Formative Research on Telidon and Educatio[n]

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ABSTRACT

TVOntario recently conducted a field trial of Telidon in education, and a formative research study based on the trial has been completed. The field trial involved the deployment of Telidon terminals at public schools, colleges, universities, libraries, and special-educational institutions. The formative research effort was undertaken to gather information on Telidon that could be applied to the development of Telidon in education. The research involved a variety of complementary research methods — including observation, interviews, and survey questionnaires. During the field trial, users tended to explore Telidon, rather than use it as a learning tool. Several factors were identified as influencing how Telidon was implemented at each institution; these included the role of the contact person, and a need for printed documentation. The database was found to contain too few sequences of interest and the search for sequences or information was considered too time consuming. The graphic design and educational level of sequences were found to offer problems. Formative research provided systematic information of this type on a new educational technology.

TVOntario has recently completed a three-year field trial of Canada's videotex system, Telidon, in which educational videotex applications were explored. The field trial included a major formative research effort to gather information that could be applied to the future development of Telidon and other computer-communication technologies in education*

Supported by the Department of Communications, the field trial involved the implementation of Telidon videotex and teletex services for 50 educational institutions across Ontario (Syrett, 1981; Bowers and Cioni, 1982). Telidon terminals were installed at elementary and secondary schools, colleges and universities, public libraries, and special-educational institutions. The Telidon project team engaged TVOntario's Office of Project Research to undertake a formative evaluation of Telidon in education by examining the nature of the educational activity

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generated by the field trial. This research has recently been completed and reported (Office of Project Research, TVOntario, 1982).

The research team was not involved in the actual running of the field trial. Distribution of equipment and materials, and liaison with the participating educational institutions, were the formidable task of the Telidon project team. The researchers, however, worked parallel with the project team, benefiting from considerable assistance in the administration of the various research methods employed.

At most sites one person became the major contact between TVOntario's Telidon project team and the institution. Most often, this person created a Telidon sequence (a series of Telidon pages) for inclusion in the TVO database. Throughout the field trial the contact people administered the use of the terminal at their institutions, often with the assistance of other interested staff or students.

The Office of Project Research set up a research team whose primary task was to provide systematic feedback on the uses of Telidon in education to TVOntario's Telidon project team and all those involved in the field trial. Since the field trial was exploratory and the research purely formative, the research team attempted to be as unobstrusive as possible, trying not to intervene in the spontaneous experimentation undertaken by the field trial participants.

The introduction of so new and unprecedented a technology as Telidon into the educational system raise many questions and generated numerous hypotheses. At the outset, the research team, in consultation with the project team, specified a number of categories from which research questions should emerge and information could be gathered. These research categories included:

1. Patterns of use: With so many promises and ideas in the air, the first priority of research was a basic record of how Telidon was used during the field trial.

2. Implementation: The manner in which Telidon was put to use at each of the participating institutions was of considerable interest. The research examined the way teachers, students, and librarians adapted Telidon to their own purposes and the degree to which Telidon use was diffused through the institutions.

3. Assessment of Telidon sequences and database: The content of the Telidon educational database produced during the field trial was examined in an attempt to gather information on how best to design videotex content for educational purposes.

The most important aspect of educational materials — their learning impact — was the most elusive to research. However, some preliminary research was undertaken.

4. Perceptions: Future development of Telidon and its processes of diffusion will have to take account of users' responses to the technology. So administrators, teachers, librarians, and students were given opportunities to express their perceptions of the system.

METHODS

The research team collected data from 34 sites. These sites included primary, secondary, and postsecondary schools as well as public libraries and special-educational institutions.

The research effort included a number of complementary research methods: structured telephone interviews with the contact person at each site; observation conducted during on-site visits; personal interviews with staff at the participating institutions; questionnaires administered to approximately 400 secondary and postsecondary school students who used Telidon in their classes; questionnaires for 200 teachers and administrators at participating institutions; and a controlled study, carried out to examine the learning impact of a Telidon CAI sequence.

FINDINGS

The breadth of the research effort provided a great deal of data under each of the research categories. The following are selected main findings that reflect the general direction of the results.

1 Patterns of Use

1.1 Learning about Telidon

Throughout the field trial the major use of Telidon consisted of learning "about" the technology, rather than "with" or "through" it. Whether in the form of demonstrations or classes about "the new technologies," Telidon itself was often the object of interest.

1.2 Differential Involvement

It became clear during the field trial that a unified definition of Telidon or its mode of application was not possible. On the contrary, the different educational goals of the participating institutions greatly influenced the process of adoption and the patterns of use.

Differential involvement operated at two levels — the institutional and the departmental. At the institutional level, for instance, universities were primarily interested in extensive research on the technology and its social impact. On the other hand, high schools were most often looking for new forms of teaching materials; they were in search of alternatives to stimulate and motivate their students. These different needs placed different demands on the databases available during the field trial.

At the departmental level, within each institution the use of Telidon was determined by the physical location of the Telidon terminal, and the discipline or function of the department that administered the terminal. For example, at the secondary-school level, terminals were sometimes located in classroom or department office. Teachers and students in the different departments looked for different types of sequences: mathematics teachers were often interested in computer-assisted lessons; geography teachers sought sequences that could be used in class as visual aids. The departmental specialization also limited the use of the system by staff and students from other departments at the institution.

1.3 System Players

At schools where students were allowed to use Telidon at their leisure, small groups of students were drawn to "play the system." These students searched for game sequences on the database (of which there were few). However, they also enjoyed the exploration of the database as a game in itself. We called their exploration "system playing" because it was not motivated by any particular information search: rather, they seemed to find enjoyment seeing how the database was organized, without regard to its contents.

2 Implementation

2.1 Role of Contact Person as Facilitator

There was limited spontaneous diffusion of Telidon use within each institution during the period of the field trial. At many sites few teachers, staff, or students other than the contact person used the system. The contact person emerged as the key link in the process of diffusion of Telidon into his or her educational institution. The administrative position of the contact person could influence the use of Telidon within a site. For instance, librarians or resource teachers were usually more effective in disseminating information about Telidon than classroom teachers. The workload, motivation, and academic discipline of the contact persons affected their promotion of Telidon and its subsequent use at each site.

2.2 Printed Documentation

There was a demand, at the elementary and secondary schools, for printed support materials. Teachers requested documentation on basic technical issues, and on pedagogical matters as well. They wanted suggestions on what Telidon material to use and how to use it. This demand came especially from those who had not produced sequences or had not used Telidon at the sites. Interviews with teachers suggested that the desire for printed material may have been part of a larger need for guidance on how to apply Telidon to teaching.

3 Assessment of Telidon Sequences and Databases

3.1 Size of the Database

Participants in the field trial could access a TVOntario educational database of 60 sequences. A sequence is a series of Telidon "pages" or videoscreens of image and text. The pages of sequence are all organized around a common theme or structure. For instance, a sequence may be a quiz on world history composed of 50 pages — some presenting questions, others providing answers. The sequences in the database varied considerably in form and content — from games to structured lessons to simple lists of information.

The creation of a 60-sequence database was a major effort, involving considerable human resources. Volunteers from the various sites produced sequences at TVOntario offices, on special minicomputers designed for page and sequence creation. The Telidon project team included sequence creators who produced their own sequences and trained and assisted the volunteers.

Despite this effort, Telidon users considered the field trial database too small. In a survey conducted at the end of the field trial, experienced users rated the lack of sequences of appropriate subject matter and educational level as the largest impediment to Telidon use. While 60 sequences represent a considerable achievement, they were spread over 45 institutions, and many different courses of study and educational levels within each.

3.2 Graphics and Educational Design

The Telidon graphics were truly impressive — users of all ages and educational backgrounds were impressed with what they saw. However, the effective use of graphics in a sequence was found to be a subtle and at times difficult design problem. In the opening pages of a sequence, a graphic may serve as a stimulant, whetting the appetite. Graphics that are essential to the purpose of the sequence were also very successful — for instance, maps in a sequence on geology. However, it was found that if a nonessential graphic is repeated throughout a sequence, it can be frustrating to the user.

3.3 Information Searches with a Menu-Driven Branching Structure

Telidon graphics and text are compatible with a variety of types of computers and can be used with different methods of accessing sequences. In the field trial, the assessing system required the user to make a series of selections from indexes displayed on the screen. The indexes were arranged hierarchically — moving from the general to the specific. The user first searched for the sequence of interest at the most general level — for instance, choosing "education" over "news" or "government services." The user would then move to the next index, choosing among history, science, or literature sequences. In this way the user searched for and retrieved the sequences of interest by consulting a series of indexes, or as they are called in computer parlance, "menu pages."

Librarians and experienced computer users found the menu-driven user searches relatively inefficient. In the search for one page of information many preceding "menu" pages had to be examined. Other users recommended that the menus include cross-references and descriptors to make searching for sequences easier and quicker. The database during the field trial was relatively small, so this problem of accessing on-line information would be compounded in growing databases.

3.4 Computer-Assisted Instruction

Several computer-assisted instruction sequences were created for the TVOntario database. In these sequences students learned material presented on the Telidon screen and answered questions on the content materials as they proceeded through the sequence.

Users familiar with computer-assisted instruction instruction applications on other computer systems found the Telidon sequences limited in comparison. For instance, the system as configured during the field trial had no form of record keeping; students could not be identified by the computer and perfor-

New Software Evaluation Instrument

The National Science Teachers Association (NSTA) has published a new Microcomputer Software Evaluation Instrument. Prepared by the NSTA Task Force on Assessing Computer-Augmented Science Instructional Materials the new instrument is designed to be used primarily in school-level or district-level evaluations of science instructional software packages.

The eight-page instrument appears in the January 1984 issues of NSTA's perodicals, *The Science Teacher, Science and Children* and the *Journal of College Science Teaching.* Copies may also be obtained from NSTA, 1742 Connecticut Avenue NW, Washington, DC 20009.

For more information, contact Leopold E. Klopfer, Prof. of Educ., Chair, NSTA Task Force, Univ. of Pittsburgh, LRDC Bldg., 3939 O'Hara St., Pittsburgh, PA 15260. 412/624-4821.

Free Access to On-Line Software Library Offered by Searchmart

Searchmart Corp., a South Florida firm specializing in database development and information retrieval systems, is offering a Free Access Software Library that lists, describes and demonstrates tens of thousands of individual applications and systems software packages online.

This library of systems and applications software will be updated daily and categorized by manufacturer, publisher or vendor, operating systems compatibility, protocol requirements, program classification, features, price and ordering information.

The unique feature is the free on-line access to the software database. "There are several services with software databases," states Searchmart's president, Victor Gruneau, "but they charge substantial fees for making searches and they are not available on-line to software shoppers who want to search the files on home or office terminals at their convenience."

Searchmart's Free Access On-line Software Library allows anyone with data communications capability to search the software database.

Software manufacturers and vendors will describe their products and companies on "pages," each page a 40-character by 20-line CRT screen. "They'll have the opportunity to give the software shopper as much information as they want — even demonstrations — and at a very modest cost per page."

For more information, contact Mary K. Hamm, Marketing Services Director, Searchman, Corporation, 636 U.S. Highway 1, Suite 210, North Palm Beach, FL 33408. Or Call 305/845-2996. □

mance statistics were not compiled. Further, the system did not allow the direct entry of text or numeric responses to a question posed in a sequence: the user could only enter page numbers through a numeric key pad. Of course, these problems are not endemic to Telidon, whose graphic system can be adapted to different host computing facilities and technical configurations. However, they alert the developers of Telidon systems to the need to ensure that any computer-assisted instruction sequences are sufficiently flexible in design and powerful in computing ability to compete with other available systems.

3.5 Learning Impact

A preliminary evaluation of one computer-assisted instructional sequence suggested that certain Telidon sequences may be effective for some students and ineffective for others. In this study more advanced students learned as well from Telidon as from a traditional teacher presentation. However, students in general-level classes who learned from Telidon tended to score less well on learning tests than students taught by a teacher. The sequence studied covered a small portion of the grade 9 mathematics curriculum and allowed students to go through the material without teacher assistance. Though this study could not employ complete controls on all related variables, these findings indicate that educational sequences must be designed with careful consideration of how and with whom they will be used.

3.6 Designing Sequences

Findings on the role of graphics and the possible differential impact of sequences were combined with sequence creators' comments to provide suggestions for the development of effective sequences. For instance, teamwork in creation, such as matching educators with graphic designers, may be one way to keep sequences properly targeted and avoid an overemphasis on any aspect of a sequence. Pre-testing sequences with target users would also be effective in sharpening the design and avoiding possible misuse of a sequence. In order to maximize the use of the database, some form of need assessment should also precede the creation of sequences.

FORMATIVE EVALUATION AND THE TELIDON FIELD TRIAL

A substantial body of research is finally emerging in the wake of the enthusiasm for educational applications of the new videotex technologies. Researchers are beginning to examine the antecedents, applications, and effects of these new systems. One important type of research is applied formative research, which can affect planning and development directly. The field trial explored the potentials of Telidon technology as an educational tool. It also provided the opportunity for the formative research to be conducted. We hope that the findings and recommendations will be useful for researchers and practitioners working with Telidon and other innovative educational technology.

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companions come out to meet the ladies outdoors. Negotiation and bargaining follows, but some essential papers have apparently not arrived, so the princess and her ladies must stay the night. The negotiations are firm, but towards the end it is obvious that the king is quite taken by the Princess.

Act III. Don Armando is in love . . . with the dairy maid. He asks his page to sing for him. A verbal duel between Moth and Don Armando discusses love, and the dairymaid's probable virtue. Finally Don Armando, desperately in love, determines to release Costard from his custody, so that Costard will deliver a message to his love.

Enter Biron. He too, apparently is in love, {Isn't everybody?} and he gives Costard another letter, destined for Rosaline. Thus Shakespeare contrasts the physical passion on the one hand, with true, honest love, on the other. And Costard now has *two* letters to deliver.

Act IV. There are three scenes in this act. The princess and her ladies are going shooting in the forest, when they are interrupted by Costard carrying the love letter meant for Rosaline. The princess asks that the letter be read aloud. It is full of pomposity. And, it is, of course, the wrong letter.

The second scene introduces two new characters, the school teacher and the curate. Jacquenetta enters with her letter. Since she is illiterate, she asks the curate to read it for her, which he does, and which the school teacher is able to promptly criticise. Again it is the wrong letter, which the characters note, and so they send Jaquenetta to the king!

Scene three. Biron is rediculed by the King, Longaville, and Dumain who see that Biron is the first to break his oath. In a quick philosophic flourish, Biron explains that the only real books are the eyes of the ladies! argument is enthusiasticlly accepted, and the four determine to go off and study what should be studied!

"For women's eyes this doctrine I derive:
They are the books, the arts, the academes,
That show, contain, and nourish all the world."

Act V. More fun is made of jargon and pedantry as the schoolmaster, the curate, the constable, and Don Armando go at each other full tilt. Moth epitomizes the jargonistic humor in which all indulge, saying that "They have been at a great feast of languages, and stolen the scraps." But it is Costard who ultimately produces the longest word of them all, probably good enough to enter the *Guiness Book of Records* . . . Honorificabilitudinitatibus.

The final scene returns us to the princess and her ladies. All have received gifts from their admirers. Upon hearing from their page that the men are about to make an appearance dressed in Muscovite costume, the ladies determine to disguise themselves. Suddenly the "Muscovites" woo the wrong girls! The humorous Pagent of the Nine Worthies follows as entertainment. Indeed, the merriment is broken as Don Armando is accused of getting Jacquenetta pregnant. And more bad news arrives. The King of France is dead. The princess resolves to return home immediately. The men all proclaim their intentions but the ladies decide to make their lovers wait a full year before they will marry them. Even Don Armando will have to prove himself . . . he will spend three years trying to be a farmer! And so, as the play comes to an end, love has been proclaimed, but, at least a year must pass before any marriages will take place. Indeed, for the moment at least, love's labour had been lost.

We began our discussion with a look at the art/science dichotomy so often cropping up in educational technology of the 1980's. We have concluded with Shakespeare's metaphoric analysis in terms of love and study. Who wins? Shakespeare is predictably ambiguous. Perhaps we should be the same. Educational technology is more than a concept; it is a state of mind. And educational technologists will appreciate that in Love's Labour's Lost, the master playwrite is . . . just possibly . . . speaking to us.

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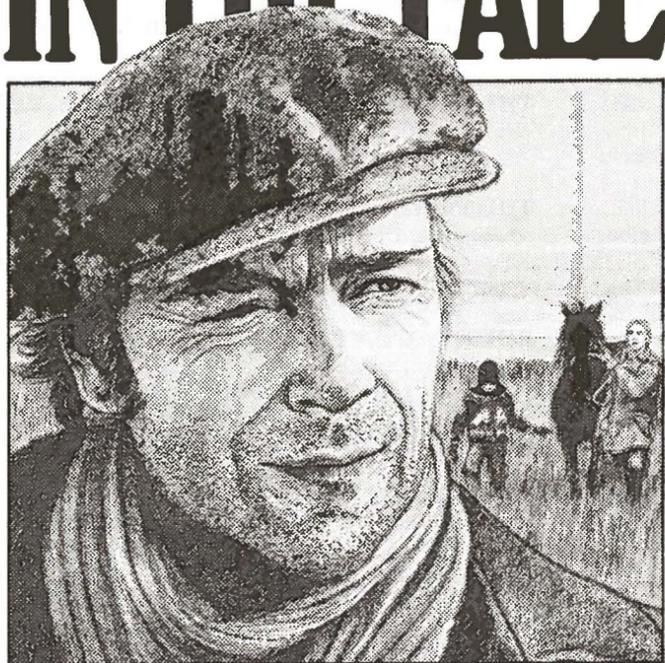We began our discussion with a look at the art/science dichotomy so often cropping up in educational technology of the 1980's. We have concluded with Sheakespeare's metaphoric analysis in terms of love and study. Who wins? Sheakespeare is predictably ambiguous. Perhaps we should be the same. Educational technology is more than a concept; it is a state of mind. And educational technologist will appreciate that in Love's Labour's Lost, the master playwrite is . . . just possibly . . . speaking to us. □

Multimedia for Manitoba?

An association for multi-image in Manitoba is in the process of being established. Those interested, or those in other provinces belonging to similar associations with ideas which might help the fledgeling organization, are invited to contact Cliff Kehler, c/o Inland AV, 1645 St. James St., Winnipeg, R3H 0X1. □