EVALUATION • EDUCATION

L'utilisation de systèmes de satellite en éducation au Canada:

Étude des coûts de deux réseaux et enquête préliminaire sur les besoins.

Tome 2

Enquête préliminaire sur les besoins

THE IMPLICATIONS OF THE EDUCATIONAL
EXPERIMENTS CONDUCTED ON THE COMMUNI-
CATIONS TECHNOLOGY SATELLITE

LES IMPLICATIONS DES EXPERIENCES EDUCATIVES

REALISEES SUR LE SATELLITE TECHNOLOGIQUE DE TELECOMMUNICATIONS

John S. Daniel - chercheur principal

L'UTILISATION DE SYSTEMES DE SATELLITE EN EDUCATION AU CANADA:

ETUDE DES COUTS DE DEUX RESEAUX ET ENQUETE PRELIMINAIRE SUR LES BESOINS

TOME 2

ENQUETE PRELIMINAIRE SUR LES BESOINS

TABLE DES MATIERES

BUT ET METHODOLOGIE DE CETTE ENQUETE

Dans le tome 1 de cette étude, l'on analyse les coûts de deux systèmes de satellite susceptibles d'être utiles en éducation au Canada. Afin de déterminer si, à l'avis des éducateurs canadiens ces réseaux sont utiles ou plausibles, nous avons fait parvenir la lettre suivante, avec un résumé de notre démarche, à toutes les universités canadiennes, aux ministères de l'Education des provinces et à certains autres organismes.

Nous présentons à la page 10, dans la langue du répondant, les réponses reçues jusqu'à date. Afin de respecter notre engagement auprès des répondants, nous avons omis les références pouvant permettre d'identifier les différentes institutions.

Maintenant que les résultats de l'analyse des coûts et de cette enquête sont disponibles, nous invitons nos répondants et nos autres lecteurs à poursuivre leur réflexion sur le rôle des satellites en éducation et de nous faire part de tout commentaire supplémentaire provoqué par cette nouvelle information.

1977-02-07

Monsieur,

Les satellites dans l'éducation au Canada

Parce que le Canada dépend d'emblée des communications, il n'est
pas étonnant qu'il soit une des premières nations à être dotée d'un
réseau national de satellites, et qu'il figure parmi les pays les
plus développés en ce qui concerne la technologie des satellites
de télécommunications. Plus que toute autre technologie, celle des
satellites élimine le phénomène des distances physiques et c'est
dans le domaine de l'éducation que le contribuable pourra tirer
profit de l'investissement de fonds publics dans des projets spatiaux.

Nous sommes en train d'évaluer les expériences menées au Canada grâce
au satellite technologique de télécommunications (Hermès). Cette
évaluation a pour but de suggérer un modèle d'utilisation future
de satellites en éducation. Il est déjà apparent que les satellites
ouvrent plusieurs voies dans le domaine éducatif; cependant, et afin
d'élaborer de bons modèles pour le futur, il nous faut plus d'infor-
mations sur les besoins réels.

Au lieu d'entreprendre un sondage dans ses formes les plus tradition-
nelles, il nous a semblé plus simple et plus efficace d'élaborer des
hypothèses sur d'éventuels réseaux de satellites, et de demander aux
institutions et organisations canadiennes de réagir à ces hypothèses.
Le document de travail ci-joint décrit deux réseaux possibles dont
nous faisons actuellement une évaluation financière. Nous vous
invitons à distribuer ce texte pour qu'une discussion dans votre
organisation en résulte. Nous vous serions gré de demander à vos
collègues de nous transmettre leurs réactions à ce sujet.

Nous cherchons surtout à savoir:

   - si l'un ou l'autre ou les deux réseaux proposés sont plausibles;

   - quels autres types de réseaux seraient utiles?

Il va de soi que nous ne limitons pas vos remarques à ces deux
seules questions: tous vos commentaires seront les bienvenus.
Ceux-ci seront traités confidentiellement et présentés dans une
forme synthétique seulement. Nous ne demandons pas un exposé
formel sur la position de votre institution face aux satellites.

Nous espérons recevoir des commentaires dès la mi-mars 1977, et ceci
afin qu'ils puissent faire partie du rapport sur l'étude financière.
La CRTC tiendra cet automne des audiences publiques relatives à la
fusion possible entre Télésat et le Réseau téléphonique transcanadien:
nous pensons donc que le moment est propice pour que les éducateurs
réfléchissent sur le rôle que pourraient jouer les satellites de
communication dans leurs activités.

Veuillez croire, monsieur, à l'expression de mes sentiments les
meilleurs.

John S. Daniel

L'UTILISATION DES SATELLITES

POUR L'EDUCATION DES ADULTES:

ETUDE DES COUTS POUR DEUX RESEAUX

1. INTRODUCTION

Le Canada est parmi les premiers pays dans le développement et l'utilisation des satellites de télécommunications. Actuellement, plusieurs institutions à travers le pays participent aux expériences du satellite technologique de télécommunications (Hermès). Une équipe menée par John Daniel (Télé-université, Québec) et Murray Richmond (Athabasca University, Alberta) fait l'évaluation de ces projets afin d'en déterminer les implications futures pour l'éducation au Canada.

L'utilisation des satellites à des fins éducatives doit reposer sur de solides bases: il faut donc connaître les besoins des diverses institutions et déterminer les coûts à défrayer pour les comber. Face aux difficultés méthodologiques inhérentes à toute étude des besoins dans ce secteur nouveau, l'équipe d'évaluation a décidé d'identifier deux réseaux possibles et de calculer le coût de réalisation de ces réseaux, si la technologie des satellites de communication était utilisée.

Nous souhaitons que cette description de l'étude que nous entreprenons suscitera des réactions chez divers institutions et organismes. Les systèmes proposés sont-ils réalistes et utiles? Sinon, est-ce parce que l'on n'a pas vraiment besoin de satellites, ou alors, est-ce parce que l'on n'a pas imaginé les bons systèmes? Des réponses à ces questions constitueront les premiers jalons d'une étude des besoins.

La possibilité d'une fusion entre Télésat Canada et le Réseau téléphonique transcanadien rend une sérieuse réflexion sur l'utilisation des satellites

en éducation d'autant plus urgente. Le Conseil de la radio-télévision et des télécommunications canadiennes tiendra ses audiences sur cette fusion à l'automne 1977 et nous espérons que la présente étude et les réactions qu'elle suscitera fourniront au Conseil des renseignements utiles relatifs au potentiel des satellites de communication dans les domaines de l'éducation et des services publiques.

2. LA DESCRIPTION DES DEUX RESEAUX PROPOSES

Deux réseaux fondés sur l'utilisation de satellites sont à l'étude. Le premier réseau appelé SUCES (Système universitaire canadien pour échanges par satellite) ou CUSS (Canadian Universities Satellite System) relierait par audio et vidéo les plus importantes universités du pays. Le deuxième réseau, le RER (Réseau éducatif régional) ou PETS (Provincial Education Telephone System) serait un réseau de téléenseignement déservant une région donnée (province ou groupe de provinces).

2.1 Le réseau SUCES

Ce réseau relierait une trentaine d'universités canadiennes. Toutes pourraient émettre et recevoir des signaux audio et recevoir des signaux vidéo alors que certaines pourraient également émettre en vidéo. Un système de télécopie serait aussi inclus dans ce réseau pour des fins de transmission de textes, graphiques, etc...

Le système SUCES permettrait à ceux empruntant le réseau de faire ce qui suit:

a) Echanger des cours
   De la même façon que l'Université Carleton (Ottawa) échange des cours avec l'Université Stanford (Californie), le réseau SUCES permettrait aux universités canadiennes d'offrir un plus grand

éventail de cours aux étudiants gradués. Un cours offert à
l'université A pourrait donc être suivi par toutes les uni-
versités B, C, D, E... reliées au système SUCES. Ces universités
verraient et entendraient le professeur de l'université A et
pourraient aussi intervenir par audio en tous points. Le système
de télécopie permettrait l'envoi immédiat de notes, textes,
diagrammes, etc... d'une localité à l'autre.

b) Séminaires et colloques de recherche
   Peu d'universités ont suffisamment d'étudiants gradués pour
   justifier des conférences données par des personnes de réputation
   mondiale. Le système SUCES se prêterait bien à de tels séminaires
   car il réunirait un grand nombre de chercheurs. Ces séminaires
   seraient formels (ex.: un lauréat Nobel en chimie exposerait
   son travail à d'autres chimistes) ou informels (ex.: des spécialistes
   échangeraient sur leurs recherches respectives). Le projet de
   microscopie électronique de l'Université du Québec sur le satellite
   STT illustre bien ce dernier exemple: plusieurs bactériologistes
   de villes différentes étudièrent ensemble les bactéries et virus
   à travers un même microscope situé à Montréal.

c) D'autres types d'application
   Si l'on implantait le système SUCES, il serait aussi utilisé pour
   des téléconférences, des réunions diverses, etc..., et ceci par
   des personnes faisant partie ou non d'une université.

2.2 Le réseau RER

Des réseaux semblables à celui-ci sont utilisés depuis plusieurs
années au Wisconsin et en Illinois. Le but d'un tel réseau est de
relier par audio un grand nombre de localités (environ 200) au sein
d'une province ou d'une région données. Ce système permettrait donc

à toutes les localités de s'écouter et de se parler entre elles.
De plus, un deuxième canal de transmission serait utilisé pour un
télécopieur ou un téléscripteur. Le réseau RER serait utile dans
les cas suivants:

a) Les cours pour adultes
   Chaque année, au Wisconsin, plus de 30,000 étudiants suivent
   des cours grâce au Réseau téléphonique éducatif du Wisconsin,
   l'ETN. Ce système pourrait servir aussi à tous les niveaux
   d'enseignement (scolaire, collégial, universitaire) et atteindrait
   la quasi-totalité des localités de la région.

b) La coordination
   Le réseau RER servirait à rassembler et coordonner les divers
   employés de départements du gouvernement provincial. L'ETN sert,
   en l'occurrence, à créer des échanges entre le département de
   l'agriculture et des agents locaux (information et conseils aux
   fermiers).

c) Réunions diverses
   Des organismes gouvernementaux et éducatifs pourraient réunir
   plusieurs personnes de localités différentes grâce au réseau
   RER. Impliquer la totalité des quelque 200 sites possibles
   n'est pas obligatoire.

3. L'ETUDE FINANCIERE

Cette étude comprend trois divisions:

1- Les coûts spatiaux (terminaux et satellite) pour
   le SUCES et le RER.

2- Les coûts terrestres et infrastructuraux du SUCES.

3- Les coûts terrestres et infrastructuraux du RER.

3.1 Les coûts spatiaux

Cette partie de l'étude sera entreprise par la firme Miller
Communications Systems Ltd. Elle fournira pour les deux réseaux:

1- Un estimé du coût d'investissement des stations terrestres
   jusqu'aux interfaces (audio et vidéo), et ceci moyennant
   l'utilisation:
   - d'émetteur(s) et récepteur(s) asservis par
     impulsion (transponder) de satellite du type
     4/6 GHz Anik I-IV;
   - d'émetteur(s) et récepteur(s) asservis par impulsion
     (transponder) de satellite du type 12/13 GHz Anik IV.

   Cet estimé serait fait en fonction de la qualité des signaux,
   le nombre de canaux nécessaires à chaque terminal (localité)
   et le nombre total de terminaux terrestres desservis par le
   réseau.

   Les deux types de transmission (modulation de fréquence et
   digital) seront analysés et évalués en fonction de l'évolution
   des coûts à court terme. L'utilisation éventuelle d'un satel-
   lite à diffusion directe et son impact sur le coût des terminaux
   sera examiné brièvement.

2- Les contraintes techniques (délai du satellite, zone de
   couverture, localisation, puissance maximale, l'équipement
   FR, l'entretien) et les contraintes administratives et insti-
   tutionnels seront prises en ligne de compte en rapport avec les
   4 (2x2) configurations du réseau.

3- Les coûts de location permanente ou occasionnelle des émetteurs
   et récepteurs asservis par impulsion ainsi que tout autre coût
   de location pour un système opérationnel seront analysés.

4- Le coût annuel d'un système de diffusion par satellite incluant les coûts d'investissement et opérationnels des terminaux, et le coût du secteur spatial seront calculés à partir de différentes hypothèses de location.

3.2 Coûts terrestres et infrastructuraux

Ces coûts seront analysés pour SUCES par le Dr Don George (Université Carleton et pour RER par John Daniel (Télé-université). On estimera:

1- Le prix de l'équipement vidéo et audio (caméras, moniteurs, enregistreurs, micros, appareils de téléconférence, télécopieurs, téléscripteurs, etc.).

2- Les frais d'entretien.

3- Le coût de l'infrastructure et du personnel (sécurité, administration).

4- Les frais nécessaires pour entraîner les professeurs au nouveau médium et pour réadapter les cours au nouveau réseau.

4. CONCLUSION

Le rapport de cette étude apparaîtra dès avril 1977. Avant cette date, nous aimerions recevoir vos commentaires et réactions sur la plausibilité et la pertinence des réseaux hypothétiques exposés ici.

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Nombre de réponses reçues au 27 avril 1977 = 44

Number of replies received by 27th April 1977 = 44

Distribution par province / Breakdown by province

- 6 . British Columbia
- 4 . Alberta
- 2 . Saskatchewan
- 8 . Manitoba
- 8 . Ontario
- 8 . Québec
- 1 . New Brunswick
- 4 . Nova Scotia
- 1 . P.E.I.
- 2 . Newfoundland

Distribution par organisme / Breakdown by organization

6	. Ministère de l'éducation	/ Department of education
32	. Universités	/ Universities
4	. Organisme de télévision éducative	/ Educational television authority
1	. Associations professionnelles	/ Professional associations
1	. Autres	/ Others

Commentaires généraux sur l'étude / General comments on the study

1. I am sure that in the coming years we will neet to develop an educational resource of this kind in Canada. I believe that your initiative towards it is greatly to be welcomed.....

2. I find your ideas innovative and creative and I hope they receive serious study.

3. At the present time our province does not see any economical use of satellites, given the practice of "bicycling" tapes around the province. Further our government is exploring the coordination of the extensive micro wave networks granted by the government and crown corporations.

4. I would hope that as plans develop that the possibility of developing a project which would be related to nursing education would be considered.

5. There is no longer any doubt that the level of this technology meets all conditions necessary for network quality broadcasting. We must, however, weigh the present economic, technological and logistical merits of the present delivery systems against program distribution by satellite or other budding technologies such as fibre optics and video disc.

   It appears that it is now opportune to initiate an intensive study on Communication Systems per se versus Impending Systems.

6. La première étape de la réflexion a consisté à établir des critères qui permettraient de réagir aux réseaux proposés puis à cerner les besoins de communication en éducation.

1.1 Critères

- Communication utile et nécessaire

   C'est-à-dire une communication répondant
   . à des besoins réels qui ne peuvent être satisfaits autrement

   . plutôt qu'au désir d'utiliser le satellite à tout prix parce
   que c'est nouveau.

- Communication instantanée et bidirectionnelle

   C'est-à-dire qui exige les caractéristiques exclusives de la
   communication par satellite et donc qui ne peut pas être rem-
   placée totalement par le courrier, l'envoi de documents,
   l'échange de bandes magnétoscopiques, etc.

- Communication économique en termes de temps, de déplacements,
  de coûts.

1.2 Besoins en éducation (qui exigent une communication bidirectionnelle
   et instantanée)

- Accessibilité de l'information (d'une région à l'autre)

   Recours aux spécialistes, utilisation des données à distance et
   des documents, accès aux laboratoires.

   Entre les régions et surtout entre les régions éloignées et des
   grands centres bien pourvus.

- Echanges nécessaires du type discussion et du type observation

   Pour créer un environnement stimulant pour la recherche, la
   créativité dans des régions moins équipées, et dans des spécia-
   lités où expérimentateurs et utilisateurs sont dispersés.

- Réalisation de programmes spéciaux d'éducation si les programmes
  doivent couvrir un grand territoire et/ou être réalisés rapidement.

Exemple: recyclage de la main-d'oeuvre suite à un changement du
milieu ou des méthodes de travail,
et
formation à l'utilisation de nouveaux instruments de travail
(formulaires/équipements/etc.).

7. Both facilities would undoubtedly be used in the future if they were
   available, but the telephone network (PETS) would be more used in
   Continuing Education Activities.

8. At the level of the University at large, a satellite delivery system could
   well complement and greatly facilitate the arrangements being mooted here
   for mutual collaboration and exchange between universities on a 'twinning'
   basis.

9. There is no doubt in my mind that both these networks are not only plausible
   but also highly useful in extending the range of educational opportunities
   for (members of a particular profession).

10. Il est très intéressant d'aborder des hypothèses sur d'éventuels réseaux
    utilisant comme support le (s) satellite (s) et les deux (2) modèles pro-
    posés sont, dans ce sens, tous deux fort plausibles a priori. D'autres
    réseaux pourraient cependant être envisagés pour des fins d'éducation à
    savoir: réseau basé sur la technologie du micro-onde, ou réseau à tech-
    nologie mixte avec supports tels que le câble coaxial, le micro-onde et le
    satellite. Cet exercice doit cependant, à notre avis, reposer sur un
    "cahier de charges" de besoins connus à satisfaire.

    En ce qui nous concerne, et vous le comprendrez sûrement, nous ne pouvons
    nous substituer aux institutions d'enseignement pour identifier leurs
    besoins de communications et de télécommunications.

11. We are dedicated to the principle of sharing facilities, either trans-
ponders or earth stations with like or compatible users.   .....We are
concerned that the proposed merger of Telesat and TCTS will overlook
the needs and interests of Canadian educators. In particular, we
would like to ensure rate structures and services that recognize educational
needs as well as our competence to own ground stations.

12. _____n'ignore pas le développement de l'utilisation des satellites
dans l'éducation à un moment où le support technique aux ressources didac-
tiques influe de plus en plus sur la tâche de l'enseignant. A elle seule,
l'approche systémique de l'éducation justifierait cet intérêt ....
En résumé _____est vivement intéressée au développement des com-
munications par satellite.

13. In general, I would support the position which you appear to be taking.
I believe that satellites are vital to education package delivery such
as we have in (the north of the province) and, of course, even more so
in the Arctic regions of Canada. My personal feeling is that much of
their future lies in the direction of computer-aided instruction rather
than the conventional method of professorial delivery. However, what you
propose is entirely feasible.

14. The physical systems which you describe seem to be well-conceived and
could, no doubt, be put into operation. Whether or not the overall
objectives of such systems would be met would be dependent on factors
outside the system but impinging on it. I am referring to the need for
adjustment to the related social systems with which your system must
interact.... Accommodation of your systems within the larger educational
and social systems requires at least as much, and probably much more,
time devoted to it than the design of your delivery systems and their
information content.

15. - Liens entre les besoins et les moyens.
    Vous avez choisi, sans doute délibérément, de définir d'abord
    les moyens sous forme de réseaux et de connaître ensuite les besoins
    des utilisateurs à travers leurs réactions face à votre définition
    de moyens, quitte à apporter après coup, j'imagine, certains correctifs
    nécessaires. Votre méthode que l'on pourrait qualifier d'inductive
    a l'avantage d'amener les utilisateurs à exprimer leurs besoins d'une
    façon concrète, mais a l'inconvénient de les contraindre à n'exprimer
    surtout que les besoins pouvant être satisfaits par les moyens que
    vous proposez.

    - Relations entre les coûts des émissions et les coûts des réseaux.
    Votre travail se limite, selon toute apparence, à l'étude exclusive
    des coûts de l'infrastructure technologique. Notre expérience indique
    pourtant que ces coûts ne représentent que la pointe de l'iceberg et
    que les coûts d'alimentation des réseaux en émissions excèdent souvent
    de dix à vingt fois les coûts de l'infrastructure technologique.

    Il serait donc souhaitable que les utilisateurs futurs soient sensi-
    bilisés à cet aspect de la question.

    - Relations entre le médium, le message et l'impact
    Notre expérience indique également que l'utilisation d'un médium, que
    ce soit la radio ou la télévision, impose des contraintes quant au
    choix des émissions et aux modalités de traitement des sujets, et
    entraîne des conséquences bien précises quant aux coûts de l'infra-
    structure technologique, aux coûts des émissions et à l'impact sur les
    auditoires cibles.

16. As a small university restricted to undergraduate work, I think it is
    very unlikely that we would originate material for such a system. Our

use of it would be very much determined by cost. Given my general
pessimism about University funds in the near future, I am doubtful
that funds will be available even for things that in the long run
might have economic benefits.

17. It is eminently sensible to proceed as you have done, to investigate
costs of video links and of telephone links, since any conclusions
concerning the uses of a communication network will include consideration
of both capital and operating cost.

The use of interactive electronic media for course delivery must be
compared with other more traditional means. It does not appear that there
will be a shortage of university teaching personnel in the long term. The
many institutions using passive television delivery systems have not shown
them to be cost effective. The legitimacy of the use of a television
network to deliver nationwide a course of lectures from a single source
must be established - is the subject matter (especially for a graduate
student) the important aspect of his course, or is it the intimate contact
with a researcher, the development of an analytical expertise?

18. Unfortunately the technology, and perhaps the decisions being taken by the
major carriers and regulatory agencies, are still ahead of the decisions
that can be taken at this time by users. This is not to say, however,
that users won't soon want to be able to create networks such as CUSS and
PETS. Factors such as cost and the regulatory environment will certainly
influence the decisions taken by users and therefore it makes sense to
continue to try to cost the various alternatives and to encourage policy
decisions that take the needs of non-commercial users into account.

19. In a general way, our Province is interested in investigating any form
of technology, including satellites, which has the potential to lower the

cost of undertakings in which we are presently involved. It is in
keeping with this interest that we would support your efforts to
investigate the two networks.

20. En tant que membres d'une institution universitaire de modestes dimensions,
nous serions évidemment très intéressés à utiliser les services offerts
par un réseau de télécommunications, ce réseau pouvant nous permettre
d'avoir accès à une information actuellement hors de notre portée.

    Dans la conjoncture actuelle, il nous est difficile de nous prononcer
sur l'un ou l'autre des réseaux proposés, mais je voudrais ici réitérer
notre intérêt pour votre projet.

21. I wish to express active interest in your investigation.

22. I find that we are at least non-committal if not lukewarm, about the
need for satellites in Canadian education. We are convinced, however,
that the two networks that are proposed are technically feasible.

    The cost of these networks relative to the cost of other means of providing
education will, of course, be a central consideration in reaching any
judgement about the uses of satellites in Canadian education.

23. It would be very helpful for us to have the report of the cost study
before we make a formal response since, although there is some advantage
in some reactions to hypothetical systems, some of us are skeptical as to
the cost benefit results of a satellite network system.

    It is encouraging that studies of this type are under way as the benefits
are clearly very great. As someone with personal knowledge of space
research, however, I would have to be convinced that the capital and

operating costs of such a system would not be put to better use if,
for example, they were added to the granting agencies for grants in
aid of research. On the other hand, if money for this project became
available at the federal level which would not otherwise be available
to education in its broadest sense, our attitude would be very different.

......I am mindful of an earlier similar kind of experiment called EDUCOM
which generated great enthusiasm 10 years ago with the possibility of
linking large data bases through comprehensive computer networks, appears
to have sunk without trace.

24. If I have to choose between audio communication which can be widely used
by each institution and a video system which would be of use only to an
elite and much smaller number, I would choose the audio. Of course, if
the video capability could be built into the network for individual
institutions in reaching their own geographic communities, that would be
even better.

25. First, my own experience and investigation leads me to believe that some
major obstacles to the use of a satellite system linking the universities
for the delivery of courses, seminars and programs in the credit mode to
both graduate and undergraduate levels will prevent any major development
in this area. These obstacles will be focused through existing faculty
unions and those faculty unions which will come into existence over the
next few years. Primarily they will represent a fear by faculty members
that the development of a system of satellite connections will represent
a threat to the employment of university professors. I would be willing
to discuss this question further but I merely flag the issue for your
attention for the moment.

In spite of my rather pessimistic views expressed in the preceding paragraph I have strong feelings about the potential value of such a system for the development of adult education programs at the university level. Here I see a wonderful opportunity to tie together some of the key resources available throughout the country to supplement existing programs, especially those in the growing area of professional adult education.

26. As a final pessimistic note, I would strongly suggest that any attempt to implement either of these schemes should include either the flexibility to convert it from educational to some other use or a large budget item for promoting its use among academics. The history of educational technology is strewn with the expensive relics of schemes that offered all sorts of theoretical advantages but which higher education did not consider worth trying out in any significant way.

27. Basically the proposal makes eminent sense both in relevance and plausibility.

Specifically, because of the rather small size of the University of _____ , the use of the CUSS Network for research seminars and colloquia would be extremely important.

A system similar to the PETS network would assist many _____ residents in obtaining education from both universities. This system combined with a video tape lecture might also bear investigation.

As much as I am heartened by the increased impetus towards the use of more technology in the use of instruction, I am not too optimistic that the Province of _____ will divert money to Universities for the development maintenance and research required. Community Colleges may fare better.

I would be interested in some of the costs now in place for those locations where systems similar to those described are being operated.

28. It seems to me and to many of my colleagues, that all of the money spent or proposed to be spent on these systems for Universities would be better spent on honoraria for guest lecturers, travel grants etc. Face-to-face contact is still the best.

29. I am certain that if we had access to these resources, there would be a development of much use by not only the university community but government or other agencies. It would take time to learn to use them to the optimum value. The limitation (in addition to the usual cost factors) would be the ingenuity of the users in maximizing the potential.

30. I have read this project with great interest. Linking various parts of Canada through a satellite communication system in view of teleconferences is overdue.

    I would like the planners to consider setting a network of teleconference centres in various parts of Canada. These centres would not be necessarily set on university campuses, but could be set in the downtown area of a city, providing access to the teleconference centres to academics as well as other users: Businessmen, federal or provincial government civil servants, private research organizations, etc.

    The centres would be financially self-sufficient by renting the use of their premises to the various users. This would necessitate the formation of some kind of a crown corporation linked to the DOC which could be named "Teleconference Satellite Network Canada", or something of that sort.

The big conference centres should be equipped with permanent 3 meter antennas, the smaller ones with 2 or 1 meter antennas only. The Teleconference Satellite Network should also be equipped with mobile antennas (3, 2, and 1 meter) such as the ones being used by the Hermes experiments, in order to be able to extend teleconference type situations between communities not linked permanently by the proposed network on a temporary basis.

I advise the planners to contact the French government, which has recently established teleconference rooms in various parts of France, which will be used on a rental basis.

In summary, I would strongly suggest that the planners get out of the university community and link their project with the administrative and business worlds. Short of doing this, I am afraid that their project, however beautiful it may be, will be tabled and will gather dust, like so many other beautiful satellite communication projects have gathered dust in the past ten years.

31. I have discussed the outline 'Satellites in Canadian Education' with my colleagues and we feel that at this stage either CUSS or PETS would be very expensive and under utilised, at least in the context of metallurgical exgineering. In theory the PETS system would be of value because it could encompass off-campus events, e.g. on-site transmission from engineering plants etc. However, one really has to weigh these advantages against use of simpler A.V. packages such as video tapes of lecture series etc. The real advantage of the latter is that the quality can be so high, e.g. the Bronwoski 'Ascent of Man', Clark's 'Civilisation' etc. This has real value to be set against the simultaneous education system.

Our feeling is that although the satellite system has long range benefit to education in general, e.g. preservation of minority cultures at the

university level, it does little to enhance the quality of education.

32. Overall, the group was favorable to the proposal of an information network between Canadian universities. There is a need for more efficient and effective means of communicating all kinds of information - from courses to student transcripts - from one Canadian university to another. It was also felt that both of the proposed networks would facilitate computer conferencing, packet switching and other forms of information exchange. A satellite-based network would also most probably mean a vastly simplified price-structure for users.

Within this generally positive reaction, questions were raised that the group felt should be addressed before going ahead. These are as follows:

1. Will the proposed networks provide a service that is substantially better than what existing microwave networks can provide? Related to this are questions such as whether existing systems are saturated now, or will be by the time the proposed networks are functioning? We should ascertain that our present systems are being used to full efficiency before setting up the new networks.

2. Is there sufficient demand to warrant setting up the new networks? The group expressed some doubt that there was enough demand to make the networks cost effective. Are institutions ready to engage in large-scale exchange of courses, speakers and so on? Probably not on the scale required to make the networks efficient. The group suggests that expanding the proposed networks to include all sources and consumers of information, not just universities, would assure a more efficient use of the systems.

3. Will the technology required to mount the proposed networks have
   changed sufficiently in the interim to permit more ready access
   by users to information? The group felt that there was a need for
   more smaller ground stations rather than fewer more sophisticated
   ones. It seems likely that "receivers" of various kinds will soon
   be available in affordable price ranges. It was felt that these
   should be set up so that no one in Canada would be more than 200
   miles from one.

4. By contrast, some thought was also given to the question of fitting
   networks into the limitations of existing technologies. The ultimate
   consumer of information provided by an information network is unlikely
   to have anything more sophisticated than a television and a telephone
   with which to gain access to the network. Perhaps these are sufficient
   to service the present needs of individuals.

5. Even if the proposed networks are not paying propositions, there may
   be other long range payoffs. Eventually, using world-wide networks,
   information, such as educational programmes, could be exported to
   developing nations.

6. What effect will political events have on the proposed networks? If
   in fact communication becomes, wholly or in part, the responsability
   of the provinces, attention will have to be given to the inter-
   connections between provincial networks. This has political and
   possibly technical implications.

   If the proposed networks make further progress towards becoming
   realities, the group is willing to participate as best it can. We
   are looking forward to news of any further developments.

Commentaires sur le réseau SUCES / Comments on the CUSS network

1. <u>The Cuss Network</u>

   While this sounds very exciting, I wonder if it will be used suf-
   ficiently to merit the cost of setting up such a network. Such a system
   would require that universities communicate frequently and be very
   aware of what others are doing. It seems to me that most faculty have
   difficulty just keeping abreast of programmes in their own universities.
   In fact, we have some capability for similar forms of communication now.
   Most universities have video equipment and may regularly tape courses.

   In Social Work, we have talked for several years about exchanging
   information by video for some of the situations mentioned in the proposal.
   This exchange does not seem to be much used. A system to catalogue resources
   of various schools of social work across Canada has also broken down and
   we have not had much pressure from either individuals or schools to complete
   the project.

2. It is our opinion that the CUSS network you describe is sufficiently
   plausible to justify a detailed study.

3. At present, there is a broadband audio and video service linking (a
   university medical school) local hospitals and other medical institutions.
   This system can also be linked to major medical schools and hospitals
   (in a region of the US). (A UNIVERSITY) has been involved in at least
   one scheme which effectively achieved the same result as you propose but
   made use of a microwave network.

4. The CUSS network would appear to be somewhat of a luxury since the
   activities which it makes possible are not really necessary.

5. Le réseau SUCES

La description du réseau SUCES a fortement intéressé le comité du
_____. A son avis, ce réseau est réalisable et avantageux parce
qu'il crée un environnement stimulant pour la recherche et le travail.

Il peut être intéressant pour toutes les universités et en particulier
pour les régions plus isolées (exemple: communautés universitaires
françaises comme Sudbury et Moncton). Cependant certaines conditions
indispensables pour rentabiliser le réseau proposé ne sont pas assurées
par le projet dans son état actuel:
- que _toutes_ les universités et _tous_ les centres universitaires
  soient reliés

    les grandes universités ont plus de possibilités
    d'échanges (personnel, budgets) avec d'autres tandis
    que les centres éloignés sont plus démunis et profi-
    teraient davantage des liaisons avec d'autres.

- que _toutes_ les universités du réseau puissent émettre des
  signaux vidéo

    autrement, on favorise la "colonisation" par les
    grandes universités, on crée une série d'universités-
    émettrices par rapport à des centres récepteurs et
    cela ne favorise pas les échanges dans lesquels chacun
    contribue et reçoit.

- que le réseau soit élargi _au niveau collégial_

    parce que les bienfaits retirés seraient largement
    supérieurs aux investissements faits.

6. Le satellite et l'université: S.U.C.E.S.

Si à première vue le niveau différent où se pose le problème nous
épargne l'effort de formuler une opinion, nous ne pouvons manquer d'en
souligner quelques aspects pouvant éclairer le débat au niveau collégial:

- L'isolement linguistique et méthodologique des universités
  québecoises dans ces échanges par satellite à travers le
  continent ne pourrait être sérieusement compensé par les
  quelques échanges en littérature québecoise ou l'ensei-
  gnement du français langue seconde.

- Par contre, il faut nous garder d'un isolement culturel
  collectif malsain que la seule preuve de l'aliénation
  linguistique ne saurait justifier. Les universités et les
  collèges québecois devraient donc échanger avec les mondes
  américains et canadiens anglophones, tout en structurant
  de façon privilégiée les échanges avec les minorités
  francophones de la Louisiane, de l'Ontario et de l'Acadie.

- Il va de soi, qu'à cause de notre situation particulière,
  nous ne saurions considérer comme complète et épanouissante
  une utilisation du satellite limitée au seul monde de l'é-
  ducation nord-américain. Au contraire, cet outil particulière-
  ment efficace de communication doit venir renforcer notre
  participation à la francophonie timidement amorcée par les
  échanges franco-québecois. Il faut prévoir et donner une
  telle envergure à l'utilisation du satellite en éducation
  si nous voulons que ce nouveau support à l'éducation ne soit
  pas un agent d'aliénation mais bien une aide dans la cons-
  truction de notre manière d'être collectif.

7. The model proposed for universities, CUSS, would have some utility for
   _____ to the extent that we produce programs using experts from
   universities, as well as soliciting their reactions to programs, and
   such a system could provide real time interactive television for
   insertion in the distribution system. In addition, such a system would
   have utility for teleconferencing for program development and for dialogue
   with regional representatives.

8. There are also systems very similar to the CUSS networks that you describe,
   the only difference being that the linkages are at present microwave,
   rather than satellite. The TAGER network in Texas is typical of these
   systems and involves hookups between northern Texas universities and
   industrial research organizations for a mutual exchange of course offerings
   and research insights.

9. ......you suggest that facsimile transmission could be used to deliver
   lecture notes to remote spots. The only inexpensive transmission systems
   which I know take for too long to do anything other than deliver a fairly
   simply diagram. Certainly they would probably have neither the resolution
   nor certainly the speed to deliver a package of lecture notes remembering
   that some professors may issue twenty or thirty pages of such notes per
   lecture. Apart from this, all seems to be well.

10. No demand exists at present for a national university communications
    satellite.

11. I think the CUSS network would not only be plausible and useful but a very
    exciting development in Canadian 'Higher' Education. I foresee particular
    benefits which would result across the country at the graduate level.

12. The sort of networks you outline could have great potential for the 10 Canadian Faculties/Schools of _____ which have the greatest difficulty keeping in touch with each other's developments.

13. Both the CUSS and the PETS networks would be of interest to _____ for continuing education program development and for increasing learner contacts. The CUSS System would provide only a limited value to _____ but the PETS network could be used on a very regular basis.

14. As far as the CUSS network for universities is concerned from the point of view of a Department of Education involved only in K-12 education this is, if you will excuse the expression, an academic question. We have examined the applications advanced by Telesat Canada and have concluded that, in the foreseeable future, there is no applicability for public school education. We are looking seriously at microwave links between a central resource point and local cable distribution points, but not at satellite applications.

15. The CUSS network. Inasmuch as there is a very limited number of people in nursing who hold Doctorate degrees and are involved with nursing research to have this kind of network linking the Canadian Universities would be invaluable in terms of developing research scholars. The possibility of course exchanges would also seem to be a possibility for nursing to investigate.

16. I have read with great interest the suggestions you have made concerning the use of a network linking some thirty Canadian Universities. There would probably be some problems of timing if this was all to be interpreted as live television, but hopefully it might be the first step towards a facility which would permit some videotapes to be seen in classrooms across the continent and this would be a valuable educational opportunity.

17. The CUSS network seems to represent a considerable advance in communi-
    cations capability that could be put to use to provide advances in
    educational practices and contact among researchers. The ability to
    permit two-way communication between researchers and advanced students
    in areas of study involving limited numbers of people would seem
    especially valuable, as it would help to overcome the problems caused
    by the fact that invariably no one institution can afford to maintain
    enough people in a limited area to create an intellectual "critical mass".

18. From the brief paper provided it would appear that the CUSS network
    has exciting possibilities. No doubt it would take some time for
    universities to coordinate programs in such a way as to realize the
    full potential of the network. Because of the regional nature of many
    aspects of a Teacher Education program, the network would not be useful
    for certain components. On the other hand unusual procedures, programs
    or courses at some universities would be available to all on the network.

    Perhaps the network would lend itself to student-supervising teacher-
    faculty member interaction among universities. A seminar discussion might
    be held at one university and reactions received from others in the network.
    Maybe such seminars could even decrease the necessity of some conferences.
    It would be an easy way of ensuring that universities are aware of current
    programs and experimental procedures in the network. Quite often we hear
    of some research (or experimental programs) in progress but the final
    outcomes are published much later. Through CUSS it should be possible
    to maintain continuous contact with the experiment to its conclusion.

19. Thank you for the opportunity of reviewing the proposal for <u>Satellites
    in Canadian Education</u>. After some thought and analysis we here at _____
    are particularly interested in the video hookup by means of the

communications satellite. Although we are conscious of the provincial base of colleges and universities, there clearly would be greater educational opportunities for a communications network that spanned Canada and included video capability.

Otherwise the media facility within the _____ Radio and Television Arts program and the Media Centre, represents one of the most sophisticated production centres in North America. We currently have three full-fledged colour studios with "industry standard" equipment, time base correctors, 2" high band recording and editing capacities, as well as transmission lines to and from a major amphitheater type classroom. What is more, we have in our faculty and on our Media Centre staff the talents to piece together programming material which would be worthy of the considerable expense represented by your exciting concept.

Thus, while each institution might choose to have some modest recording and transmission facility, _____ - with minimal addition to its existing capacity - could play a major role in offering resources for this new use. I am certain that funding agencies might find the idea more attractive if they thought that a totally new expenditure was not involved. Furthermore, it is interesting that your idea should surface at a time when _____ has taken pains to ensure that its media equipment inventory is closely related to the highest standards in the professional broadcast community. Last summer approximately $300,000 worth of new cameras, recording and switching facility was added to an already impressive array of equipment. At the moment we have changed our emphasis to stereo radio equipment within our radio training branch, and - through an aggressive contact with the industry - we foresee expenditures at the end of this year amounting to an additional fifty to sixty thousand dollars.

To conclude, we here at _____ are enthusiastic about your proposal.
We would be happy to assist you in any way to mount this project. This
assistance might include technical advice, evaluation of proposed equipment,
teaching modes, production designs, recording, storage and utilization
of tapes, and the involvement of our broadcast teaching faculty as resource
people.

20. <u>Le réseau SUCES</u>

L'asymétrie des ressources de communications entre les différents parte-
naires de ce réseau nous apparaît malheureux. Il serait grandement préfé-
rable de concevoir un réseau distribué où chacun serait tour à tour émetteur
et récepteur vidéo.

Quant à la possibilité pour chacun d'émettre et de recevoir en audio par
satellite, nous estimons que le satellite n'offre pas d'avantages ni
technologiques, ni économiques par rapport au réseau téléphonique terrien,
sauf pour des distances de l'ordre de plusieurs milliers de milles.

L'échange de cours envisagé comportera, d'autre part, des problèmes au
niveau de la langue et de la compatibilité des curricula.

Commentaires sur le réseau RER / Comments on the PETS network

1. I personally believe that the people of British Columbia and their educational institutions could receive greater benefit from the second (PETS) model.

Because many people in the non-metropolitan areas of British Columbia have limited access to educational opportunities, a Provincial Education Telephone System would have considerable value to these people and to the universities and colleges serving their educational needs. Most of the population of British Columbia is concentrated in the Southwest corner and all three universities are located in these major population centres. The universities currently offer correspondence courses and occasional off-campus lecture courses, but these programs have severe limitations in both scope and quality. The interior of the Province is served by 14 colleges located in the smaller population centres, but the ability of colleges to reach the people in small neighboring communities is limited by distance and poor road conditions. These realities clearly suggest that some system of distance education will be required if the people who are geographically or socially isolated are to have equal access to educational opportunities.

From my perspective, the advantages of the second model are that:

1. it would appear to be a less costly system;

2. It would serve more people and provide greater access to educational opportunities to those who are geographically or socially isolated;

3. it would enable existing educational institutions to improve the quality of existing distance education programs by providing opportunities for direct, immediate contact between instructors and students and among students;

4. it would enlarge the range of options by which the colleges and universities in B.C. could develop new low-cost distance education courses and programs;

5. it would be of value to the new university college that the B.C. Department of Education is considering for the interior of the Province.

I appreciate very much being given the opportunity to comment on your survey and will look forward to hearing the results.

2. The PETS network. The need for providing educational programmes for nurses in rural areas is an acute one indeed. The PETS network as you describe it would seem to have much possibility in reaching out to nurses who intend to continue on with their education.

3. The PETS network, on the other hand, may have some potential, In particular, we would be interested in its application to Government Correspondence School instruction. As I understand your proposal, the PETS network would differ from the standard conference telephone call in that a facsimile transmission capability would complement the stricly audio signal.

4. Demand does exist for a provincial telephone network - particularly for _____ operations.

5. The PETS model would have no utility for us at the present time since _____ is not in the business of delivering educational materials to end users apart from some of our broadcast and videotape offerings.

6. My colleagues have suggested that the educational possibilities of
   this community's technology should be further explored, initially in
   the context of a provincial (PETS) network. A word of caution has,
   however, been voiced concerning the degree of public interest in such
   education or the ability of post secondary institutions to provide the
   resources necessary for such a project.

   Nevertheless we believe that the system has considerable potential for
   creating new modes of post-secondary education. It has also been suggested
   that it may have special value for community-based clinical educational
   programs for physicians in remote areas and we would encourage you to
   explore these possibilities further.

7. Satellite et collège (R.E.R.)
   Ce deuxième projet, qui intéresse l'ensemble du réseau collégial, nous
   est présenté avec une économie d'imagination peu favorable à un embal-
   lement collectif; par contre l'intérêt d'un tel réseau est certain.

   - L'utilisation des supports technologiques dans la pédagogie
     au niveau collégial nous permet de croire à l'avenir d'un
     réseau audio reliant l'ensemble des collèges. A ce titre,
     l'expérience de la radio M.F. de la zone économique no. 4
     mériterait d'être aidée un peu à la façon d'un prétest pour
     un tel réseau.

   - Aux aspects positifs déjà soulignés à propos du satellite
     et l'université, on peut ajouter qu'un réseau audio, beau-
     coup plus modeste dans ses coûts et simple dans son utilisa-
     tion, pourrait permettre l'établissement d'un réseau de com-
     munications entre les collèges, d'un réseau d'échange de
     cours et d'une gestion de l'acte pédagogique à peine soup-
     çonnée actuellement.

8. Le réseau RER

La description du réseau RER soumise à l'attention du comité est trop imprécise pour permettre une appréciation correcte de ce projet.

Compte tenu de ce manque d'information, le comité émet ses réactions sous toutes réserves.

- Pour la communication audio, le comité ne voit pas les
  avantages que le RER ajouterait au réseau Centrex à l'usage
  des employés du gouvernement,
  ou
  aux conférences téléphoniques organisées par Bell Canada
  à l'usage des universités ou du gouvernement.

  Ce comité juge important de ne pas investir dans des infra-
  structures (équipements, préparation du personnel technique)
  quand des services analogues existent déjà et sont accessibles.
  Dans un premier temps, les projets expérimentaux pourraient
  utiliser les réseaux existants jusqu'à ce que la nécessité
  d'un nouveau réseau s'impose.

- Pour le service de télécopie, quelle serait la particularité
  du RER par rapport aux télex répandus un peu partout?

Cependant, il reste à explorer des utilisations d'un réseau "audio"
pour des clientèles tout à fait nouvelles: v.g. des groupes ou des
sous-groupes pour qui l'audio représente un moyen de communication
privilégié (comme les aveugles) ou encore des groupes pour qui un tel
réseau serait un facilitateur important, par exemple les maîtres en
perfectionnement à travers tout le territoire.

9. The PETS network on the other hand might serve as a course delivery system which supplants correspondence and also the live presence in extension education: it would thus be a replacement and not an additional cost.

10. PETS - our experience with a 3 month experimental use of a telephone teaching, teleconference system involving 2 towns, was certainty positive, but a longer trial period involving more points and a more systematic evaluation would be necessary before we would even decide to try to set up a Province-wide network, let alone a regional one.

11. The second network, the PETS, has interesting implications for our Atlantic Provinces where we are trying to coordinate parts of our educational planning. Its use in this instance is more likely to be for meetings of planning groups rather than for formal educational programs as suggested in your paper.

12. I think it is urgent that (our institution) get into the satellite education field. .....we did research on the PETS model. Although I do not have the report of our work in front of me I do remember some of the results clearly.

    1. Each site needed a skilled facilitator.

    2. Professors were not happy. The major reason was that they could not anticipate feedback questions in time to feel confident.

    3. Learners were dissatisfied because they could not either keep the line to carry on a dialogue, or they could not get the line when they wanted it.

    4. As a tool for knowledge and information dissemination it was very useful and efficient. However, we felt a computer terminal hookup would ultimately be cheaper and more efficient once the information was programmed.

5. Facsimile transmission required the performer (Professor)
   to the more graphic than he usually was prepared to be.

6. Generally we concluded that if one were to go into this the
   following needed to be done:

   a. The system must be video
   b. Learning materials must be more standard
   c. Experts must be shown at work in a technical
      way, e.g., artists painting, scientists in
      laboratories, adult educators facilitating,
      etc. This rules out the learned lecturer.

For us in the Adult Education Training & Development field a video
satellite for our graduate students would be a great asset. It would
also provide us with further opportunity to develop learning packages
which we could facilitate in places such as the North right here from
our Adult and Continuing Education Centre.

13. The PETS Network

This proposal appears to me to have a great deal of merit--while not
having as much glamour as a cross-country system which provides both
visual and audio transmissions. I think it would be much more useful to
individual programmes and institutions. It would certainly be most
helpful to our programmes in social work as we seek to make our regular
programme more accessible to working people or to people who live outside
of _____. In addition, it would facilitate our communication with a
variety of people--students who might be placed for part of their training
in rural or northern communities; graduates who are scattered throughout
the province and need some regular, readily accessible form of keeping in
touch with new thinking; and perhaps providing access to special resources

for isolated practitioners or local community people who are trying
to resolve complex difficulties. I know that similar parallels exist
for a number of other schools of social work across Canada. For example,
Memorial University has nearly all of its students placed in locations
throughout Newfoundland for their final year; the Maritime (Dalhousie)
and Moncton Schools are also moving to decentralized provision of
programmes; Laurentian, Lakehead, Regina, Calgary, Victoria are similarily
attempting (I believe) to provide some instruction off campus or to use
decentralized learning at least for a part of student learning. What is
significant here I think is that we each need to find ways of communicating
with people in a variety of locations without having the cost of travel
for either students or faculty. In addition, we are concerned here with
basic education-- not with advanced of unusual or special programmes.
For me this is a major reason for focusing on local needs and a better
way of meeting these--as opposed to specialized needs for a small fraction
of programmes. In our School, we do have a graduate programme but the
delivery of graduate instruction seems less problematic to us at this time
than the delivery of regular and continuing education needs to those
outside of_____.

In Ontario and Quebec where universities are close together, it seems
to me that the PETS network could meet the needs of both individual
institutions in delivery of their programmes and for exchange among
programmes.

14. Unless the PETS network involves significant advantages in costs or
    quality of communication, I don't see why it would offer any improvement
    over present telephone service facilities.

15. The PETS network is of course much more limiting. It is somewhat
    reminiscent of the VERB (Visual Electronic Remote Blackboard) system
    we tried in Saskatchewan in 1965-66. That system connected Regina to
    four stations via telephone. It provided audio links (any site could
    hear all sites) and visual link by permitting transmission of writing
    from the main center to the four stations. There appeared to be a
    limitation of the type of courses that might be appropriate for such
    a system and likely this will be true of PETS. However, it is possible
    by careful planning to do more than what first appears to be feasible.
    For instance, sending data by mail in advance of a formal lecture and
    discussion would be one way of increasing the utilization of a system.

    Some interchange (discussions, seminars) could be usefully held via
    PETS almost as profitably as through CUSS. Certain presentations
    which do not require visual aids could certainly be made via the former.

16. <u>Le réseau RER</u>
    L'opportunité et l'intérêt de l'utilisation d'un satellite de commu-
    nication pour la mise en place d'un réseau audio ne nous paraît pas des
    plus évidents. Basée sur les conclusions de travaux de recherche que
    nous avons faits, l'utilisation du réseau réléphonique dans ce cas nous
    paraît plus rentable à première vue.

Autres commentaires / Other comments

1. Quant à la seconde question que vous posez: quels autres types de réseaux seraient utiles? Nous désirons attirer votre attention sur l'utilisation faite en Europe de la radiovision qui s'est avérée concluante dans le domaine de l'enseignement à distance.

2. A third model that would have great utility for us would be a system that replaces our temestrial microwave system, as well as providing the capacity for origination from one of five regions. Such a system could feed conventional broadcast transmitters, cable systems, and master antenna systems, and hopefully at the same time receivers or convertors would be within the economic range of individual homes.