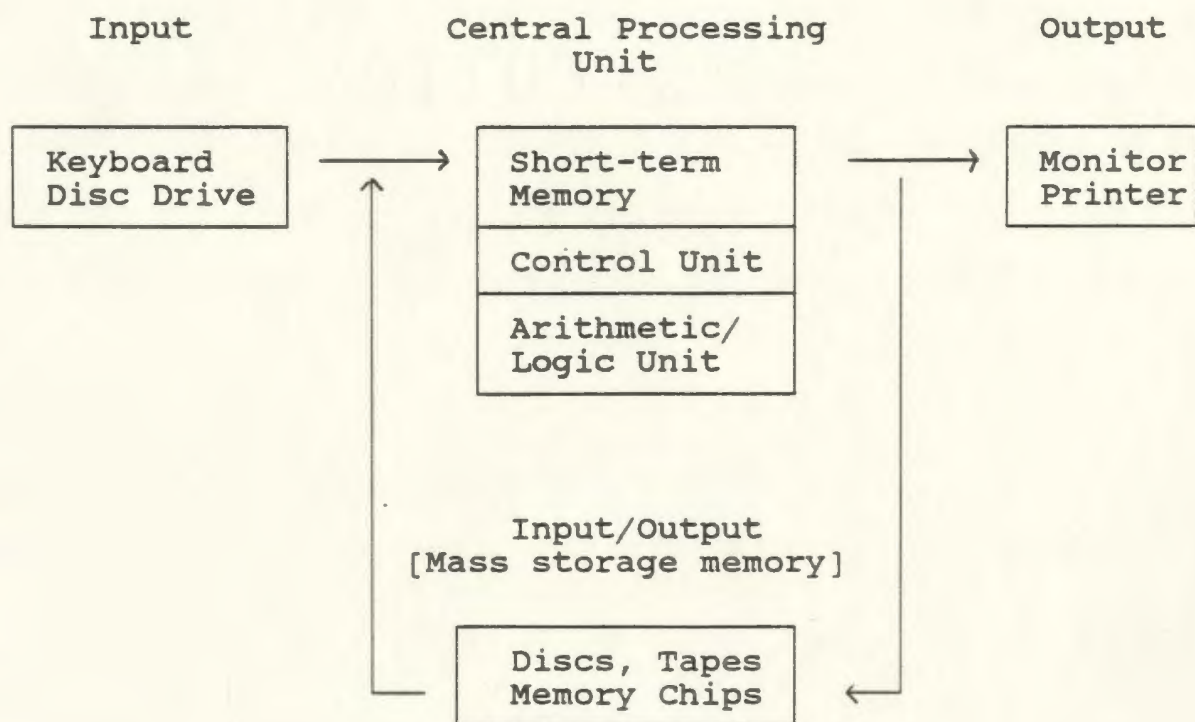


Figure 8 - Processing Information on a Computer System

Processing

Processing is carried out with the help of the two central features of the computer - the Central Processing Unit (CPU) and memory chips. Movement of information to and from the CPU is controlled by an operating system which manages the computer and its peripheral devices. Many operating systems are incorporated into disc operating systems (DOS) which also control the movement of data to and from discs. Well-known names of operating systems include MS DOS, Commodore, and Apple. Information entered into a computer goes to the Central Processing Unit where commands are carried out and information is stored in the memory. When the memory of the CPU is full, information is sent out to be stored on memory chips until it is ready for output or is no longer needed. The size of the memory of a computer is very important since it determines the capacity, the efficiency and the speed of the system operation.

Memory capacity is measured in terms of kilobytes (K) or megabytes (M). A kilobyte holds 1 024 bytes of information with one byte being the amount of memory needed to store one character of text. Many of today's microcomputers have 64, 128, 512, or 640 K of memory.

There are two kinds of memory used in a computer system: Random Access Memory (RAM) and Read Only Memory (ROM). Random Access Memory is used to store new data and programs entered by the user. When power to the computer is shut or cut off, information stored in RAM is lost. For this reason, a computer operator wishing to save information put into the computer must copy it on disc before turning off the computer.

Read Only Memory consists of memory chips, programmed by the manufacturer, which cannot be accessed or altered by the computer user. Commands which allow the computer to function are located in ROM memory.

```
*****
* Pause for Thought:                                *
*                                                     *
* 1.   Why is it important to copy any information  *
*       you wish to keep onto disc before shutting *
*       off your computer?                          *
*                                                     *
* 2.   Your school computers have how many kilobytes *
*       of memory?                                   *
*                                                     *
*****
```

Output

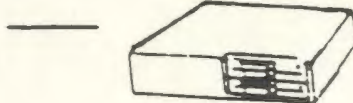
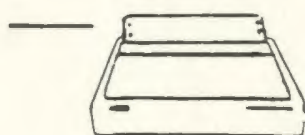
When information is ready to be output from the memory, a command sends the information to one or several output devices. The most common of these is the monitor. Information from the computer may also be sent to another common output device - the printer.

Reference was made earlier to disc drives as sources of "input" information. The same disc drive can also be used to "output information"; that is, information can be sent from the computer to the disc drive. In other words, disc drives are both input and output devices.

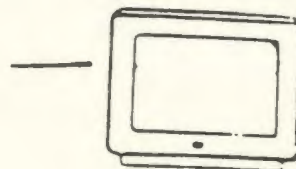
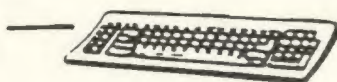
The information storage, processing and output capabilities of the microcomputer have provided a valuable tool for today's society and today's schools. As microcomputer use has become more widespread, certain features of the microcomputer have come to light. Please complete the self quiz on the next page and then proceed to page 18 for further information on some of the features of microcomputers which have a relevance to computer-assisted language learning.

Self-Quiz #1 (Basic)

1. [To be answered by persons without previous computer experience]
Label the following microcomputer components by placing the correct letter in the space provided by each picture.



- a. disc drive
- b. monitor
- c. printer
- d. keyboard



2. [To be answered by persons with no previous computer experience]
Label each of the following as I (Input), O (Output), or I/O (Input/Output) devices:

- | | |
|---------------------|-------------------|
| a. _____ printer | c. _____ monitor |
| b. _____ disc drive | d. _____ keyboard |

3. The two central components of a computer are:
- a. Central Processing Unit and Keyboard
 - b. Memory Chips and Monitor
 - c. Central Processing Unit and Memory Chips
 - d. Keyboard and Monitor

(Check your answers in the preceding section.)

The Microcomputer System (Advanced)

Note: Before reading this section, the reader requires some knowledge of the computer including familiarity with the following components: monitor, disc drive, keyboard, and printer. As well, an understanding of the basic concepts of input, processing, output, CPU, and memory storage is desirable.

Introduction

The growth of technology in today's world is increasing at a phenomenal rate. In the area of computers, new capabilities and features are constantly being developed to keep pace with growing demands. This section presents some of the additional features of computer hardware for teachers who already possess a basic knowledge of the computer and wish to delve deeper into some of the present possibilities for computer-assisted language learning.

Input Devices

Information to be processed in a computer must first be fed into the computer. The most common input devices include the keyboard and disc drive. In addition to these devices, there are a number of other input devices available for use with microcomputers. Several of these input devices will be discussed below.

Mouse

The mouse, a palm-sized input device, is rolled along a flat surface such as a desk top. The direction in which the mouse is rolled determines the movement of the cursor on the monitor. Two keys or buttons on the mouse enable the user to send commands such as select, pick up, or enter.

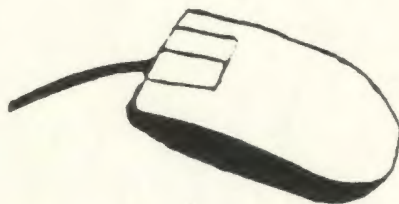


Figure 9. - Mouse.

Light Pen

The light pen is a device which enables users to select answers and input information by touching the monitor or display unit in the appropriate place with the light pen. The signal is sent from the light pen through a connecting wire to the computer for processing.



Figure 10. - Light Pen.

Joystick

The joystick is a familiar input device to many video game players. The joystick, similar in appearance to a gearshift on a car, can be moved in any direction, thereby causing the cursor or character to move on the screen. The push of a button on the joystick sends a command to the computer to select an option or enter a command such as "jump".

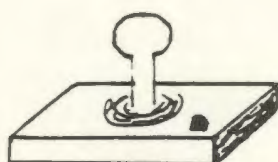


Figure 11. - Joystick

Graphics Tablet

The graphics tablet, also known as a graphics pad, is an input device often used with graphics packages. This device consists of a rubber or plastic pad on which the user presses some blunt object such as a pen tip cover. The direction of movement of the blunt object on the pad controls the direction of movement of the cursor, thereby allowing the user to create drawings and images at will.



Figure 12. - Graphics Tablet.

Disc Drive

The disc drive, a more common input device, can be used to input information not only to one's own computer but to other computers as well. This may be accomplished through a system of piggy-backing - the connection of several computers to one disc drive. The teacher can then load a program into several computers without having to continually move the disc. The discs are also spared the dangers of too much handling by students. Networks may also be set up to connect several computers. This may be accomplished through direct connection or through the use of the telephone lines using a device called a modem (See Input/Output, p. 21).

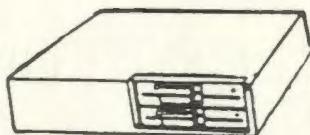


Figure 13. - Disc Drive.

Processing

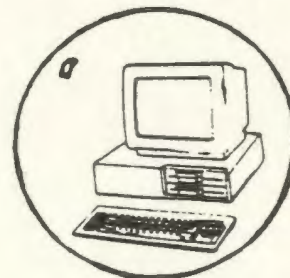
Information which has been entered or "input" into the computer goes to one of the two central components of the computer: (1) the Central Processing Unit (CPU) or (2) Memory chips for processing or storage. New advancements in computer technology have greatly increased the processing and storage capabilities of today's microcomputer. Some of these advancements are outlined below.

Multi-Processing

The new generation of computers is moving in the direction of "multi-processing". Multiprocessing involves the running of more than one program at a time. This feature promises to be common on microcomputers in the near future.

Bubble Memory

New computers are also moving toward the development of bubble memory. This new type of memory would keep information and commands in the computer memory from being lost when the microcomputer system is shut down. This safeguard would be especially useful in the case of power failures or power surges.



Hard Disc

The "hard disc", another form of storing information in memory, has become a common feature on many of today's microcomputers. This hard disc or "hard drive" is installed in the computer and can be used to store many megabytes of memory. One megabyte can hold approximately 1 000 000 bytes of information. These discs are built into the disc drive so are not subject to frequent handling by the user. Similar to a 45 rpm record in appearance, hard discs receive information from the computer and record this information on one of the two recording surfaces - top or bottom. Computers with hard drives usually have 20 or 30 megabyte memory capacity. The new Compaq computers offer 110 and 300 megabyte memory storage.

```
*****
*                                     *
*   Question:                       *
*                                     *
*   Can you name the two central features of the *
*   Microcomputer?                 *
*                                     *
*****
```


Output Devices

Monitors and printers constitute the "output only" components of a microcomputer system. Progress has been made in each of these areas to improve the capabilities of these components. Monitors are now available to provide higher resolution graphics and other images. These monitors provide higher density and therefore "sharper" images; however, they are as yet fairly expensive.

Another fairly expensive output item on the market is the laser printer. These printers produce very high quality print and are quieter than the dot-matrix and daisy wheel printers.

Input/Output Devices

In addition to the disc drive, the modem is an input/output device which has increased in popularity and usage in the 1980s. The modem connects two or more computers by providing a telephone hook-up. This device is usually connected to a telephone outlet and to the computer. Information may then be sent and received, through the phone lines, to or from a computer or an electronic bulletin board at the other end.

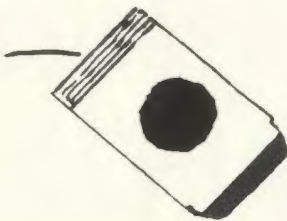


Figure 14. - Modem.

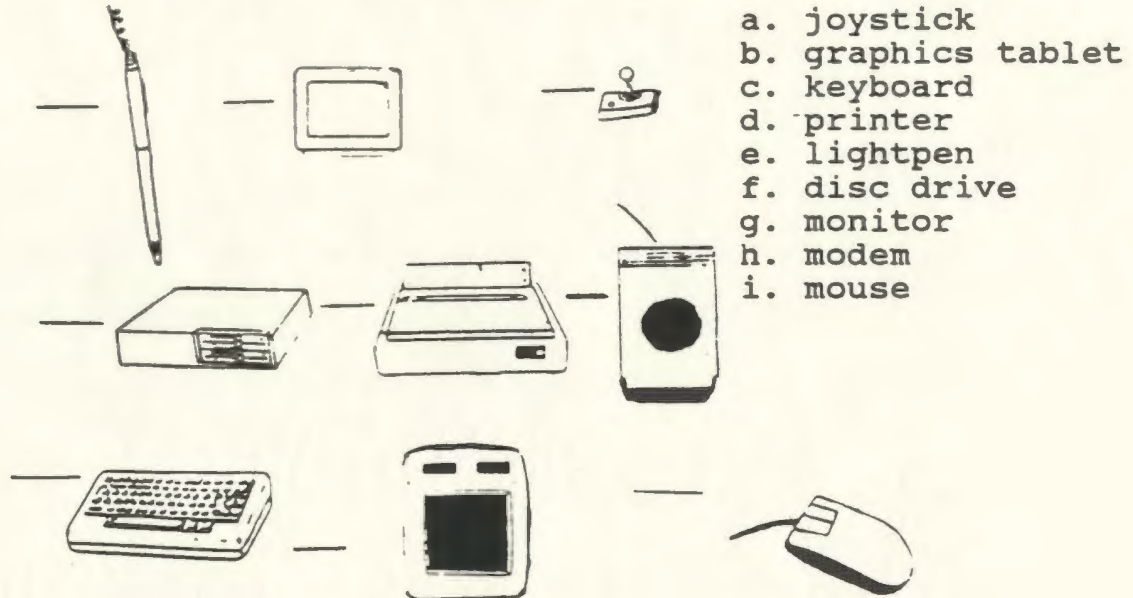
Modems may be especially useful in language learning by providing a means for cheap communication with people of other cultures and languages. Sayers and Brown (1987) set up a system of computer networks so that students in New England who were studying Spanish could actually communicate by computer to Spanish speaking students in Mexico and Puerto Rico. Information was sent, using modems, to electronic bulletin boards and forwarded at the least expensive times so that large batches of student writings were transmitted for less than a dollar.

The rapid growth of computer technology promises many more advancements in the not too distant future. These advancements, along with present technology, promise to further enhance the application of computers in second language learning.

Self-Quiz #1 (Advanced)

1. [To be answered by persons with previous computer experience]

Label the following microcomputer system components by placing the correct letter in the space provided by each picture.



2. [To be answered by persons with previous computer experience]

Label each of the following as I (Input), O (Output), or I/O (Input/Output) devices:

- | | |
|-------------------------|--------------------|
| a. ____ joystick | f. ____ disc drive |
| b. ____ graphics tablet | g. ____ monitor |
| c. ____ keyboard | h. ____ modem |
| d. ____ printer | i. ____ mouse |
| e. ____ light pen | |

3. The two central components of a computer are:

- a. Central Processing Unit and Keyboard
b. Memory Chips and Monitor
c. Central Processing Unit and Memory Chips
d. Keyboard and Monitor

(Check your answers in the preceding section.)

Features of the Microcomputer

The computer possesses special features which lend themselves to second language learning. These features are not intended to replace the features of the teacher for "there is a warmth and immediacy in contact with another human being which no amount of electronics could ever replace" (Higgins & Johns, 1984, p. 8). The computer is a classroom tool which uses special features to promote fluency in second language students. These special features, as identified by Ahmad et al. (1985), include:

1. Interactivity - The computer can send messages and receive and assess student responses.
2. Accuracy and Precision - The computer does not make mistakes. Humans entering information into the computer may make mistakes; however, because the computer cannot think, it can only react as programmed.
3. Stamina - The computer doesn't tire or falter. The same information will be presented in the same way repeatedly with no loss of enthusiasm.

4. Impartiality - The computer is as impartial and unbiased as the material typed in.
5. Processing of Large Volumes of Interaction - Rapid advancements in technology have led to the capability of computers to process large volumes of interaction quickly and efficiently. The new supercomputers can process in excess of one billion instructions in less than a second.
6. Frequent Feedback - The large number of students in a class means that the teacher's attention is divided and individual feedback is difficult. One or several students at a computer have the attention of that computer, thereby receiving feedback at more frequent intervals than would be possible with a human teacher.
7. Time flexibility - Students may be scheduled for time at the computer any time during the school day or outside school hours. Drill-and-practice exercises are especially suitable for scheduling outside class time, thereby freeing the teacher to work in situations where teacher-student contact is more desirable. Students who have completed work or who need remediation or

enrichment may make use of the computer at any time.

8. Accommodation of a Variety in Learning Speeds -
The computer can run programs which present material at various speeds and levels of difficulty. Built-in remedial loops also provide help for students who run into difficulty. Many computer programs also provide a help facility to supply clues, questions or answers to needy students. In this manner, the computer can accommodate a variety of learning speeds.
-

Self-Quiz #2

1. Place a checkmark beside those of the following which are features of the microcomputer.

<input type="checkbox"/> Frequent Feedback	<input type="checkbox"/> Impartiality
<input type="checkbox"/> Intelligence	<input type="checkbox"/> Colourful
<input type="checkbox"/> Interactivity	<input type="checkbox"/> Accommodation
<input type="checkbox"/> Stamina	<input type="checkbox"/> of a variety
<input type="checkbox"/> Time Flexibility	<input type="checkbox"/> of Learning
<input type="checkbox"/> Accuracy and	<input type="checkbox"/> Speeds
<input type="checkbox"/> Precision	<input type="checkbox"/> Processing of
	<input type="checkbox"/> Large Volumes
	<input type="checkbox"/> of
	<input type="checkbox"/> Information

Software and Computer Use In Second Language Learning

The various hardware components and features of the microcomputer, in combination with appropriate software, can help provide a valuable tool for students of French language. How can a computer be successfully applied to the second language classroom? The various uses of the computer in the French classroom are explained as the various types of software and their applications are described below.

Types of CALL Software and Their Application to Second Language Learning

"Software" refers to programs recorded for use on a computer system. These programs are usually stored on discs in a manner somewhat similar to the way words or music are recorded on records or audio tape. Teachers competent in computer programming can create their own software; however, most teachers do not have sufficient training to do this. Fortunately, much software exists that can be purchased and run by teachers and students who are not computer "experts".

The different types of software available for use in computer-assisted language learning include: drill-and-practice, tutorial, simulation, games, problem solving, and tool uses.

Drill-and-Practice

Description

Drill-and-practice programs are the most common type of second language software on today's market. This type of program does not attempt to teach new information; instead, it presents the opportunity to work on examples of previously learnt information. Drill-and-practice exercises often consist of providing correct endings, agreement, or some other aspect of grammar or syntax. The most commonly used structure for drill-and-practice exercises is as follows:

1. Select task or question
2. Display question
3. Accept student's answer
4. Match answer against acceptable answer(s)
5. Report success or failure
6. Adjust student's running score
7. Return to (1).

(Higgins & Johns, 1984. p. 39)

Application

Drill-and-practice exercises form a part of most second language programs. Computerized drill-and practice exercises can help make this type of exercise more motivating and rewarding by presenting a game or simulation format, and by using images, colour, competition, and sound to capture student interest. These aspects provide motivation for the learner and bring new life to an otherwise dull or boring exercise.

The computer may also provide immediate reinforcement and help where necessary. The computer lets the student know if the answers are correct or incorrect. In some cases, the student may avail of a "help" facility to provide clues or information. In other cases, the student having difficulty may branch into a remedial loop to review the rules for conjugation of "er" verbs before returning to regular work on the exercise.

At the end of the exercise, some programs provide the teacher with information on the number of correct/incorrect answers given by each student. Patterns of difficulty may also be provided to help the teacher identify problem areas which need extra instruction.

Through drill-and-practice exercises, the learner is afforded the opportunity to practice and internalize the points and concepts of grammar and usage involved in language learning. Many of these exercises were included

in the structural approaches to language learning used in the past.

Purpose of Drill-and-Practice

Some educators have had difficulty in reconciling drill-and-practice exercises with the communicative approach. The place of rote structural exercises in an approach which places emphasis on the use of the target language in real and meaningful situations of communication has been questioned.

Krashen (1981) provided an answer to this question in his theory of language acquisition and learning. He proposed "acquisition" as an unconscious process through which one learns a system of communication little by little as a result of true communication experiences. "Learning" on the other hand, is a conscious process of studying the language, its rules and forms. This learning acts as a monitor, standing by to correct errors in speech which emerge from the acquisition aspect of one's language capability.

Widdowson (1984), makes a similar distinction in referring to language as communication and language for communication. He states,

Drills which provide repetitive practice for sound discrimination or for the absorption of sentence patterns into habitual behaviour do not of their very nature deal with authentic language as communication. But they could provide an indispensable service in developing language for communication. (p. 219)

Drill-and-practice exercises can help prepare students for authentic communication by providing an internalized set of rules and patterns to aid in language production.

```

*****
*
*   Pause for thought:
*
*   Can you think of a game format for a drill-and-
*   practice exercise presently in use in your
*   classroom (s)?
*   Imagine this game with colour, sound, and graphics!
*
*****

```

Simulation

Description

Simulation programs place the student in an imaginary situation. Well-known examples are video games where the student makes a simulation flight in an airplane or drives a car along a simulated raceway.

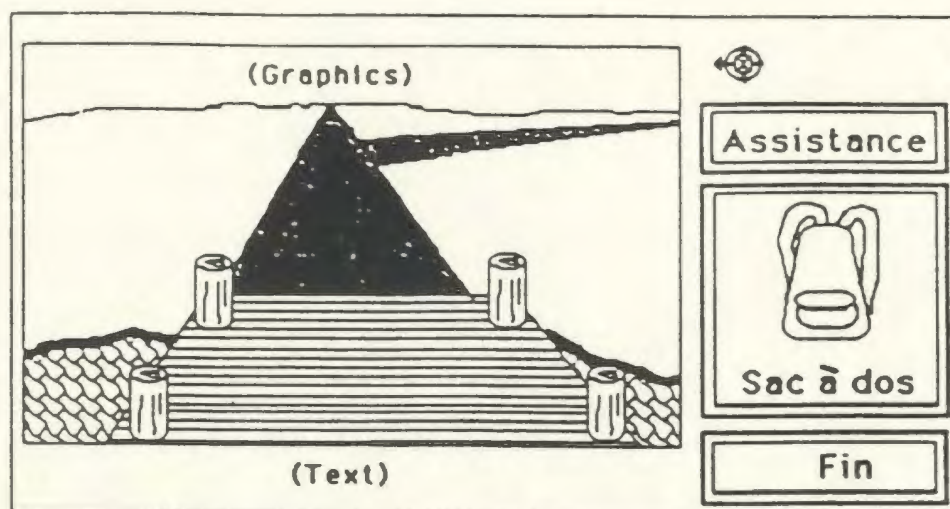
Application

"Simulations provide rich and motivating contexts for language (and other) learning by requiring users to assess and respond to changing conditions in the simulated operation of some system" (Canale et. al., 1985).

Simulations may also be used to provide drill-and-practice, for example, practicing one's numbers by telling a friend about a reading on the speedometer of a race car. Simulations may be used to play a game such as Hangman, to teach new material, or to solve a problem in an exciting new way (see The Treasure of Ile Madame discussed below).

Cultural units may also be presented through simulation programs. The program GRANVILLE takes students on an imaginary visit to Normandy, France. While there, the student is required to wisely budget and spend money over the length of the stay (Jones, 1985).

Closer to home, the program THE TREASURE OF ILE MADAME (Ullmann & Sakamoto, 1988) takes students on a simulated treasure hunt while at the same time presenting aspects of Acadian culture.



Voici Ile Madame. Nous voilà au commencement de la route qui traverse l'île. Qu'est-ce que tu veux faire maintenant? Si tu n'as pas de réponse roule la balle et place la flèche sur Assistance à droite de l'écran.

Figure 15. - Beginning keyscreen for The Treasure of Ile Madame. (Sakamoto and Ullmann, 1987, p. 2 - 2).

Real-time vs. Move-based Simulation

Simulation may be broken down into "real-time" and "move-based" simulations (Higgins & Johns, 1984).

Although "real-time" simulation may be useful, it is "move-based" simulation which has the greatest potential for second language learning.

Real-time simulation involves continuous action; the user may be penalized or fail for reacting too slowly to a situation. Students may benefit from reading simple directions or by directing another student in a group to make a specific move.

Move-based simulations will wait for user responses so that students working in groups have time to discuss

possible moves or ramifications. Although students may at first be tempted to talk in their mother tongue, continued use of the program results in eventual communication in the target language used to present the problem.

This type of simulation should have great potential for the future as it clearly promotes thinking and decision-making in the foreign language; this is a skill that is generally regarded as extremely difficult to obtain in foreign language instruction. (Cox, 1985, p. 7).

```

*****
*
* Question:
* What are the advantages of simulation use in group
* situations?
*
*****

```

Games

Description

Games have long been a favourite activity of both children and adults. Second language learning has always made use of games to provide practice and moments of relaxation for students. Today, there is an abundance of computer games designed for the second language learner. These games may be: a) educational in nature, b) adventure games, or c) some combination of a and b. According to Ahmad et al., (1985), games may be divided into two types: competitive and collaborative.

Competitive games have the player either winning or losing against an opponent or the computer, based upon a system of points.

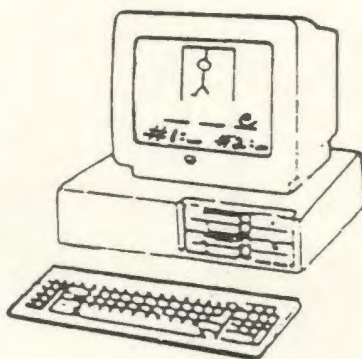


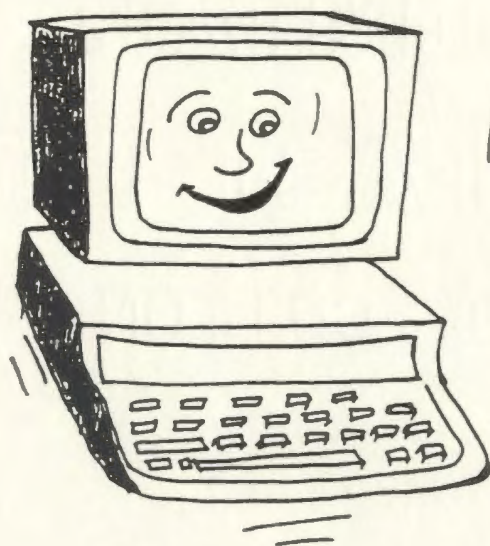
Figure 16. - Game.

Collaborative games have the student and perhaps the computer working together toward some common goal, for example, building a bridge.

Application

Games may be used to present problem solving opportunities or to provide reinforcement of vocabulary or grammar skills.

Games may also be used to provide moments of relaxation and amusement while at the same time exposing students to authentic situations of communication. Motivation and communication are two of the major benefits of game use in the second language classroom.



Tutorial

Description

A tutorial program combines elements of drill-and-practice with presentation of new material. A tutorial program sees the content to be learned divided into a series of small steps with students mastering one step before moving to the next. Higgins and Johns (1984) describe the process of constructing a tutoring lesson as follows:

1. Identify the skill or block of subject matter to be taught.
2. Identify a criterion, a piece of behaviour which will show that the student has mastered the skill or subject matter.
3. Divide the subject into a series of very small steps, each of which requires at most one new concept or decision.
4. Present each step in the form of a "frame" containing any necessary exposition and a question. The question in the last frame or frames will embody the criterion behaviours.
5. Make the student give an overt answer to each question, usually by writing down a letter or word.
6. Then let the student check that answer against the right answer before continuing. (p. 51)

An example of tutorial software is a series of six thematic beginning French tutorial programs available from D.C. Heath and Company. These programs include drill-and-practice exercises, as well as the introduction of new vocabulary and grammatical structures.

Application

Tutorial packages may be used to provide individualized instruction in situations where teacher-student contact is impractical. A student needing tutorial work on the passé composé may work through a computer program, thereby freeing the teacher to work with the rest of the class who may not need practice on this topic. Students may be permitted some choice in the material they learn and in how far they proceed. Individualized learning is thereby provided in accordance with students' interests and abilities. One-to-one teaching is often impractical in a classroom situation; however, the computer can become a patient and attentive teacher.

Tutorial programs may also be used to present information in new or more exciting ways. The use of computer features such as colour, sound and graphics may hold student interest and provide motivation to learn a new concept. Programs such as these may be useful with a whole class where a large monitor may be set up at the front of the room. Tutorial programs may also be used with a group or with individuals.

Second language tutorial packages may also be used to present cultural components. An example is the simulation package THE TREASURE OF ILE MADAME discussed previously. This package mixes elements of simulation and adventure games with tutorial information on Acadian culture.

```
*****
*
* Question:
*
* Can you name three reasons for using a computer
* tutorial program in your classroom?
*
*****
```

Problem Solving

Description

Problem solving programs are also available for use in the second language classroom. These programs often involve simulation where the learner is required to solve a problem presented in the simulation, for example finding one's way to a grocery store or solving a mystery.

Problem solving may also involve word or mathematical problems such as those often found in social studies or mathematics textbooks. Programs are also available to help solve problems with communication in the target language by providing such quick reference sources as dictionaries and thesauri.

Application

Problem solving can be developed and exploited in the second language classroom through the use of computer problem solving programs. Not only can students' problem solving potential be developed, but students may also benefit from communication with others as well as through individual instruction involving authentic interaction with the computer.

One possibility is through the use of computerized story or word problems. After reading a specified amount of text, the student is required to make decisions to help solve a problem. The decision may be made by an individual or a decision may be reached through discussion

with others, thereby necessitating meaningful communication.

Computer programs may also be used in a problem solving capacity by serving as a linguistic data base to aid students in communication in the target language. Dictionary use also helps solve communication problems. THE LINGUIST, by Gessler, is an electronic dictionary which can be used to find words in 20 different languages.



Tool Uses

Programs which fit into the tool use category present no content themselves. Instead, tool uses such as word processing, databases, spreadsheets, and graphics packages help facilitate other activities.

Description - Word Processing

Word processing offers the ability to edit, to move words and blocks of text, and to add new information without retyping the whole text. The format of the text may be changed instantly from single to double spacing, from wide to narrow margins, to add spaces for drawings, and for many other uses.

Application

A word processing package can be an invaluable tool in activities such as dictation and composition. Students feel more inclined to make changes to text they have entered previously. Better essays and dictations are the result of work developed through a process of revision and addition as opposed to a quick free-write session. Word processing can also be used to create French language newspapers, menus, and many other items which may provide authentic communication experiences for students.

Description - Database

Databases can be used to collect or access information on people, events, and cultures. Information in databases is usually in the form of a file, much like a customer file in a business or patient file at a pharmacy. Information may selectively taken from these files, for example the average age of persons in the database may be calculated, assuming that information is in some part of the file.

Application - Database

Databases may be used to examine events and other cultures. Databases may also serve as a springboard for discussion of one's own culture. One might, for example, access databases to compare a list of family names in Québec to family names in St. Pierre.

Description - Spreadsheet

Spreadsheets are used to work with collections of numerical data. Information is usually stored in the form of tables with the ability to selectively recover any desired information from the tables.

Application - Spreadsheet

A spreadsheet might be used to keep track of the scores in track and field events, to compare statistics between two cultures, or to derive information for discussion of a particular topic, for example, rainfall in the Laurentians.

Description - Graphics Packages

Graphics packages are used to create interesting and imaginative designs. Many of these programs are easy to use. The student may be able to chose from pre-programmed images to create an overall effect such as a poster or greeting card. The student may also be able to use devices such as a graphics tablet to create original drawings.

Application - Graphics Packages

Graphics may be used as a topic for meaningful communication or as a visual aid to effective communication. Graphics such as the following could easily serve as a springboard for discussion of Newfoundland and Labrador culture.

"Indian Chief"

Koala Pad

Todd Hoffman, Grade 5

Kenwood Ele. School, Bend, Oregon

Mr. Reynolds, teacher



Figure 17. - Graphics

The Computing Teacher, April, 1985

Stand-Alone vs. Teacher Supplemented Programs

The various types of CALL software may come in one of two forms: stand-alone or teacher supplemented.

Stand-alone software is commercially available software with all of the content of the exercises, and possible student responses, programmed by the manufacturer. This type of program may be run only; changes or additions to the program are not possible.

Teacher-supplemented programs permit teacher input into the program. This is usually accomplished through the use of authoring systems. These authoring systems require no programming skills on the part of the teacher. Instead, they present a format for an exercise with a menu and prompts for the teacher to fill in the questions, information, vocabulary, and so forth. The teacher is thereby enabled to create an exercise on a topic and use vocabulary relevant to the learner and the instructional program.

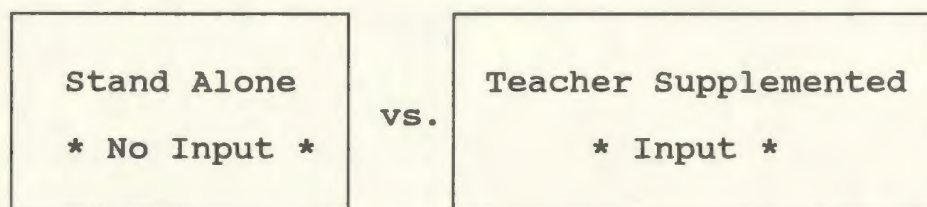


Figure 18. - Stand Alone vs. Teacher Supplemented Software.

General Guidelines for Application of CALL Software

The application of any type of CALL software to the classroom requires some preparation in order to ensure success. Students should have some familiarity with the computer before proceeding with these programs; therefore, a few introductory lessons to familiarize students with the keyboard, monitor and other parts of the computer may be useful. A few instructions and the use of one or two simple games will help students become comfortable with the computer and derive maximum enjoyment from its use.

The use of computer programs should also be coordinated with other topics and activities in the classroom as opposed to presenting topics in isolation. In some cases, such as programs presenting aspects of other cultures, a "pre-activity" and a "post-activity" may be useful. Many accompanying teacher manuals suggest introductory and follow-up activities to assist in using the package to its fullest potential.

All of the various types of software, whether stand-alone or teacher supplemented, can be used to improve students' language skills. They may be applied in areas such as: 1) grammar, 2) vocabulary, 3) reading comprehension, 4) translation, 5) aural comprehension and 6) oral proficiency. Together, these types of software help provide some of the tools necessary for a good second language program.

Note:

Differences among computers make it impossible to give explicit directions for loading and running a program; however, these directions are usually included with any good software program.

```

*****
*      Review:                                     *
*                                                    *
*      1.   What is software?                       *
*                                                    *
*      2.   What are the different types of software? *
*                                                    *
*      3.   What is the difference between "stand-alone" *
*            and teacher-supplemented software?      *
*                                                    *
*****

```


Criteria of Good CALL Software

In selecting software for use in the second language classroom, a number of criteria may be examined to determine the appropriateness of a particular CALL program. These criteria include:

- * effectiveness,
- * matching of software with learner needs and interests,
- * compatibility with program of instruction,
- * compatibility with teaching strategies,
- * appropriate error correction,
- * teacher manual,
- * cost,
- * backup policy,
- * list of materials required,
- * specified age group, and
- * loading instructions.

Effectiveness

The selection of particular software for use in a second language classroom should include an examination of the effectiveness of software. Questions might include: How well does the software accomplish what it sets out to do? How are students communicative skills improved? What are the gains from this program in terms of cognitive and affective benefits?

Effectiveness and the Communicative Approach

An effective CALL software program should provide the student with improvement in communicative ability. Some second language teachers have questioned the role of the computer in a program of instruction which follows the communicative approach. They wonder if any software program can effectively provide a communicative experience for the student. The goal of the communicative approach is to equip the student with a communicative competence - the ability to use the language rather than know the language. Emphasis is placed upon the transmission of messages in true and meaningful situations of communication. Can software programs be effective in meeting these requirements?

Yes!

An examination of good second language software reveals features of the communicative approach such as interaction, authenticity, student-based learning and cultural awareness.

Interaction, one of the cornerstones of the communicative approach, is composed of the successful transmission of messages from a sender to a receiver. Good computer-assisted language learning software enables the student to benefit from interaction between the

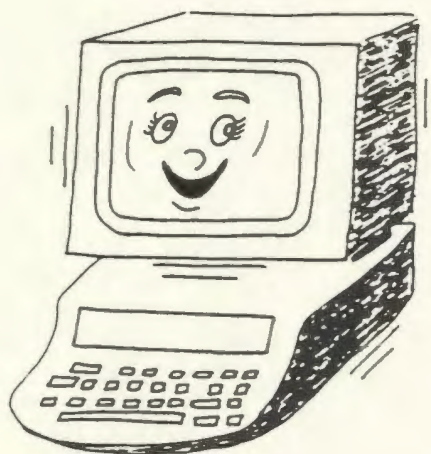


student and the computer. A message sent by the computer usually requires some kind of response on the part of the student, thereby letting the computer know if the message has been successfully sent. A message sent by a student will be analyzed by the computer to determine the correctness of a response and feedback will be provided.

Authenticity, another cornerstone of the communicative approach, is another feature of good CALL software. Authentic text can be entered into or output from the computer. The teacher can use authentic aural documents as sources of dictation to be done using word processing. Authentic aural documents can also provide information from which students must answer questions or make choices on computer.

Authentic documents can be used to place emphasis on the socio-cultural aspect of language learning. Students benefit from exposure to other cultures through the use of these materials; however, an authentic communication setting is also established in the classroom where students work in groups or as a class on a computer project. Group work is especially profitable in provoking widespread communication.

Computers are very good at stimulating people to talk and listen... . A lot of language arises out of practical necessity, since only one member of the group can comfortably operate the keyboard. The others will want to play their part in the task but can do so only by ordering, suggesting, reminding, or persuading, all language functions for which natural contexts may be awkward to create in the classroom. (Higgins & Johns, 1984, p. 37).



Authentic communication also takes place between the computer and the learner. The student must make authentic use of commands, statements and questions in order to interact with the computer.

Student-based learning, another feature of the communicative approach, is also a feature of computer-assisted language learning. Computer programs may be selected to respond to students' needs and interests. Material may be provided on various topics using a variety of approaches and levels of difficulty.

The cultural aspect of language learning can also benefit from the use of computers. Software is available which stimulates students' cultural awareness through games, problem solving, and simulated visits to other cultures. Networks may also be set up to allow reasonably priced communication with people of the target culture.

A criteria of effective software must then be that it provide a communicative experience for the student.

```

*****
*
*   Review Question:
*
*   Name four features of the communicative approach
*   which are also features of computer-assisted
*   language learning.
*
*****

```

Effectiveness and the Cognitive Domain

Good software should be examined to determine effectiveness in cognitive benefits. A good software program should realize the cognitive goals of the developer and the student to an acceptable degree.



The literature on cognitive gains with computer-assisted language learning is still inconclusive. The computer is not a panacea for all of the problems with second language teaching; however, some researchers (Chapelle & Jamieson, 1986; Ahmad et al., 1985) feel that material can be better and more quickly learnt through the use of good CALL software.

It is necessary, then, for the potential user of a particular program to examine a package to determine if it is effective in providing cognitive benefits for students. This may be done through trial use or through consultation of reviews of the software in question.

Effectiveness and the Affective Domain

Good CALL software should also be effective in providing positive affective benefits for students. Many available programs are highly motivating in terms of competition, diversity, sophistication, use of colours, and fun and games. This motivation has contributed to lower drop-out rates and longer attention spans in some language classes.

Good second language software also helps reduce student anxiety - a stumbling block in many second language classrooms. Patience and user-friendliness on the part of the computer program will help reduce this anxiety and encourage enjoyment of the second language learning process.



Matching of Software with Learner Needs and Interests

An important concern in selecting software is the matching of a program with learner needs and interests. A program that has many excellent features may not be appropriate to a particular student or class. The learner must be considered to determine if a particular piece of software is suitable for use. Aspects of the learner to be considered include:

- a) the educational needs of the student,
- b) the present level of French of the student,
- c) the interests of the student, and
- d) the past computer experience of the student.

The software, then, must be examined to determine the extent to which it matches the needs and interests of the students. This may be done through trial use or through the use of selection aids such as reviews or checklists.

Compatibility with Program of Instruction

Good software must be compatible not only with learner needs and interests but also with the program of instruction. The philosophy of instruction of the software should be consistent with the philosophy of the instructional program of the teacher and the school. This philosophy will include the approach to second language teaching and cognitive and affective goals.

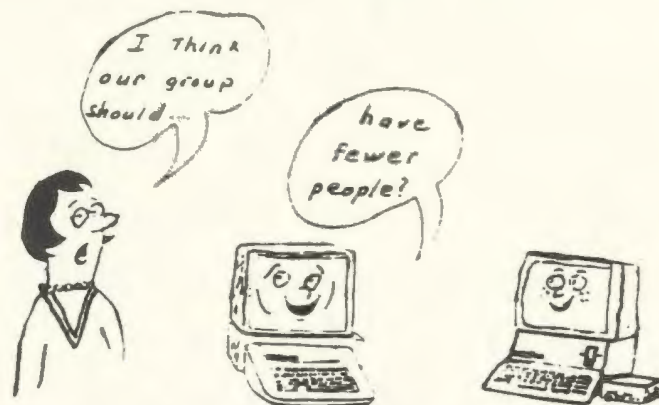
Compatibility with Teaching Strategies

The compatibility of software with teaching strategies presently employed in the classroom is also a criteria of good CALL software. Does the software take positions on teaching strategies such as self-monitoring and contextualization which are similar to those of the teacher? Does the software lend itself to class use, group use, or individual use? How do these uses match strategies used by the teacher?

Class, Group, Individual Use

Individual use of a computer program is appropriate for most types of software from drill-and-practice and individualized tutorials to word processing. A student may particularly benefit from individual use if that student fears ridicule from classmates. Individual use of the computer allows the student to make errors and to take chances with the language in a less threatening environment.

Group use of a computer program is desirable when communication between students is desired. Communication is especially encouraged through games and simulations which require the students to make, and discuss, decisions on how to proceed.



Class use is useful in teaching the class new concepts or ideas often associated with tutorial software. Class use may also be appropriate in stimulating class discussion on a variety of topics including culture, art, geography, and society.

The teacher must be comfortable with the teaching strategies appropriate for a particular piece of software. Compatibility of the teaching strategies suggested for the software with the teaching strategies used by the classroom teacher is therefore a criterion of good CALL software.

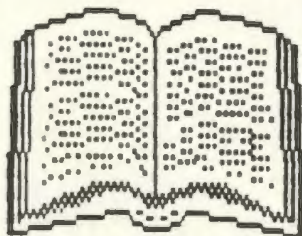
Appropriate Error Correction

Error correction has received much attention in recent language learning research (Richards, 1984; Pérez, 1986). The appropriate correction of errors is an integral feature of good CALL software. Decoo (1986) reports that "overemphasis on corection of faults can have a negative effect on learning, especially if the computer is always stopping to correct" (p. 21). At the same time, automatic and rapid correction is a major attribute of the computer. Decoo (1986) suggests a middle-of-the-

road approach for good software. Mistakes should be brought to students' attention but follow-up should be rapid and easy without too much indepth study.

Teacher Manual

Many good software programs are accompanied by a teacher manual. This manual should include introductory activities, suggestions for use of the package, and suggestions for follow-up activities. A statement of the philosophy, goals and objectives of the software also provides teachers with a clear picture of what the program is intended to achieve.



Cost

The cost of the software is an important factor in determining its selection for purchase.

Is the software cost-effective - is it good enough to warrant the price?

Would some less expensive software achieve the same goals? Would some means of instruction other than computer serve the same purpose at a lower price?

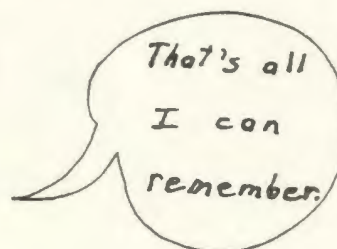
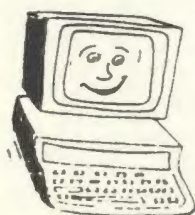
Backup Policy

Good CALL software should have a clearly stated backup policy. This may consist of allowing the purchaser to make backup copies in case the original is damaged. Often, the backup policy consists of an agreement to replace damaged software free of charge or at a nominal rate.

List of Materials Required

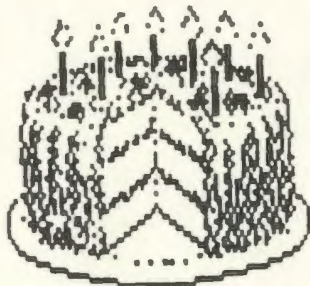
A list of materials required to run the software should be included with any acceptable CALL program. This list should include all of the necessary computer components, a list of the various operating systems on which the program will run, the memory storage capacity needed, and any other materials the student may need such as discs and light pens.

Teachers purchasing computer-assisted language learning software must be careful to select material which can run on the operating system of their school computers, such as MS DOS, COMMODORE, and APPLE. The purchaser must also be certain that the school computers have the memory space needed to hold the program.



Specified Age Group

Good CALL software should clearly specify the age group for which the software is most suitable.



Loading Instructions

The loading instructions for any piece of CALL software should be found directly on the disc sticker. Due to the variety of operating systems and computers, these loading instructions may vary from one software program to another. It is therefore necessary to have them easily accessible for quick reference.

```

*****
*
* Review Question:
* What are the criteria of good CALL software?
*
*****

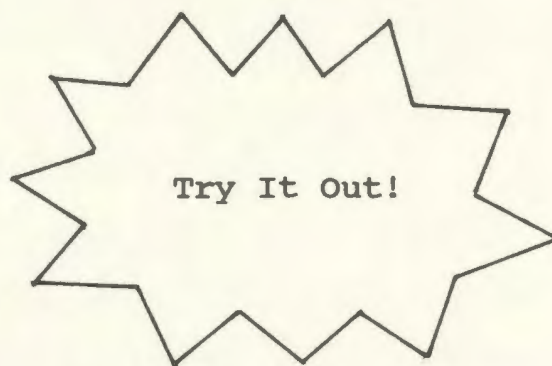
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Software Selection Procedures

The selection of CALL software for purchase or use in the classroom involves consideration of the criteria of good software outlined in the previous section. A number of selection procedures to aid the teacher in choosing suitable software are suggested in the following section.

Trial Use

Trial use involves trying the software under consideration in a class setting before buying. This software may be borrowed from colleagues or from the office of the School Board. Some software dealers will send software for preview before purchasing. Clues to the appropriateness of a program may be derived from observation, student comments, and examination of student work after exposure to the software.



Purchase on Approval

An alternative to trial use offered by some software dealers is purchase on approval. This involves the purchase of software with the understanding that any material deemed unacceptable may be returned within a certain time frame.

Peer Recommendations

Colleagues who have previously used the proposed software constitute a valuable source of information. The use of several well-directed questions may help provide a better picture of the features and capabilities of the package being considered for purchase.



Software Selection Aids

The use of selection aids provides the teacher with a systematic approach to evaluating software. A record of the results of the use of these aids can be easily preserved in school files for future reconsideration or to avoid duplication of evaluation. Two of the most common software selection aids are reviews and checklists.

Reviews

Reviews of computer software are available through:

1. professional journals such as The Modern Language Journal and CONTACT which provide a CALL software review section.
2. various magazine articles, especially in computer magazines on hardware and software.
3. the American Digest of Software Reviews which serves as a good source of information on much of the available computer software.
4. CMEC Database for Educational Software prepared by the Council of Ministers of Education, Canada. A telephone service is available for easy consultation of this database. As well, a hardcover collection of reviews will be available in the near future. For further information and catalogues, write:

Instructional Materials Division
Department of Education
Pleasantville, NF
A1C 5T7

Checklists

Along with reviews, checklists form a useful tool in the evaluation of second language software. A checklist may be prepared by the teacher or one of the many published checklists may be used. Using A Microcomputer in the Classroom by Bitter and Camuse (1988), provides several general purpose checklists for use in evaluating software. Included in Appendix A is a Computer-Assisted Language Learning Materials Evaluation Form, a checklist by Canale et al., (1985) for use in evaluation of second language software.



Self-Quiz #3

1. Match the type of program with the descriptions provided by placing a letter in the space provided.

___ Trivial Pursuit	a. drill-and-practice
___ write a letter to a friend	b. tutorial
___ an imaginary visit to a friend	c. simulation
___ place the correct ending on the verbs	d. game
___ find the quickest route from Montréal to Trois Rivières using maps	e. problem-solving
___ how to conjugate an ir verb	f. tool use

2. Label the following programs as either S (Stand Alone) or T (Teacher Supplemented):

___ a program bought by the teacher to meet student needs. She especially liked this program because provision was made for inclusion of words and ideas from any instructional program.
___ a program bought by the teacher to meet the needs of her students. She especially liked the way the material corresponded to her program of instruction.

3. Circle the letter of the factors to be considered in determining the effectiveness of software:

- a. the author of the software, cognitive gains, affective benefits
- b. Group dynamics, communicative benefits, cognitive gains
- c. Communicative benefits, cognitive gains, affective benefits
- d. all of the above

4. Place a checkmark in the space beside the criteria of good software.

☐ List of materials required is stated.
☐ Backup policy
☐ Colourful Packaging
☐ Teacher Manual
☐ Plastic case for discs
☐ Effectiveness
☐ Matching of software with learner needs and interests
☐ Loading Instructions
☐ Game format
☐ Compatability with program of instruction
☐ Specification of appropriate age group
☐ Useful in networking
☐ Appropriate error correction

5. Tell whether the following statements are true or false by placing "T" for true or "F" for false in the spaces provided.

☐ Individual computer use is beneficial to a student who fears speaking out in French class.
☐ A simulated vacation to the French Riviera is useful in creating discussion in a group setting.
☐ A tutorial on the use of the subjunctive tense is inappropriate for use with a whole class.

6. Circle the letter of the appropriate procedure(s) in selecting suitable software:

a. use of selection aids
 b. purchase on approval
 c. trial use
 d. peer recommendation
 e. all of the above

7. Circle the letter of the answer which best describes useful selection aids in identifying and purchasing suitable software:

a. magazine and computer digest reviews
 b. checklists
 c. a and b
 d. none of the above

Limitations of the Microcomputer in CALL Use

The microcomputer has benefited from tremendous advances over the last decade, including development in both hardware and software. Factors limiting microcomputer use in the second language classroom have been reduced considerably; however, several limitations continue to pose problems for the potential user.

Technology

Technology is growing at an incredible rate. Breakthroughs such as the microchip have greatly increased the capabilities of the microcomputer; nevertheless, other important problems remain to be solved. The following section presents some of the technological limitations facing today's microcomputer user.

Incompatibility

The incompatibility of microcomputer systems in terms of hardware and software poses an important restriction on microcomputer use in second language classrooms. Each microcomputer has an operating system which controls the operation of the computer through built-in sets of commands. Well known examples of operating systems include MS DOS and COMMODORE. These operating systems are often not compatible; therefore, software which operates on a computer using MS DOS will not operate on COMMODORE

and vice versa. This incompatibility results in a reduction in available software for the school restricted to one microcomputer operating system.

Hardware components are often not compatible as well. Printers, monitors, keyboards, and so forth, will only work with certain types of computers.



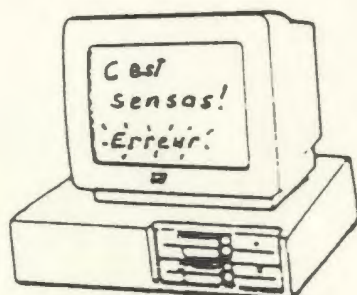
Literal-mindedness

Computers are very literal-minded inventions. Because a computer does not possess intelligence and only records knowledge inputted through a binary system, there is not much leeway for error in student answers. A misplaced comma, letter, or space can severely influence the computer's response to a student's input. The longer and more complex the input, the greater the range of possible errors. Some improvements such as "fuzzy matching" and "instring search" have been made in this area; however, there is still much room for improvement.

Fuzzy matching is used to accept student answers which match to an acceptable degree. Misplaced spaces, capitalization and minor spelling errors may be ignored or simply pointed out to the student while reinforcement is provided for the correct answer.

Instring search is used in more open-ended answers where the computer picks up key words to determine the appropriateness of answers.

Although these new innovations are an improvement, spontaneous creative language use cannot yet be processed by the computer. (Ahmad et al., 1985).



Voice Input

Most microcomputers cannot yet respond to voice input. This feature would be especially useful in language learning as the student would be able to ask questions and give commands to the computer in the target language.

Voice Output

Voice output or "synthesized speech" is now possible with computers; however, the quality of this speech is not appropriate for use in a second language classroom (Henry, Hartmann & Henry, 1987). This technological limitation poses some hindrance to aural/oral communication.

Cost

The cost of the microcomputer has fallen dramatically in the last ten years, yet present cost is still a limiting factor in widespread computer use. Although most second language teachers report access to a computer at school, prices must improve before several microcomputer systems may be found in each classroom.

```
*****
*
*   Question:
*
*   What operating system does your school computer use?*
*
*****
```

Software Development

Amount of Suitable Software

Development and availability of suitable software is also a limitation of the use of microcomputers in second language classrooms. Much of the computer material available for second language is drill-and-practice. Although drill-and-practice does have a place in current language learning theory, CALL can offer much more.

Compatibility with Instructional Program

Co-ordination of software with current programs of instruction is also a limitation of microcomputer use. Many of today's software packages are developed independently of any background or program which the student may have previously experienced. Students, especially those having problems, need confidence and a feeling of security in order to receive maximum benefit from a program. CALL software should therefore correspond to vocabulary and topics covered in the language program and form an integral part of the overall French curriculum.

Many of the limitations of the microcomputer will be overcome as future prospects of CALL become tomorrow's reality. Until then, careful selection and use of microcomputer systems and software will help ensure successful computer-assisted language learning.

Self-Quiz #4

1. Circle the letter of the answer which best describes the limitations of the microcomputer in CALL use:
 - a. Technology, cost, software development
 - b. Technology, opinions of parents, cost
 - c. Cost, software development, student ignorance of computers
 - d. None of the above

2. Existing technological problems in computer-assisted language learning include: (circle a letter)
 - a. Incompatability
 - b. Literal-mindedness
 - c. Voice input
 - d. Voice output
 - e. a and b
 - f. c and d
 - g. all of the above

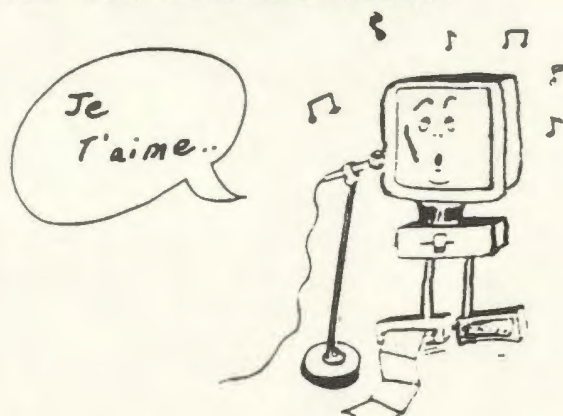
3. Circle the letter of the answer which best describes existing problems in software development:
 - a. amount of suitable software
 - b. compatability with instructional programs
 - c. a and b
 - d. none of the above

The Future of CALL

The unprecedented rate of growth of technology promises an end to many of the current limitations of the microcomputer. Advances such as artificial intelligence, video and audio disc, and voice synthesizers suggest even more possibilities for the application of the microcomputer to second language learning. The next section presents six of the most promising developments for use in computer-assisted language learning.

Voice Synthesizers

Synthesized speech has long been awaited by many proponents of computer-assisted language learning. In an era of language education where oral communication has gained in importance, computer-produced speech can provide a whole new dimension to language learning and increased opportunities for communication.



Synthesized speech is produced by storing speech as a set of numbers (digital) or through phoneme synthesis using such technology as the Votrox chip, until it is

ready for output. Computers can then be used to display the correct answers and say them as well.

Unfortunately, neither of these systems has yet perfected native speech to a sufficient degree.

The problem is that all such devices currently sound like computers. While they are more or less comprehensible, they would not do to teach listening comprehension of any foreign language where precise pronunciation of accents, tones, intonation, and cadence is important. (Henry, Hartmann & Henry, 1987, p. 257).

Voice Input

Voice input has had more success in computer development. This process involves speaking into a microphone which is connected to a special circuit board. Information is then stored in this circuit board for recording and playback. This technique can be very useful for CALL programs where sound may be added to regular monitor displays and where sound in the form of questions or statements may replace monitor displays.

Speaking commands directly into the computer to control operation has not yet been sufficiently developed for use in computer-assisted language learning.



Artificial Intelligence

Artificial intelligence leads the way in research on computer-assisted language learning (CALL). Feigenbaum and Barr (1982) define artificial intelligence as "the part of computer science concerned with designing intelligent computer systems, that is, systems that exhibit the characteristics we associate with intelligence in human behaviour - understanding language, learning, reasoning, solving problems and so on" (p. 3). A simpler definition is supplied by Paramskas (1986) as "a system capable of pattern recognition" (p. 619).

Many of the intelligent computer programs for language learning are parsers. "Parsing" involves the use of syntax and other sources of knowledge to determine the functions of the words in the input sentence in order to create a data structure. This data structure can then be used to get at the meaning of a sentence. (Feigenbaum & Barr, 1982). A well known example is DEREDEC 2, a combination of several programs for automatic textual analysis in French (Paramskas, 1986).

Progress is so rapid that it is not impossible to conceive of interactive programs which allow any user - expert or total beginner - to consult the computer like one can consult any expert in any field, be understood, and receive answers or information in everyday language - oral or written.

(Paramskas, 1986, p. 627).

Digital Audio Disc

Random-access audio also holds great promise for computer-assisted language learning. Several means of presenting audio in connection with computer use are available, including: standard linear slide-tape recorder, random-access audio disc, random-access cassette recorder, compact disc, digital audio tape cassette, speech synthesis, and video disc.

Random-access audio discs have gained particular distinction in CALL use.. These discs present almost instant access to approximately 600 possible messages which are available at given points of a lesson and include hints, translations, cultural notes and slower recordings of natural language segments. Random-access audio discs may be used in exercises ranging from drill-and-practice to the creation of interactive stories where the student chooses which path to take.

Random-access audio devices such as INSTAVOX do exist; however, at present they are expensive to buy. It is also expensive to store and duplicate the magnetic floppy discs. Bulkiness of the device and noise when accessing a particular speech are also problems which have delayed the widespread use of the random-access audio disc; however, the future holds much promise in this area.



Video-Disc

The video-disc combines features of the digital audio disc with video pictures. A video-disc stores up to 55 000 frames on each side of a disc with any frame being accessible in two to three seconds. Video-discs may contain several levels of difficulty and various branching techniques to allow the students to proceed at their own pace and in directions determined by their answers to certain questions.

A well known simulation using video-disc is MONTEVIDISCO - a program for students of Spanish. Students are asked to respond to speech and actions from Mexicans seen on the screen. These responses may land the student in jail or in a hospital if the student makes certain choices! A Japanese company now produces an interactive video-disc in 3-D. The video-disc is gaining ground in educational circles. In 1985, 88 860 units were sold. By 1990, sales are expected to reach more than 400 000.

The price of video-discs is still high and problems such as impossibility of tapeover have not yet been solved; however, technological advances promise to make the video-disc a cultural and educational phenomenon of the future.

```
*****
*
* Question:
* How does the video-disc allow for individualized
* instruction?
*****
```


Dictionary/Stored Text

The features of the computer are also being exploited to develop dictionary use and to store running text.

Dictionary use includes discovering meanings and translations through consultation with the computer.

Running text would include the storage of longer pieces of written material - novels, articles, and so forth. The student of a second language could then electronically scan these running texts to find examples and uses of new phrases or words.

Self-Quiz #5

1. Place a checkmark beside those of the following which are future prospects for computer-assisted language learning (CALL).

<input type="checkbox"/> digital audio disc	<input type="checkbox"/> networking
<input type="checkbox"/> dictionary/stored text	<input type="checkbox"/> video disc
<input type="checkbox"/> artificial intelligence	<input type="checkbox"/> voice input
<input type="checkbox"/> voice synthesizers	<input type="checkbox"/> graphics

Conclusion

"Computers can make a useful contribution to teaching a wide spread of subjects, including languages, applying a very broad range of methodologies" (Ahmad et al., 1985, p. 1). Computer use has been employed in many subject areas in the past. Only since the 1980s has there been a significant increase in the quality and quantity of courseware for second language teaching. This courseware is not proposed as a replacement for the teacher; it is intended as a tool to be exploited by students and teachers alike. This tool provides the student with a variety of experiences which encourage student participation and interaction.

Although much of the early courseware was created in drill-and-practice or tutorial modes, new material is moving into other directions which permit more authentic and communicative use of the target language.

New advances in technology including artificial intelligence and speech simulation are bringing us ever closer to the day when students will carry on intelligent oral and written communication with computers. Meanwhile, many exciting possibilities for computer-assisted language learning already exist. The many features of the microcomputer offer the student opportunities for creative and interactive language experiences. These experiences

will help students realize the ultimate goal of the communicative approach - the ability to communicate in the target language.



Bibliography

- Ahmad, K., Corbett, G., Rogers, M., & Sussex, R. (1985). Computers, Language Learning and Language Teaching. Cambridge: Cambridge University Press.
- Bitter, G.G. and Camuse, R.A. (1988). Using a Microcomputer in the Classroom. Englewood Cliffs, NJ: Prentice Hall.
- Canale, M., Barker, G., Blanger, M., MacRury, K., McLean, R.S., and Ragsdale, R.G. (1985). Microcomputer Software for Language Arts: Survey and Analysis. Toronto: OISE Press.
- Chapelle, C., and Jamieson, J. (1986). Computer-assisted language learning as a predictor of success in acquiring English as a second language. TESOL Quaterly, 20(1), 27-46.
- Cox, R. (1985). Computers in the foreign language classroom: Not just another "fad or frill". Paper presented at the Annual Meeting of the Mid-South Educational Research Association, 14th. Biloxi, MS.
- Decoo, W. (1986). Ordinateur et didactique: La recherche de la varit et de l'fficacit. CONTACT, 5(4), 17-22.
- Dunkel, P.A. (1987). Computer-assisted instruction (CAI) and Computer-assisted language learning (CALL): Past dilemmas and future prospects for audible CALL. The Modern Language Journal, 71(3), 250-260.
- Gale, L.E. (1983). Montevideo: An anecdotal history of an interactive videodisc. CALICO Journal, 1(1), 42-46.
- Henry, G.M., Hartmann, J.F., and Henry, P.B. (1987). Computer-controlled random-access audio in the comprehension approach to second-language learning. Foreign Language Annals, 20(3), 255-261.
- Higgins, J. and Johns, T. (1984). Computers in Language Learning. Aylesbury: Hazell, Watson and Viney.
- Holmes, G. and Kidd, M.E. (1982). Second language learning and computers. Modern Language Review, 38(3), 503-516.

- Hoskins, V. (1988). The use of the computer as an instructional aid in teaching French in Newfoundland. Unpublished master's thesis, Memorial University of Newfoundland, St. John's, NF.
- Jones, B. (1985). Call for help ... computer-assisted language learning. Modern Languages, 66, 45,47.
- Krashen, S.D. (1981). Second Language Acquisition and Second Language Learning. New York: Pergamon Press.
- Lessard, G. (1986). The presentation of vocabulary in computer-aided instruction. The Canadian Modern Language Review, 43(1), 94-107.
- Mydlarski, D. (1985). How communicative can a computer be? The Canadian Modern Language Review, 42(1), 75-82.
- Obadia, A.A. (1986). Le VICF: Un vidodisque interactif et communicatif de franais. CONTACT, 5(4), 2-5.
- Papert, S. (1980). Mindstorms: Children, Computers and Powerful Ideas. New York: Basic Books.
- Paramskas, D.M. (1986). Artificial intelligence in computer-assisted language instruction. The Canadian Modern Language Review, 42(3), 619-628.
- Sakamoto, E. and Ullmann, R. (1987). Teacher Manual for "The Treasure of Ile Madame". Toronto: Evannah Sakamoto and Rebecca Ullmann Educational Consultant Inc.
- Sayers, D. and Brown, K. (1987). Bilingual education and telecommunications: A perfect fit. The Computing Teacher, 14(7), 23-24.
- Taylor, R.P. (Ed.). (1980). The computer in the school: Tutor, tool, tutee. New York: Teacher's College Press.
- Thrush, J.A. and Thrush, R. (1984). Microcomputers in foreign language instruction. Modern Language Journal, 68, 21-27.
- Widdowson, H.G. (1984), Exploration in Applied Linguistics 2. Oxford: Oxford University Press.

APPENDICES

APPENDIX A

Computer-Assisted Language Learning Materials Evaluation Form
 Ontario Institute for Studies in Education and Faculty of
 Education, University of Toronto

SUMMARY SHEET

A. General Description

Catalogue Info: _____
 Package Title: _____ Cost: _____
 Topic/Theme: _____
 Language(s): _____ Author(s): _____
 Publisher & Address: _____
 Distributor: _____

Is Documentation and/or support material included?

☐ Yes ☐ No

Is the package in the public domain?

☐ Yes ☐ No

State publisher's conditions regarding back-up copies and/or
 licensing: _____

B. Hardware and Software Required

Computer Model(s): _____ Memory: _____ K.
 Peripherals and Interface Devices (List all necessary) _____

Software: Format: ☐ Diskette ☐ Cartridge ☐ Cassette
 Tape ☐ Other _____

Type and version of programming language and DOS, (if known)

C. Intended Users

☐ Students: School/Grade Level(s): _____
 Second-Language Level: ☐ N/A ☐ Beginning
 Intermediate ☐ ☐ Advanced
☐ Teachers ☐ Courseware Designers ☐ Other (specify) _____

☐ For individual use ☐ For small group use ☐ Usable
 with either _____

D. Package Overview Summarize the Package

- E. **Recommendation** (To be completed as the final step of the evaluation, based on the detailed questions on the following pages. For information on the evaluation process see Part J, page 91.)

I/we would use or recommend use of this package:

- | | | | |
|----|---|--------------------------|--------------------------|
| 1. | For the intended users (stated or inferred): | Yes | No |
| | a) with little or not change | <input type="checkbox"/> | <input type="checkbox"/> |
| | b) only if certain changes were made
(refer to Part I, pages 90-91). | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | For other users: | | |
| | a) with little or no change | <input type="checkbox"/> | <input type="checkbox"/> |
| | b) only if certain changes were made
(refer to Part I, pages 90-91). | <input type="checkbox"/> | <input type="checkbox"/> |

F. **Package Objectives and Learning Outcomes**

1. Indicate the package objectives. Are they stated in the package? ☐ Yes ☐ No
2. a. How well does the package fulfil these objectives?
☐ not applicable. ☐ completely ☐ somewhat
☐ not at all
 b. Explain:
3. For what other objectives or expected learnings may the package be suitable?

Curriculum Goals

4. Identify the specific curriculum guidelines, areas or topics to which this package may be related:

Type of Software

5. Circle the main type of software and check others if applicable.

- | | |
|---|--|
| <input type="checkbox"/> Tutorial | <input type="checkbox"/> Logo Program |
| <input type="checkbox"/> Drill-and-Practice | <input type="checkbox"/> Programming Language |
| <input type="checkbox"/> Situational Activity | <input type="checkbox"/> Authoring System/
Template |
| <input type="checkbox"/> Word Processing | <input type="checkbox"/> Database |
| <input type="checkbox"/> Composition Aid | <input type="checkbox"/> Learning/class
management |
| <input type="checkbox"/> Game | <input type="checkbox"/> Test Assessment |
| <input type="checkbox"/> Problem-Solving | <input type="checkbox"/> Utility |
| <input type="checkbox"/> Simulation | <input type="checkbox"/> Other (Describe) _____ |

Prerequisite Knowledge and Skills

6. Indicate necessary prerequisite skills and knowledge:

G. Content

The following aspects relate to the intended users indicated in Part C. (For each item, circle one star from the rating scale: SA = Strongly Agree, A = Agree, NoOp = No Opinion, D = Disagree, SD = Strongly Disagree, NA = Not Applicable)

Language

1. SA A NoOp D SD NA The package serves as a good model of language for the students. Consider the Following:

*	*	*	*	*	*	Grammar
*	*	*	*	*	*	Vocabulary
*	*	*	*	*	*	Language use situations
*	*	*	*	*	*	Organization/ coherence
*	*	*	*	*	*	Language style (eg. formal/informal)
*	*	*	*	*	*	Other (specify) _____

- 2a. The package contains errors in: Check all applicable)

☐ Spelling ☐ Grammar ☐ Punctuation
☐ Capitalization ☐ Accents ☐ Other

- b. Specify the most frequent or important errors:

3. SA A NoOp D SD NA The package encourages the user to interact actively with it by:

*	*	*	*	*	*	reading
*	*	*	*	*	*	writing
*	*	*	*	*	*	talking
*	*	*	*	*	*	listening

4. SA A NoOp D SD NA The language of the package is:

*	*	*	*	*	*	consistent with the grade level (see Part C)
*	*	*	*	*	*	consistent with the second-language level (" ")
*	*	*	*	*	*	appropriate in terms of required reading ability

5a. SA A NoOp D SD NA The package deals adequately with a variety of unexpected user responses. Consider each of:

*	*	*	*	*	*	Grammar
*	*	*	*	*	*	Vocabulary
*	*	*	*	*	*	Word Endings
*	*	*	*	*	*	Spelling
*	*	*	*	*	*	Punctuation
*	*	*	*	*	*	Capitalization
*	*	*	*	*	*	Accents

5b. Describe how incorrect or unexpected responses are handled by the program:

6. Summarize your opinion of the language content of the package:

Cultural References and General Knowledge

7.	SA	A	NoOp	D	SD	NA	In the context of the package, the specific cultural references are:
	*	*	*	*	*	*	accurate
	*	*	*	*	*	*	clearly presented
	*	*	*	*	*	*	acceptable
	*	*	*	*	*	*	free of racial, ethnic, sexual, religious, or social class stereotypes.
8.	SA	A	NoOp	D	SD	NA	In the context of the package, the specific items of general knowledge are:
	*	*	*	*	*	*	accurate
	*	*	*	*	*	*	clearly presented
	*	*	*	*	*	*	acceptable

H. Package Design Instructional Quality

1.	SA	A	NoOp	D	SD	NA	CONTENT
	*	*	*	*	*	*	The content has educational value.
	*	*	*	*	*	*	Presentation of content is clear and logical.
	*	*	*	*	*	*	The content can be easily changed as needed.
	*	*	*	*	*	*	Suitable diagnostic capabilities are provided.
	*	*	*	*	*	*	The instructions are clear to the user.
	*	*	*	*	*	*	Adequate examples are provided.
	*	*	*	*	*	*	Package can be easily integrated with other learning materials, on or off the computer.

2.	SA	A	NoOp	D	SD	NA	USE
*	*	*	*	*	*	*	The package is simple to use.
*	*	*	*	*	*	*	The package encourages creativity of user.
*	*	*	*	*	*	*	Interaction with other people is encouraged.
*	*	*	*	*	*	*	A "Help" function and/or menu is provided.
*	*	*	*	*	*	*	The user can control rate or presentation.
*	*	*	*	*	*	*	The user can control sequence of activities.
*	*	*	*	*	*	*	Feedback is appropriate.
*	*	*	*	*	*	*	Testing/evaluation capabilities are appropriate.
*	*	*	*	*	*	*	Record-keeping capabilities are appropriate.
*	*	*	*	*	*	*	Graphics are used appropriately.
*	*	*	*	*	*	*	Sound is used appropriately.
*	*	*	*	*	*	*	Work can be printed out easily from package.

Technical Quality

3.	SA	A	NoOp	D	SD	NA	
*	*	*	*	*	*	*	The package is reliable in normal use.
*	*	*	*	*	*	*	Intended users can easily operate the package.
*	*	*	*	*	*	*	Teachers can easily operate the package.
*	*	*	*	*	*	*	Program and support materials are well-packaged.
*	*	*	*	*	*	*	Screen displays are effective.
*	*	*	*	*	*	*	The cost of the package is appropriate.

4.	SA	A	NoOp	D	SD	NA	The package effectively uses:
	*	*	*	*	*	*	Interface devices (joystick, mouse, graphics pad)
	*	*	*	*	*	*	Video-tape and/or videodisc
	*	*	*	*	*	*	Oral interaction (eg., on cassette; synthesized or digitalized voice).

Documentation and Support Materials

5.	SA	A	NoOp	D	SD	NA	
	*	*	*	*	*	*	Teacher support materials are comprehensive.
	*	*	*	*	*	*	Teacher support materials are effective.
	*	*	*	*	*	*	Student support materials are comprehensive.
	*	*	*	*	*	*	Student support materials are effective.

6a. Check all the kinds of materials included in the package.

- | | |
|--|--|
| <input type="checkbox"/> teacher manuals | <input type="checkbox"/> prerequisite activities |
| <input type="checkbox"/> student manuals | <input type="checkbox"/> follow-up activities |
| <input type="checkbox"/> user/technical manual | <input type="checkbox"/> worksheets |
| <input type="checkbox"/> lesson plans | <input type="checkbox"/> demonstration on disk |
| <input type="checkbox"/> other _____ | |

b. Are materials required other than those provided in the package?

☐ Yes ☐ No

If yes, describe:

I. Summary

Summarize the package by describing:

1. Major Strengths:

2. Major Weaknesses:
3. Potential Uses:
4. Recommended Changes:

PLEASE COMPLETE THE FOLLOWING INFORMATION

J. Evaluation Information

1. Evaluated by: _____ Date: _____
 Address: _____

 Phone: _____
 Position(s): _____
2. Relevant background of evaluator(s): _____
3. Evaluation process included observation of use by
 intended users:
☐ Yes ☐ No
4. Describe the evaluation process and summarize the
 observations made: _____

PLEASE INDICATE YOUR RECOMMENDATION IN PART E ON PAGE 85.
 THANK- YOU.

The Computer-Assisted Language Learning Materials Evaluation Form
 originally appeared in Microcomputer Software for Language Arts:
 Survey and Analysis by Canale et al., 1985.

APPENDIX B

Glossary of Computer Terminology

Accoustic Coupler -	A type of MODEM used to send and receive computer messages by telephone directly through the earpiece and mouthpiece.
ASCII -	American Standard Code for Information Interchange -- A binary code using 8 bits to represent 128 text and control characters.
BASIC -	Beginners All-Purpose Symbolic Instruction Code: A beginning programming language using common English words and mathematical symbols to perform operations and solve problems.
Bit -	The smallest unit of memory or digital information possible; a bit is composed of a binary digit, a choice between 0 and 1.
Bug -	An error in a computer program.
Byte -	Eight bits. One byte can store any one of the characters on a keyboard through its combination of 0's and 1's.
Command -	An instruction telling the computer what to do, for example, "Load" or "Run".
Computer Graphics -	Designs generated by a computer through the use of a graphics software package.
CPU -	Central Processing Unit -- Performs all of the calculations and directs the operation of all the other components of a computer. It is "the brains" of a computer.
CRT -	Cathode Ray Tube: a type of visual display unit, a monitor.

Daisy Wheel Printer -	Printer with a print wheel containing letters, numbers and characters. This wheel rotates and strikes the paper through a ribbon to produce the desired character.
Database Software -	Software enabling the user to store, manipulate and extract large collections of data. Information is often stored in the form of files.
Debug -	To find and eliminate errors in a program.
Disc -	A plastic disc with magnetic recording surfaces capable of storing large amounts of information.
Disc Drive -	A peripheral device used to store and retrieve information on discs.
Disc Operating System -	An operating system for disc drive. An operating system manages the computer and its peripheral devices, allowing the user to run programs and control the movement of data.
Dot Matrix Printer -	A printer which uses dot patterns to print letters and graphics.
Floppy Disc -	A thin, flexible plastic disc with magnetic recording surfaces capable of storing large amounts of information.
Hardware -	The physical components of a computer system.
Input Devices -	Devices allowing the computer user to enter information into a computer. eg. keyboard.
Interface -	An electronic, physical connection between devices, especially between a computer and its various hardware components.

K -	Kilobyte -- 1024 bytes of information; a term often used in discussing memory capacity.
Keyboard -	A computer keyboard containing a function key area, a typewriter key area, and a numeric key pad for calculations.
LOGO -	A simple programming language for students, LOGO was developed by Seymour Papert of MIT. Instead of long sequences of programming instructions, students invent new commands to "teach the computer".
Mainframe -	A large computer often requiring one or more rooms for storage. This type of computer is frequently used by large companies and agencies.
Microcomputer -	A computer whose central processing unit is a microprocessor. It is easily portable and usually fits on a desk.
Minicomputer -	Slightly larger than a microcomputer, the minicomputer is often used by smaller businesses or institutions. Information is often stored on tapes instead of discs.
Modem -	<u>Modulator/Demodulator</u> -- A device which provides communication between computers over telephone lines.
Monitor -	A visual display unit using a cathode ray tube similar to that used in a television screen.
Network -	A system for sharing resources between two or more computers.
Output Device -	A device used to receive information from the computer, for example, printer, monitor.

Peripheral -	A device for communicating with the CPU or for storing data accessible to the CPU. examples include disc drive, and monitor.
Printer -	A peripheral device used to print information from the computer or disc drive onto paper.
RAM -	Random Access Memory -- the computer's general memory which may be written to or read by the CPU. Information stored in RAM is lost when the computer is shut off.
ROM -	Read Only Memory -- Fixed memory which cannot be changed by the computer operator. Circuits use ROM to provide a set of simple commands which enable the loading of more powerful programs.
Silicon Chip -	A thin wafer of silicon containing a pattern or circuit. This wafer functions as a transistor and may contain an assortment of functions on a single chip.
Software -	Programs or sets of commands by which the computer is instructed to perform specific tasks.
Spreadsheet software -	Software for dealing with arithmetical data. The screen is usually in the form of a grid to efficiently organize, store, and report information.
VDU -	Visual Display Unit -- monitor or television.
Voice Synthesizer -	A device allowing the computer to duplicate sounds similar to a human voice.
Wordprocessing Software -	Software which permits the storage, formatting revision, and printing of text.

APPENDIX C Mini-Lexique des Micro-Ordinateurs*

<u>Anglais</u>	<u>Français</u>
Bit	Bit (n.m.)
Byte.	Octet (ou multiplet) (n.m.)
Bug	Erreur (n.f.)
CAI	EAO
(Computer Assisted Instruction)	(Enseignement assisté par ordinateur)
Cassette tape	Cassette (n.f.)
Chip.	Puce (n.f.)
Command	Commande (n.f.)
CMI (Computer Managed Instruction)	EGO (Enseignement géré par ordinateur)
CPU (Central Processing Unit	Unité Centrale de Traitement (n.f.)
Courseware.	Didacticiel (n.m.)
Data.	Données (n.f.)
Debugging	Mise au Point (n.f.)
Disk drive.	Unité de disques (ou de disquettes) (n.f.)
Diskette (or floppy disk) . .	Disquette (n.f.) (ou disque souple - n.m.)
DOS (Disk Operating System) .	SED (Système d'exploitation de disquette)
External memory	Mémoire auxilaire (n.f.)
Hardware.	Matériel (n.m.)
High level language	Langage de haut niveau (n.m.)
Input	Entrée (n.f.)
Input/Output (I/O).	Entrée/Sortie (E/S)
Keyboard.	Clavier (n.m.)
Machine Language.	Langage machine (n.m.)
Microprocessor.	Microprocesseur (n.m.)
Modem	Modem (n.m.)
Monitor	Ecran (n.m.), moniteur (n.m.)
Network	Réseau (n.m.)
Operating System.	Système d'exploitation (n.m.)
Output.	Sortie (n.f.)
Peripheral equipment.	Périphériques (n.m.)
Printer	Imprimante (n.f.)
Program	Programme (n.f.)
Programming Language.	Langage de programmation (n.m.)
RAM (random access. memory)	MEV (Mémoire vive ou mémoire accès direct) (n.f.)

ROM (read only memory)	. . .	MEM (mémoire morte)	(n.f.)
Software	Logiciel	(n.m.)
Software package	Progiciel	(n.m.)
Word Processing	Traitement de mots (ou de texte)	(n.m.)

*Adapted from: CONTACT Vol 2, No. 4, December, 1983.

APPENDIX D

Hardware Manufacturers

Apple Computer, Inc.
7495 Birchmount Rd.
Markham, Ontario
L3R 5G2

Commodore Business Machines
3470 Pharmacy Avenue
Agincourt, Ontario
M1W 2K4

Digital Equipment of Canada
100 Herzberg Rd.,
P.O. Box 13 000, Kanata
Ontario K2K 2A6

Hewlett-Packard Co., Canada
900 Windmill Road
Dartmouth, Nova Scotia
B3B 1P7

IBM Canada Ltd.
3500 Steeles Ave. East
Markham, Ontario
L3R 5G2

Tandy-Radio Shack, Canada
P.O. Box 34 000
Barrie, Ontario
L4M 4W5

APPENDIX E

Sources of CALL Software

- | | |
|---|-----------------------------------|
| ALPHALOG-François Dupont
Faculté d'éducation
651, rue Cumberland
Ottawa, Ontario
K1N 6N5
Tel: (613) 231-4223 | - Apple, Commodore |
| Associates In
Computer Education
67 Emerald Grove Drive
Winnipeg, Manitoba
R3J 1H3
Tel: (204) 889-7727 | - Apple, Commodore |
| Aurora Software
P.O. Box 1394
Haleybury, Ontario.
P0J 1K0
Tel: (705) 672-5517 | -PET/CBM Commodore 64 |
| CEDI Informatique
Attn: Joel Baumier
539 Cherrier
Montréal, Québec
H2L 1H2
Tel: (514) 884-5136 | - Apple, Commodore |
| Centre des manuels scolaires
277, rue Hutchings
Winnipeg, Manitoba
R2X 2R4 | -Apple, Commodore |
| CEC
(Centre Educatif et Culturel)
8101, Boul. Métropolitain,
Montréal, Québec
H1J 1J9
Tel: (514) 351-6010 | - Apple, Vic 20, IBM-PC
TRS-80 |
| Choix CSG
90, rue Sparks, bureau 704
Ottawa, Ontario
K1P 5B4
Tel: (613) 563-4444 | - Apple, Commodore |

- CLEF (Computer-Assisted Learning Exercises for French)
Language Laboratories,
University College,
University of Western Ontario
London, Ontario
N6A 3K7
Tel: (519) 679-2554

- Commodore, IBM-PC
- CFORP (Centre franco-Ontarien de Ressources Pédagogiques)
339, Rue Wilbrod
Ottawa, Ontario
K1N 6M4
(613) 238-7957

- Apple, Commodore,
CBM-4032, ICON
- Commodore
c/o Yvon Husereau
625 Président Kennedy
Montréal, Québec
H3A 1K2

- Commodore, CBM, PET
- CONDUIT
Litus Software
3952 Chesswood Drive
Downsview, Ontario
M3J 2W6

- Apple, PET, TRS-80, Atari
- Conseil des Ecoles Séparées d'Ottawa (Le)
140 Cumberland
Ottawa, Ontario
K1N 7G9
Tel: (613) 237-5660

- ---
- Direction des ressources éducatives françaises
Ministère de l'Éducation du Manitoba
200, avenue de la Cathédrale
Saint-Boniface, Manitoba
R2H 0H7

- Apple, Commodore, TRS-80
- Didacticiels FM
1113 Desnoyers,
Laval, Québec
H7C 1Y6
Tel: (514) 324-0712

- Apple, Commodore, IBM-PC

- Didateck
2669 Chemin Sainte-Foy
Sainte-Foy, Québec
G1V 1V3
Tel: 1-800-463-5369 - Apple, Commodore, IBM
- Editions Champlain
107 Church Street
Toronto, Ontario
(416) 364-4345 - Apple, Commodore, IBM-PC
- Editions Le Nordais (Les)
2550, chemin Bates, bureau 400
Montréal, Québec
H3S 1A7
Tel: (514) 738-8820 - Apple, IBM
- Edu-Ware Services Inc.
2222 Sherman Way, Suite 102
Canoga Park, CA 91303 - Apple, Commodore
- Gessler Educational Software
Suite 10A,
900 Broadway, New York
NY, USA 10003 - Apple, Commodore, Atari,
IBM-PC, TRS 80
- Guérin
4501, rue Drolet
Montréal, Québec
H2T 2G2
Tel: (514) 842-3481 - Apple, IBM-PC, Commodore,
TRS 80
- Informatics Software Ltd.
329 Lakeshore Rd. E., Suite 205
Oakville, Ontario
L6J 1J4
Tel: (416) 842-2684 - Commodore
- Logéduc Inc.
1117 rue Ste-Catherine ouest
Bureau 601, Montréal, Québec
H3B 1H9
Tel: (514) 849-2231 - IBM-PC, MICRAL
- Manitoba Computer Assisted
Learning Consortium
Educational Psychology, Rm 114
Faculty of Education
University of Magnitoba
Winnipeg, Manitoba
R3T 2N2
Tel: (204) 269-6621 - Apple, PET, TRS-80

Ontario Educational Software - Apple, Commodore, ICON
 Service, TV Ontario
 Client Services/Educational Software
 P.O. Box 200, Station Q
 Toronto, Ontario
 M4T 2T1
 Tel: (416) 484-2665

Publications Graficor (Les) - ---
 87, Place du Petit-Bois
 Varennes, Québec
 J0L 2P0
 Tel: (514) 861-2764

PROMPT (Program for Reading - IBM-PC
 Comprehension - Teacher Controlled)
 D. Mydlarski, Dept. of French,
 Spanish, Italian
 University of Calgary,
 Calgary, Alberta
 T2N 1N4
 Tel: (403) 284-5300 ext. 5303

Puce (Programmation - Apple, IBM-PC, Commodore
 Utilisé et Conçue pour l'Enseignement)
 342, Rue Sherbrooke est,
 Montréal, Québec
 Tel: (514) 288-5506

Scholastic Software - Apple, Commodore, IBM-PC
 123 Newkirk Road
 Richmond Hill, Ontario
 L4C 3G5
 Tel: (416) 883-5300

Sierra On-Line Inc. - Apple, Commodore, IBM
 Sierra On-Line Bldg.,
 Coarsegold, USA
 93614

Sunburst Communications - Apple, Commodore, IBM-PC
 39 Washington Avenue
 Pleasantville, New York
 NY, USA 10570

Visiontronique - Commodore, CBM
 218, rue Alexandre
 Sherbrooke, Québec
 J1H 4S7

APPENDIX F
Computer and Second Language Magazines

CALICO Journal,
 Computer Aided Language Learning and Instruction
 Consortium
 229 KMB, Brigham Young University,
 Provo, Utah
 84602, USA

Canadian Modern Language Review (The)
 Attn: Frank A. Addario
 237 Hellems Avenue
 Welland, Ontario
 L3B 3B8
 Tel: (416) 734-3640

Computers In Education
 1300 Don Mills Road
 Don Mills, Toronto, Ontario
 M3B 3M8
 Tel: (416) 445-5600

Computers In The Schools
 The Hawthorn Press, Inc.
 12 West 32 Street
 New York, NY
 10001
 Tel: (212) 279-1200

Computing Teacher (The)
 University of Oregon
 1787 Agate St.
 Eugene, OR
 97403 - 1923
 Tel: (503) 686-4414

CONTACT
 Simon Fraser University
 Faculty of Education
 Burnaby, British Colombia
 V5A 1S6
 Tel: (604) 291-3166

Foreign Language Annals
 Journal of the American Council on the Teaching of Foreign
 Language
 579 Broadway, P.O. Box 408
 Hastings-on-Hudson,
 NY 10706
 Tel: (914) 478-2011

Modern Languages
Regent's College, Inner Circle,
Regent's Park, London
NW1 4NS
Tel: 01-487-7439

Modern Language Journal (The)
MLJ Business Office
University of Wisconsin Press
114 North Murray Street
Madison WI 53715
Tel: (608) 262-4952

SYSTEM
Pergammon Press Inc.
Maxwell House, Fairview Park
Elmsford, NY
10523 USA

TESOL Quarterly
(membership required)
TESOL Central Office
Suite 205, 1118 22nd St. NW,
Washington, DC
20037
Tel: (202) 872-1271

APPENDIX B

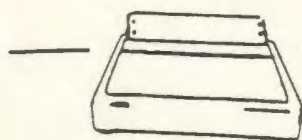
G?

Appendix B

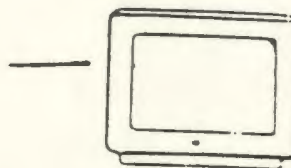
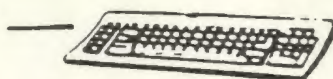
Criterion-Referenced Test

Computer-Assisted Language Learning

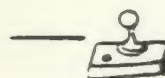
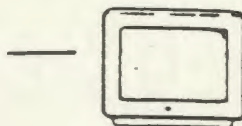
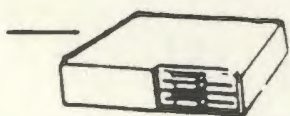
- 1a. [To be answered by persons without previous computer experience]
Label the following microcomputer components by placing the correct letter in the space provided by each picture.



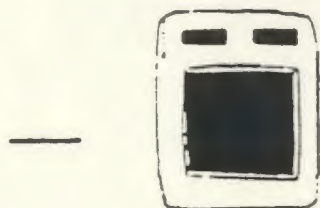
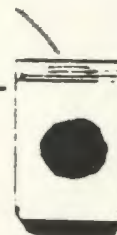
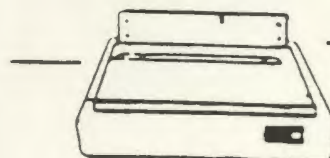
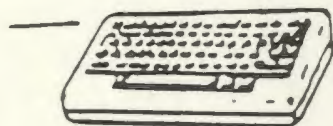
- a. disc drive
- b. monitor
- c. printer
- d. keyboard



- 1b. [To be answered by persons with previous computer experience]
Label the following microcomputer system components by placing the correct letter in the space provided by each picture.



- a. joystick
- b. koalapad
- c. keyboard
- d. printer
- e. lightpen
- f. disc drive
- g. monitor
- h. modem
- i. mouse



- 2a. [To be answered by persons with no previous computer experience]
Label each of the following as I (Input), O (Output), or I/O (Input/Output) devices:

a. _____ printer	c. _____ monitor
b. _____ disc drive	d. _____ keyboard

- 2b. [To be answered by persons with previous computer experience]
Label each of the following as I (Input), O (Output), or I/O (Input/Output) devices:

a. _____ joystick	f. _____ disc drive
b. _____ graphics tablet	g. _____ monitor
c. _____ keyboard	h. _____ modem
d. _____ printer	i. _____ mouse
e. _____ light pen	

3. The two central components of a computer are:

a. Central Processing Unit and Keyboard
b. Memory Chips and Monitor
c. Central Processing Unit and Memory Chips
d. Keyboard and Monitor

4. Match the type of program with the descriptions provided by placing a letter in the space provided.

_____ Trivial Pursuit	a. drill-and-practice
_____ write a letter to a friend	b. tutorial
_____ an imaginary visit to a friend	c. simulation
_____ place the correct ending on the verbs	d. game
_____ find the quickest route from Montréal to Trois Rivières using maps	e. problem-solving
_____ how to conjugate an ir verb	f. tool use

5. Label the following programs as either S (Stand Alone) or T (Teacher Supplemented):

- ___ a program bought by the teacher to meet student needs. She especially liked this program because provision was made for inclusion of words and ideas from any instructional program.
- ___ a program bought by the teacher to meet the needs of her students. She especially liked the way the material corresponded to her program of instruction.

6. Place a checkmark beside those of the following which are features of the microcomputer.

- | | |
|-----------------------|--------------------|
| ___ Frequent Feedback | ___ Impartiality |
| ___ Portability | ___ Colourful |
| ___ Interactivity | ___ Accommodation |
| ___ Stamina | ___ of a variety |
| ___ Time Flexibility | ___ of Learning |
| ___ Accuracy and | ___ Speeds |
| ___ Precision | ___ Processing of |
| | ___ Large Volumes |
| | ___ of Information |

7. Place a checkmark in the space beside the criteria of good software.

- ___ List of materials required is stated.
- ___ Backup policy
- ___ Colourful Packaging
- ___ Teacher Manual
- ___ Plastic case for discs
- ___ Effectiveness
- ___ Matching of software with learner needs and interests
- ___ Loading Instructions
- ___ Game format
- ___ Compatability with program of instruction
- ___ Specification of appropriate age group
- ___ Useful in networking
- ___ Appropriate error correction

8. Circle the letter of the factors to be considered in determining the effectiveness of software:
- a. the author of the software, cognitive gains, affective benefits
 - b. Group dynamics, communicative benefits, cognitive gains
 - c. Communicative benefits, cognitive gains, affective benefits
 - d. all of the above
9. Tell whether the following statements are true or false by placing "T" for true or "F" for false in the spaces provided.
- ___ Individual computer use is beneficial to a student who fears speaking out in French class.
- ___ A simulated vacation to the French Riviera is useful in creating discussion in a group setting.
- ___ A tutorial on the use of the subjunctive tense is inappropriate for use with a whole class.
10. Circle the letter of the appropriate procedure(s) in selecting suitable software:
- a. use of selection aids
 - b. purchase on approval
 - c. trial use
 - d. peer recommendation
 - e. all of the above
11. Circle the letter of the answer which best describes useful selection aids in identifying and purchasing suitable software:
- a. magazine and computer digest reviews
 - b. checklists
 - c. a and b
 - d. none of the above

12. Circle the letter of the answer which best describes the limitations of the microcomputer in CALL use:
- a. Technology, cost, software development
 - b. Technology, opinions of parents, cost
 - c. Cost, software development, student ignorance of computers
 - d. None of the above
13. Existing technological problems in computer-assisted language learning include: (circle a letter)
- a. Incompatability
 - b. Literal-mindedness
 - c. Voice input
 - d. Voice output
 - e. a and b
 - f. c and d
 - g. all of the above
14. Circle the letter of the answer which best describes existing problems in software development:
- a. amount of suitable software
 - b. compatability with instructional programs
 - c. a and b
 - d. none of the above
15. Place a checkmark beside the future prospects for computer-assisted language learning (CALL).
- | | |
|--|--------------------------------------|
| <input type="checkbox"/> digital audio disc | <input type="checkbox"/> networking |
| <input type="checkbox"/> dictionary/stored text | <input type="checkbox"/> video disc |
| <input type="checkbox"/> artificial intelligence | <input type="checkbox"/> voice input |
| <input type="checkbox"/> voice synthesizers | <input type="checkbox"/> graphics |

APPENDIX C

14 Pumphrey Ave.
Mt. Pearl, Nfld.
A1N 2V5
June 26, 1988

Dr. Michael Canale, Associate Professor
The Ontario Institute for Studies In Education
252 Bloor St., Toronto, Ontario
M5S 1V6

Dear Dr. Canale,

As a graduate student at Memorial University of Newfoundland, I am presently working on a thesis concerning the development of a handbook for second language teachers interested in applying computers to their language classes. In the course of my research, I was directed by my supervisor, Mrs. Joan Netten, to the publication Microcomputer Software for Language Arts: Survey and Analysis written by you and your associates (1985). I was particularly interested in your Computer-Assisted Language Learning Materials Evaluation Form which may be of use in responding to one of the needs of Newfoundland teachers with respect to CALL as identified in a survey by Hoskins (1988). This need was for guidance in the selection and evaluation of suitable software.

I am therefore requesting permission to include a copy of your evaluation form - along with proper accreditation - in my handbook. I would also appreciate any other information or material on this topic which you might recommend.

I look forward to hearing from you at your earliest convenience.

Respectfully yours,
Ivan J. MacDonald
Ivan J. MacDonald



The Ontario Institute for Studies in Education

252 Bloor Street West, Toronto, Ontario M5S 1V6 Tel. 923-6641

Centre for Franco-Ontarian Studies

Centre de recherches en éducation franco-ontarienne

20 July 1988

Ivan J. MacDonald
14 Pumphrey Ave.
Mt. Pearl, NFLD
A1N 2V5

Dear Mr. MacDonald,

Please excuse the delay in responding to your recent letter. I've been away from Toronto and OISE most of the past six weeks.

I am delighted to grant permission for you to reproduce the evaluation form from our 1985 OISE publication Microcomputer software for language arts The form itself emerged from repeated use of trial software in language classrooms by teachers and students of all sorts. Our goal in printing it in the final project report was to see that it could be used by others (in part, with modifications, etc.).

Two further sources of general -- not language-specific -- software evaluation forms are:

- Software Assistance Development Centre (at OISE); and
- Council of Ministers of Education of Canada (also at OISE).

I hope this information is helpful; much discussion of software evaluation and suitable forms can be found in almost every book on the market that deals with computer-assisted language learning. As well, you might check the software evaluation section of journals such as Foreign Language Annals and The Modern Language Journal.

Every succes on your thesis work.

Sincerely,

Michael Canale
Associate Professor
Curriculum Dept. & CREFO

14 Pumphrey Ave.
Mount Pearl, NF.
A1N 2V5
August 3, 1988

Dear Ms. Ullmann,

As indicated in past telephone conversations, I am presently preparing a handbook on computer-assisted language learning. I am hereby requesting permission to include in this handbook a copy of the opening keyscreen for your software program The Treasure of Ile Madame as depicted in the Teacher Manual for "The Treasure of Ile Madame", (1987). This graphic would be very helpful in providing second language teachers who have never seen a second language simulation image with an example of the graphics available in such programs.

I look forward to hearing from you at your earliest convenience.

Yours truly,

Ivan J. MacDonald

Ivan J. MacDonald

From the desk of... **Rebecca Ullmann**
EDUCATIONAL CONSULTANT INC.
247 BEDFORD ROAD
TORONTO, ONTARIO
M5R 2L3 CANADA
tel. (416) 921-0742

August 12/88

To: Juan J. MacDonald.

Permission granted
to include a copy of the
opening keyscreen from the
software program "The Treasure
of Ile Madame" (1987) as
depicted in the "Teacher Manual
for the Treasure of Ile Madame" (1987),
on the condition that proper
credit is given for the material
and that two copies of the
handbook and M.A. thesis are
forwarded to R. Ullmann and
E. Sakamoto.

Rebecca Ullmann

c.c. E. Sakamoto.

39A St. Clare Ave.
Stephenville, NF
A2N 1N8
February 5, 1989

Dr. André Obadia, Editor in Chief
CONTACT
Faculty of Education, Simon Fraser University
Burnaby, British Columbia
V5A 1S6

Dear Dr. Obadia,

As a graduate student at Memorial University of Newfoundland, I am presently working on a thesis concerning the development of a handbook for second language teachers interested in applying computers to their language classes. In the course of my research, I located a "Mini-Lexique des Micro-Ordinateurs" in Contact, Volume 2, number 4, published in December, 1983. In consultation with my advisor, Mrs. Joan Netten, I have adapted this "mini-lexique" through deletion of some items and the addition of others. I feel that this glossary would make a valuable contribution to the handbook.

I am hereby requesting permission to include a copy of this adapted Mini-Glossary of computer terminology, along with proper accreditation, in the handbook.

I look forward to hearing from you at your earliest convenience.

Respectfully yours,

Ivan J. MacDonald
Ivan J. MacDonald



FACULTY OF EDUCATION
SIMON FRASER UNIVERSITY,
BURNABY, B.C. CANADA V5A 1S6

ANDRÉ A. OBADIA
(Founder/Fondateur)
EDITOR/REDACTEUR EN CHEF
(604) 291-2166 (604) 291-4344 (Messages) 3143
Fax: (604) 291-3203

•REVUE CANADIENNE DESTINEE AUX PROFESSEURS DE FRANÇAIS

•CANADIAN REVIEW FOR FRENCH TEACHERS

February 27, 1989

Ivan J. MacDonald
39A St. Clare Ave.
Stephenville, NF
A2N 1N8

Dear M. MacDonald:

In response to your letter dated February 5, 1989, we are pleased to advise you that permission is hereby granted for you to include the copy of the adapted Mini-Glossary of computer terminology, along with proper accreditation, in the handbook.

Hoping this is to your satisfaction I remain,

Yours truly,

André Obadia
Editor



