TELIDON FIELD TRIAL EVALUATION:

TECHNICAL ISSUES

BY: THE STAFF OF BEHAVIOURAL TEAM

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VEIKKO PIIPPONEN
DARIAN WALLIS, M.PHIL.
TOM HAY, PH.D.
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FOR: THE DEPARTMENT OF COMMUNICATIONS

DATE: MARCH 31, 1983

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VOLUME I_____
II ✓

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STUDIES OF THE TELIDON INDUSTRY

INTRODUCTION

From early December, 1982, until mid-March, interviews were held with the varied personnel of the Telidon industry. Formal, structured interviews were conducted with six Network Providers, eight Database Operators, eight Information Providers, and ten Page Creators. Appendix D presents the distribution of interviews by organization and by region. In a few instances, interviews were conducted by telephone in order to keep closer to project budget. In addition to the formal interviews, there were contacts of many kinds with several dozen more directly interested parties.

This report will now examine the generic participants in the delivery of Telidon under the field trials. The main participants discussed below are -

** Network Providers
** Database Operators
** Page Creators
** Information Providers.

In distinguishing these participants for purposes of analysis, certain problems of definition have been glossed over. For example, there is a large firm, Infomart, which fills all of the roles in one or another of the field trials. They might be called an "integrated" Telidon company. There are other organizations, such as Dominion Directory, which are information providers, page creators, Telidon promoters, close associates of network operators, and more. These might be called "umbrella IP's" because they handle everything except storage and distribution to users.

Please note, Behavioural Team was asked by the DOC to organize the material on the industry actors in the particular sequence which follows. Some facts may seem disjointed and out of place. This was done against our better judgment and we apologize for any pain this may cause the reader.

Network Providers

1. WHAT, WHO, AND WHY?

The Network Providers (or Operators) are the organizations which provide the link between the Telidon information and those who seek it. These organizations transmit, carry, or broadcast signals from the various databases to the Telidon terminals. In addition to being the carriers, some of the Network Providers also function as Database Operators.

Not surprisingly, in most cases Network Providers are the telephone companies. They have been in the business of transmitting information for years and have established extensive systems for doing so. What better, more economical means to link Telidon terminals with central databases than the existing telephone lines? There are, as always, some exceptions. The Network Providers for teletext services can be television stations, cable companies, and/or organizations which operate satellite transmissions. Cable companies also function as Network Providers in some instances of videotex service, usually with publicly located terminals.

2. MANAGEMENT

The main thrust behind the Network Provider's involvement with Telidon is economic. Most want to assess the economic viability of becoming involved in this type of service on a larger scale. There are also other goals.

Many Network Providers want to be on the leading edge of new technological applications in the field of communications. They want to provide both government and industry with the technological, marketing, and economic data required for policy making. They want to be involved in the development of new products and to provide a "test bed" for the assessment of these new applications.

The main performance goals of the Field Trials are quite varied. They include:

"to be at the poker table,"
maintain market share,
service to IP's and DOC,
collect trial information, experiment,
and consider rural services.

In so far as goals are modest or of the "look-see" variety, they have been generally met, in the eyes of the Network Providers. Some NP's are still reserving judgment on their success.

There are few long-range implications which have arisen from the trials. At least, no carrier was admitting what they might be to us! It is clear from the iNet development, however, that the Network Providers are not necessary tied to Telidon as the term is defined in the field trials.

Even if implications are not clear at this moment, there do remain certain continuing needs for information. There was little consensus among the Network Providers. Mentioned were: economic facts, human-factors (particularly of keypads and decoders), network logic, and open-channel transmission information.

The Network Providers had not yet fully digested their own data by the time of our interviews. Thus they weren't sure how satisfactory it was. The Network Providers have, with the help of the Database Operators, amassed considerable data on user page selections but this information is not easily translated into user service information.

Only some of the Network Providers were familiar with user complaints. That is because user complaints were generally directed to the Database Operator and sometimes, alas, nobody collected organized management information on complaints. NP's saw few major sources of consistent complaints. User complaints are covered in some detail elsewhere in this report.

The Network Providers had few comments about management problems or their outcomes.

The carriers raided their general management ranks to people the Telidon functions. Therefore, most management personnel came from engineering specialties and computer courses. However, as in the general ranks, the Telidon group often included individuals with marketing training; these were often engineers who continued their eduction to receive an MBA degree. To the best of our knowledge, no videotex specialists were hired on among the Network Providers.

From among the other industry parties, the main contact was with the Database Operator of that specific trial. There were minor operational problems - as with any similar undertaking - but few hard-core unresolved problems.

Clearly, Network Providers, by the very nature of their function, interact with those who supply the information for transmission - the Database Operators. Often the relationship is quite close as both have a common concern - the end user of Telidon. This means that there is usually cooperation between the two. Often user difficulties with one are fielded by the other and they work together to solve the users' problems. However, there are aspects of the general Telidon industry development on which Network Providers are at loggerheads with Database Operators. The resolutions of these disagreements have a potentially important impact on the

developmental direction of the industry.

As a case in point, we draw attention to database content - a crucial cornerstone of Telidon. Because of their contact with Telidon users, the Network Providers maintain that what is desired (and important for promoting increased use) is content which provides more local information for users via Telidon. This thrust is in direct conflict with a goal of the Database Operators: the "universal database." Obviously this goal is based on cost considerations. These types of issues must be approached from all perspectives, of course, but resolved keeping in mind what is crucial for Telidon to grow, namely, frequent use of the service.

Most of the Network Providers rarely, if ever, directly interact with the other key Telidon players - the Information Providers or Page Creators. They may be held responsible for delays but these complaints are passed on the Database Operator.

Curiously, the user may not know the Database Operator exists. S/he may call, say, Infomart's phone number with a complaint and yet believe that s/he has reached Bell Canada. Indeed, it is a Bell service person who later appears at their door.

Another area of concern with the other Telidon players has to do with regulation. To date, it is unclear what role the Canadian Radio-television and Telecommunications Commission (CRTC) will play

in controlling the Network Providers. We feel that the CRTC deserves criticism for not making its position clear from the start. The present uncertainty about regulation only serves to make Network Providers very uneasy, with just cause in our opinion. They might make substantial investments in the Telidon industry, yet with the potential threat of very restrictive regulation in the future hanging over their heads.

We think the CRTC should adopt a "laissez-faire" position and make that position well known. We recommend that any control of the Telidon industry be achieved through means other than legal regulation, as this might stifle the industry in its infancy.

3. CONNECT TIME / SYSTEM LOAD

Some trials have few problems with delays because of their technology (VBI teletext) or level of patronage relative to capacity. Other trials express definite misgivings on this subject. However, there is really no hard data to relate users, pages, ports, session length, computer capacity, and delays. Our impression is that delays are more serious and have occurred early in the demand curve than the Network Providers care to admit. However, the bottleneck tends to be in the Database Operator's computer rather than in the Network Provider's system.

One of the potential service problems mentioned by the Network Providers, and one which caused some concern, has to do with the disruption of normal telephone service. Especially during heavy Telidon use, there is the risk of tying up the telephone lines to a degree which could impair normal telephone service. This problem is potentially more potent in small communities through which long-distance calls are routed. While this is not a Telidon problem per se, it is a result of Telidon use.

It should be noted that users do seem to object to Telidon speed. Delays in logging-on are a common complaint discussed in an early chapter. Again, this tends not to be a carrier limitation.

Peak demand seems to occur after school and in the early evening for systems which primarily serve homes. Services to mostly public sites seems to have a less predictable - and flatter - daily demand curve.

4. TECHNICAL RELIABILITY / TECHNICAL PROBLEM

Most emergent problems are identified by the home users rather than detected by the carrier or Database Operator. For public terminals, it is not unfair to say that noboby notifies the carrier or Database Operator and the malady can continue unreported for quite a while.

Luckily, hardware malfunctions are not so common. We did not find evidence of effective efforts at quality control procedures on the part of the Network Providers. Neither is there much in the way of preventive maintenance (which, we believe does not really seem important except on a very lightly sampled basis.) An exception to the above generalizations has to do with cordless, battery powered keypads. These have no "off" switch, although this may not result in much extra battery drain. These require periodic battery replacement.

When complaints are received, they are generally routed through the Database Operator (if the Database Operator is distinct from the Network Provider.) The Database Operator may have the right to call the Network Provider's service foreman directly; this expedites service.

Repairs are handled through the carriers who tend to be quite effective and quick. Most repairs are of the replacement rather than the fix it sort. The defective unit is returned to the manufacturer for fixing. Our impression is that repair services are well handled and not a source of user anger.

With broadcast services, transmission can be variable; this is discussed in detail above. Fibre optics systems believe that they are more reliable than twisted-pair systems particularly in regions where stresses from extreme cold can occur. Of course, the fibre

optics plant is newer and that may account for the difference. During installation, some Network Providers test the patron's lines to insure that they are in good working condition.

The computers which carry the databases are fallible. But they are neither better nor worse than similar computers doing similar work, we are told.

It is nice to report that distance does not seem to badly degrade the quality of the Telidon signal - assuming, of course, that is has been boosted as needed. However, the quality of some long-distance and INWATS lines may be poor and thus Telidon signals inherit their problems.

There is presently no data relating transmission quality to user satisfaction. Users of digital systems are rarely able to discriminate the source of service impairments. Therefore, poor services arising from diverse sources are lumped together in users' minds.

5. INSTALLATION AND MAINTENANCE

The general procedures for installation are quite simple and not particularly different in kind from phone installation. In fact, a

second phone line is often installed as part of a Telidon home. It is good practice to have certain test pages in the database for use in testing but at the present moment, it it not clear what are the appropriate tests. If the installation works for a week, then it is deemed to be "OK."

There seems to be little effort to debrief the installers. This is unfortunate since we have identified them as among the most key personnel in the success or failure of Telidon.

One important part of the installation is the instructions to the users. Unfortunately, there seems to be little organized effort to prepare the installers for this important function. Users find the installers quite helpful in spite of their lack of proper behavioural training. Installers, we are told, feel somewhat inadequate in this role.

If the users were given more and better preparation, then the Network Providers would save a lot money. Users tend to be scared to handle the cables and they avoid do-it-yourself diagnosis and fixing. Thus the carrier has many more service home visits than are really needed.

There are times when the system is "down." One operator simply leaves the computer "off the hook" if the delay is expected to be less than 10 minutes. If more, some effort is made to get a message to users.

User feedback. As pointed out in many places, management information collection is a weakness of the Telidon industry. This is especially so for user information. Of course, in the Field Trials, there were supposed to be formal surveys. The reader of this report can judge how little information Behavioural Team have gleaned from this source. There seems to be little sense of importance to writing down, analyzing, and acting on user complaints. They are treated on an ad-hoc basis and nobody learns much in an organized way. In fairness, individuals who work with Telidon do learn from their experience but we are concerned with system knowledge rather than personal knowledge.

Database Operators

The various field trials differ greatly in the operation of the computer database. Some of these differences result from the size of the database, while others reflect management or organizational differences.

In the case of WETA (a broadcast teletext trial in Washington, D.C.), the database is relatively small and the operation is well co-ordinated. The database is contained on two mini-computers. A PDP 1134 handles the operations of storing and filing, and a PDP 1103 inserts the signal into the TV transmission. The Database Operators are the same people who contact IP's, create pages, load or update them on the database, and answer user queries and complaints. This arrangement encourages consistent goals and good communication links between the various operations.

Some of the larger field trials employ commercial Database Operators. A single Database Operator may even be involved in several field trials and other commercial ventures involving Telidon. In these cases, co-ordination of the various operations becomes more difficult. Goals and information may not be shared. Problems may

arise between, for example, use of inside versus outside Page Creators. Lines of responsibility may be unclear.

In any case, the Database Operator functions, by default, as the Publisher. The buck must stop there for problems such as incorrect linkage between sections of the database and lack of on-line "help" for users.

This chapter reviews some of the characteristics and problems of database operation.

1. MANAGEMENT

For large commercial database operations, run as management services for several Field Trials, the main management goals are:

1. making sure the user equipment (Norpak and Northern Telecom terminals) works technically;
2. ensuring that Telidon is a viable business enterprise (including market research)
3. finding out how much people will be willing to pay;
4. analyzing any new technology (e.g., fibre optics) which promises improvement of the above service.

Management goals of smaller-scale database services include:

1. creation of public awareness regarding the database operator as a provider of Telidon services;
2. profit;
3. providing a lively information service.

The management goals are being achieved as an ongoing effort. Consumer interest has been shown in the databases. Usually the equipment works technically. Users can generally get a page quickly. But there are problems - the page inputting system is not interactive and updates can not be made quickly enough to the information database.

In terms of Telidon data for future planning, Database Operators need to keep abreast of equipment and keypad advances and enhancements to decoder memory. There is also a need to have technical and reliability data.

Information on open channel service possibilities was also requested by one of the teletext operators. Access to Telidon user data is needed to provide support to clients. One operator estimates it presently costs $100 per year, assuming 10 hours of use per month, for a page to be stored. This must represent some comparable value for the IP to decide to use Telidon.

As a more general point, the DOC wants more information about users than some of the industry are willing to share. They may not want users' (or their own) confidentiality affected by the DOC research.

In general, Database Operators don't interface directly with the public and cater more to IP's than to users. However, "help" lines tend to end on the Database Operator's desk so they are exposed to users' complaints which they pass on to repair services.

The range of user complaints resembles that documented elsewhere in this report. There are both content and use problems (including service delays). The keypads seem difficult to use and there may be reception difficulties.

Database personnel requirements range from 3 to 35, with a median of 20 staff persons. In the smaller outfit, one person handles discs, and two other persons handle hardware. In the larger outfit, there are four people for administration, two for marketing, 19 for videotex services, five for computer operations, six for systems engineering, and four for audio-visual. The medium-sized system operation requires 20 people for running the computer, selling the product, and creating the pages.

Thus, the number of personnel required to run database operations may vary considerably since much more than "babysitting a computer" may be required.

Database operations staff come from a range of backgrounds:

1. computers - hardware/software,
2. telecommunications and telephone,
3. editorial positions and the publishing industry,
4. educational technology - e.g., captioning for hearing impaired.

There are some areas of stress and strain between the Database Operator and the other Telidon players. This is almost inevitable because the Database Operator is pretty much the "man in the middle." Unlike the Network Providers, there is no serious regulation of the Database Operators.

Database Operators work <u>for</u> Network Providers or else, they are highly dependant on Network Provider lines. Thus their relationship is bound to be a rocky one.

One Database Operator expressed its relations to the network carrier as follows: the Database Operator's goal is to advance the service and provide interest in promoting use of the service. The network carrier is interested in use of new technologies like fibre optics since one "carrier" (cable, TV, telephone, Telidon, etc.) can accommodate many uses.

The relationship between the Database Operator and Field Trial operator or network carrier may vary. In some cases the Database Operator does the heddering himself. In other cases either the Database Operator or Field Trial operator may do this, creating a closer liaison between the two.

The Database Operators feel that IP's need to be "educated" slowly. Many IP's, they feel, are unsophisticated in page creation and in linking pages together and "heddering." This means that the information quality of the database can fluctuate beyond the control of the Database Operator. This is a problem for a Database Operator who does not have control over the pages which IP's put on his system.

The relationship of Database Operator and Information Provider is subtle since the Database Operator serves the Information Provider's pages. The Information Provider expects high levels of service from the Database Operator. The Database Operator's salespeople solicit the business of the Information Provider and must make claims for the videotex medium which may or may not be the strict truth.

A management problem exists between the Database Operator and Information Provider. Some IP's want quick listing, while some IP's don't want to update their information. IP's have good and poor content side by side. IP's may, or may not, create their own pages, "hedder" them (identify them for proper placement within the

database), and update the content themselves. If they do these things, the pages would be sent on disc to the Database Operator. The IP would do the internal linking (e.g., within a 200-page section of the database) and tell the Database Operator how to link it into the main database (heddering).

On some systems Information Providers may each have their own way of creating content. This creates a problem in running the database. It also creates a problem for users who want easy access to information, in terms of clear database organization and page layout.

Some small IP's don't know how to structure their pages, creating problems for maintenance of the database. Ultimately, whether Information Providers control the database or a regulated Database Operator, some improvement in this state of affairs is needed.

The relationship between the Database Operator and the Page Creator can be complicated because they are often rivals in the page creation business. There are rumors of friction arising from this conflict of interest on the part of the Database Operator.

The heddering function is often performed by the Page Creator because, oddly, no one has developed computer programs to do it automatically! However, not all Page Creators hedder perfectly and not all Database Operators mount pages perfectly either. There are sometimes problems of hardware compatability when the Information

Provider or Page Creator seeks to deliver their pages to the Database Operator.

2. TECHNICAL RELIABILITY AND TECHNICAL PROBLEMS

The Database Operators are responsible for keeping performance maximized and like to boast about how well they achieve this. We have no reason to doubt their performance but then the common experience of the Behavioural Team staff in finding non-functional terminals raises some doubts in our minds.

The prevalence of DEC equipment and the good esteem in which it is held by the Database Operators is re-assuring. When breakdowns do occur, the DEC service people seem to be quick and effective.

In general, Database Operators have little contact with Telidon hardware manufacturers because Database Operators don't deal with terminals directly (in most cases). However, more information on equipment characteristics was deemed a requirement by Database Operators - for example, the relation between pages (number and complexity) and cycle time and optional location, amount and order of graphics. Database Operators do, of course, have contact with the manufacturer of their database computer(s). These computers have been fairly reliable.

Software problems are concentrated at the information input end. That is, the general daily operation of the database in suppling requested pages to users is satisfactory. But getting information into the system is not as smooth as the Database Operators would like. For example, there is no flawless way to get news-wire service directly into Telidon pages. Likewise, pages created on different terminals - even when they are all, say 699's - may not be mountable without some fuss.

One pecularity of the Telidon software is that system maintenance (or even adding new pages) can not be performed while the database computer is in full service. This should not be an inherent limitation of Telidon. Adding pages during service hours is no problem if you have a spare computer, of course.

Problems with database operation are more organizational and software-related than equipment-related. The very "manual" method by which pages are loaded, changed or removed does cause problems, though.

The filing and tracking system for pages on the database is not well organized. If pages are not loaded properly, or if there are updating errors, pages can be lost in the database. There are often no hardcopies of pages because there is no simple way to get them printed - a significant oversight on the part of the Telidon developers.

In the view of the staff of Behavioural Team, this indicates too much reliance on the powers of new technology and a peculiar bigotry towards paper-based systems. It is also related to the low state of development of colour printers three years ago. For most purposes, a Polaroid snapshot would do. For example, documentation and filing or giving a copy to the IP would work using Polaroid prints. The high-resolutions technology ("Videoprint") is still quite expensive.

The individual Database Operators are each improving their software. For example, one large firm is trying to develop some text editing capabilities. Software is expensive and the riddle of the "critical mass" has no easy solution.

Some of the problems of managing reams of pages arises from the text weaknesses of Telidon. There are few mechanisms for performing say, a wild-card character search through the database. Nor can computer dictionaries be used to correct the woefully frequent misspellings found.

The other main problem noted by Behavioural Team (and, no doubt, countless observers) is the lack of consistent standards, rules and guidelines for IP's and Page Creators. In our view, this leads to frustratingly complex pages, low quality information, disorganized sections of the database, features that are incomprehensible to users, and stale data.

There seem to be few problems with passwords or ID's. The user log-on procedures are viewed as functioning all right ... but then, the Database Operators have not made sufficient professional effort to find out what ordinary users think.

Database Operators do not acknowledge problems with the tree structure or database organization. Elsewhere in this report we are quite critical of the lack of behavioural sophistication in database development. In our view, the Database Operators should really speak with their publics more.

There are no special problems associated with special types of pages. Since the bulk of the field trial requests were simply pages of information, there is little data on other sorts of user requests.

Users can detect certain system anomalies from error messages which arise from the system or from the terminal itself. These include messages about pages not found, invalid page numbers, faulty transmission, and unorthodox key sequences.

The ability of the system to detect malfunctions is extremely limited. This is partly a result of the "serial character" of Telidon discussed elsewhere. There could be developed software which notes peculiarities and reports them to the computer operator. It

would not seem beyond the reaches of computer science to identify help-needing users. Someone who has made eight invalid key presses out of 20 might be automatically sent a help menu.

In one field trial, there is no way to know for certain if a public terminal is working; sometimes these terminals are out of service for days until a service person happens to wander by.

The Database Operators do not service the terminals, as a rule. Servicing of their own headquarters gear is generally left to the manufacturer's representatives.

3. SYSTEM EFFICIENCY AND USER SATISFACTION

(The following paragraphs mostly refer to telephone-based Telidon services.)

The user must wait for line connection and for page retrieval and may not be able to distinguish these two sorts of delays. Some terminals use dedicated lines and so the line connection time is zero.

There is also the distinction between page retrieval time and page display time. Complex pages take more time to display but not much

extra time to retrieve.

The Database Operators have quite different views of appropriate response time. One says, "partly what users get used to." Other goals vary from one-half second to five seconds. Some Database Operators have been quite conscientious in tracking their performance in delivering pages quickly.

The number of users and the volume of interactions (as opposed to simple sequential page display) materially slow down database computer operations. The exact relationship is not clear at the moment but the slowing is more severe than originally anticipated by the Database Operators.

When gatewaying, there are much longer delays. It may not be clear to users that their request may be traveling half way across the country! There might also be some delays for pages which are not kept within the main database files; an example would be some games. Some pages are chained and that can affect response time too. Serious crashes can occur if, say, 10 users ask for the same page, we were told.

There are different forms of messaging. Using a bulletin board does not burden the system. But personal messaging would. Other action tasks also tend to slow the system.

As far as the Database Operator is concerned, the size of the database (within limits, of course) and the complexity of pages have little effect on retrieval time.

Database Operators have gathered the impression that users feel the service is sometimes too slow. However, they have not professionally studied user trade-offs against delay. A promising method would be the psychological measurements used to price seats for sports stadiums and arenas; different sports have different seating "price contours" and this approach allows a precise plan of pricing to maximize revenue.

As previously said, the Database Operators are careful about some of their performance statistics. Also, they tend to keep an eye on page popularity which is a form of market research and it is important feedback to the Information Providers. Otherwise, the flow of information among the industry actors is casual. Elsewhere we have described the potential sources of friction with the Database Operator. Because of these frictions, the flow of feedback can be impaired.

User complaints flow into the Database Operator from phone calls and occassional etters. Common user complaints are:

1. getting onto the system - sometimes the central computer

won't allow a sign-on;

2. choices listed on database which do not exist - this is annoying to users - and future choices are "blocked off."
3. very slow graphics - Information Providers want precise graphics, especially their logo, and happiness of the user becomes an increasingly secondary concern. An arbitrarily imposed limit of 15 seconds for graphics to display was set up by one Database Operator, but some IP's violate this. Complexity of graphics causes long display time.

Other user complaints about databases relate to (a) complexity of the system (e.g., using the keypad to log on), (b) system response time (as opposed to page display time), and (c) specific programs or games.

In summary, Behavioural Team feel that the role of the Database Operator needs to be more clearly defined. As Publisher of the information, the Database Operators must take responsibility for content quality, timeliness, access and organization of the pages. There are some equipment advances that will assist the Database Operators. The main one is an economical device for producing hard copy of Telidon pages.

Other improvements are needed in the software for loading, editing,

heddering, updating and connecting pages. As Telidon moves to a more commercial basis, the information must be useful and easy to work with in order to compete in the information marketplace.

Page Creators

1. SUMMARY

At the beginning of the Telidon field trials, videotex page creation was both a new information medium and a new art form. Computer graphic systems were not new, but they were primitive by today's standards. What makes Telidon different from other computer graphics is the compression of the graphics code. This is necessitated by issues of economy of storage and transmission of pages.

However, the Page Creators do not always appreciate that the essence of Telidon is this economy. Their task has generally been defined as figuring out how to make nice looking pages for Telidon. Guidelines for style, technique, and presentation of information and choices have not been adequately developed.

This has had effects on the users' end of Telidon. Many pages take a long time to display because of the detail and presentation of graphics. The Page Creator has made an attractive page, but people get tired of waiting for the picture of the watch when they simply

want to know what time it is.

The systems (hardware and software) used in page creation have drawbacks in terms of ergonomics, price, portability, ease of learning, and cognitive human-factors. Page creators in various field trials were quite cooperative in telling us about problems with the system. Our behavioural observations revealed other issues.

This chapter reviews the process of page creation from several perspectives;

the flow of information from provider to user

the human-factors of the tasks of page creation

the influence of page creation on other aspects of the system

This last topic is discussed below in a section entitled "Page creation as a bottleneck?"

There has been a continual increase in the number of people creating Telidon pages and in the variety of settings where they are employed. There have also been recent developments in page creation systems. The process of page creation should be seen as critical to the success of Telidon. The information reviewed below is intended to highlight some of the most pressing human-factors needs in this

process.

2. BACKGROUND

Page creation involves the use of specialized computer and Telidon display systems to produce a series of "picture description instructions" (or PDI's.) These PDI's form the Telidon code which is transmitted to decoders. The decoders reproduce the Telidon pages from the code. There are many ways to produce a particular page, depending on the elements and attributes used and their order of presentation. Like computer programs, various solutions may "work," but some solutions are obviously more elegant and efficient than others.

The Page Creators presently have at their disposal certain basic attributes and elements. The attributes are six colours, black, white, six shades of grey, four line textures, eight fill patterns, many fill densities, transparency, outlining and blinking. (The new 709 standard will have more colours.) The graphic elements are dot, line, arc, circle, rectangle and polygon. There are also utility features such as grids that can be superimposed on the Page Creator's display but don't appear on the user's page.

The text elements usually consist of four basic character sizes, with

options for doubling the height or varying the line spacing. Text can also be created using the graphic elements, but this is time consuming and generally reserved for producing logos. Some systems permit text made from graphics to be saved as "fonts" which can be called up for use on other pages. There are provisions for characters from English and French and other languages.

The most common page creation systems in use in the field trials are those made by Norpak Limited. The various versions of the Information Provider System (IPS) are IPS 1, IPS 2, and IPS 2.2. Northern Telecom also developed a Videotex Information Provider System (VIPS). Cableshare has recently developed a different type of system called "Picture Painter." This system is in use in several commercial applications of Telidon.

Page Creators have ranged from teachers creating a sequence of pages for an educational application, to graphic artists employed full time to create pages for various Information Providers, to Telidon system operators who also create pages for their database. The working conditions, training and experience of these Page Creators covers a broad range. In general, Page Creators are more likely to have graphic arts than computer training, and little post-educational experience in either. They have had no formal training in human cognitive processing or applied psychology.

3. MANAGEMENT

There have been hundreds of sources of information for Telidon pages across the various field trials. Government and other agencies have provided public service information. There is usually some weather information. Educational content has come from both public and private sources. Pages on local entertainment, shopping and other topics come from many Information Providers (IP's.)

Some IP's have their own page creation systems. Others are familiar with Telidon and define their pages in Telidon terms. Most providers, however, submit graphics, photos and/or verbal descriptions without regard to the limitations or requirements of Telidon.

In a few cases there are some guidelines for IP's concerning style and content. More often it is a matter of the Page Creator trying to approximate the desired page or sequence using their own style. Sometimes the IP gets to see the page and suggest changes either before or after it goes on the system.

Our interviews with page creators revealed that besides producing the specific page content, the Page Creator is often responsible for

ensuring that the page is placed into the database properly. It must fit into the tree structure, keyword search and other aspects of database organization. The pages and selections leading to and from the page must be checked for errors. Otherwise a user may not be able to correctly access a page, or move forward or back to other appropriate pages. This task, called "heddering," is sometimes performed by the Database Operator. But the routing choices displayed on the user's page are usually entered by the Page Creator. Final editing and manual heddering make take up to 40% of the total page production time.

Page creators interviewed by Behavioural Team felt that most IP's wanted more out of the system than was reasonable, at least initially. The IP's did not understand the task of page creation, the psychological aspects of information display and page choice, or the implications of complexity for display time. The IP's often wanted more text on a page than the users could easily read or digest. Their expectations about graphics were often beyond what could be easily created or quickly displayed.

If the Page Creators are not well trained, or if proper guidelines and editing are lacking, they often create pages that are pleasing to the IP but a disaster for users. The Page Creators, themselves, may have unchecked desires for artistic expression. These factors have led to an abundance of gratuitous or unnecessarily complex graphics. These graphics are given undue prominence when they are displayed

temporally before information or choices.

On systems where a new page can be requested before the page display has finished, non-essential graphics should usually be displayed after any relevant information. This gives the user the choice of skipping the decoration. This is particularly important on menu and other pages that users must see more than once.

On systems where the full page must be displayed each time it is requested, there is special need for quick and simple graphics.

The editorial control of system content is also unclear in too many cases. The early tendency was to take any and all content to increase the available number of pages. In some cases, a content committee has been formed to oversee overall content and to approve new pages. Recommendations on the best mechanism for reviewing content will depend on the goals of the particular application. But the general goals of quick access to useful information should apply to all applications. Page Creators need to be continually updating on style and content guidelines.

The "free trial" nature of many of the field trials has contributed to the lack of clarity and discipline in page creation. Many users complained about long page display times due to graphics (see the sections on "users" above.) If users have to pay for pages based on the required display time, their disenchantment with gratuitous

graphics can be expected to increase dramatically. In commercial applications, more attention has been paid to issues such as page display time.

The use of unnecessary or overly complex graphics also hampers the timely delivery of information. Complex pages are harder to alter or replace than simple ones. They tend to promote staleness.

4. INTERACTION PROTOCOL

Assuming that a page or sequence has been defined by the IP, that its place and routing in the database has been specified, and that it complies with appropriate content and style requirements, there are several steps to producing a page. The steps will be described based on the Norpak IPS2 system. Then the differences between the Norpak and Cableshare systems will be discussed.

The Norpak IPS2 consists of a picture screen, a menu screen (both video display units), a keyboard, a digitizing tablet, and a desk housing a microcomputer and disc drives. The keyboard and tablet are the input devices operated by the page creator technician. The menu screen contains choices for elements, attributes and other features. It also displays the Page Creator's choices, and the text to be edited.

The keyboard has special function keys to facilitate common commands. It also has keys to move the cursor on the picture screen. Alternatively, the digitizing tablet can be used to enter commands as well as for entering graphic elements and sketching. The tablet has one area for graphics and another for commands.

The microcomputer and disc drives are the "brains" of the operation. A system disc contains the software for page creation. This is loaded into the computer at the start of operation. An operator disc is used to store pages that the operator has worked on.

The finished page can be transmitted from the IPS to the host computer electronically, or the disc can be manually delivered and read into the host.

The following list describes the general tasks of page creation, in the order they are performed.

1. Turn on the power.

2. Insert the system disc.

3. "Boot" the computer with another switch.

4. Reset the "geometric picture processor" with a third switch.

5. Wait for the system to be ready (one to several minutes).

6. Choose a service from the "Dispatcher" menu ("Picture Editor" is used first).

7. Wait for the "Picture Editor" menu.

8. Perform the activities required for creation of appropriate graphics and text.

   (Step 8 involves choosing elements and attributes using the keyboard and menu, and positioning them using the cursor keys, keyboard commands and/or the digitizing tablet. The specific tasks vary with the features desired for a particular page. There are usually several alternative means of creating particular graphic features. For example, a rectangle could be defined by two points if it's called a rectangle or by four, or even 400, points if it's called a polygon.)

9. Features such as colour and line are chosen for drawing. A command to begin a graphic element (e.g., "C" for circle) puts the system in the "mode" for that element. It will continue to produce circles, from the colour and line type chosen, until the operator changes something. If the "join" function is operating, every additional point will define another circle joined to the

last one. If "join" is not in effect, every two new points chosen will define another, separate, circle.
The Page Creator must indicate the defining points for each element with the "enter" command, or by pushing the digitizing pen down on the tablet. (A switch contact is made when the pen is pushed down.) Changes can be made using the "delete" command and re-entering the information (points, text, or menu choices) before the "enter" command is pressed.

10. The completion of elements that have variable components (polygons and text) is marked with the "done" button. Other elements (point, circle, rectangle, arc) are consistently defined by 1, 2 or 3 points, so the computer knows when they are done.

11. The page is redisplayed after every new completed element is done, or it can be redisplayed by operator command.

12. The Page Creator then edits the page using one of two edit modes. The first is for changing positions, shapes, attributes, or text strings, or it is for erasing elements. The second mode is used to copy, rotate, scale or reflect graphic elements, or to change their order of presentation.

13. Finally, the operator must save the finished page on the operator disc. The filing system also permits files to be recalled, viewed, catalogued, or removed, and for backup files to be

stored.

14. Turning off the IPS seems to be somewhat easier than starting up. It requires removing the discs and turning (only!) two switches off.

Cableshare Limited (London, Ontario) has developed a different system for creating pages called "Picture Painter." The system uses one screen for displaying both commands and the page in progress. The software can be booted on any microcomputer using the widely available CP/M operating system. A means to send pages to another computer is also included in the software. The units that Behavioural Team, saw used a 8080 chip microprocessor with a hard disc for the Page Creator software and a floppy disc for storage of pages.

Cableshare is presently selling the system as an integrated unit. However, it should be possible to adapt the software to any microcomputer that runs CP/M. As more small computers are adapted to Telidon graphics display standards, more people will have page creation systems available to them. The recent development of the North American Presentation-Level-Protocol Syntax, or NAPLPS, (see Fleming and Frezza, 1983) makes this software approach much more viable.

Norpak have recently developed an Apple computer Telidon board. The

available informaton is characteristically skimpy. But it appears that this expensive board produces (on the Apple) bizarre and unorthodox Telidon graphics.

The "Picture Painter" system uses a more conversational approach to commands. The Page Creator generates the commands on a keyboard or digitizing pad, as in other systems. But the commands are not displayed in menu form on a second screen. The commands take the form of a series of steps. Each step consists of an attribute, a graphic element, or defining points. The resulting file can be translated into PDIs automatically by the software. But there are advantages in having the file to work on before it gets translated.

The text can be edited using available word processing software. This has been a serious problem on pages created on other systems. Other changes are easier to make on the "Picture Painter" file because it is more comprehensible to the Page Creator than a series of raw PDI's.

There have not been controlled comparisons of different page creation systems. Page Creators interviewed by Behavioural Team who had worked on both systems preferred the "Picture Painter," but admitted that Norpak's IPS2 has some advantages. It is easier (faster) to rotate, move, and reflect graphic elements on the IPS2. Making the first draft of a page takes somewhat longer on the "Picture Painter" but subsequent modifications are easier. Changing single attributes

is roughly equal in terms of ease of using the two systems.

The Cableshare system may also be more economical in term of producing condensed code for pages since the software translates the series of steps into the shortest possible string of PDI's. However, this difference may be due more to the fact that the Norpak system allows a lot of redundancy. Software could also be developed that would edit pages made on an IPS2 to remove unnecessary points or redundant commands.

Besides these cognitive human-factors considerations, the systems also differ in ergonomics of design. These aspects are described in the next section, which deals with problems with the Page Creator systems.

5. TECHNICAL RELIABILITY AND PROBLEMS

The field trials differed in their approach to page creation, so their problems differed too. Some of the ergonomic problems and system limitations were common to everyone using the Norpak system. But the effect of these design features varied depending on many factors. These include everything from the global management of the system to the details of room lighting.

A major factor was time on the system. In some cases page creator technicians had only one day to learn about the system and some blocks of time on a system to create a short sequence of pages. In other cases Page Creators had over a year of experience on a system which they used many hours every day. The problems cited in such different situations cover a broad range.

1. Communication and Management

In the WETA field trial things seemed fairly conducive to good page creation. The database was relatively small since it is a teletext broadcasting system. Some pages were updated every day and the content was kept timely. The entire operation was conducted by a

small group of enthusiastic staff within the station. The same people handled contact with IP's, definition of their page specs, page creation, host computer operation, page routing, heddering and loading, user complaints, and style and content guidelines.

In this field trial there were not the communication and management problems experienced in other trials where different people control different parts of the operation. The Page Creators knew perfectly well how long different pages took to create, display and transmit. They knew that users didn't like pages that took too long to display. They had easy access to the page creation equipment and loaded their own pages. They didn't have to rely on other groups with other goals and other (or no) guidelines to implement their pages. In addition, the requirements for a limited database encouraged a timely and lively service. But mostly, they were enthusiastic.

Unlike videotex, teletext is broadcast in a continuous cycle. The total time of this cycle defines the average time to access a requested page. A database of about 60 pages has an appropriately short cycle time of about seven seconds if the pages are not too complex. This led WETA to concentrate on quality while other trials sought quantity of pages.

Communication and managerial problems in the other field trials were common. In cases where Page Creators were a large group of people who each used the system a little, problems included access to the

page creation system, limited experience, no control of editing and loading, and no systematic feedback on the fate of their page with users.

Other problems relate to the issue of editorial control of the system. In some cases the control of editing and timeliness is unclear. Errors may remain on pages forever and events that happened months ago may be proffered as "current" because no one has been charged with fixing and updating pages.

Once they enter some of the larger databases, pages can even get lost. If there is some mistake in heddering, the page may be inaccessible by normal means. There should be clear lines of responsibility and feedback for Page Creators to optimize their efforts. The question of control is discussed in "Recomendations."

2. Equipment Problems

The majority of the problems involved software limitations and bugs. Some of these relate to issues of equipment compatibility.

The hardware was fairly reliable. Norpak's service was reported to be good in most cases. They did request information on system problems and annoyances. The item most likely to fail was the graphics pen. The cable and connections to the digitizing tablet are

prone to problems in many pen and tablet systems (including Behavioural Team's own computer tablet). For this item it was also hard to get quick service or replacement.

There were several cases of incompatibility between the Page Creators' and the users' terminals. This was particularly true when television sets had been recruited for Telidon.

Some of the simpler problems involved loss of edges and differences in colour or resolution. The more complex problems seemed to result from incompatibilities between the Page Creator software and the decoder. If the Page Creator moved or copied some graphic elements across the boundaries of other elements there were often problems on users' sets. Unless the Page Creator sees the pages on the same sort of system as the user, these problems can slip by unnoticed.

3. Standards Problems

In cases where a variety of display units are used on a system, there must be systematic review of performance on these displays to reveal problems. Changes may have to be made to displays, decoders and to the Page Creator software. But one of the main points in favour of Telidon is its adaptability to different sets of equipment.

Adoption of the NAPLPS (see above) for Telidon will introduce other

problems of equipment incompatibility. This protocol makes provision for some of these differences. By referencing points to the lower left (0,0) corner and the upper right (1,1) corner, their relative position should be the same regardless of the resolution of the particular display. There are even standards for what will be omitted when edges are lost on a rectangular screen.

Of course, NAPLPS will also require some changes in the page creation software. Cableshare and Norpak have both begun to introduce what is called the 709 protocol to replace the former 699 protocol. Problems in decoders to "retrofit" systems for the 709 have been reported from one of the field trials.

Changes in the standards affect many aspects of Telidon besides page creation.

6. LEARNING / UNDERSTANDING

Any new page creation software should attempt to overcome the limitations reported by Page Creators from the field trials. Some of these limitations may have been due to inadequate training or instructions, or to limited experience with the system. But the Page Creators did experience difficulty.

Most Page Creators had from one to five days of formal training. Some had no real training. From there, they relied on the manual, experimentation, other Page Creators, and help calls to Norpak. The manual was not rated highly by operators. It is more of a programmed text for learning the basics of the system than a comprehensive user's manual.

Page Creators said they learned the most from just trying it. Other operators were also a favourite source of help, in cases where there were other operators available. Although the system has a "help" button on it, this did not mean that help information would appear.

In one field trial, the Database Operators developed their own on-line tutorials. Most Page Creators reported that it took about a month to get proficient with the basics of the system. None of them

felt like they had mastered it all, even after a year of daily use.

Another umbrella organization had several dozen "cue cards" papering the walls of their working space. This was a bright approach to "help." It was properly graphic, as befits the temperament of graphics staff. Two points should be drawn from this. First, the page creation system badly needs help for training and use. Second, few other PC's were sufficiently effective as organizations to develop their own training aids.

During our visit to a large Telidon organization, we discussed training with a new employee. He had taken a few courses in art and had worked as a free-lance photographer. What training program was developed for him? "Take this manual and read it." His training: reading a manual.

7. PAGE DISPLAY

Some of the main problems of the page creation system were in modifying pages and editing text. The graphic approach to text (representing a letter by some series of PDI's) makes it incompatible with most state-of-the-art text editors. Graphic changes in the text also caused problems. There was no automatic adjustment for changes in character size. The text would overflow the page edge. Other problems resulted from altering the order of presentation of the different elements.

There was some confusion from the arrangement and operation of function keys. The clear and display buttons were too frequently mixed up. Any competent manufacturer would have made certain that the clear key should be separate and easily distinguished since it can ERASE previous work. Any fool knows that, or more precisely, almost any fool knows that.

Moving graphic elements was also difficult and potentially problematic. If elements were moved, altered, and then returned to their original position, the result was unpredictable. Sometimes it worked and sometimes it didn't. Other problems mentioned were the lack of tab settings and the resultant difficulty with tables of

information, and holes in the background when later elements were erased.

Filing pages created its own problems. The system did not tell the operator if a page to be saved was going to write over another page of the same name. This caused some pages to be lost. Power failures and system crashes also destroyed some pages. The Page Creators often had to develop their own systems for keeping track of drafts, finished pages and back-up files.

In general, Page Creators felt that the system had "quirks" that one could only learn by trying. They reported that page creation was very time consuming and that making changes was difficult. Perhaps readers of this critical sub-section will feel comforted to learn that one of the computer graphics software package purchased by Behavioural Team has as many weaknesses and quirks. There is a difference, however. Our general purpose commercial software cost only $55.

But organizationally, there is one final, very undesirable, fact to report. None of the field trials reported any <u>systematic</u> review of Page Creators' performance nor had any analysis of efficient use of the system's capabilities been undertaken.

8. ERGONOMICS AND AESTHETICS OF HARDWARE

Complaints about the physical design and placement of the equipment were also common. Because the desk surface was too high for keyboarding, the technicians rested the keyboards on the desk drawer. This was awkward. Also, the heavy, inflexible cable was then routed across the work surface.

If the room illumination was bright enough to see paperwork, there was often a glare on one or both screens. Neither had effective anti-glare treatments. The table and keyboard were too high for many operators, and the table was not big enough to permit work simultaneously on the keyboard, tablet, and paper copy. Looking back and forth between the screens, tablet and specs caused difficulty because of these layout problems. There was no convenient place for reference books, such as a dictionary. These problems are attributable both to the manufacturers and to the PC's.

Page Creators found the digitizing tablet too bulky. It differed from the display screen in both size and proportions. The viewing distance to the display screen was too close for most operators. In addition, the desk edge was uncomfortably hard and sharp.

Because it is magnetic, the tablet erases any hapless disk which might rest on it. It is thoroughly stupid to supply such a tablet to these work settings without clear warnings concerning risks to disks.

Common environmental problems were heat and static from the terminals. Uncomfortable chairs were also a common complaint.

These various factors limit the amount of time per day that a Page Creator can work effectively. In our interviewing with them, individual operators suggested maximum times at the terminal ranging from three to five hours out of a seven-hour day. They reported eyestrain, fatigue and other physical responses after 45 minutes to three hours at a single sitting. Working with straight text was judged to be more tiring than a mix of text and graphics. As applied psychologists, we deplore the human and mechanized inefficiencies of page creation.

These limits will vary with individuals, specific environmental conditions and the nature of the work. Based on information from the industry interviews, Behavioural Team feel that operators should be able to take a 10 to 15 minute break after the first two hours, with more frequent and longer breaks for successive work periods. Reducing glare and designing comfortable workstations would be extremely beneficial for Page Creators. Some of these issues are discussed in a report prepared by Behavioural Team for Health and Welfare Canada on office lighting, 1982.

The Norpak page creation equipment was not seen as portable. Operators complained that it was "temperamental" about being moved even a few feet within an office! The equipment is obviously too bulky to take home at night. In addition, it is very expensive. Along with possible problems from remote page loading, these limit the potential for home-based freelance page creation.

The move toward a software-intensive page creation system which would work on a variety of microcomputers would increase this potential greatly. In addition, it would allow operators to take advantage of the "user friendly" software and ergonomic hardware features of other systems (such as movable keyboards) which are found in sanely designed systems. (The IPS2 does have a movable keyboard.)

9. SUMMARY

Behavioural Team's analysis of the job of page creation has revealed many problems. These range from lack of guidelines for complexity and style, to physical features of the equipment. The near future will probably see adoption of the NAPLPS, improvements in the function, portability and potential of page creation software, and better initial and ongoing training. If these changes do not take place in the near future, then Telidon might have no future at all.

The task of page creation is a very important one in the development of Telidon. Further research is needed on all aspects of this function, from personnel selection and training needs to software improvements. The job of page creation has, so far, been haphazard and time consuming.

The "time" was often subsidized so the real cost of page creation in a commercial system is relatively unknown. Lack of guidelines and control, particularly with regard to graphic complexity and efficiency of code, have led to serious problems. Initial positive responses to the system can be quickly overpowered by user frustration.

The Page Creation organizations have not shown much organizational intelligence. They haven't condemned the console gear they are forced to use, improved the situation through in-house smarts, or taken steps to better inform themselves on page creation "market research." We might add, neither they nor the DOC have been effective in promoting industry organization for mutual betterment.

Information Providers

1. WHO ARE THE INFORMATION PROVIDERS? (IP's)?

For purposes of this report, IP's are organizations which wish to present their pages and information about their services to users. This definition excludes the purveyors of inter-activities, gateway service, and databases serving general computer users. These artificial exclusions are necessary because we have not collected sufficient field trial evidence on the excluded classes of IP.

The Royal Bank, for example, is a large IP with about 200 pages generated. The Royal Bank present pages about their products, some material for children about money, and the location of branches.

Other IP's present pages about weather, shopping, tourism interests, government service, games, etc. Some pages are prepared by the Database Operator to help users find other materials.

Most IP's are not primarily engaged in Telidon-related activities. They are thinking of <u>using</u> Telidon as a medium for their message.

2. WHAT ARE THE GOALS OF THE IP's? WHY HAVE THEY CHOSEN TO USE TELIDON?

The IP's all reported one goal in common: to explore the potential of Telidon. Beyond that, goals varied:

- ** to deliver services,
- ** to achieve the wishes of higher management,
- ** to keep ahead of the competition.

There was good agreement on the part of IP's that they had successfully explored the potential of Telidon. However, few professional, objective, or effective evaluations were made to confirm or disconfirm this impression.

One important exception is an evaluation conducted on behalf of a federal organization which served as an IP "middleman." This was an evaluation performed by a well-known consulting organization. Although skimpy on user feedback, it did review many aspects of performance. With information such as this in hand, the IP can carefully judge the results of their participation in Telidon. Moreover, they can adjust their operations by fine-tuning.

3. HOW DID "INFORMATION" BECOME "PAGES?"

There are three routes to making pages. You can do it yourself, you can hire a Page Creator firm, or you can phone Infomart. Both Information Providers and their page makers report that fairly little discussion ever takes place. Just a minimum of review by the Client and then the page joins the database.

The staff of Behavioural Team regard this as not atypical for similar technologies but then not entirely healthy. Primarily, it indicates, we think, an absence of canons of judgment. Elsewhere it is argued that Telidon is building few foundations on which to build. The absence of client-vendor debate may indicate this.

4. WHO STAFFED THE IP'S OFFICE?

IP staffs varied from 1 to 12 individuals. Few were engineers. Most came from business and/or administrative roles within their organizations. For most, the Telidon activities were a clear extension of their other activities and past skills. Thus, the IP's as a group had a good cohort of motivated and trained staff as

compared to other industry actors.

Most organizations did not create their own pages. This was left to umbrella, integrative, or graphics firms. Since this is typical of probable future operations, it provides a model of later organization but may not provide the best learning experience.

The resulting pages showed the strengths and weaknesses of the page creation technician - not the maturing judgment of the Information Provider sector. But IP evaluations of the pages created for them were rarely done in depth and there aren't standards for what constitutes a "good page." Therefore, IP's today are not positioned well to understand the specific strengths of their pages.

5. TECHNICAL PROBLEMS OF PRODUCING PAGES: ACCEPTABILITY OF THE RESULTING PAGES

Producing <u>good</u> Telidon pages requires a grasp of some new principles plus the literary, artistic, and behavioural smarts to create effective material. As expected, there was much learning to be done. The Information Providers had to shift their thinking from <u>text</u> to Telidon. You must work with few words. You can't clarify and qualify as finely as before. Your pages must compete for attention

with lots of other pages. It has to be memorable.

Our Information Providers had to learn to work with the Database Operators. Sometimes this was as simple as delivering a wire service to the Database Operator's premises. In other instances, some weeks of gestation were necessary before the IP (or the Database Operator) quite knew what the other was really asking for.

In general, the IP's expressed reasonable satisfaction with the general run of people who made their pages. In some sense, it was the blind leading the blind since in the whole of the Telidon industry there were few old-timers.

6. WE ASKED THE IP'S, "WOULD YOU DO IT AGAIN...?"

Some of the Information Providers were generally pleased with their past participation. It had been a positive learning experience and - within a context of modest goals - had been a success. They had no enduring regrets.

Other IP's were less well pleased with their participation. One large banking organization (not the Royal Bank) received the following bad help from a large Database Operator. They were told that all they need to do is hire a "creative type" to prepare their

materials, that their proposed page would take 5 seconds to display (it took 30 seconds), and that the DO felt they needed no specific guidance beyond that information.

> The Behavioural Team marketing department approached about 100 organizations - mostly private sector - to offer videotex planning services. This was done subsequent to our DOC data collection which contributed to this 350 page volume. We were thoroughly dismayed to learn that presently there is little impetus to produce Telidon material. The most upbeat reactions were, "wait and see."

7. PROBLEMS OF INTER-RELATIONS

The other participants held ambivalent views of the Information Providers. On the one hand, they were the valued client, the raison d'etre of Telidon. They paid for pages and caused the database to expand.

On the other hand, as in all service relationships, the client was often villified! A typical comment might be paraphrased as:

> Those so-and-so's don't have a clue about how to make appealing pictures. The make us draw their logo on every page. Why won't they pay us to make <u>interesting</u> pages? Their [expletive deleted] copy is very dull for the folks at home.

This conflict, as we have indicated, is not at all unique to page creation. At this point in time, the PC's and DB's lack the credibility to impress the IP's with their old wisdom. The IP's, on the other hand, lack the experience to have faith in their PC contractors' judgment. For the most part, the problem will resolve itself in time.

However, to chill this optimistic view, it should be noted that neither IP's, DB's, nor PC's are going about their work very carefully. None of these organizations are making sufficient effort to amass historical records, user feedback, or even basic "sales" information on pages.

There is an "historical anomaly" whch we should point out. In the early days of Telidon promotion, the Database Operators approached organizations at the top. That is, Chief Executive Officers and Vice-Presidents were solicited.

These executives, if convinced, then initiated the process of being an IP. The unforeseen handicap, however, was that the intermediate Communications managers were not consulted. Well, often when consultation is not distributed wisely (or widely) across an organization, deleterious results ensue.

The "Telidon group" within the IP's organization often lacked the internal mandate, collegial support, and access to resources needed

to do the job properly. Moreover, the Telidon group often failed to engage the external institutional back-up that is so essential to management within the organization. In particular, the "ad agencies" and market research houses that always guided the organization in other campaigns were omitted.

There are several undesirable consequences of this rupture in organizational behaviour. First, the Telidon project suffers. Second, perhaps more important, both the organization and its external infrastructure miss a learning opportunity. Finally, Telidon progress suffers.

9. Recommendations

1. ABSTRACT

This chapter brings together the main conflicts and unresolved issues of the evaluation. The problems are not in the hardware. The problems tend to be related to management and philosophy! There are structural problems in the Telidon industry.

2. WHO IS IN CHARGE?

Telidon is a service activity; to function as an information service, it requires a Publisher. By "publisher," we mean an active participant who expresses a proprietary interest in the health of the service, who has a larger vision of the means and the ends of transmission, and who exercises an editorial function on the database.

The function is being filled in various ways at present. There is currently much sorting-out of leadership roles. As always in life,

leadership falls to those who take the initiative. This is consistent with the philosophy underlying the concept of field trials and is in the best interest of the program. It is the transition period between leaders that causes the problems. Therefore, at the present moment a main problem with Telidon is that nobody appears to be in charge! Who is the Publisher?

Information Providers are not in over-all charge; their aim is to see their own material presented to users effectively. Their self-interest may or may not correspond to the course which is best for Canadian Telidon as a whole.

On the other hand, IP's are the clients of the industry. (Defining "the client" is a very productive exercise for any venture. But that is not a defined activity for Behavioural Team in this report. "Defining the client" means the same as "defining the criteria of an activity.")

IP's confer benefits on the Telidon venture. They pay for pages, generate interest in Telidon, supply bulk to the database, and can do these things into the future. As such, their wishes are observed by Page Creators, Database Operators, and Network Operators.

Logically, Page Creators should not be in charge; they perform a service role vis à vis the IP's.

On the other hand, as discussed more fully under "Page Creation as a Bottleneck," they actually do account for the bulk of day to day decision making. An analogy might be to the policeman on the beat. S/he has the bulk of discretion within the justice system and his or her decisions tend to influence the well-being of criminal suspects very much.

Likewise, the Page Creator truly "creates" the face of Telidon. It is pages which are Telidon, not the code, per se. The Page Creator, often by default, establishes the educational psychology model for instruction and communication.

The Database Operators could serve as the Publisher and, by default, they do. They have accepted much of the responsibility for the long-term prospects of Telidon. This is largely because the database is (potentially) a money-making centre.

Based on comments recorded during our industry observations, Database Operators have not been particularly successful so far in the role of Publisher. They are principally responsible for the delays, stale materials, awful instructions and so on that have marred the field trials. We do not assert that the Database Operators are cutting all corners, only that they are cutting the wrong corners.

Because no one is in over-all charge of Telidon, there has been no clear establishment of roles for the Database Operators. For their

part, the organizations who do this work have not thought through their concept of responsibilities. Because of that, they have been haphazard and insufficient in fulfilling their responsibilities.

Database Operators, like Page Creators control a lot of significant factors by default. An example is the naming of menu entries. A disliked IP could find their materials catalogued under "Miscellaneous." Or, a bookstore - a form of recreation - could find itself listed as "Reference Materials." That sounds pretty unappealing!

Finally, Network Operators also could serve as the publisher but they are thoroughly frightened of possible reactions from the CRTC. In other network services (such as telephones or broadcasting), the firms feel that they take great care to be independent of the content of which they are the carrier. This is not strictly true since format has a lot to do with substance. There are many subtle ways in which phone and cable services influence the character of their transmissions, and a clarification of the psychological impacts of formats should be undertaken by the DOC.

On the other hand, Network Operators have important control over the practicalities of Telidon reception. They will influence the rate structure which affects everyone both generally and differentially. "Differentially" in the sense that public policy (that is, Telco or Cableco regulation) establishes the relative costs to rural, urban,

residential, business, coin-operated, and so on, classes of service. Their interests influence special qualities of service such as two-directional service on cable, data transmission by phone, or broadcast quality for TV.

The fact of a dispersed-power Publisher has truly harmed the field trials. In our view, it is the most significant factor in keeping Telidon from achieving its full potential. The Publisher is the participant who <u>really cares</u> about the outcome of the field trial. By being absent, the inspiration and effectiveness of the trials is greatly diminished.

As exceptions, two organizations should be cited with approval for showing leadership. First, Dominion Directory took an assertive role in selling the Telidon concept in B.C. Their corporate cousins, AEL-Microtel, likewise were assertive in developing good user terminals. Second, WETA were enthusiastic about their work. WETA were an integrated participant but in a very small database. Because of the nature of the trial and their enthusiasm, we found that WETA was the only trial which was uniformly successful in removing stale and dated materials.

In summary...

In the opinion of the staff of Behavioural Team, the CRTC must settle the question of institutional control. Market forces "come home to roost" most strongly for the Database Operators. Therefore it may be concluded that they should have the most private sector control because they will need the least external regulation.

In addition, recent events have shown that the Telcos are not necessarily strongly committed to a concept of Telidon as the universal database. Their successful introduction of Envoy 100 undercuts much of the rationale for universal Telidon. Therefore, the carriers are less likely to be good candidates for leadership.

As with various other major social upheavals today, Telidon does not have the luck to be enmeshed in healthy feedback loops. It is large, multi-institutional, overlaps private and public interests, is (at least during initial development) dependent on government support, naturally oligopolistic, and it is new. As a consequence, it needs guidance for proper growth. In short, the DOC has a critical role to play.

The sections which follow outline the areas where DOC initiatives can have the best impact.

3. USER CENTREDNESS

The first automatic bank teller machines looked like bank vaults. They gave messages to customers that sounded like, "Debit vendor account to credit transaction," and required non-memorable six-digit security ID's. We used to joke, "Only a banker could love such a machine." It was obviously designed by and for bankers.

Professional bankers were, of course, the real "client" of the manufacturer. The manufacturer did not particularly care if people were annoyed by the ATM -- just as long as bankers bought them.

Micro-computers, at least in the "early days," were user unfriendly. Were they designed by and for computer specialists? (In another section, we compare Telidon to micro-computers.)

Is Telidon a technology which is user friendly? Was it spec'ed by ergonomic evaluations and market research? Or was it an adaptation by and for communications engineers?

We implicitly deal with these questions throughout this report. In summary, there are many notable achievements in the human interface.

But Telidon is not behaviourally sophisticated. It is not primarily the product of clever psychologists, but the product of clever technologists. In addition, the realization of Telidon is by unguided page creation artists.

In fact, aside from the professional past contributions of DOC and BNR researchers and psychologists from Behavioural Team, few features reflect adequate consultation in human-factors or applied psychology. Moreover, in reviewing the great mass of field trial studies, it is dismaying to note the reliance placed on uncredentialled "experts" in "communications studies" and general-duty market research firms.

Elsewhere is discussed the ergonomics of hardware and the perception of pages. Two examples of non-user-centredness may be offered here.

> EXAMPLE ONE: weather appears under "Environment Canada" in one database
>
> EXAMPLE TWO: to get the time on one database, you must sit through a slow drawing of a clockface

The first example is IP-centred; the second example is graphics-gone-mad, or PC-centred.

The material presented immediately below illustrates "user-centred" thinking. It is presented as a work-sample of psychologists in

action. We would not defend it as especially brilliant, but it is typical of our approach.

[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]

Is the manner in which numbers are used to identify pages a true hardship on users? Helpful numeric mnemonics are not possible since there are only a few <u>memorable</u> <u>numbers</u>. (Useful mnemonic numbers, by the way, include a person's own birthdate, holiday dates, numbers which fall in a sequence (such as "2, 4, 6..."), and numbers which have a physical or motoric representation (such as "2, 5, 8, 0" on a button phone.)

Indeed, the numbers as chosen are "Information Provider centred" (quite literally) because they relate to the chunk of material submitted by a specific IP. (This is an aspect related to the "Publisher" question discussed above. More ideally, the database should assign numbers based on user-centredness.) Perhaps it would be helpful to describe the "user centred" variant.

IP centred

** time..............page 31085
** local weather.....page 74215
** Alberta weather   page 74216
** OC Transit times..page 400
** Alberta travel....page 6305

User centred

** time..............page 31
** local weather.....page 31
** OC Transit times..page 32
** Alberta weather...page 6304
** Alberta travel....page 6305

(The page allocations above are offered as a crude preliminary guess, merely for purposes of illustration and subject to empirical validation. Parenthetically, our survey found that 44% of men and 57% of women write down page numbers.)

It would be better to use alpha-numeric responses. However,

there is a hierarchy of implementations which vary in user effectiveness, programming effort, and system operating costs. Careful behavioural analysis is needed to establish exactly what approach is best for what proportion of users AND what <u>that</u> would cost to implement.

The software implication is that a customer's request has to be interpreted by the computer. That is, the customer types "Temp" and the computer must determine where to dig up the right page. This requires smarter central computers. Also, there is the added computer processing time.

But improving the software in that way is really part of the larger requirement to have improved software control of the database - as for automatic stale page removal. We have discussed this elsewhere.

[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]

Graphics -as applied presently- is a non-user-centred aspect of Telidon. This may not be obvious to people on the "inside" of Telidon. Perhaps a few words of human psychology would be in order here....

Telidon is a wonderful graphics generator. With saturated colours and animation, it is a delight for the eye. But, as pointed out in several places previously, the excessive reliance on graphics has been to the detriment of user satisfaction.

It is not hard to see the forces which lead to over-use of graphics.

First, it is like a new toy. There is much to explore and develop.

Second, the <u>people</u> who make pages are art-oriented, not prose-oriented.

Third, the clients (IP's) are not sufficiently sophisticated to assert their views vis à vis the PC's.

Fourth, the lousy PC terminals force the page creation technician into being graphics-oriented.

Fifth, the standards of judgment are not reliable. People "eyeball" the pages and form hasty judgments; there are no "portfolios" of classic pages kept. No one is learning from research.

Sixth, as the twig is bent, so grows the tree. The justifiable exuberance of the DOC-CRC in developing Telidon has led to poor judgment about the balance between prose and graphics. Just because the technological breakthrough is related to graphics does not necessarily mean that the social need is for pictures rather than verbal content.

At the present moment, a graphics-oriented Telidon seems inevitable. The swift development of graphics tools has not been matched by ANY comparable (Canadian) text editing development. Behavioural Team deplore this present state of affairs.

It is hard to find a good balance. One of the largest IP's told our interviewer that initially, they intended to have very little graphics; the words were their message. However, their PC, one of the largest and most capable umbrella groups, encouraged them to experiment with new approaches. The result was that the IP's pages became much more interesting. At the same time, they became much less contented.

The true "bottom line" of this story is not really known

yet. The "bottom line" as far as Behavioural Team is concerned lies in a detailed knowledge of how users reacted to the new, livelier pages. In other words, there is a need to be firmly committed to user-centred thinking.

In the judgment of the staff of Behavioural Team the change to user centredness should be fully activated long before Telidon services begin in earnest. This requires the following steps:

** as a good, cheap way to start, by circulating this report among the industry players

** fund legitimate applied psychologists to conduct research projects aimed at clarifying how users conceptualize databases, react to Telidon hardware, understand operating manuals, follow screen-borne instructions, and, in general, understand the tasks involved in using Telidon

** establish functional (behavioural performance) specifications for the user interface

** credit only those Network Operators, Database Operators, and Page Creators who meet the standard established

** require the players in the Telidon industry to demonstrate commitment to user effectiveness

** modify the page creation process for easier realization of changes and for ongoing enhancements

Alternatively, Canada can learn slowly by trial and error... from experience... from painful experience....Or, by trying to catch up to Time, Inc.

4. NAIVE AND EXPERIENCED USERS

In every system operated by unselected humans, there is a conflict between the needs of naive and the needs of experienced users. For some systems, all users are "trained" to a level of proficiency. These are systems used by "skilled" people.

Other systems must be capable of serving first-time, naive users. These are often of the "cue, prompt, feedback" variety. Analytically, the "task analysis" reveals them to be single tracked; the use of the telephone for placing reversed charges calls is an example.

At present, Telidon is a mixture of the two approaches. Some users can skip ahead without working through the tedious menus by keying the number of the destination page they are seeking. On the other

hand, there is a non-neglibile amount of skill and memory needed to use the system at present.

There has been an effort to help naive users. This has been tried through printed materials, on-screen instructions, phone help lines, cordial terminal installers, and instructions on the back of keypads.

We have found considerable success in trials on the "informal social network" of help. Indeed, the field trials would all have collapsed long ago if they were not staffed by friendly and congenial personnel. The human, unplanned assistance has succeeded where the behaviourally inept hardware and untested prose have fallen short.

Please note, "informal social network" does not imply that efforts in this direction must be casual, careless, or unpremeditated in the future. Indeed, Behavioural Team urge the DOC to broaden its conception of user assistance.

In our view, the instructions have not been suitably professional. These weaknesses have been documented in the appropriate chapters above. It is no joke to say that any experienced user will understand the instructions perfectly well! Behavioural Team are very well aware how hard it is for the experienced people who write instructions to anticipate the mental state of naive users.

Other areas where the needs of new users differ from others are in

the identification of keys (especially functionless keys) and the use of "neologism" glyphs.

Based on our observations, the "serial" character of the Telidon transmission user control system interferes with the ease of introducing behaviourally designed multi-tracking operation. This is analogous to a CPU awaiting an "XOFF" signal from a peripheral device which has become powered-down.

There are, of course, software alternatives to being "hung-up" by an absent "XOFF." What this means, by analogy, is that an experienced user can take a parallel path and thus bypass the normal procedures. There are also implications for user error correction, discussed below. Of course, using smarter terminals, as we have advocated in our discussion of "intelligent users" (in the following section), might solve this riddle.

Naive users represent a drain on database services all out of proportion to their number. Moreover, in our experience, operators in many facilities routinely and grossly underestimate the numbers of new users who are patrons.

A final thought. It is a common error to burden even experienced users with excessive mental demands. When Behavioural Team worked on nuclear power plant control rooms, we casually assumed that all "users" were highly experienced. We did not assume, however, that

they have perfect attention, memory, or motivation. As a consequence, good applied psychology is needed for experienced Telidon patrons as well as for new users.

5. INTELLIGENCE IN USERS AND TERMINALS

As applied psychologists, we take a rather optimistic view of people. We generally credit them with good sense, positive motivation, and knowing their own wishes. But... we recognize that users must act on the basis of the information available to them. This information is often so meagre that they, in turn, can not react wisely, politely, or sometimes, even in their own best self-interest.

Telidon has achieved a variety of solutions to keep users informed of system status. It is the exceptional - but grating - instance that we will now examine.

With Telidon, emergent problem situations and error routines are often mysterious to users. That's because users have little information on which to base their personal behaviour. Because feedback to the user is sometimes inadequate, customers are unable to react wisely.

In our view, part of the difficulty is inherent in current Telidon.

Because it is digital in nature, faults tend to be "all or nothing" and thus the potential for diagnosis on the part of the user is quite limited. By contrast, when an airplane flies over your TV antenna, you are able to relate the specific reception problem to the specific noise over your head. Indeed, the fading is correlated to the noise level. That's how it is with most things in life, we have some basis for evaluating the error.

Telidon is also inherently serial; at least today it is. By "serial," we mean that there is a single path between computer and terminal and that this path can not be readily over-ridden. In short, the user can not query the computer. S/he must wait patiently for further word... which, of course, may never come.

This "serial" property causes some unwelcome peculiarities particularly in public terminal functioning. We think that the current home system is not suitable for application to public settings without major redefinition of the user interface.

Based on user comments, customers are often mystified by failure modes with Telidon. Is it their phone line, computer breakdown, poor connections, plug disconnected, an absent database page, or simply a natural delay? In fairness to customers, there is practically no help to relieve their uncertainty. There is no voice overlay saying,

"THIS PAGE HAS BEEN INTERRUPTED

DUE TO TECHNICAL DIFFICULTIES."

The presence of an "X" on the bottom text line may, or may not, mean anything to the user. They may, or may not, remember what it means, even if they once knew it. Whatever, the meaning, it may not be clear what corrective action is needed. Being in a state of uncertainty is very unpleasant. The inability of Telidon (or the Database Operator) to relieve the uncertainty is particularly unsettling to customers.

Moreover, recent events such as the advent of Envoy 100, have shown that Telidon will probably not become the universal information system. Therefore, the carriers are not likely to become exclusively Telidon oriented.

As in the example above, spoken words provide special reassurance. The fact that present Telidon is mute (and deaf) is a true handicap to user acceptance. As with visual and hardware design, spoken words merit behavioural research. Some practical applied psychology of language appears in a paper by one of the authors of this report, "The Human-Factors of Words." This material is from a presentation made by Dr. Barkow to the University of Toronto Computer Systems Reearch Group.

In summary -

The issue of error detection and error correction procedure is more important than it may at first appear. The basic issue is confidence in Telidon as an effective Canadian development. Mysterious flaws greatly diminish the respect people pay to a system. If your reading light on a Boeing 747 burns out, do you feel quite as safe flying that day?

In keeping with various other active development trends, greater terminal intelligence seems needed. While this may not be economic vis a vis the cost of central processing, there are so many user benefits that it may prove a more sensible course of action. Behavioural Team recommend a great expansion of pre-tested, easily accessed "help" means in the terminal.

In particular, public settings can not be properly served by the present system. The deployment of public terminals, without the behavioural enhancement of user interaction protocols is counter-productive.

6. PAGE CREATION AS A BOTTLENECK

Elsewhere in this report we have examined the day to day functioning of the page creation activity. In this section, we will put page creation into the larger context of the delivery of Telidon services. By definition, we include heddering and the entry (and their removal, if ever!) of pages into the database, within our review of page creation. In practice, those who create the pages often are not the same people who handle their placement in the database.

As elsewhere in this report, the story is complicated by interactions! First of all, Telidon (as we use the word) was implemented by means of the remarkable, condensed Telidon code. It did not derive from, say, teletype services, mail delivery, office automation, or, for that matter, a careful conceptualization (read: market research) of what Canadians need as an information service. As a consequence, it grew like a "high-level language," transportable from machine to machine, and ready to transmit any content.

From these beginnings, the successful Telidon project developed. An extensive library of bright pages and creative contents followed as motivated IP's sought first-hand experience with the promising baby. However, the activity of page creation did not develop apace with the

demand.

Owing to its history, page creation (both hardware and software) by Telidon is even today disastrously primitive. It is primitive when compared to text treatment by conventional word processors and also primitive when compared to graphic treatment by the better graphics packages. The great majority of material is expensively (slowly) prepared page by page, by persons with art school training.

A further bottleneck is that this material can not be edited except by expensively and slowly re-enacting the page creation process. In fact, a neutral observer would deem it a notably "manual" peripheral input system throttling a powerful automatic database.

As a further direct consequence of this, an excessive number of pages tend to be stale. This is staleness in several senses:

"past dated" announcements of things that have already taken place

"passive staleness" such as an IP avoiding, say, the daily changes in the price of gold

"boring and over-exposed" materials not replaced due to the cost

Above, we alluded to "art school training." This is the modal background of those who create the pages. It is also typical for them to have little post-education experience before sitting down at a page creation terminal. As with the "cop on the beat," they make the bulk of the practical daily decisions. What the world sees as Telidon flows from the mind of the page creator technician.

"But," you might ask, "isn't that similar to any publishing endeavour?" It is similar except that other, competing media have perhaps a thousand or more years of experience! Moveover, they have institutional and organizational quality controls in place. These have not yet matured here, as we pointed out above.

For Telidon, there are presently no guidelines for "good pages." Nor, in our field inspections, did we detect much careful internal review of product quality. Behavioural Team fear that the upgrading of page quality will be haphazard and uneven. The present graphics Mafia must give way to a balanced approach. At present there are graphics mysteries in Telidon. In one field trial, information on

gateway databases is indicated by different colours. How many viewers will catch that coding? Likewise the many glyphs and symbols are graphically lovely but perceptually obscure.

In summary -

We feel that the mechanics (hardware and software) of page creation are faulty. They are not configured to meet the heavy throughput requirements of Telidon. Specifically, the major commercially available page creation terminal is a travesty of behavioural design. We suggest DOC fund a better product.

The staff of Behavioural Team recommend organizational and institutional development to deal with the issue of quality control of pages.

7. TELIDON AS A MICRO-COMPUTER

It is quite natural to think of Telidon home units as micro-computers. Strictly speaking, they are "smart terminals." The exact degree of smartness varies from manufacturer to manufacturer.

As far as users are concerned, it doest matter at all what's inside; function is the only issue.

Analogous to the "graphics trap" discussed under "User-Centredness" above, is the "automatic trap." The "trap" is the mistaken belief that it is always better, easier, cheaper, more fun, more sanitary, etc., to do things without human intervention. For Telidon, an additional corollary is that it is better to have screen displays than printed paper displays.

It's interesting to note the great recent success of the Compu-Serve utility as compared to, say, The Source. One reason may be that Compu-Serve now has people (when needed) available for serving users. They find this works better than having a 100% computer response.

Analytically, this may be conceptualized as multi-tracking, as described in the "Learning" chapter above. It permits different

treatments for naive as compared to experienced as compared to expert users.

The micro-computer - which can not have any humans in it - is not the only model of user interaction protocols. It is misleading to form the (implicit) syllogism:

1. Telidon is micro-chip based;
2. People are enthusiastic about Apples;
3. Hence, give people Apple-like Telidon.

There are other models which ought to be explored. The staff of Behavioural Team recognize that Telidon must emulate these computer models because, of course, Telidon is a computer. But we recommend that the DOC review alternate possibilities to see how these might be incorporated into Telidon's human interaction.

Another issue raised in the body of this report related to user expectations. One aspect of expectation relates to smartness and error-tolerance of the system.

People do expect computers to be smart. For example, new users are always amazed that a computer doesn't know what a "catalogue" is! Sure, it understands "catalog," but doesn't respond to plain Canadian words. Or, "Why doesn't that darn terminal remember that I ask for the weather every darn morning?"

The art of behavioural design requires careful judgment about user expectations and their frustration. This must be in light of practical technical constraints. Never the less, Telidon terminals need much better intelligence than they now have.

A theme of this report is the difference between public and home Telidon. As far as smartness is concerned, the public devices must be quite smart in an absolute sense and relative to the home units.

A wise course of action might be to replace public terminals with microcomputer controlled Telidon terminals. The staff of Behavioural Team recommend the following sequence of study.

First, behavioural design requirements should be established. Next, the settings of terminals should be reviewed. Then, behavioural and technical factors should (must!) be coordinated. Only then should pre-testing, mocking-up, and re-testing be started.

8. MAKING TELIDON MORE COMPETITIVE

As defined in this report, Telidon is a big, broad-appeal Canadian utility. What are the alternatives to Telidon? How can Telidon be more competitive? The alternatives to Telidon as a universal utility are many even though the distinction between Telidon-code and ASCII

may disappear.

It is easier to identify the special strengths of Telidon than to try to find any absolutely unique quality. In our view, the strong characteristics are:

broadly-based public system
interactive
graphic

Alas, each of the special virtues brings along intellectual traps for the unwary policy maker.

- broadly-based public system

As a general public system there has been an admirable diversity of interesting content. Perhaps cleverest of all have been the Telidon games because you must play without a gamepaddle! On the other hand, self-absorbed IP's have filled many pages with materials which hold only slight interest to the general public. (In defense, we might point out that such pages are often valuable as demos for the IP's management, internally. Therefore, some pages which seem dull to the public actually serve important roles in the Telidon drama.)

As in our discussion of the "publisher" for Telidon, the main

issues revolve around "control." In the case of contents ensemble, the control is more in the form of friendly persuasion rather than of coercion.

- interactive

Interaction, in the sense of selecting pages, is alive and well in Telidon. But in the field trials, there have been very few other interactive features. We suspect that the only moderate levels of approval reported in Chapter 2 would have warmed considerably if behaviourally designed interactive features had been present.

- graphic

Telidon pictures can be magnificent, particularly on RGB monitors. On the other hand, this feature has definitely led many fine page creators down the garden path. Many pages are boring, slow, over-detailed, and presented as "graphics for graphics sake." As such, graphics has been a very alluring trap.

Behavioural Team

APPENDIX A

FIELD TRIAL VIGNETTES

FIELD TRIAL VIGNETTES

NEW BRUNSWICK FIELD TRIAL

(Project Mercury)

The New Brunswick videotex field trial was conducted by N.B. Telephone from April 1981 to October 1982.

A total of 20 terminals were situated in residential locations, and 7 in public and educational locations. All were in the English-speaking community of Saint John.

The equipment used in the field trial consisted of:

- -Electrohome T.V. monitors (RGB)
- -Norpak Mark 2 decoders
- -Norpak keypads.

Information was transmitted between the database and the user terminals via dedicated telephone lines. The equipment automatically dialled the appropriate telephone number for the logging-on process.

Videotex users accessed information by making choices from index pages which formed part of the tree structure.

In the summer of 1982, the videotex system became totally interactive, allowing participants to more fully use the system's capabilities. Prior to this time, users could only retrieve pages of information from the databases.

In total, Videotex users had access to approximately 15,000 pages in four databases (Datavision, Time-Share, Questel, and Tourism Newfoundland).The New Brunswick videotex field trial was conducted by N.B. Telephone from April 1981 to October 1982.

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CABOT FIELD TRIAL

The Memorial University of Newfoundland, in conjunction with the Newfoundland Telephone Company, the Federal Department of Communications, and the Newfoundland Department of Development (Tourism Branch), conducted a videotex field trial which was in full operation during July and August of 1982. The trial was named "Project Cabot".

The project evaluated the impact of a combination of Telidon pages, accompanying slides, and audio tape in presenting material relevant to the tourist potential of a specific geographic area of Newfoundland. The interactive capabilities of Telidon were not used in the field trial.

The videotex equipment used consisted of an EPS 1 Hempton unit. This eliminated the need for a transmission link, making the equipment "stand alone". While rapid updating of the material presented was not possible, this was not important, since the information presented was geographical and historical in nature.

The information for the Telidon pages was sent to Ottawa where the Hempton Page Creation Unit completed the pages used during the field trial.

During July, the complete presentation of tourist material was shown in a shopping mall situated near where incoming ferries unloaded passengers on the island of Newfoundland. During August, the presentation was shown three times daily in a hotel located in the same town. These presentations were timed to coincide with the daily arrival of the ferries.

During the last half of August, another Hempton unit was also used as part of a presentation displayed three times daily at the mainland ferry departure location.

VISTA FIELD TRIAL

Bell Canada's Vista videotex field trial began in May, 1981, and is still in progress. A total of 340 terminals in various locations are in active use. The breakdown of these terminals by setting is as follows:

Residential

-152 English (Toronto)
-82 French (Cap Rouge)

Public

-6 English (Toronto)
-6 French (Montreal, Quebec City)

Other (demonstrators, information providers, etc.)

-94.

There is one important aspect which is different between the Cap Rouge and Toronto residential settings. The distribution of terminals and the Vista coverage is widespread in Toronto, whereas in

Cap Rouge, the field trial is concentrated on this small community, just outside metropolitan Quebec City. Much of the database content available to Cap Rouge participants is based on local information.

The field trial equipment varies slightly among the different settings, and overall consists of:

-Electrohome TV monitor (RF)
-Electrohome terminal (RGB)
-Northern Telecom decoder
-Northern Telecom keypad (numeric)

Information from the database is transmitted via dedicated telephone lines to the user terminals. The equipment automatically dials the appropriate number when users wish to log on to the system.

Vista users can switch from normal television viewing to Vista by pressing the appropriate key on the keypad. They can also "zoom" closer to detailed information (maps, etc.), or further away to scan large amounts of text. There is also a "pause" capability on the keypad. Vista participants are able to screen either a printed or an electronic index for the information they desire.

During the initial part of the trial, participants could access the database provided by Infomart. About November, 1982, the Department of Communications Telidon database, and the educational database used

in the OECA trial were made available.

For the participants in the province of Quebec, a French version of the database displays first, although an English version is also accessible. The reverse is true for Vista participants located in Ontario. As of mid-December, 1982, there were 32,277 pages on the English database, and 12,191 on the French version.

OECA FIELD TRIAL

The Ontario Educational Communications Authority (OECA) conducted a Telidon field trial beginning in late 1979 and concluding in June, 1982. The purpose of the project was to investigate the applications of videotex and teletext in the field of education.

The videotex service was available from the beginning of the trial. The teletext service was in full operation from late summer of 1981.

The Telidon project team invited educational institutions from across Ontario to participate in the project. These institutions included elementary and secondary schools, colleges of applied arts and technology, universities, and special institutions such as schools for the disabled. The number of participants throughout the duration of the field trial ranged from 20 to 45.

The equipment used was changed from primitive prototypes to more sophisticated versions as the project progressed. Over the course of the trial, the following equipment had been used:

- -Electrohome T.V. monitors (RGB)
- -Norpak Mark 1, 2, and 3 terminals
- -Norpak Mark 1, 2, 3, and 4 dual-mode decoders

-Norpak keypads

-Norpak keyboards.

The teletext service transmission was by microwave, off-air, relay stations, UHF, VHF, and satellite. The information reached not only the educational institutions participating in the field trial, but also people who could normally receive TV Ontario.

Information available through videotex was transmitted by telephone lines. Initially, normal long-distance lines were used. Later there was a switch to datapac.

Field trial participants could switch back and forth between teletext and videotex by pressing the appropriate key on the keypad or keyboard. In the videotex mode, the user manually dialled the telephone number to access the host computer.

Users could search for information using a number of approaches. They could view index pages associated with the tree structure of the database, and work through the levels to the information they wanted. Alternatively, they could use alphabetical indices, or a keyword search if they desired.

The teletext service included captioning for hearing-impaired individuals, as well as multilingual subtitles.

Each participating institution was asked to create educational sequences which would meet some of their own educational needs. As well, the OECA project staff produced educational sequences for use by the field trial participants. Towards the end part of the field trial, the OECA database consisted of 60 unique educational sequences. Approximately 100 pages were available on the teletext service.

The Telidon terminals located in the institutions allowed each one to access sequences created by other institutions. Also, the OECA database was coupled with the Department of Communications Telidon database in Ottawa, allowing participants to access a variety of general information throughout the period of the field trial. For a brief period, OECA participants were able to access information on the Bell Canada Vista database.

CANTEL FIELD TRIAL

Cantel is a Federal Government public information service, accessible through videotex terminals. This project, spearheaded by the Federal Task Force on Service to the Public, has been underway since late 1980.

As of late 1982, there were approximately 45 terminals located in Quebec, Ontario, and British Columbia. These terminals are situated in 15 Canada Service Bureaux and in shopping malls and libraries.

The equipment in use consists of:

-integrated Electrohome terminals (decoder is part of the terminal)

-Electrohome keypads

-Norpak keypads

(both numeric and alpha numeric keypads are in use).

Information is transmitted between the database and the terminals via dedicated telephone lines. Some terminals offer automatic logging-on procedures, while others require the appropriate telephone numbers to be dialed manually.

Users view index pages and make the appropriate choice from each one presented until arriving at the information they are searching for.

Cantel users have access to about 50,000 pages of information. Included is information about available Government programs and services, addresses of about 4,500 Government offices, weather, travel packages, as well as jobs listed under the National Job Bank.

IDA FIELD TRIAL

The IDA field trial was conducted by Manitoba Telephone Systems from April, 1980 to December, 1981 in the Manitoba community of Headingley.

The videotex service was part of a number of trial services offered to participants. Others were cable, pay, and educational television, digital telephone service, automatic meter reading, and automatic alarm service. The different services were provided gradually over the length of the trial.

In total, 100 terminals were located in English homes. There were no business or public locations involved.

The equipment used consisted of:

-Electrohome T.V. monitors (RGB)
-Norpak Mark 2 decoders
-Norpak keyboards and keypads.

Information was transmitted between the host computer and user terminals via dedicated coaxial cable. There was both automatic and manual dialling, depending on which of two databases were accessed.

Field trial participants used a tree structure and index page approach to seasrch for information.

Users had access to a database provided by Infomart and to one called Omnitext. The latter was about 500 pages in size, while the one provided by Infomart contained approximately 2000 pages of information.

ELIE FIELD TRIAL

In October of 1981, Manitoba Telephone Systems began a communications field trial in the rural Manitoba communities of Elie and St. Eustache.

The trial (still in progress at the time of this writing) involves 144 participants. Of these, 10 are non-residential (3 businesses, 3 schools, 1 credit union, 1 municipal office, 1 farm, and 1 senior citizen's residence). They are all part of a trial designed to assess the viability of a fibre optics system for delivering a variety of communications signals.

The services provided to participants via the fibre optics system are single party telephone, cable television, cable stereo FM radio, and videotex.

The videotex equipment in use consists of:

-Electrohome TV monitors (RGB)
-Norpak Mark 3 decoders
-Norpak keyboards (QWERTY).

The transmission of information between the users and the databases

occurs via dedicated fibre optic lines, using a telephone dial-up log-on procedure. Participants use a tree structure and index page approach to search for information.

There was some variation in the videotex service. For a period of 6 weeks, 15 participants used an experimental hand-held alphabetical keypad. An electronic messaging capability came into effect in mid-1982.

Videotex users have the option of accessing databases provided by either Infomart or Cybershare. Infomart provides the bulk of the information available to users. This includes lifestyle information (community and consumer related), teleshopping, some school courses, games, and agricultural information. The latter category includes access to Grassroots - the agricultural database available to many videotex users outside of the Elie - St. Eustache field trial.

Cybershare provides information which is, for the most part, complementary to that offerred by Infomart. The database supplied by Cybershare, smaller than Infomart's, focusses on business applications information, and computer based learning materials. It also includes games.

ALBERTA GOVERNMENT TELEPHONES FIELD TRIAL

From late 1981 throught to mid 1982, Alberta Government Telephones conducted a videotex field trial, directed at the use of Telidon in libraries and schools.

Because of financial difficulties, only seven user terminals became operative. Four of these were located in libraries in the Calgary area. The remainder were situated in schools.

Department of Communication page creation terminals were provided to the Calgary library community and to the Alberta Department of Education.

The Department of Education was the page creator in the development of the database used for vocational training applications in provincial secondary schools. Individuals involved in the Calgary public library community created pages of interest to the public. The database and the host computer were located in Calgary. Information between the database and user terminals was transmitted via the telephone network.

One application of Telidon for educational purposes was formally conducted and evaluated. This involved the use of Telidon as a

delivery vehicle for an introductory secondary school mechanics course, conducted by the Alberta Correspondence School.

BRITISH COLUMBIA FIELD TRIAL

From November, 1981 to July, 1982, B.C. Telephone conducted a videotex field trial in Vancouver and Victoria.

Approximately 90 terminals were involved in the trial: 72 in public locations and 18 in businesses. No residential users were included in the trial.

The equipment used in the field trial consisted of:

- -AEL-Microtel integrated terminals (built-in decoders, keypads or keyboards, and display screens)
- -Norpak terminals
- -alpha numeric keyboards
- -alpha numeric keypads.

Transmission of information was via telephone lines. The Microtel equipment automatically dialled the appropriate number(s) for the logging on process. The Norpak terminals required users to manually dial the numbers in order to log on.

Participants could access information in a variety of ways. They could make selections from index pages as they worked their way

through the levels of the tree structure. If preferred, users could directly access information by keying in the appropriate page number. Finally, participants could use a keyword approach.

The system in use also offered electronic messaging as an additional service.

Another feature, "gatewaying", allowed users to access a number of databases on computers other than B.C. Telephone's host system. Through a single-point gateway, field trial participants had access to a variety of databases, including Marketscan (an on-line stock market information system in Toronto), Grassroots (an agricultural information system in Winnipeg), and the Department of Communications Telidon demonstration system in Ottawa.

WETA FIELD TRIAL

From June, 1981 through to July, 1982, a teletext field trial was conducted in the Washington D.C. area in conjunction with a local television station, WETA-TV.

Approximately 50 terminals were used, 40 in residential settings and 10 in public locations.

The equipment used in the field trial consisted of:

- -an Electrohome C-40 series 19 inch RGB monitor/TV receiver
- -a Norpak Mark 3 decoder
- -a Norpak keypad
- -a cassette recorder for automatic logging of which pages were accessed.

The teletext service was transmitted using the vertical blanking intervals of regular television signals being broadcast (off-air transmission). The receivers used in the field trial were attached to outside antennas in order to maximize the quality of the reception.

Participants in the field trial could select teletext or regular

television reception on the same receiver. The teletext service in use allowed participants to access information in two ways. They could search for information by using the tree structure, making selections from each index page presented. Alternatively, they could access information directly by using an alphabetical index.

In January, 1982, the service was changed considerably for both residential and public terminals. The major change was with the database content.

Prior to the beginning of 1982, the content was best described as forming a small electronic newspaper, emphasizing timely "hard" information. After the change, the content could be characterized as a small electronic feature magazine, stressing a stylized presentation of "softer" information.

There was also another noteworthy change. The number of pages on the broadcast cycle was reduced from about 110 to 70. There was a corresponding reduction in the cycle duration from over 20 seconds to about 13.

APPENDIX B

TELEPHONE SURVEY

METHODOLOGY

During January, February, and March of 1983, telephone interviews were conducted with participants from five field trials across Canada.

Survey respondents were participants in the New Brunswick Project Mercury, Vista, OECA, Elie, and British Columbia field trials. The procedures resulting in these individuals being interviewed varied slightly among the trials, and as such will be described separately where appropriate.

Participants in the New Brunswick trial were sent a letter informing them of the purpose of the survey and providing them with a telephone number to call collect if they were willing to be interviewed. This method was used because the participants not only had Telidon in their homes, they also had an experimental security system installed for the trial period. It was felt that providing participants with the choice to call, as opposed to obtaining their telephone numbers and calling them, would maintain their sense of privacy and security.

A letter outlining the telephone survey was sent by Bell Canada to participants in the Vista trial. These people returned cards to Bell

indicating whether or not they were willing to be interviewed. The names and telephone numbers of willing participants were then forwarded to Behavioural Team.

Lists of participants names for the B.C. Telephone, Elie, and OECA field trials were sent to Behavioural Team by the contact person for each trial. These lists did not include all participants for each trial.

In total, 96 field trial participants were interviewed. A breakdown of the number by field trial appears below.

Trial	Total	Surveyed	Percentage
N.B. Telephone			
(English residential)	20	13	65.0
Vista			
(English residential)	152	19	12.5
(French residential)	82	17	20.7
OECA			
(English educational)	45	22	48.9

Elie			
(English residential)	134	20	14.9
B.C. Telephone			
(English business)	18	5	27.8
TOTAL	451	96	21.3

Respondents were interviewed with the use of a questionnaire developed in consultation with the Federal Department of Communications. The final questionnaire was designed to elicit participants reactions to a number of videotex aspects, including what they liked and disliked the most about the system they used. The questionnaires used for each field trial varied slightly. Where appropriate, the field trial name replaced the word "telidon". As well, some of the questions were omitted, depending on the specific nature of the trial in question. (Not all respondents were asked about electronic messaging, or gatewaying, for example.) The basic questionnaire and the survey results follow this description of the telephone survey.

Respondents from all the field trials except OECA tended to answer as

individual users. Those involved in the OECA trial tended to be the educators most familiar with Telidon. They generally answered on behalf of the students and teachers they had witnessed using the system.

1.24 When you use Telidon, do you write down page numbers for future reference?

a) Yes

b) No

1.25 In general, how easy to read are the Telidon pages?

a) Easy to read

b) Average

c) Difficult to read

1.26 If "difficult to read," what is the specific problem?

a) type size

b) spacing

c) too many lines

d) font type

e) contrast

f) colour

g) other

Behavioural Team

QUESTIONNAIRE

1.1 Do you have a written Telidon user manual?

a) Yes
b) No

1.2 Have you read through it?

a) Yes
b) No

1.3 Was it clear?

a) Yes
b) No

1.4 Which method do you use most often to look for information? (Check ONE)

a) listing in printed booklet
b) index on the screen
c) direct access by page number
d) access by keywords

1.5 Do you find any piece of Telidon equipment physically uncomfortable to use?

a) Yes
b) No

1.6 If yes, what is the specific problem?

a) equipment design
b) installation
c) equipment damage
d) other

1.7 Does Telidon give you any problem in terms of:

a) eyestrain
b) headache
c) fatigue
d) heat coming from the terminal
e) some other problem of this type? Please specify

1.8 Does the amount of Telidon equipment or space it takes up present any problem in terms of comfortable everyday use and viewing?

a) Yes
b) No

1.9 Overall, do you find the equipment attractive in terms of its colour, shape, and size?

a) Yes, attractive
b) Average
c) No, unattractive

1.10 If "unattractive," why is it unattractive?

a) colour
b) shape
c) size
d) pieces
e) other
f) cable

IN TERMS OF YOUR EXPERIENCE IN USING TELIDON UP TO NOW, DO YOU FIND THE FOLLOWING THINGS EASY OR DIFFICULT TO DO?

1.11 hooking up the cables and switching on the equipment

a) always easy
b) sometimes a problem
c) always difficult

1.12 dialing up, entering your ID number

a) always easy
b) sometimes a problem
c) always difficult

1.13 understanding the written user manual

a) always easy
b) sometimes a problem
c) always difficult

1.14 understanding the organization of the menu index

a) always easy
b) sometimes a problem
c) always difficult

1.15 understanding the instructions on the various pages on the screen

a) always easy
b) sometimes a problem
c) always difficult

1.16 matching commands on the screen with symbols on the keypad or keyboard

a) always easy
b) sometimes a problem
c) always difficult

1.17 finding information you are looking for

a) always easy
b) sometimes a problem
c) always difficult

1.18 remembering information you have seen on the screen, or tracking back to find something you saw earlier

a) always easy
b) sometimes a problem
c) always difficult

1.19 knowing what to do when you have pressed the wrong key, and correcting the mistake

a) always easy
b) sometimes a problem
c) always difficult

1.20 understanding and reacting to error messages on the screen

a) always easy
b) sometimes a problem
c) always difficult

1.21 signing off, turning off the equipment

a) always easy
b) sometimes a problem
c) always difficult

1.22 sending a personal message to another terminal using your keyboard (FOR BC TEL AND ELIE RESPONDENTS ONLY)

a) always easy
b) sometimes a problem
c) always difficult

1.23 getting from one database directly into another database, without dialing up by phone a second time (FOR BC TEL RESPONDENTS ONLY)

a) always easy
b) sometimes a problem
c) always difficult

1.24 When you use Telidon, do you write down page numbers for future reference?

a) Yes
b) No

1.25 In general, how easy to read are the Telidon pages?

a) Easy to read
b) Average
c) Difficult to read

1.26 If "difficult to read," what is the specific problem?

a) type size
b) spacing
c) too many lines
d) font type
e) contrast
f) colour
g) other

1.27 Overall, how attractive do you find the pages shown on Telidon?

a) Attractive
b) Average
c) Unattractive

1.28 If "unattractive," why do you find the pages unattractive?

a) colour
b) contrast
c) graphics
d) clutter
e) other

2.1 Sometimes it takes too long for pages to <u>begin</u> to be drawn on the screen. How often do you find this time too long?

a) Often
b) Sometimes
c) Never

2.2 Some pages take a long time to <u>finish</u> drawing on the screen. Do you ever find this boring?

a) Yes
b) No

2.3 Can you remember a type of particularly slow page?

a) graphics
b) index
c) information
d) game
e) other

2.4 In comparison to the daily newspaper as a way of getting information, is what you gain from Telidon worth the time and effort spent?

a) More worthwhile
b) Just as worthwhile
c) Less worthwhile

2.5 Is Telidon more satisfying to use now than when you began using it?

a) Yes
b) No

2.6 If "Yes", why is it more satisfying now?

a) learned to use
b) more information now
c) better service
d) lower user expectations
e) other

2.7 If "No," why is it less satisfying now?

a) novelty worn off
b) small database
c) database stale
d) no way to discover new information
e) other

2.8 Does using Telidon cause you frustration or aggravation?

a) Yes, very much
b) Yes, a bit
c) No, not at all

2.9 Please comment.

a) lack of "mental map"
b) log-on delays
c) no direct page access
d) database small or stale
e) slow graphics display

2.10 Has your Telidon equipment ever broken down?

a) Yes
b) No

2.11 Has the service deterioratied?

a) Yes
b) no

2.12 Have you had any problems with:

a) interference in your regular television reception
b) missing or partially missing pages
c) cloudy or blurred picture on Telidon
d) interrupted electrical connection
e) the decoder
f) the keyboard
g) the monitor / T.V.
h) other

2.13 How was the breakdown fixed? Check as many as apply:

a) professional repair service
b) by you with no assistance
c) by telephoning a helpline for instructions
d) by consulting your user manual
e) another way (specify)

To finish, I'd like to check some background information.

2.14 Type of Terminal

a) had to dial number
b) hand-held keypad
c) desk top pad

2.15 Location of the Terminal

a) home
b) business
c) school/library
d) institution for handicapped

2.16 Can you tell me your job category?

a) clerical/blue collar
b) student
c) at home
d) professional
e) other

2.17 Your age

a) < 18
b) 18 - 24
c) 25 - 44
d) 45 - 64
e) 65 +

2.18 Sex of Respondent

a) Male
b) Female

2.19 Mother tongue

a) English
b) French

2.20 Are there any handicapped users in your household / office / school / library / institution?

a) Yes
b) No

2.21 What is the highest level of education you have achieved?

a) attended community college or university
b) attended high school
c) attended elementary school

2.22 Have you had experience in using any of the following? (Stop with the highest level reached)

a) programming computers
b) operating computers
c) using a home computer
d) using a video game
e) using a word processor
f) using a typewriter
g) using an adding machine
h) never used any of the above

3.1 How long have you been involved with the Telidon Field Trial?

a) < 3 months
b) 3 - 6 months
c) 6 - 9 months
d) 9 - 12 months
e) > 12 months

Please estimate as precisely as you can your use of Telidon during the Field Trial:

3.2 average number of times per week using Telidon

a) 1 - 2
b) 3 - 4
c) 5 - 6
d) 7 - 8
e) 9 - 10
f) 11+

3.3 how long you use Telidon each time, on an average (minutes)

a) 0 - 4
b) 5 - 9
c) 10 - 14
d) 15 - 19
e) 20+

3.4 usual time of day when using Telidon

a) am
b) pm
c) am & pm

3.5 percent of times in getting connected the first time you dial up (%)

a) 0 - 24
b) 25 - 49
c) 50 - 74
d) 75 - 100

3.6 Is this acceptable?

a) Yes
b) No

3.7 total percentage of Telidon use over period of the Field Trial which is browsing or randomly looking at the pages (%)

a) 0 - 24
b) 25 - 49
c) 50 - 74
d) 75 - 100

3.8 percentage of Telidon use which is playing games (%)

a) 0 - 24
b) 25 - 49
c) 50 - 74
d) 75 - 100

3.9 percentage of Telidon use which is searching for a specific piece of information (%)

a) 0 - 24
b) 25 - 49
c) 50 - 74
d) 75 - 100

3.10 What do you like best about Telidon?

a) graphics
b) information
b) concept
d) access to information
e) novelty
f) other
g) potential use
h) games

3.11 What do you like least about Telidon?

a) speed of information
b) content
c) bulk
d) lack of mental map
e) log-on delay
f) other
g) database small / stale
h) slow graphics
i) no direct page access

3.12 Name of Field Trial

a) NB Tel
b) BC Tel
c) Elie
d) OECA
e) Vista

Thank you very much for your help. Do you mind if I call you again in case we have an extra follow-up question to ask later?

(Interviewer makes sure the following is noted):

NAME
PHONE NUMBER ( )

DETAILED SURVEY RESULTS

ANALYSIS OF DATA

SURVEY: TELIDON

TOTAL # OF RESPONSES: 96

FULL LISTING

LISTING #1: EVERYONE
TOTAL RESPONSE: 96 = 100% OF FULL TOTAL

QUESTION 1.1: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

1.1.A 86 89.6%: **********
1.1.B 10 10.4%: **********

QUESTION 1.2: MULTIPLE CHOICE

RESPONSE: 85 = 88.5% OF TOTAL

1.2.A 71 83.5%: **********
1.2.B 14 16.5%: **********

QUESTION 1.3: MULTIPLE CHOICE

RESPONSE: 73 = 76% OF TOTAL

1.3.A 67 91.8%: **********
1.3.B 6 8.2%: **********

QUESTION 1.4: MULTIPLE CHOICE

ESPONSE: 96 = 100% OF TOTAL

```
1.4.A  14   14.6%: **************
1.4.B  75   78.1%: ***************************************************************************
1.4.C  25     26%: *************************
1.4.D  2     2.1%: **
```

QUESTION 1.5: MULTIPLE CHOICE

ESPONSE: 95 = 99% OF TOTAL

```
1.5.A  26   27.4%: ***************************
1.5.B  69   72.6%: ***************************************************************************
```

QUESTION 1.6: MULTIPLE CHOICE

RESPONSE: 20 = 20.8% OF TOTAL

```
1.6.A  15     75%: ***************************************************************************
1.6.B  1       5%: *****
1.6.C  0       0%:
1.6.D  6      30%: ******************************
```

QUESTION 1.7: MULTIPLE CHOICE

RESPONSE: 27 = 28.1% OF TOTAL

```
1.7.A  26   96.3%: ***************************************************************************************************
1.7.B  3    11.1%: ***********
1.7.C  6    22.2%: ***********************
1.7.D  0      0%:
1.7.E  1     3.7%: ****
```

QUESTION 1.8: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.8.A  22   22.9%: **********************
1.8.B  74   77.1%: ************************************************************************
```

QUESTION 1.9: MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

```
1.9.A  22   23.2%: ************************
1.9.B  56   58.9%: ************************************************************
1.9.C  17   17.9%: ******************
```

QUESTION 1.10: MULTIPLE CHOICE

RESPONSE: 22 = 22.9% OF TOTAL

```
1.10.A 4    18.2%: ******************
1.10.B 2     9.1%: *********
1.10.C 15   68.2%: ************************************************************************
1.10.D 11     50%: ****************************************************
1.10.E 3    13.6%: **************
1.10.F 0      0%:
```

QUESTION 1.11: MULTIPLE CHOICE

RESPONSE: 82 = 85.4% OF TOTAL

```
1.11.A 71   86.6%: ************************************************************************************************
1.11.B 10   12.2%: ************
1.11.C 1     1.2%: *
```

QUESTION 1.12: MULTIPLE CHOICE

RESPONSE: 80 = 83.3% OF TOTAL

1.12.A 60 75%: **********
1.12.B 19 23.8%: **********
1.12.C 1 1.3%: *

QUESTION 1.13: MULTIPLE CHOICE

RESPONSE: 74 = 77.1% OF TOTAL

1.13.A 66 89.2%: **********
1.13.B 8 10.8%: **********
1.13.C 0 0%:

QUESTION 1.14: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

1.14.A 75 78.1%: **********
1.14.B 17 17.7%: **********
1.14.C 4 4.2%: ****

QUESTION 1.15: MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

1.15.A 80 84.2%: **********
1.15.B 13 13.7%: **********
1.15.C 2 2.1%: **

QUESTION 1.16: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.16.A 68   70.8%: **********************************************************************
1.16.B 24     25%: ************************
1.16.C 4     4.2%: ****
```

QUESTION 1.17: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.17.A 46   47.9%: ***********************************************
1.17.B 43   44.8%: **********************************************
1.17.C 7     7.3%: *******
```

QUESTION 1.18: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.18.A 39   40.6%: ****************************************
1.18.B 44   45.8%: *********************************************
1.18.C 13   13.5%: *************
```

QUESTION 1.19: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.19.A 69   71.9%: **********************************************************************
1.19.B 19   19.8%: ********************
1.19.C 8     8.3%: ********
```

QUESTION 1.20: MULTIPLE CHOICE

ESPONSE: 85 = 88.5% OF TOTAL

1.20.A 61 71.8%: **********
1.20.B 18 21.2%: **********
1.20.C 6 7.1%: *******

QUESTION 1.21: MULTIPLE CHOICE

ESPONSE: 96 = 100% OF TOTAL

1.21.A 95 99%: **********
1.21.B 1 1%: *
1.21.C 0 0%:

QUESTION 1.22: MULTIPLE CHOICE

ESPONSE: 16 = 16.7% OF TOTAL

1.22.A 11 68.8%: **********
1.22.B 3 18.8%: **********
1.22.C 2 12.5%: **********

QUESTION 1.23: MULTIPLE CHOICE

RESPONSE: 4 = 4.2% OF TOTAL

1.23.A 1 25%: **********
1.23.B 1 25%: **********
1.23.C 2 50%: **********

QUESTION 1.24: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.24.A 47    49%: ************************************************
1.24.B 49    51%: *************************************************
```

QUESTION 1.25: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
1.25.A 69   71.9%: ************************************************************************
1.25.B 23    24%: ************************
1.25.C 4     4.2%: ****
```

QUESTION 1.26: MULTIPLE CHOICE

RESPONSE: 28 = 29.2% OF TOTAL

```
1.26.A 6    21.4%: **********************
1.26.B 1     3.6%: ****
1.26.C 12   42.9%: ********************************************
1.26.D 0      0%:
1.26.E 11   39.3%: ****************************************
1.26.F 17   60.7%: ************************************************************
1.26.G 3    10.7%: ***********
```

QUESTION 1.27: MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

```
1.27.A 66   69.5%: ************************************************************************
1.27.B 28   29.5%: *****************************
1.27.C 1     1.1%: *
```

QUESTION 1.28 * MULTIPLE CHOICE

SPONSE: 6 = 6.3% OF TOTAL

```
1.28.A 3     50%: **************************************************
1.28.B 3     50%: **************************************************
1.28.C 1   16.7%: *****************
1.28.D 3     50%: **************************************************
1.28.E 1   16.7%: *****************
```

QUESTION 2.1 * MULTIPLE CHOICE

RESPONSE: 92 = 95.8% OF TOTAL

```
2.1.A  39  42.4%: ******************************************
2.1.B  32  34.8%: **********************************
2.1.C  21  22.8%: ************************
```

QUESTION 2.2 * MULTIPLE CHOICE

ESPONSE: 96 = 100% OF TOTAL

```
2.2.A  76  79.2%: ********************************************************************************
2.2.B  20  20.8%: *********************
```

QUESTION 2.3 * MULTIPLE CHOICE

RESPONSE: 77 = 80.2% OF TOTAL

```
2.3.A  66  85.7%: ************************************************************************************
2.3.B  2    2.6%: ***
2.3.C  5    6.5%: *******
2.3.D  8   10.4%: **********
2.3.E  9   11.7%: ************
```

QUESTION 2.4: MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

```
2.4.A  11   11.6%: ************
2.4.B  26   27.4%: ****************************
2.4.C  58   61.1%: ************************************************************
```

QUESTION 2.5: MULTIPLE CHOICE

RESPONSE: 88 = 91.7% OF TOTAL

```
2.5.A  66     75%: ***************************************************************************
2.5.B  23   26.1%: ************************
```

QUESTION 2.6: MULTIPLE CHOICE

RESPONSE: 57 = 59.4% OF TOTAL

```
2.6.A  25   43.9%: ********************************************
2.6.B  35   61.4%: ************************************************************
2.6.C  6    10.5%: ***********
2.6.D  4      7%: *******
2.6.E  4      7%: *******
```

QUESTION 2.7: MULTIPLE CHOICE

RESPONSE: 21 = 21.9% OF TOTAL

```
2.7.A  2     9.5%: **********
2.7.B  15   71.4%: ************************************************************************
2.7.C  4      19%: ********************
2.7.D  1    4.8%: *****
2.7.E  4      19%: ********************
```

QUESTION 2.8: MULTIPLE CHOICE

ESPONSE: 96 = 100% OF TOTAL

```
2.8.A  23    24%: ************************
2.8.B  39  40.6%: ****************************************
2.8.C  34  35.4%: **********************************
```

QUESTION 2.9: MULTIPLE CHOICE

ESPONSE: 36 = 37.5% OF TOTAL

```
2.9.A  2    5.6%: ******
2.9.B  18    50%: ******************************************************
2.9.C  5   13.9%: **************
2.9.D  12  33.3%: **********************************
2.9.E  1    2.8%: ***
```

QUESTION 2.10: MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

```
2.10.A 51  53.7%: ******************************************************
2.10.B 44  46.3%: ********************************************
```

QUESTION 2.11: MULTIPLE CHOICE

RESPONSE: 59 = 61.5% OF TOTAL

```
2.11.A 2    3.4%: ***
2.11.B 57  96.6%: ************************************************************************************************************
```

QUESTION 2.12: MULTIPLE CHOICE

RESPONSE: 45 = 46.9% OF TOTAL

```
2.12.A 1    2.2%: **
2.12.B 16  35.6%: ********************************
2.12.C 5   11.1%: **********
2.12.D 6   13.3%: ************
2.12.E 8   17.8%: ****************
2.12.F 4    8.9%: *********
2.12.G 2    4.4%: ****
2.12.H 17  37.8%: ***********************************
```

QUESTION 2.13: MULTIPLE CHOICE

SPONSE: 52 = 54.2% OF TOTAL

```
2.13.A 3    5.8%: ******
2.13.B 2    3.8%: ****
2.13.C 45  86.5%: *****************************************************************************************
2.13.D 1    1.9%: **
2.13.E 4    7.7%: ********
```

QUESTION 2.14: MULTIPLE CHOICE

RESPONSE: 78 = 81.3% OF TOTAL

```
2.14.A 58  74.4%: ************************************************************************
2.14.B 50  64.1%: ****************************************************************
2.14.C 26  33.3%: *********************************
```

QUESTION 2.15: MULTIPLE CHOICE

RESPONSE: 76 = 79.2% OF TOTAL

```
2.15.A 48   63.2%: ************************************************************
2.15.B 5     6.6%: *******
2.15.C 20   26.3%: ***************************
2.15.D 3     3.9%: ****
```

QUESTION 2.16: MULTIPLE CHOICE

RESPONSE: 83 = 86.5% OF TOTAL

```
2.16.A 14   16.9%: ******************
2.16.B 9    10.8%: ************
2.16.C 11   13.3%: **************
2.16.D 47   56.6%: ************************************************************
2.16.E 2     2.4%: **
```

QUESTION 2.17: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
2.17.A 7     7.3%: ********
2.17.B 7     7.3%: ********
2.17.C 64   66.7%: ************************************************************
2.17.D 23     24%: ************************
2.17.E 2     2.1%: **
```

QUESTION 2.18: MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
2.18.A 62   64.6%: ************************************************************
2.18.B 37   38.5%: ************************************
```

QUESTION 2.19 : MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

2.19.A 70 72.9%: **********
2.19.B 28 29.2%: **********

QUESTION 2.20 : MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

2.20.A 3 3.2%: ***
2.20.B 92 96.8%: **********

QUESTION 2.21 : MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

2.21.A 71 74%: **********
2.21.B 22 22.9%: **********
2.21.C 5 5.2%: *****

QUESTION 2.22 : MULTIPLE CHOICE

RESPONSE: 95 = 99% OF TOTAL

2.22.A 40 42.1%: **********
2.22.B 15 15.8%: **********
2.22.C 2 2.1%: **
2.22.D 12 12.6%: **********
2.22.E 1 1.1%: *
2.22.F 16 16.8%: **********
2.22.G 7 7.4%: *******
2.22.H 5 5.3%: *****

QUESTION 3.1 = MULTIPLE CHOICE

SPONSE: 96 = 100% OF TOTAL

```
3.1.A  4     4.2%: ****
3.1.B  10   10.4%: **********
3.1.C  9     9.4%: *********
3.1.D  14   14.6%: **************
3.1.E  59   61.5%: ************************************************************
```

QUESTION 3.2 = MULTIPLE CHOICE

ESPONSE: 91 = 94.8% OF TOTAL

```
3.2.A  20     22%: **********************
3.2.B  20     22%: **********************
3.2.C  13   14.3%: **************
3.2.D  19   20.9%: ********************
3.2.E  5     5.5%: ******
3.2.F  14   15.4%: ***************
```

QUESTION 3.3 = MULTIPLE CHOICE

ESPONSE: 92 = 95.8% OF TOTAL

```
3.3.A  2     2.2%: **
3.3.B  6     6.5%: *******
3.3.C  13   14.1%: **************
3.3.D  13   14.1%: **************
3.3.E  58     63%: ************************************************************
```

QUESTION 3.4: MULTIPLE CHOICE

RESPONSE: 84 = 87.5% OF TOTAL

```
3.4.A  4    4.8%: *****
3.4.B  50  59.5%: ************************************************************
3.4.C  30  35.7%: ************************************
```

QUESTION 3.5: MULTIPLE CHOICE

RESPONSE: 93 = 96.9% OF TOTAL

```
3.5.A  0     0%:
3.5.B  2    2.2%: **
3.5.C  19  20.4%: ********************
3.5.D  72  77.4%: ************************************************************************
```

QUESTION 3.6: MULTIPLE CHOICE

RESPONSE: 88 = 91.7% OF TOTAL

```
3.6.A  62  70.5%: ************************************************************************
3.6.B  26  29.5%: ******************************
```

QUESTION 3.7: MULTIPLE CHOICE

RESPONSE: 90 = 93.8% OF TOTAL

```
3.7.A  37  41.1%: ********************************************
3.7.B  25  27.8%: ******************************
3.7.C  14  15.6%: ****************
3.7.D  14  15.6%: ****************
```

QUESTION 3.8 : MULTIPLE CHOICE

RESPONSE: 82 = 85.4% OF TOTAL

```
3.8.A  45   54.9%: ***********************************************************
3.8.B  18     22%: ************************
3.8.C  11   13.4%: **************
3.8.D  8     9.8%: ***********
```

QUESTION 3.9 : MULTIPLE CHOICE

RESPONSE: 81 = 84.4% OF TOTAL

```
3.9.A  36   44.4%: ***********************************************
3.9.B  25   30.9%: ********************************
3.9.C  9    11.1%: ************
3.9.D  11   13.6%: ***************
```

QUESTION 3.10 : MULTIPLE CHOICE

RESPONSE: 93 = 96.9% OF TOTAL

```
3.10.A 11   11.8%: *************
3.10.B 37   39.8%: ************************************************
3.10.C 23   24.7%: ******************************
3.10.D 22   23.7%: *****************************
3.10.E 8     8.6%: **********
3.10.F 15   16.1%: ******************
3.10.G 8     8.6%: **********
3.10.H 11   11.8%: *************
```

QUESTION 3.11 = MULTIPLE CHOICE

RESPONSE: 93 = 96.9% OF TOTAL

```
3.11.A 16  17.2%: #################
3.11.B 32  34.4%: #################################
3.11.C 3    3.2%: ###
3.11.D 1    1.1%: #
3.11.E 16  17.2%: #################
3.11.F 36  38.7%: #####################################
3.11.G 25  26.9%: #########################
3.11.H 5    5.4%: #####
3.11.I 9    9.7%: #########
```

QUESTION 3.12 = MULTIPLE CHOICE

RESPONSE: 96 = 100% OF TOTAL

```
3.12.A 13  13.5%: #############
3.12.B 5    5.2%: #####
3.12.C 20  20.8%: ####################
3.12.D 22  22.9%: ######################
3.12.E 36  37.5%: #####################################
```

Behavioural Team

APPENDIX C

BEHAVIOURAL OBSERVATIONS

BEHAVIOURAL OBSERVATIONS

Various public terminal locations were visited by Behavioural Team Observers during the beginning of 1983. Observations were made at the B.C. Telephone, Elie, Weta, Cantel, and Vista field trials for varied lengths of time.

A total of 12 different terminals were observed. Ten were public terminals, one was a business/office terminal, and the other was a home terminal. A total of 31 hours of observations were manually recorded. Table 1 presents a breakdown of the sample by field trial.

Table 1.

Field Trial	Number of Terminals	Time (Hr.)	Number of People Observed
B.C. Telephone	3	6	48
Elie (Manitoba)	1	2	36
Weta (Washington)	3	5	38
Cantel	1	6	19

Vista	4	12	50
Total	12	31	191

The public terminals were located in shopping malls, libraries, museums, galleries, and information centres. The specific location of the terminals varied from site to site.

For the most part, the public terminals consisted of stand-alone units for which the user remained standing to use the system. These stand-alone units were not reconceptualized from the home units.

Each person observed was classified according to one of three behaviours. These were: using the terminal; watching others use it (but not trying it); and glancing at the terminal and passing by. These three types of behaviours are interpreted as indicative of varying degrees of interest in Telidon. The Observers also noted the approximate age of the individual, their sex, and made notes about the situation being observed. A breakdown of these observations for the categories of behaviour appears in Tables 2 to 6. A summary is presented in Table 7.

Many factors - the settings, hours of observation, weather conditions, etc. - influenced the observations. The reader is

cautioned that the figures are descriptive only. Perhaps other observations would yield results different from the ones presented in this report. All that can be attested to is that the behavioural observations are unbiased records of actual real-world conditions of use. The distribution of sex and ages of people did not appear materially different from the distriubution normal for such places.

Table 2.

B.C. Telephone Field Trial

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	9	-	1	-	-	-	10	-
13 to 17	8	1	5	-	-	5	13	6

18 to 24	3	1	-	1	1	-	4	2
25 to 44	4	2	1	-	4	-	9	2
45 to 64	1	-	-	1	-	-	1	1
65 +	-	-	-	-	-	-	-	-
Total:	25	4	7	2	5	5	37	11

Table 3.

Elie Field Trial

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	-	-	-	-	-	-	-	-
13 to 17	18	-	9	5	-	-	27	5
18 to 24	-	-	-	-	-	-	-	-
25 to 44	-	-	-	-	4	-	4	-
45 to 64	-	-	-	-	-	-	-	-

65 +	-	-		-	-		-	-		-	-
Total:	18	-		9	5		4	-		31	5

Table 4.

Weta Field Trial

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	7	1	-	-	-	-	7	1
13 to 17	10	2	-	-	-	-	10	2
18 to 24	2	-	1	-	-	-	3	-
25 to 44	8	-	5	2	-	-	13	2
45 to 64	-	-	-	-	-	-	-	-

65 +	-	-	-	-	-	-	-	-
Total:	27	3	6	2	-	-	33	5

Table 5.

Cantel Field Project

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	-	-	-	-	-	-	-	-
13 to 17	-	1	-	1	-	-	-	2
18 to 24	-	-	-	-	-	1	-	1
25 to 44	3	2	1	2	5	1	9	5
45 to 64	1	-	-	-	1	-	2	-

65 +	-	-	-	-	-	-	-	-
Total:	4	3	1	3	6	2	11	8

Table 6.

Vista Field Trial

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	2	-	-	-	-	-	2	-
13 to 17	-	-	-	-	-	-	-	-
18 to 24	2	-	-	-	-	-	2	-
25 to 44	14	7	15	10	-	-	29	17
45 to 64	-	-	-	-	-	-	-	-

65 +	-	-		-	-		-	-	
Total:	18	7		15	10		-	-	
							33	17	

Table 7.

Summary of Interest x Age x Sex

Age (years)	Used System		Watched Others Use System		Glanced and Walked Away		Total	
	M	F	M	F	M	F	M	F
< 13	18	1	1	-	-	-	19	1
13 to 17	36	4	14	6	-	5	50	15
18 to 24	7	1	1	1	1	1	9	3
25 to 44	29	11	22	14	13	1	64	26
45 to 64	2	-	-	1	1	-	3	1

65 +	-	-	-	-	-	-	-	-
Total:	92	17	38	22	15	7	145	46

Of the 191 individuals observed, 24% were women, and 76% were men.

Behavioural Team

APPENDIX D

INDUSTRY INTERVIEWS

INDUSTRY INTERVIEWS

During December, 1982, and the beginning of 1983, interviews were conducted with personnel involved on the industry side of Telidon. Interviews were conducted in person with a number of Database Operators, Network Providers, Page Creators, and Information Providers from across Canada, and in the U.S. In a few instances, interviews were conducted by telephone in order to accomodate interviewee schedules, and to keep project costs reasonable.

In total, 32 industry interviews were conducted according to the distribution presented in Table 1.

Table 1

Distribution of Interviews

Location	Network Provider	Database Operator	Page Creator	Information Provider
New Brunswick	NB Tel	NB Tel	NB Tel	-
Ottawa	-	Infomart	Infomart	DSS
				Atmos. Env.
Toronto	Bell	Infomart	Infomart	Bank of Mtl.
		Videopress	TV Ont.	Sheridan College
				The Bay
			Videopress	

Winnipeg	MTS	Infomart	Infomart	United Grain Grower's Ass'n.
Alberta	AGT	AGT	-	Min. of Ed. Alta. Corresp. Schools
British Columbia	BC Tel	BC Tel	Dominion Directories	Royal Bank
Washington D.C.	Weta	Weta	Weta	Bureau of Nat'l Affairs
Totals:	6	8	8	10

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