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ABSTRACT

Volume 1 of this study describes and costs two possible satellite networks which could be used in education in Canada. In order to determine whether these networks were plausible or useful, a letter and a description of the two hypothetical networks (Volume 2) were sent, before the cost study was completed, to all Canadian universities and provincial Departments of Education, as well as to other bodies likely to be interested. This report contains a second letter, an expanded description of the two hypothetical networks, and the costing information, not available at the time of the first letter, all of which were sent to the same audience as the first letter. All of the replies to this second letter are provided and they are compared with the replies from the first inquiry. (DAG)

THE USE OF SATELLITE SYSTEMS IN CANADIAN EDUCATION

NEEDS SURVEY: SECOND ROUND

vol. 3.

par

Michel Robin

John S. Daniel

October 1977

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1) INTRODUCTION

This survey is part of a larger study aimed at evaluating the educational experiments carried out in Canada on the Communications Technology Satellite (CTS) and suggesting a model for the use of satellite communications in Canadian education. In this context we thought it essential both to investigate costs of operational satellite systems and to ask Canadian educational institutions to tell us whether they see any useful applications of satellites in their own activities.

The first round of the needs survey was conducted in the spring of 1977. A short description of two hypothetical educational networks, a pan-canadian "Canadian Universities Satellite System" (CUSS) and a regional audio network "Provincial Educational Telephone System" (PETS) was sent to all Canadian Universities and provincial departments of education and to some professional associations with a request for comments on the usefulness in education of satellites in general and of these two systems in particular. 44 replies were received. Meanwhile the creation of the two networks had been costed and the results of this economic study, together with the verbatim of the replies, were published in May 1977 [1].

Since the descriptions of the networks used as the basis for the survey were very general and institutions were only given a few weeks to reply it was decided to proceed to a second round. In this case the two reports were sent out to the same institutions and organizations with a request for further comments in the light of this new information. Replies were invited for August 31st 1977 and nineteen had been received by September 15th.

This report analyzes the replies received in the second round and compares them with the results of the first.

2) NATURE AND GEOGRAPHICAL DESTRIBUTION OF RESPONDENTS

The nineteen letters received came from the following provinces. Figures for replies for the first round are given in brackets.

British Columbia	2	(6)
Alberta	1	(4)
Saskatchewan	0	(2)
Manitoba	0	(8)
Ontario	8	(8)
Quebec	3	(8)
New Brunswick	0	(1)
Nova Scotia	1	(4)
Prince Edward Island	0	(1)
Newfoundland	2	(2)

The types of institution or organization were as follows:

Provincial department of education	5	(6)
Universities	11	(32)
Educational TV Authority	1	(4)
Professional Associations	0	(1)
Other	2	(1)

3) FACTORS MENTIONED IN REPLIES

In the tables which follow we have attempted to summarize the key points made by the writers of the replies in the first and second rounds and to class them as favourable or unfavourable respectively. The reader has only to skim through the verbatim of the first round of replies to realise the limits of such a procedure. Much of the subtlety of the replies is

inevitably lost and where a respondent argued the pros and cons of satellites in good academic fashion it is presumptuous to decide whether the overall conclusion is favourable or unfavourable. However, with these caveats the tables do give a useful indication of the frequency with which various points were raised.

TABLE 1 - COMMENTS ON THE CUSS NETWORK

	Number of replies	
	1st round	2nd round
Favourable replies	15	8
Reasons given:		
Academic quality	2	0
Encouragement of research	5	0
Accessibility of universities	0	1
Specific need	1	0
Usefulness in medecine and nursing	0	1
With some reserves:		
Need for further feasibility studies	2	1
Administrative problems	1	0
Technical difficulties	1	1
Economic constraints	1	0
Unfavourable replies	4	9
Reasons given:		
Cost greater than usefulness	2	2
Previous experience doesn't support idea	2	2

	1st round	2nd round
Cost outweighs teaching effectiveness	1	0
Lack of interest	2	0
Other systems do job adequately	2	4
Asymmetry of systems	1	0
Academic problems	2	0
Telecopier system inadequate	1	0
Need does not justify technology	0	5
No special need	0	3
Does not really provide anything new	0	1
Of no relevance to institution	0	1
With comments that:		
Study should be pursued	0	2
Would be interested in results of further studies	4	5

4) COMMENTS ON THE REPLIES

4.1 CUSS network

Table 1 shows that in the first round most institutions expressed a positive interest in satellites. However, it is worth noting that these positive reactions were usually qualified and hedged about with conditions whereas the negative replies were usually firm and categorical. In the second round the overall proportion of negative replies increased and all replies were somewhat firmer, probably because the respondents, having read the cost study and preliminary needs survey, had more information to go on.

The chief doubts expressed about the application of satellites concern cost and educational usefulness. Many respondents feel that the

educational benefits are not commensurate with the costs and the low utilization of Canada's existing satellite system is cited as an indication of the lack of cost effective public applications. Another difficulty is that the institutions who would be interested in using satellites realise that it may not be easy to interest partner institutions in the enterprise. It is significant that medical and nursing education was practically the only case cited as an area where benefit would outweigh costs.

The positive replies contained a greater diversity of comment, often including proposals for modifications which would increase the usefulness of the system. Most respondents realised that the application in education of telecommunications systems in general, and satellites in particular, has scarcely begun and thus encouraged further studies of feasibility and of needs. The question of needs evoked frequent comment. Clearly the educational system as it now is operates without telecommunications systems. Institutions ask to be shown that there are new educational needs which fall within their mandate and which can be satisfied most effectively and cheaply by methods involving telecommunications.

A few institutions which have already made major investments in audio-visual technology see satellite networks as a natural extension of this activity.

4.2 The PETS network

The PETS audio network evoked fewer, but more sharply polarised comments than CUSS. Whilst some respondents claimed that a system equivalent to PETS could be achieved more cheaply using existing facilities and saw

little interest in a non video network, others claimed that the combination of narrow band technology and dense coverage created a more useful system than CUSS. Since education in Canada is organized on a provincial basis it is possible that a provincial system was seen as inherently more useful than a pan-canadian system. Indeed, several respondents told us that the most useful network would be a CUSS type of network concentrated in a particular region or province. We are in the process of costing such a regional video network and it is worth nothing that the Anik B satellite will allow the creation of such a network as a pilot project.

4.3 Comparison of round 1 and round 2

Round 2 produced fewer replies than round one, (19 vs 44), probably for three reasons:

- institutions who had replied in round 1 had nothing further to add,
- round 1 was based on a summary document of a few pages whereas round 2 invited comments on two reports totalling over 100 pages,
- in round 1 respondents were given only one month to reply. The three month period allocated for round 2 no doubt encouraged procrastination, particularly since it corresponded with the summer months.

In general, the replies to round 2 were firmer than for round 1. The proportion of negative replies increased for the CUSS network but decreased for the PETS network. However, it is probably unfair to attach any significance to these trends. Of perhaps more significance is the fact that a smaller proportion of the round 2 respondents commented on PETS at all.

The danger that education would be a victim of a technology in search of an application was mentioned frequently in round 2 replies, and the importance of needs analysis was emphasized. Some respondents had been surprised at the cost of setting up satellite networks. However, even the negative responses contain remarks to the effect that education has not adapted itself to the modern world. New needs and new opportunities will cause changes of which the introduction of telecommunications technology might be a part.

5) CONCLUSION

Replies to both rounds of the needs survey revealed two overriding requirements, greater attention to the educational needs that satellite systems could help to meet and a more thorough analysis of the educational cost/benefit tradeoffs obtainable with telecommunications systems.

Many of those who see a future for satellites in Canadian education suggest it might lie in the creation of networks which combine the video component of CUSS with the regional emphasis of PETS However, some respondents saw value in each of these networks in their original form.

Most respondents would like studies to continue but suggest that more attention be paid to the educational and institutional aspects of the networks rather than simply to the costs of the technical system.

6) FURTHER WORK AND DEVELOPMENTS

6.1 Round 3 of the needs survey

In response to the replies received we are costing a "Regional Interactive Video Educational Network" (RIVEN) and will incorporate the results in a descriptive document which will form the basis for round

3 of our survey. This document, besides summarizing the features of different possible networks, will describe the educational experiments which have been conducted to date on the Hermes satellite in order to give respondents an indication of the types of activity which can be carried out. We intend to send this document, with a request for comments and information on needs, to a much wider range of institutions than we have contacted to date.

6.2 Satellite experiments and pilot projects

Whether satellites are ever used in an operational manner in Canadian education will depend greatly on the results of the applications and constraints discovered by potential users in pre-operational experiments. A first series of experiments, conducted by a number of institutions across the country on the Hermes satellite, is coming to an end, and planning is now underway for pilot projects on the Anik B satellite. Any educational institution which believes that satellite communications could have a rôle in its future should investigate the possibility of involvement in the Anik B project by contacting the Department of Communications of its province or the project manager: Mike Patriarche, Anik B Project, Department of Communications, 17th floor, Journal Building North, 300 Slater St, Ottawa, Ont.

Référence:

Daniel, J.S., "The Use of Satellite Delivery Systems in Education in Canada".
Vol 1 - The costing of two networks
Vol 2 - A preliminary needs survey
Télé-université, Québec 1977.

1. Thank you for sending copies of your reports. Appropriate staff of the Department have now had an opportunity to review your findings. Although there is no serious disagreement with your report, there is little to be added to our original input.

As we indicated then, our primary concern at present is in exploring the use of cable television; however, we are generally interested in any form of technology which allows us to meet educational needs in a more cost effective manner.

I would appreciate being kept informed of future developments.

2. We have reviewed the cost studies which you sent on May 17. I really have nothing substantive to add at this time other than to say there is not much interest at [redacted] in the use of the satellite proposal in our programs.

3. It is my feeling that there is great potential for the use of satellites in education for the exchange of information and experience from one geographical location to another but I am concerned about any technologically based system into which vague educational needs are shoehorned for the sake of justifying the existence of the system. Those of us in Ontario have had this experience with television in the 1960's which can only be described as a failure. Ideally the educational need should come first and the technology should follow. This would make the choice of specific technical requirements and costing much more straightforward. Unfortunately a fact of life is that technology moves much faster in our society than does education. The educational system rather slowly accommodates technological change and with the exception of a few innovators it will take some time before educators begin to recognize the potential of a satellite system.

This is not intended in any way as a criticism of the satellite technology

but merely a plea for caution in its application to education. A sudden investment of millions of dollars will initially be underused by educators and appear to be wasted. Eventually, though, uses would be found (by which time the technology would be obsolete -Catch 22).

Educators have been slow to adopt audio visual technology as you have pointed out. The sudden impingement of an external technology will not accelerate the process. I believe that can only be accomplished from within, if at all.

To echo [redacted]'s comments, the greatest potential at the moment would seem to be with the PETS system and its application in continuing education and conference hookups. In spite of mother Bell, a standard ground telephone hookup may be preferable to a satellite based system initially. I see somewhat limited use for the CUSS system proposed - at least initially within the universities. It would be very useful for [redacted], special lecturers and research seminars but I do not see it used extensively as a medium for course exchange. Universities are somewhat jealous of their course offerings and the problem of transfer of credit from one university to another is a tough one. Graduate level courses may offer more possibilities than undergraduate courses. There might be more potential at the primary, secondary, and community college levels of education at the moment and I certainly feel that the involvement of the provincial media agencies like ACCESS, Sask. Media, OECA, and Radio Québec should be encouraged especially in the broad adult education framework.

One of the most exciting uses of satellite technology I have seen was the medical program of remote diagnosis and consultation done through the University of Western Ontario. Although not specifically educational, there is excellent potential there because the technological capabilities of the system are met by the requirements of the application.

It must be remembered that a satellite system is only an extended delivery system of existing instructional methodology - not a new methodology. It may, however, be necessary to develop new methodologies to be more compatible with the medium. Again, I refer to the experience with television.

At first, I thought that the satellite system might facilitate the exchange of existing television and other audio visual programs but now I have some doubts. One reason is that the system you propose is black-and-white and there is an increasing demand for colour in education in spite of the extra cost and the fact that it is seldom very well justified for instructional purposes.

Given that the uses for the system are most likely somewhat randomly scheduled events, the scheduling for the use of the system would need to be extremely flexible.

Technology and Cost

CUSS:
1. The technical specifications expecially of the ground stations would be made after the educational needs have been identified although I am not sure this is possible.
2. The choice of the best satellite system to employ would probably have to be made ultimately by the technical experts.
3. I have mentioned my concern about limiting transmission to black-and-white.
4. Limited access to the system also limits the use. [redacted]'s proximity to other larger universities would probably eliminate it as a transmit site.
5. Who would pay for the basic system installation and maintenance?

PETS:
1. Probably the greatest immediate potential for use here.
2. We must look carefully at the cost differences between a ground based and a satellite based system.
3. I am personally concerned about the limited audio quality of the system which eliminates some possible uses (although probably not enough to be concerned about).
4. Again, who pays?

Preliminary Needs Survey

The comments recorded in your report tend to be on the positive side but seem to be a little naive in their recognition of the potential or of the potential problems of such a system. There are very few concrete criticisms or positive suggestions which indicates to me that there is simply not a clearly identified need for this system at this time.

I believe that most university faculty would welcome the announcement of a satellite-based educational network with overwhelming indifference. The question remains as to whether innovators' use of it would justify its creation.

The value of the use of satellites in the north, Newfoundland, and other remote areas for communication and education where travel is unrealistic or impossible has already been demonstrated. But this seems to depend on low cost ground stations for fairly wide accessibility. While you seem to have rejected the CTS Hermes approach for several reasons including its experimental nature, would it not be worth considering a further development of it so that ground station costs could be kept low? Of course, a careful cost analysis of such an approach would have to be done.

Cable television in North America is opening up new possibilities for continuing education in the home. Perhaps if satellite systems could hook in with cable television the possibilities would be almost unlimited.

Another area that could be investigated is computer-based networks like the PLATO system.

4. Report re Satellites in Canadian Education

Introduction

This report has been prepared as a response to a letter to [redacted] from Dr. J. S. Daniel, Téle-Université du Québec, requesting a reaction to hypotheses about possible satellite networks for use in Canadian Education. A survey of interest in satellite communication systems by academic departments, centres and institutes was made by the Office of Audio Visual Services requesting reaction to the proposals contained in Dr. Daniel's letter.

Findings

Replies were received from 32 respondents in which 14 identified the Department which they represented. The instrument used in the survey "Interest Inventory in the Development of Satellite Communication Systems for Canadian Education" provided a five point rating scale from "extremely desirable" to "definitely not of interest". The mid point on the scale measured a neutral response "don't know" or "undecided".

The first area of interest surveyed was that of a Canadian Universities Satellite System Network which would link 30 universities providing capability to send and receive audio signals with a few having video (TV) signal capability as well. The following summarize the replies received to the hypotheses presented:

a) Course exchange. Such a system could provide for a wide range of specialized courses to be exchanged among Canadian universities. N= 29.

Extremely desirable	7%
Possible use	66%
Undecided	10%
Questionable	17%

b) Research seminars and colloquia. Colloquia with world renowned authorities or seminars on research findings could be held simultaneously on the network. N = 29.

Extremely desirable	41%
Possible use	41%
Undecided	14%
Questionable	4%

c) Other applications. Committee meetings and Conferences on a regional or national basis could be held on the network eliminating the need for travel and loss of time. N = 30.

Extremely desirable	26%
Possible value	50%
Undecided	7%
Questionable	17%

The second area treated in the survey was a Provincial Educational Telephone System which would provide a voice link among a large number of sites within the region and would be capable of providing written or graphic data in addition to voice. The following responses were received to the statements presented:

a) If such a system were available in [redacted] it would receive: (N = 30)

Considerable use	17%
Some use	23%
Don't know	50%
Little value	10%

b) Meetings between government departments and universities using this system would be of (N = 30)

Great value	7%
Some value	60%
Don't know	30%
Little value	3%

The experience respondents had with existing communications systems was tested in the areas of courses by satellite, telelecture system and televised lectures.

Limited use of the three systems was reported by 11 of the respondents. One respondent indicated experience with courses given by satellite, four indicated experience with the telelecture system using regular telephone lines and eight reported using televised lectures as part of a course of instructions. 21 respondents reported no experience with any of the media forms listed.
General comments were invited and these indicated the need for more information especially on costs. Interest was expressed by the Dean of Graduate Studies in the general prospect presented for graduate study but this would be subject to a substantial level of cooperation among a number of universities.

Discussion and Assessment

A survey of the type conducted here has a serious limitation in that it asks people to project possible applications of a technique or system where there is little experience upon which to base that projection. This limitation is evident in the survey findings which showed a relatively low experience level with telelectures and television course applications. In interpreting the findings of the survey in the light of this limitation some caution is required lest it be construed that a ready and willing academic community is prepared to adopt the communications satellite system simply because it is available. Experience in the past decade with television in Ontario universities would suggest a controlled and measured approach through pilot projects and experience diffusion activities in preference to a massive investment in technical apparatus.

In expanding interaction among universities the availability of some form of distance communication system is a necessary but not sufficient condition. More fundamental than the technical facilities is a clear articulation of needs to be served. Further, there is the threat posed by any new system through the disruption of established patterns of organization and control. A long standing expectation for the exchange of course materials in contemporary media forms has yet to achieve demonstrable proportions although progress is beginning to be noted in this area. The application of satellite technology for general higher education purposes is not dissimilar to these other media applications.

Three possible approaches are suggested from this survey. The first is an intensive "tooling up" of technical capability and at the opposite is a complete rejection of any work in the area. Between these extremes a modest level of activity should be fostered through the existence of funding support on a measured basis and controlled by demonstrated needs in specific areas.

In specific terms distance interaction, where needed, can be achieved to an extent using available telephone and teleconferencing facilities without the high risk of long term financial commitment. It would be preferred to develop this experience base and leading out of it justification or otherwise for a satellite network.

A more immediate and practical task might well be a cost benefit study of a province-wide inter-university/government telephone service.

Recommendations

1. The University [redacted] register caution with respect to reliance upon a heavy technical investment as the first step toward a Canadian Universities Satellite System.

2. The University [redacted] be prepared to enter into discussions with other universities and governmental agencies concerning cost benefits of an extended province wide toll free telephone service.

3. The University [redacted] be prepared to support and participate in controlled and measured projects involving distance communication in academic settings where a significant need can be demonstrated.

5. I regret that it was not possible for me to reply previously to your letter of May 17, but I have just received some comments from my colleagues.

Briefly, they support the development of the domestic satellite systems for educational purposes. They specifically recommend "CUSS" as the most useful way for universities to exchange course and seminar material, particularly at the graduate studies and research level. It is perceived, however, that if this system is substantially utilized it will entail significant annual costs for each institution involved.

The "PETS" system is recommended as especially appropriate for providing extension courses at locations which are remote from teaching institutions. While this system's costs per institution are more modest than those of "CUSS", it is urged that studies directed toward the development of both educational satellite systems go forward since each appears to promise very important benefits for Canadian education.

6. I find it difficult to reply to your letter of May 17 in great detail for I find, amongst [redacted] Faculty, little interest in the use of data links to other institutions as a means of conducting classes. However, some consider that seminars and research conferences could be organized if two way links are available.

There does seem to be an opinion here that such links would be useful for the purpose of rapid data retrieval.

An experiment entitled "Project Teleprof" was carried out between RMC and CMR (St. Jean, P.Q.) under the auspices of the Educational Technology Program of the Department of Communications. This project centered around a TV-telephone link with, I believe, a low data rate video channel being used. I have not seen a report on the experiment and the RMC participants say they have seen only a draft. If you are interested, you might be able to obtain a report from DOC.

[redacted] participants are not enthusiastic about the potential of the channel on which they experimented.

7. Thank you for your kind invitation for input regarding "Satellites in Canadian Education".

The satellite's ability to carry multidestination traffic and the ability to provide specific requirements determined by the Educational institution's location, size, and the user's degree of mobility makes satellite education in deed attractive! Yet, communication satellites are simply radio relay platforms in space and as such serve much the same purpose as microwave transmission towers of which educational institutions do not use, some only for telephone linkages. One wonders if, in fact, such a venture is simply another effort to secure support for a technological innovation which would be poorly utilized and ill suited to the vast majority of educational endeavours.

The fact is in the audio domain, educational readio is almost non-existent in Canada. And educational television generally exhibits poor content..even poorer techniques and is ill used. And when one considers that full-time telephone, telegraph and data transmission services account for 86% of the global satellite traffic...television, occasional and special services making up the remainder...the satellite platform is not going to enhance these modes.

This is not to say, Dr. Daniel, that considering such a venture is not wise- to the contrary! It shows good planning! But, to presently allote a bandwidth to educational institutions who can quite adequately meet declining enrollments with present facilities seems foolish.

Again I thank you for your invitation to respond to these plans, and would be interested in their outcome.

8. Nous avons pris connaissance, [redacted], du rapport que vous nous adressiez et qui est intitulé "Evaluation Education". Le contenu de ce rapport nous a vivement intéressés et nous venons par la présente, en réponse à la suggestion contenue dans votre lettre du 17 mai dernier, ajouter certaines "remarques sur le rôle des satellites dans l'éducation".

Dans l'immédiat, nous constatons un besoin d'échange vidéo (S.U.C.E.S.) ou tout au moins audio (R.E.R.) entre certains collèges engagés dans une même recherche. A titre d'exemple pour cette année 1977-78, une telle liaison entre les cégeps de Jonquière et de St-Jean serait d'une grande utilité pour leur permettre d'échanger des informations concernant leurs recherches portant sur l'enseignement de la mécanique. Avec le développement de la recherche et de l'expérimentation dans les collèges, c'est vraisemblablement un besoin qui grandira.

Dans un avenir moins immédiat, la liaison audio (R.E.R.) permettrait non seulement à tous les collèges d'échanger directement entre eux des renseignements, des cours, des recherches, mais aussi pour tous les collèges reliés à des câbles (vidéo et audio) communautaires (déjà quelques uns le sont) de faire profiter leur clientèle régulière ou adulte et leur population de cours ou d'activités d'éducation populaire venant de toutes les régions du Québec. La quantité et la qualité de ces émissions y gagneraient certainement. A titre d'exemple, l'expérience de la radio MF éducative de Trois-Rivières pourrait ainsi bénéficier à tout le réseau collégial dans un avenir plus ou moins rapproché.

Il va de soi que le rôle des satellites dans l'éducation restera dépendant de l'évolution pédagogique de l'enseignement à distance. Cette pédagogie ne fait l'objet d'aucune recherche particulière au niveau collégial, pour le moment. Nous comptons procéder de concert en cette matière, avec le niveau universitaire.

9. Thank you for drawing to our attention the possibility of the use of satellite delivery systems in education in Canada.

I have referred the material to some of our experts in this area and the general conclusion seems to be that the potential costs would outweigh the educational value of the system. That is, obviously, a very general comment. More particularly, we do not think that the system would be useful as far as the [redacted] is concerned.

I am sorry to be negative, but I know that this is the comment you would like to have if this is, in fact, our judgment about it.

10. The following comments are offered in response to your memorandum of May 17, 1977.

The concept of a national educational satellite communications system is extremely exciting and it is easy to imagine a number of uses which could conceivably enhance the quality of our educational system.

Technically your CUSS and PETS system hypotheses look sound and the costs, although expectedly higher than more conventional delivery systems, are not as prohibitive as one would imagine.

The benefits derived from the use of such systems, however, would clearly have to justify these costs and it is no secret that in today's economic climate it is becoming increasingly difficult to solicit funds for projects which can be categorized as desirable rather than essential at this point in time.

Obviously if a given use were to generate cost savings in another area, this could offset at least some of the satellite usage costs and make the proposals more acceptable. As a device for high speed document retrieval and facsimile transmission, for example, the satellite might well compete with existing inter-library loan systems.

Although experience so far with "remote lecturing" suggests that it is pedagogically ineffective and counters the trend toward individually "contracted" learning programs, media technology advancements could make it possible to build instructional models that are indeed individual - even with classes spread over a wide geographic area.

It is inevitable, however, that financial support for any educational network in Canada will require, as a prerequisite, indisputable evidence of its cost effectiveness. Network studies of a satellite system should, we conclude, cover all kinds of communication from courier to computer before its role can be said to be fully evaluated.

11. I have received your letter of May 17, 1977, and the accompanying documents have been examined by several officials of the Ministry.

While your projects are quite innovative and extensive, they would appear to be only marginally relevant to the immediate jurisdiction of this Ministry. Our responsibilities are limited to elementary and secondary school education whereas it appears to us that the major potential for satellite educational communication is at the post-secondary and continuing education level.

Satellite communications could have a role to play in the professional development of teachers in remote communities and even for professional consultation between remote educators and experts in other locations. These possibilities do not seem to justify the expenses of satellite communications as currently projected, while we already have alternate communication systems in Ontario — namely the TV Ontario network, CATV systems, bicycling of tapes and other materials, and dedicated telecommunications systems to most remote locations.

We are in no way rejecting your satellite communication and will watch with interest as your and other projects develop, leaving open the possibility of more intensive involvement on specific elementary and secondary education activities in the future.

12. I have consulted with others, and from their reactions and my own experience must report no interest in either the satellite of the PET project at this time.

[redacted] has had eight years of direct experience in trying to develop off-campus educational use of television. For three years (1970 73) we cosponsored [redacted] Television Association) which provided about forty hours programming per week on a VHF channel shared with CBC. More recently we have been a partner in the [redacted] Education Cable Consortium) which has full access to a cable channel. We also work with [redacted] in producing videotapes for classrooms and public use.

In the field of radio we have been active for fifty years, since we went on air with [redacted] a university station. Although the university has not operated the station for many years (it is now [redacted], we continue to supply some programs.

Our general conclusion, after all this experience, is that we are not yet able to make full and effective use of the technology now available. Neither staff nor potential students have the commitment to spend the time and effort required for successful continuing programs. We feel we must put our efforts and resources into small scale projects aimed at improving human participation, rather than into large scale and expensive developments of technology. This is not to deny the many exciting possibilities: we do not think we are yet ready for them.

13. [redacted] is presently co-operating with the Provincial Ministry of Education's Distance Education Planning Group to experiment with a variety of educational uses of satellite technology using the Hermes satellite. The geography of British Columbia and the diversity of population density in the province lend themselves, in principle, to the suitability of the satellite delivery. The major advantage is, of course, the two-way interaction capability.

At this initial stage of [redacted]'s involvement, the following three evaluation components are of major concern: instructional effectiveness, learner/instructor acceptance and cost/time efficiency. The latter component has been addressed by the Department of Communications. Learner/instructor acceptability has been and is a major concern of those involved in the Hermes experiment. Useful guidelines and instruments have been developed by the Department of Communications. We expect that evaluation of the wide variety of programs included in British Columbia's Hermes experiment will add to this knowledge.

The instructional effectiveness of satellite technology is an area we have identified for future exploration and evaluation. More specifically, the following items are of concern:

1) Clarification of the objectives of institutional involvement in the use of this technology.

2) Identification of learning needs that can be met specifically by use of satellite delivery.

3) Training needs of personnel using the technology.

The necessity of continuous evaluation and sharing of information is fundamental to forward action in the use of satellite technology.