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ABSTRACT

The potential for the use of technology in second language instruction lies in two general areas: information management (locating, organizing, applying, storing, updating, and evaluating data) and instructional design and implementation. It would be a great disservice to language instruction not to explore these areas, and the language teaching profession should be closely involved in this exploration. True collaboration between educators and computer programmers has not yet been achieved. The range of possible computer applications for foreign language professionals is broad, is not restricted to the classroom, and is becoming increasingly available to the average non-technologically oriented user. These applications include artificial intelligence, audio and video technology, database management, linguistic analysis courseware and lesson design, learning theory, broadcasting, artificial and synthesized speech, telecommunications and networking, and testing and evaluation. A futuristic but not unrealistic scenario of a multimedia learning space in the language classroom might combine many of these applications in a designated area intended for daily student use. (MSE)

The Implications of Technology for Foreign Language Teaching

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Running head: Implications of Technology

The Implications of Technology for Foreign Language Teaching

> Knowledge is of two kinds.
> We know a subject ourselves, or
> we know where we can find
> information upon it.
>
> In Boswell's
> Life of Johnson, 1791

At no time in history has Samuel Johnson's quote been more appropriate. As we are reminded repeatedly, we live in the "Information Age." To a considerable extent we are its products. Computer technology provides us with the means to remain its uncontested masters. Johnson was a lexicographer- a man celebrated as the dictator and pope of our English language. He successfully combined the talents of rigorous empirical investigation with a creative gift and the acuteness of thought to select passages from scholars and philosophers that make the reading of his Dictionary a veritable pleasure. He crossed the bold line of demarcation that differentiates the "hard," applied sciences from the forms of investigation traditionally connected with the humanities.

Foreign language educators today are challenged by this age-old dichotomy as they are confronted by the designs of electrical engineers, the architecture of computer scientists and the techniques of audio and video technologists. New expectations by educational administrators and students alike demand the utilization of developments in fields traditionally alien to the ways of thinking of humanists.

More and more, the perception of a solid barrier between the technologists and "others" is not only counterproductive, it is simply invalid. In fact among the most impressive computer applications are the contributions of individuals primarily engaged in the fine arts[1].

The utilization of technology to aid in foreign language instruction points to two prominent applications. The role of information is centripetal. Technology does a superb job of locating, organizing, applying, storing, updating, and evaluating. Secondly, and even more critical, is the translation of technological advances to the design and application of instruction. Avoiding the exploration of the potential uses of technology for instruction permits the possibility of a great disservice to foreign language teaching. If we retreat, and the translation of pedagogical principles is left to those solely involved in technological investigation, we invite failure. The continuing embryonic state of computer software development is already symptomatic of educators' indifference. A truly productive collaboration has not yet been achieved by the programmer and pedagogue.

Several disclaimers about technology's contemporary role will serve as an introduction to the current discussion. A principal effect of technology is not, and never has been, the loss of someone's job. Speculation to that end results in nothing more than intellectual stagnation and the continued assignment of uncreative duties to those least

inclined to perform them - the professionals. Industrial history is replete with examples of the effects of the application of new approaches to traditional tasks. While initially disturbing in social terms, the ripple effect of innovation assures a net expansion in jobs and income. It simply cannot be refuted that certain tasks are done much better by machines than by humans. Consequently, we must ascertain which aspects of language learning lend themselves to a computer-aided format and begin providing relief for the classroom instructor often beleaguered by repetitive drill routines.

A corollary to a concerted search for appropriate language learning procedures must not be the often heard suggestion that anyone will be able to write CALL (computer-aided language learning) materials within a "short time" after becoming the proud owner of a microcomputer. This is a widely circulating misconception. It is also pure folly to try to convince anyone that it's time to return to school to learn programming in order to develop teaching materials. Foreign language instructors have neither the time nor the inclination to spend what would amount to an academic year to become proficient in the most basic programming tongue. Finally, stale comparisons of computers with foreign language labs or "programmed learning" machines of various descriptions are extremism of the most negative type and result in counterproductive measures.

The range of computer applications for foreign language professionals is wide indeed. Applicable are not only materials developed for instructional purposes, but also those involving the entire range of basic office automation. Especially useful are word processing systems, spreadsheets, and variousdata management instruments that can easily be used for routine classroom chores such as student grade assignment and attendance. Word processing should be underscored especially as a most productive tool to increase professional and personal efficiency, and to enhance various aspects of creativity.

The technology employed in administration, composition of classroom materials, routine correspondence, and record keeping is basically mundane. But the utilization of technological innovation for pedagogical application and materials design is limited only by the imagination. Areas that appear to offer the most promise and deserve the attention of foreign language professionals can be summarized:

1. Artificial intelligence, particularly in its recent developments toward "intelligent" CALL.
2. Audio and video technology, especially in the field of the language laboratory, and in those areas where CALL and audio/video utilization intersect.
3. Data-base management as applied to automated dictionaries and semantic inventories.

4. Natural language parsing and random state morphological generation.
5. Computer enhanced courseware and lesson design, "authoring" languages, systems, and templates.
6. Learning theory, programmed learning and models of man-machine interaction.
7. Videodisc, compact disc, and CD-ROM technology in its various rapidly evolving forms.
8. Broadcast technology, including satellite transmission as well as all aspects of radio transmission for instructional purposes.
9. Artificial and synthesized speech both in the production and recognition modes.
10. Telecommunications in the form of computer networking (PBX, LAN), and research in fiber optics.
11. Educational testing and evaluation as aided by computerized statistical analysis[2].

Such a comprehensive topical listing, is perhaps most appropriate for consideration by professional course designers of instructional materials. However, it does contain areas of interest that are daily becoming more accessible to the average non-technologically oriented foreign language instructor. An enumeration of reliable sources that feature informative articles on technological trends is as follows:

Classroom Computer Learning
Pitman Learning, Inc.
19 Davis Drive
Belmont, CA 94002

Educational Computer
Edcomp, Inc.
P.O. Box 535
Cupertino, CA 95015

Electronic Learning
Scholastic Inc.
50 W. 44th St.
New York, NY 10036

PC World
P.O. Box 51833
Boulder, CO 80321-1833

CALICO
3078 JKHB
Brigham Young University
Provo, Utah 84602

Journal of Educational Techniques and Technologies
(formerly NALLD Journal)
University of Georgia
3rd Floor, Moore College
Athens, GA 30602

SYSTEM
Pergamon Press Inc.
Maxwell House
Fairview Park
Elmsford, NY 10523

Modern Language Journal
"MLJ Computer Corner"
University of Wisconsin Press
114 North Murray Street
Madison, WI 53715

Educational Technology
Education News Service
140 Sylvan Ave.
Englewood Cliffs, NJ 07632

Electronic Education
Electronic Communications, Inc
Suite 220
1311 Executive Center Division
Tallahassee, FL 32301

Technological Horizons in Education, T.H.E. Journal
P.O. Box 992
Acton, MA 01720

SCOPE
Paradigm Press, Inc.
P.O. Box 1057
Osprey, FL 33559

Computers and the Humanities
Paradigm Press, Inc.
P.O. Box 1057
Osprey, FL 33559

Journal of Computer-Based Instruction
International Headquarters
Miller Hall 409
Western Washington University
Bellingham, WA 98225

A-Plus for Apple Microcomputing
Ziff-Davis Publishing Co.
One Park Avenue
New York, NY 10016

Foreign Language Annals
"Foreign Language Teaching and the Computer"
Ed., Garnett, Hart, and Millgren
579 Broadway
Hastings-on-Hudson, NY 10706

For many language teaching professionals, the phrase "teaching technology" causes the mind to conjure up images of machines, wires, and printed circuits. This is an unfortunate state of affairs, since it overlooks the primacy of courseware. Yet in a discussion of evolving educational technology, topical division based on modes of delivery (hardware) does offer a convenient organization of topics.

THE COMPUTER, CALL

The literature on CALL has burgeoned. Culminating with the most recent overview by Ahmad et al. (1986), at least eight major publications over the course of the last four years have surveyed the field[3]. Thus, contemporary CALL in its present state has been adequately portrayed. However, succinct, unbiased, and up-dated summaries of courseware are not readily available[4].

Very little has been done to enhance this traditionally mute medium. Generally, approaches to computer-aided instruction have been limited thus far to drill and practice programs not incorporating audio technology. However, the future looks especially bright in this area since the linking of microcomputers with sound production/recognition is an inescapable next step.

AUDIO INSTRUCTION

This has been the exclusive arena of the foreign language laboratory housing the everchanging models of tape recorders with their upgraded features. However, a metamorphosis is

under way in this solid symbol of foreign language teaching of the post-Sputnik era of the 1960's. Then the lab was considered an integral component of the audio-lingual method which depended heavily on drilling and overlearning. A distinctly Skinnerian attitude favoring listening and repetition prevailed. Often laboratory learning was guided by monitors subservient to immutable lab schedules. The eclecticism of the 1970's and 80's (spurred on by an interest in the individualization of instruction) caused inroads to be made in the expansion of foreign language audio labs to incorporate more learner-controlled activities. The current shift on audio cassettes (rendering obsolete reel to reel technology) is a vivid symbol of the reassignment of a larger degree of learning to the student.

A further illustration of changes in technology, paralleling a methodological evolution, can be seen in the present generation of microprocessor-controlled audio tape decks. The leading manufacturers of foreign language laboratories recently released student cassette decks, incorporating a feature called "bookmark." When a student, during a first listening, hears a segment to which he wishes to return, he merely inserts an electronic tab. Upon completing the entire listening sequence without interruption the tabs maybe quickly accessed and reviewed. While the basic format and intent of lab materials(determined by text

authors and publishers) have not changed substantially, the lock-step aspect of laboratory learning is being challenged by students availing themselves of technology. Such engineering combined with learner initiative is most welcome. It supports widely-held impressions that foreign language educators will witness a general expansion in the functions and capabilities of the traditional (audio) language lab, gradually evolving into a more comprehensive technological media center. The center will house a wide range of technology used to enhance the language learning experience including multiple band radio, CALL, foreign language television (satellite and cable), and various types of interactive video.

Rapidly decreasing costs associated with microprocessor technology are also responsible for a renewed interest in the use of radio and shortwave to teach foreign languages[5]. These have been woefully neglected and offer us a most valuable resource requiring a relatively minor investment. Supervised activities as well as free listening provide student access to authentic speech models as well as topics of current and cultural interest.

VIDEO INSTRUCTION

Another example of the expanding role of the language laboratory is the incorporation of video technology into the routine capability of the language laboratory. Providing access to a video cassette recorder (VCR) is a logical

extension of the laboratory's increasing services.

The current generation of students has been exposed to a tremendous volume of visual stimulation delivered by the ubiquitous television set. No more powerful, yet underutilized means of delivering educational information has ever existed. With the advent of the VCR and its increased use in the home, an entirely new era in video applications for instructional purposes beckons. The flexibility created in the language labs by the new generation of audio cassette recorders, hints at increased video use options for foreign language instruction as well. But, as with audio materials, the dearth of commercially available quality materials can be an impediment. Library collections of modern and culturally exemplary samples of foreign language materials represent a substantial capital outlay. Locally produced video, while often motivating, is nevertheless a quick-fix proposition. The prohibitive cost of producing professional video segments leads only to one logical conclusion: "repurposing." This process, usually linked to the far more expensive technology connected with laser disk production is gaining popularity. Educators are beginning to explore the possibilities or dubbing over commercially produced video programs in a foreign language and providing appropriate drills and learning activities[6].

Another recent development, while not an educational application per se, could be effectively utilized for foreign

language instruction: stereo television and the capability of broadcasting signals in two languages simultaneously. Commercial television broadcasting has begun experimenting with bilingual programming in certain areas of Texas and California. The viewer can select an English or dubbed-over Spanish version, and view popular TV programs that have been equipped with a second sound track. The imagination reels from the possibilities that suggest themselves: Miami Vice in Russian(?).

ELECTRONIC TEXT

A subcomponent of the video category, electronic text(ET) has had a rather slow moving career since its commercial introduction in 1976. Only in recent years have technological improvements and reductions in cost permitted wider application. ET is a system which permits the user to store print and graphic information in computers and then broadcast via telephone lines, satellites, or cable. A conventional television set fitted with a decoder becomes the receiver and permits an individual access to information on electronic "pages" that are formatted by the transmitting source. These pages are designed to fit the space provided on a television screen and consequently the information is not as dense as that on the page of a book. Information is broadcast by becoming part of the unused portion of a television signal and is therefore a byproduct of normal transmission - only a decoder is required to receive the

information. ET provides an option to send information as well as receive it, and the use of the term "videotext" has come to mean a two way system while "teletext" is reserved for electronic text that is one way when a user can select information transmitted from a central source. For instructional purposes, the applications are very wide ranging. This latter application permits the transmission of voice and data completely in digital form over twisted wire(PBX) or coaxial cable(LAN). The PBX version, however, requires a dedicated telephone line and the cost of keeping a work station on-line can be prohibitively expensive. All routine out of class communication that takes place on paper between an instructor and a student could be converted to this mode. For instance, proficiency testing, quizzes and examinations, supplementary course materials, correspondence type courses, announcements, and news events(transmitted in both directions), become feasible. Practically speaking, any location that can house a television and a computer could in essence become a learning station. Especially promising is the introduction of such systems where students scattered over wide geographic areas making traditional class attendance impossible.

The proliferation of computer terminals in the business world and accompanying price decreases are causing educators as well to consider the full range of on-campus utilization of technology. The linking together of students, instructors

and administrators is approaching the stage where serious financial commitments will be made by many institutions throughout the country. The thread joining together these various applications is "interactivity."

Ultimately, discussions of maximally effective materials lead to the subject of interactive video. Throughout the late 1960's and 70's educators were already attaching audiotape players, slide projectors, and VCR's to computers. These were logical enhancements to increase the motivational value of materials. The integration of computers with this first generation of "peripheral" devices provided considerable experimentation possibilities. However, the equipment that was being linked was unreliable and early efforts were rather inconclusive. Recent advances have significantly improved the technical integrity of such systems. The availability of large amounts of commercial video material on cassette, reflecting the home viewing VCR explosion, guarantees this as a most fruitful area of applied research. Unlike conventional video used by educators since the 50's, video augmented by computer can be non-linear. This implies that the learner determines the order of filmed sequences and is required to respond to questions posed by a computer program. Depending on the choice of segments and the accuracy of responses to questions posed by the accompanying program, the student progresses at an individual pace.

The entire process is controlled by either an electronic chip or a video board resident in the computer. This enables the computer to communicate with the VCR and to locate the appropriate video segment. Accessed information is played back over a conventional television receiver or monitor. While a promising method of enhancing foreign language printed materials, the linking of VCR's with computers does have certain limitations which are alleviated by the technology of videodisc.

VIDEODISC APPLICATIONS

Interactive teaching materials when delivered via the recently reemerging application of laser videodisc. Several years ago this technology suffered a serious setback in the home-viewing market. Consumers soon realized that there were no advantages to viewing films that were marketed at higher cost than ordinary videotapes and required a laser playback unit. Such home electronics were typical technological overkill, and this sealed the fate of videodisc for home use (reminiscent of the analogous destiny of quadraphonic hi-fidelity). Within the last few years videodiscs have started to gain acceptance by major corporations and the medical professions for training purposes. The use of videodisc for use in instructional settings has been adequately described in relatively few sources[7].

A videodisc mated to a computer provides an incomparable teaching system. Laser technology permits the storage of

vast amounts of information on discs and allows its access in fractions of a second. Limiting factors, however, are the complexity and cost of the commercial production of discs. However, the era of erasable videodiscs, requiring no complex and expensive pressing is rapidly approaching.

Disc pressing cost does not take into consideration factors of design and course development. Producing branched materials with multiple learning tracks and integrated media is time consuming and technically demanding. Therefore, integrated systems enabling the non-computer specialist to develop interactive learning materials are gradually being made available. These systems consist of computers and video delivery systems with interfacing hardware, "primed" to accept materials developed via an authoring system. In summary, the ability to present voice, data, and images (still photos as well as filmed sequences) in every conceivable combination represents a quantum leap in the delivery of information for instructional purposes[8]. The effects of this emerging technology for foreign language learning are inestimable. However, its prudent use as an adjunct to any give foreign language classroom methodology could well result in unprecedented increases in foreign language interest, student motivation, enrollments, and proficiency.

This brief overview of foreign language teaching

technology has concentrated on a kind of segmented perspective of audio-video-data delivery as it relates to the instructional process. Such technological disarray is clearly a temporary state and a total orchestration of various branches of "infomedia" resulting in revolutionary approaches to teaching foreign languages looms in the not too distant future. In fact, research and experimentation in diverse areas of information science and technology is making possible the following futuristic scenario.

MOSCOW, WEST : Multimedia Learning Space 9

Since foreign language learning is a prime testing ground for the interrelationship between informal learning(as proposed by Piaget) and formal instruction, the concept of "learning space" represents the embodiment of the interaction of these two approaches. A student in an intermediate Russian class, for instance, has decided to begin a new unit as assigned by the instructor. He proceeds to the foreign language learning media center on campus and enters an experiential study room designated "MOSCOW, WEST,"(of course the German students would have named it "NEW HEIDELBERG," and so on). The learning space occupies an average personal office(16'x11') with an eight foot ceiling. The intended effect of the environment is to soothe the user and to afford a quiet study haven in contrast to the din of the media center. The color scheme of the walls and carpeting helps further to relax the student. One entire wall is a display screen of tempered

glass, frosted to facilitate rear projection. The user sits in the middle of the room in a comfortable, vinyl-covered chair fitted with a "joy stick" on the armrest. Within easy reach is a television monitor with a touch sensitive screen. Eight loudspeakers are positioned strategically around the room to achieve acoustics that literally envelop the listener. A speech recognition device(consisting of a sensitive microphone linked to a computer) relates spoken commands to the system and can be used to initiate the entire range of activities that a user might want to engage in.

The personal monitor displays the total categorical information sources and information providing devices that a user has access to. They are logically organized and displayed in some conventional fashion, as the indices of a book. The possibilities here are almost limitless but a tentative listing might include bilingual dictionaries and a Thesaurus, pedagogical grammars, a calendar, an atlas, a shortwave receiver, a telephone, lists of musical recordings, a gallery of portraits and photographs, and inventories of available filmed sequences. These collections might even contain such highly personalized effects as favorite poems, and perhaps a foreign language rock video or two to break the monotony of boning up on some exceptionally thorny grammar points. This monitor is dubbed the "Mirovozzrenie" - (Weltanschauung) screen and the user navigates around it helicopter style, using the joystick on the arm rest. The

student's exact location at any time is indicated by a blinking arrow or cursor that confirms travels around the display device. Other options for changing locations include the voicing of commands, such as "dictionary, please" or "take me to December, 1985." Pointing with a finger on the touch sensitive screen also effects a change. When a general area is located that one wishes to "explore," then pushing the joystick results in a magnification of that particular data field and its display on the large screen. Essentially, the personal monitor (Weltanschauung screen) provides a kind of map of available information sources, a macro perspective. The magnification on the wall is a zooming-in on specific instances of voice, data, or image fields. Continued exertion on the joystick peels away layers of information and goes deeper and deeper to pinpoint precisely the intended focus of the user.

Certain logical conventions determine the "navigation" rules. If a student is looking for a particular pronunciation of a vocabulary item, a typical search routine might proceed from page, to column, to lexical entry, to phonetic representation (via a pronunciation key provided on a split screen). A more direct approach yet would be voicing a question directed to the system, "How do you pronounce the Russian word for aardvark?"

The efficient use of "nested" information is a key factor in the organization of such complex and reciprocally

related data bases. The success of the entire system, to a great extent, depends on the transparency of the operating conventions and the ease of retrieval of requested information segments.

The difference between "Moscow, West" and the type of activity that occurs when a student takes a seat in a traditional language lab or in front of a desk-top terminal is vast indeed. Interaction at a CRT(today's computer-assisted language learning) is emphatically unidimesional if the objectives of that interaction relate to learning based primarily on data manipulation and assimilation. Consequently, of central interest in the above description is the way that the learner's motions or activities(joystick manipulation, speech, etc.) accomplish an information task.

This scenario incorporating cutting edge technology into a language learning situation is not provided to appear audaciously modernistic. In fact, available for student use in "Moscow, West" will be all the traditional tools of scholarship and study, the inevitable dictionaries and grammars with their paradigms. However, in "Moscow, West" a student will also be able to take a leisurely excursion through the Hermitage, study a train schedule for the Trans-Siberian, or browse through current menus of the Moscow State University student cafeteria. The inclusion of learning materials enhanced by optical videodisc technology and

spatial data management cannot fail to increase student motivation. In all probability, it will increase learning.

The distance of the traditional classroom from actual foreign language settings is tremendous and such technological intensification will serve to make the real foreign language world appear a little closer. Providing students access to such multifaceted learning modes will have inestimable effect not only on foreign language instruction but on all aspects of the presentation of information for teaching activities.

NOTES

1. Note, for instance, Pamela McCorduck's accounts of the work of Lillian Schwartz and Harold Cohen in the Universal Machine (New York: McGraw-Hill, 1985) 121 ff.

2. These topics are suggested by Vance Stevens, Roland Sussex, and Walter Vladimir Tuman, A Bibliography of Computer-Aided Language Learning, (New York: AMS Press, 1986).

3. Khursid Ahman, Greville Corbett, Margaret Rogers and Roland Sussex, Computers, Language Learning and Language Teaching (Cambridge, UK: Cambridge University Press, 1985).

4. For a comprehensive listing of available software and vendors cf. Hubert P. Weller, Computer Assisted Instructional Programs. Available from the author at Dept. of Foreign Languages, Hope College, Holland, Michigan 49423.

5. David Crookall (1984). Rigs and posts: radio reception for FLL. System, 12(2), 151-167; see also Joseph A. Wipf (1984). Shortwave Radio and the Second Language Class. Modern Language Journal, 68, 7-12.

6. Useful suggestions for video development and implementation can be found in Jack Lonergan, Video in Language Teaching (Cambridge: Cambridge University Press, 1984); Marion Geddes and Gill Sturtridge, ed. Video in the Language Classroom (London: Heinemann Educational Books, 1982).

7. Michael L. DeBloois (1982), Videodisc/Microcomputer Courseware Design (Englewood Cliffs, New Jersey: Educational Technology Publications); see also Ed Schwartz (1985), The Educators' Handbook to Interactive Videodisc (Washington, D.C.: AECT); Steve Lambert & Jane Sallis, Eds. (1987). CD-I and Interactive Videodisc Technology (Indianapolis: Howard W. Sams & Co.).

8. Charles R. Miller, III (1985). Systems add new dimension. Electronic Education, October, 13-20; see also Nicholas V. Iuppa (1984), A Practical Guide to Interactive Video Design (White Plains, NY: Knowledge Industry Publishers, Inc.).

9. This "foreign language" adaptation is based on Dataland, the Media Room at MIT's Architecture Machine Group laboratory. cf. Richard A. Bolt, The Human Interface (Lifetime Learning Publications: Belmont, CA, 1984).