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ABSTRACT

This two-part report describes a pilot study initiated by the Ontario Ministry of Education in 1981 to define the methodology for a subsequent research project on the current use of different types of instructional resources in Ontario public schools. The first section reports on case studies based on personal interviews with both staff and students in six representative schools. Eight recommendations on the appropriate methodology for a more comprehensive study resulting from the experiences of the interviewer are provided. The second section focuses on a search of the literature on the effectiveness of the new media, especially the microcomputer, as compared with traditional methods. Summaries are provided both of the procedures used and the findings of searches of the databases of the Ontario Educational Research Information System (ONTERIS) and ERIC, as well as vertical files and manual searches. A review of the literature which includes suggested questions that emerged from the search process concludes the report. Appendices contain a paper comparing the effectiveness of textbook and non-textbook approaches to learning, abstracts of selected documents from the searches, and the guidelines for the interviewer together with questions suggested for use with various groups. (LMM)

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INSTRUCTIONAL RESOURCES IN ONTARIO

Case Studies and Literature Search

LEWIS MILLER, Principal Investigator

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Contents

Foreword

I. Introduction: Case Studies / 1

Case Study: School 1 / 2

Case Study: School 2 / 8

Case Study: School 3 / 12

Case Study: School 4 / 16

Case Study: School 5 / 22

Case Study: School 6 / 27

Interim Report: July 20, 1981 / 33

Summary Report and Recommendations: / 38
August 20, 1981

II. Literature Search / 43

Introduction / 44

Methodology for the Searches / 44

ONTERIS Search / 45

ERIC Search / 45

Vertical Files and Manual Searches / 47

Summary of Findings / 48

(a) ONTERIS / 48

(b) ONTERIS / 48

(c) ERIC / 50

Summary Report / 50

Conclusions / 55

References / 57

Appendix A: Kormos, Jim; Abstract / 59

Appendix B: Swick, Kevin J.; Abstract / 60

Appendix C: ONTERIS Search: Excerpts / 67

Appendix D: ERIC Search: Excerpts / 77

Appendix E: Design of Method and Questionnaire / 79

FOREWORD

This pilot study was initiated by the Ministry of Education in the spring of 1981.. Following discussions with senior members of the Research Branch of the ministry, Mr. B. M. Hildebrand, Director of the Research Branch, commissioned the study on May 8, 1981. The first three paragraphs of his letter of that date are as follows:

The Minister of Education wishes to determine the use currently made in Ontario schools of different types of instructional resources. In order to be able to do this, it is important to develop a suitable methodology for the acquisition of this information.

In recent discussions between you (Lewis Miller) and members of ministry staff, we have agreed that you will undertake to develop this methodology in a pilot study involving six schools to be selected by ministry staff.

In each school you will undertake to interview the principal, the librarian, and/or audio-visual co-ordinator, at least three teachers representing different grade levels and at least six pupils to be selected in a manner to be determined. These interviews will follow a prepared questionnaire which will be approved by ministry staff and will seek to determine the current availability and use of a variety of instructional resources including texts, film, overhead projectors, television, microfiche, radio, photo-copiers, computers, record players and other similar resources.

A draft questionnaire was presented to senior research staff and reviewed during three meetings. A revised version was submitted and approved on May 18, 1981 (see Appendix E). This questionnaire was designed to serve as a guideline for the interview sessions, rather than as an instrument to be circulated separately to those who were to be interviewed.

Arrangements were then made for the visits to the six selected schools, chosen to represent a modest spectrum of interests. The schools, not in order of visitation, may be classified as follows:

K to 8, rural, English-language

K to 8, metropolitan, inner-city, English-language

K to 8, metropolitan, Francophone

K to 13, rural, English-language

Secondary, metropolitan, English-language

Secondary, metropolitan, Francophone

These schools were visited and interviews conducted between May 25 and June 11, 1981.

Introduction: Case Studies

These case studies are based on impressions recorded soon after visiting each of the six selected schools. I have acquired a large binder of specific data, and this information may be used in preparing the design for a more thorough study if this is required. It is intended that early in the summer I will meet with ministry staff members for a "de-briefing", at which time I will rely on the detailed notes, I have made.

The six schools were selected in co-operation with ministry staff to represent a spectrum of interests from Anglophone to Francophone, elementary to secondary, rural to city, and the traditional to the highly innovative. The sample is small, however, and the findings of these case studies may not be taken as if based on an extensive survey.

In undertaking the case studies, I conducted personal interviews of staff and students in each of the selected schools. The interviews followed the guideline questions as set out in my May 18, 1981 memorandum for ministry staff (see Appendix E).

It is not presumed that this pilot study represents a thorough report on current uses of instructional resources in Ontario schools; rather, it is hoped that the study will bring to light questions that may help the ministry in subsequent, more thorough research.

SCHOOL 1

The first school I visited was a rural school, serving Kindergarten to Grade 8. It used to be called a public school but during the past year it was renamed a community school, and it now also serves adults in the community. The school is located in a sparsely settled area of the province, and the majority of its students, numbering 415 in 1980, travel to school by bus. Most of the students are of the Protestant faith, mainly Lutheran, with a few Roman Catholics; according to the principal, there are no students of any other faith. All the students appear to be of Anglo-Saxon origin. There was a higher percentage of blue eyes and light complexions than one sees, for example, in most Toronto schools.

There are fifteen classes in the school, including two Special Education classes. There are nineteen teachers in all. The student-teacher ratio, according to board figures, is 22.5 to 1 for Kindergarten to Grade 5, and 22 to 1 for Grades 6 to 8. The average class size is approximately twenty-seven. In recent years, there has been a trend of declining enrolment, but this year, according to the principal, it has levelled off.

All the staff in the school appeared to favour a method of teaching that uses a wide variety of resources, from field trips to traditional textbooks. The teachers I interviewed, as well as the librarian, all seemed to want their students to undertake self-directed or independent research projects. There was also a trend among teachers to co-operate and share in the use of texts or workbooks and other resources. Textbooks, however, while still viewed generally as highly important, are simply one resource within this variety. In recent years there has been an increase in the use of audio-visual resources, and this increase has cut into the time and attention that might have been given to textbooks. The principal made a point of emphasizing that nowadays teachers shared resources much more than they had done in the past.

The sharing of resources not only reflects a generally more co-operative style of teaching, but also indicates the effects of budget constraints, in a time of increased inflation, faced by a school that has undergone some decline in enrolment. Budgets, the principal said, are caught in inflation, and the funds they receive seem to purchase a decreasing amount: for example, what used to be \$4.00 textbooks now cost \$8.00 and \$9.00, but the budget amount has not been doubled. The budget based upon per pupil average of daily enrolment has, of course, declined over the years as enrolment dropped from 580 students to its current total of just over 400.

Resources are shared not only between teachers of different classes but also within single classes. In the Grade 3 class, for example, I watched as pairs of students pushed their seat-desks together to share an arithmetic workbook. Each pair of students used stencil paper to trace the pages of the workbook, and no pencil or ink marks were written on the printed pages. Thus these books, which in earlier times might have been written off as consumables, can now be used for several years. In another class the teacher had two half-sets of textbooks so as to serve two general levels of ability among his students. The same teacher told me that he would sometimes prefer to order five different sets of six texts per set rather than one set of thirty texts.

The principal and teachers were aware of the Book Purchase Plan and well aware of Circular 14. The principal said, "I like the Book Purchase Plan; it gives us a real chance to view books before investing in a series." The principal also told me that publishers' textbooks and reference books were of a very high quality in format--that is, in the use of colour and the clarity of print--and generally well organized.

The ministry copyright policy is well known to the principal, teachers, and the librarian. According to the teachers, the principal has regularly made announcements concerning this policy. The therma-fax copier is well used, but generally, it appears, for a single copy

of an excerpt of a text or of a drawing or a map. The therma-fax copier, is used for multiple copies, I was told, only when texts give permission to copy. I was shown one text, a reader published in the U.S., with "permission to copy" boldly printed in the introduction.

The same teacher who showed me this text also told me that she would welcome more Canadian texts. Canadian materials, she said, are "sadly lacking" for some of her purposes. She had obtained, however, a couple of workbooks by the McDonald's hamburger chain. She purchased these books, she said, at the Royal Winter Fair and believes that they are very good. They are produced at highly subsidized prices--about \$1.00 a copy, she said--and she referred to these workbooks as "cheap material published in the United States." The workbooks have on their front cover the familiar M logo for McDonald's. At the bottom of each of the sheets inside is the inscription, "A public service of McDonald's Family Restaurants". Lest this teacher be misunderstood, I shall quote some of her statements: "I abhor all this American material," she said. She felt that the school can adapt well to the restricted budget but "we will go the way of the McDonald's books because of rising prices", and went on to say, "Canadian publishers should get on the ball and start competing and broadening their area." Money, she felt, is an answer to much of the problem. She also showed me a copy of a series called Adventure Trails with the subtitle Diagnostic Reading Workbook Series, published by the Merrill Publishing Division of Bell and Howell Publishing Company. Inside, the first story is called "Our National Bird", and, "of course", shows the eagle. The eighth story in this particular book is also American, and the title is "A Building to Honour Franklin". There is another story called "The Turkey is a National Bird". Yet, she felt, there is nothing to compare with this particular book in Canadian texts, both in terms of price and content.

Lest it be thought that this teacher and other teachers and the librarian were in any sense unpatriotic, I must point out that the principal and all staff members were strongly pro-Canadian. Another teacher said, for example, that "he would appreciate far more Canadian

content" in the printed literature available. He would especially like to see more Canadian fiction and Canadian materials generally coming into the school and made available in the library. He did say, however, that it was nice to see that Canadian materials were being based on the metric system.

While on the subject of the metric system, I might point out that I was sitting with the principal in the hallway of the school when field day was taking place outside. At that particular time he was supervising the interior of the school. We sat there and watched as the children came in with their ribbons and awards very proudly talking about what they had done and what they had not done, and I overheard one boy say to another, "Gosh, I almost beat him, he was ahead of me by less than a metre."

On the question of Canadian content, the librarian told me that she received many books--not texts, as in the prescribed Circular 14 list, but library books--that, she said, are alleged to be Canadian but very often are not. The editions may be listed as Canadian, but often, she felt, they contain too many U.S. references. She mentioned one reference text, for example, which is said to be completely Canadian but which overlooks many Canadian references in the Ontario section: "This had more pages on Buffalo than the rest of Canada." Any book publisher, she felt, with a parent company in the U.S. tends to have a significant amount of U.S. references.

The librarian told me that videotapes were widely used. JVO series, she said, have been used extensively, especially Readalong for Grades 1 and 2, and she is continually making out orders. Other TVO series that are used are Read All About It, All About You, Right On, and Math Patrol.

She did say, however, that she would like to see more Canadian stories in videotape programs, especially ones that were not English or British in pronunciation. She said that there were many series that they had received from TVO which were well done except for the English or British accent. "Our kids here find a lot of difficulty with the

English accent," she said. She pointed out that series such as "Ballet Shoes and Tom Grattan's War were very well done" but that the accents were so English or British that "the children were to some extent turned away from them."

In addition to the concern for more Canadian content in educational materials, and for more Canadian written and produced materials generally I also noticed a consciousness on the part of all staff against any bias in terms of, for example, race, colour, religion, or sex. While the librarian told me there were still books on the shelves that were full of stereotyping, there has definitely been a change for the better. She and the teachers seemed to be on the alert for any bias or stereotyping and they do try to avoid new books that fall prey to this. There are of course classics, I was told, such as Huckleberry Finn, that use certain words in a manner that is now to be frowned upon. Where this occurs the students are made aware of shifts in attitude that have occurred over the years.

The school does not have a microcomputer, although the Grade 8 students go for their shop classes to a school thirteen kilometres away that does have a microcomputer, and they have been made aware of this resource. Two of the Grade 8 students have in fact developed a keen interest in it and have had a brief introduction to its use. Other students, I was told, look forward to having hands-on experience.

The nearest resource the school has to the computer are two mathematics program-learning machines with the trade name "Little Professor", which the teacher who handles the split Grade 5-Grade 6 class has acquired through the school. This modest machine, about the size of a tape recorder and costing approximately \$50.00, has four levels of difficulty in its programming. The students love it, the teacher said, and rapidly advance at their own pace in the programs.

The modest library (now also being used by the adults in the community program of the school) is obviously well used as a resource, but according to the Grade 8 teacher as well as the librarian, is unable now to cope with the multi-media demands being made upon it.

The space will be enlarged in the coming year but, it was feared, there will probably not be an adequate budget to satisfy the demand for materials. The newspaper and periodicals section, for instance, has not been able to meet demand, and the teachers bring in their own copies to supplement the needs of their classes. The Grade 8 teacher told me that only seven of the homes from which her twenty-three students came, received a daily newspaper.

The general impression I gained during the two days I spent in this attractive rural school, in observing the students in and out of the classrooms, at work and at play, as well as in the interviews I had with students and teachers, is that this is a highly motivated, active, bright, and happy school. There is obviously a lot of caring on the part of staff for their students; and it works. Approximately 80 per cent of the Grade 8 graduating students go to levels 4 and 5 in secondary schools. This is despite the fact that, as one teacher told me, many of the children come from broken homes and single-parent families. This teacher is in charge of the social adjustment program and has ten periods per week ranging from Kindergarten to Grade 8. She referred to the environment from which the children come as the "welfare circuit". She told me that all the teachers were aware of the need to spot social and learning problems very quickly, and that there was a good deal of co-operation in this endeavour.

I was gratified to be told by the principal, at the end of my two days' session, that the teachers and staff I interviewed had told him that they thought they had participated in a worthwhile activity. I was also told that my questioning had helped them gain a clearer picture of their school and its activities--an interesting by-product of my visit.

SCHOOL 2

This is an impressionistic report on the second of the schools I visited, a secondary school located in a metropolitan area. This school is generally recognized as being one of a select few schools in the province that serve primarily as routes to university education. Currently it has an enrolment of approximately 1200 students and this enrolment is likely to remain steady. There has been a modest decline in the number of students from the township in which the school is located, but this decline has been offset by an increased intake of students from outside the district who seek to enrol in the school because of its high academic standards and because of the success it has enjoyed in placing its graduates in universities. Well over 80 per cent of its graduates go on to university. At present, somewhat over 30 per cent of its enrolment is from outside the district. There are high academic expectations, one of the two vice-principals told me. The students are highly motivated and the school enjoys very active, positive parental support. One teacher told me that the teaching in the school is generally directed towards turning out students who will gain entrance to university and will move easily into the university environment. It is this goal that primarily conditions the approach to teaching. It is perhaps not surprising then that teachers openly acknowledge that the school might be termed "traditional" or even "conservative" in its academic approach.

As part of this traditional approach, there is a heavy emphasis on print material. Textbooks are considered essential, generally, by both teachers and students, especially for sciences and mathematics. In some subjects, however, such as geography, physical education, and creative writing, textbooks are deemed to be either inappropriate or, when available, inadequate. Many teachers make up their own courses with mimeographed or copied course outlines and assignments. The head of one of the departments told me that although he did not himself use a text for one of his courses, he wished he could find an appropriate one both as a support for his teaching and as a guide for his students.

He also told me that, as a department head, he preferred to have members of his department using textbooks. After all, he said, some teachers are not as able as others, and the text provides support and a structure for some teachers to follow.

Circular 14 and the Book Purchase Plan are well known and used, and there is a general concern to follow curriculum guidelines. Textbooks are, in general, a valued commodity. When I was in the school, I heard in-house announcements for return of school-owned texts at the end of term before students were to leave for the summer. While students may use a pencil lightly (it is recommended to sideline or underline passages in the text), they are asked to erase such markings before the texts are returned. While most of the texts in the Circular 14 list are reasonably durable, some are not. One text, I was told, "fell apart quickly", and in view of its cost this was much resented.

In view of the academic approach of this school, with its heavy emphasis on print, it was not surprising that the escalating costs of textbooks and library books were a matter of concern to all the staff members I interviewed. It was not suggested that such escalating costs were confined only to books but rather that such rising costs were more readily apparent where books were concerned because of the school's print orientation. The librarian and the audio-visual co-ordinator both told me, for example, that the cost of filmstrips had increased enormously, probably because of the silver oxide content in the film. The librarian thought that the cost of filmstrips had risen significantly higher than the cost of books.

In general, however, there appears to be some relative decline in the purchase of books, and there appear to be at least three related reasons for this. First, and this too is in line with the university orientation of the school, teachers are encouraging their students to undertake more independent research. This necessarily entails their searching for a wider variety of resources and materials. A single text, while to some extent appropriate for some subjects, is simply not appropriate and not encouraged for most subjects. Secondly, teachers

are increasingly making up their own course outlines and are collating photocopies and mimeographed materials for their own particular courses. Thirdly, a considerable amount of photocopying and mimeographing takes place.

The photocopy machine, when first introduced about seven years ago, was fairly tightly controlled. Teachers had to sign for its use. For about the last four years, however, there has been "open access" to the machine, the only proviso being that teachers must indicate how many copies they have made, with the costs being charged back to the appropriate department. Students, too, have reasonably open access, although they pay the school 10¢ for each sheet they run off. Teachers are made aware of ministry directives concerning copyright, and this awareness is reflected in their use of the photocopy machine. One teacher told me, for example, that his own policy was not to copy anything that would limit sales of a text or book.

One of the staff members told me he suspected there might be some infringement of copyright. This, however, would be impossible to "police". Most copying, he thought, was of materials from newspapers and magazines, and in most cases, he said, from sheets that teachers had typed out themselves for test purposes and assignments. Nevertheless, the librarian did say she believed that book purchases had declined relatively during the past several years both because of the escalating cost of books and because teachers were selectively copying from texts they had procured.

There is relatively little use made of the audio-visual material in this school. There are three black-and-white television sets and three colour sets. Over a third of the classrooms are wired for cable, but, according to the teaching aids technician, the sets are not often used. Film and filmstrips are more often used, but here, too, their use is relatively low. The teaching aids technician, who has his office or centre in this school, believed that more use would be made of the equipment if the school had one or more BETAMAX playback machines and if he were able to come to the school more often. This

school is one of seven schools served by the technician; thus, he is able to give only one day per week to this school and only three and one-half hours per week to each of the other schools.

A modest beginning has been made in the use of new equipment. It is estimated that almost every student owns a hand-held calculator. The school has a microcomputer--a PET model. Thirdly, the school is linked by terminal to the main-frame computer at the central board of education office. For the past couple of years, the school has offered a computer science program for students from Grade 11 and up. This program tends to be somewhat elitist, however, since students must have a 75 per cent average to gain admission. One Grade 12 student told me that "this is one of the better courses taught here". The teachers are very good, he said, and they encourage an open, relaxed, and self-directed method, with students using their own time to meet objectives. He told me that he had free access to the main-line terminal and he said, "I used the main terminal almost every day." He looks forward, similarly, to access to the microcomputer. This same student, by the way, told me he very much liked to have a textbook for these courses. He did not like to have to take notes or to work from notes. Thus he was "glad to have a text".

SCHOOL 3

The third school I visited was an inner-city Junior-Senior public school in Metropolitan Toronto. It is in the heart of an area with a population comprising many racial, cultural, and religious groups. On entering the school, perhaps the first notice to catch one's eye is a "No Smoking" sign printed in nine different languages. One of the teachers told me that this was not nearly sufficiently multilingual, for at the last count there were children from homes in which a total of over thirty different languages and dialects were spoken. When notices go out to parents, however, the school limits these to English and five other languages.

Another early impression, which was reinforced during my two-day visit, was that this is a bright, active, and happy school. Without being aggressive, the children to whom I talked were forward in asking the purpose of my study and were very quick to volunteer to be interviewed. The principal and teachers agreed that the children were very highly motivated and were in fact willing and ready workers. A high percentage of students go on to levels 4 and 5 in secondary school--two different teachers gave me figures of 82 and 92 per cent respectively, so, the true figure is probably somewhere in between.

This school of approximately 500 students has been experiencing a trend of declining enrolment in the past several years, although the principal expected that there would be some levelling off of this trend in the future. This decline has affected the school's activities in several ways. First, and this has a general effect on everything in the school, the funding has also been declining. As the principal pointed out, however, there has not been a corresponding decline in the services provided to the same spectrum of students for the same number of hours. Indeed, such so-called fixed costs have continued to rise.

With the decline in funding there have, of course, been constraints on spending. For example, the library budget for instructional materials in 1980 was \$5252, but in 1981 this was reduced to \$3860, a cut of approximately 27 per cent, without considering inflation. In that time, the costs of library materials have went up considerably.

Another significant effect of declining enrolment is that some teaching positions have been cut. Further cuts may be made and for all to see on the bulletin board in the staff room there is a computerized list of all the teachers in the school with their seniority ratings. The fewer, remaining teachers, however, have to continue to serve the same K-Grade 8 spectrum and its accompanying curriculum guidelines. Thus, some teachers have had to expand their duties to accommodate some of the areas that had been served by their departed colleagues. Some non-musicians, for example, now have to teach music classes and teachers of other subjects such as social studies have had to extend the boundaries of their subjects to include areas that are felt to be necessary within the curriculum guidelines. The decline in enrolment has not only led to insecurity on the part of the junior teachers, but has also complicated the problems of maintaining some continuity in the school's curriculum. One suggestion made to me was that some procedure be worked out that would permit any teacher to remain in his or her position for at least three years before being "bumped". This would not only permit continuity in the school's teaching curriculum but would also allow junior teachers who feel threatened more time in which to search for another job.

With respect to curriculum guidelines, the feeling was expressed that schools are not given enough time or money to implement new guidelines. It was felt that guideline committees and policy makers cannot be sufficiently appreciative of the time and resources required for implementation. For every new guideline, it was suggested, there should be additional moneys allotted to schools, and target dates allowing for reasonable implementation.

The cost of texts and library books is worrisome to the staff. The librarian showed me her budget for last year as compared with this year, and the average cost of hard-cover books has gone up from \$6.00 to \$7.60, while paperbacks have gone up from \$2.00 to \$2.50. As she reported, the library gets less and books cost more. Now, she says, she tends to be in a position to replace lost and damaged books but is unable to purchase any new ones.

Circular 14 and the Book Purchase Plan are very much appreciated. The school tends "to order everything that is new".

There was satisfaction also with the ministry's effort to achieve and maintain stronger Canadian emphasis in texts. The principal suggested, however, that the ministry should establish something like a Circular 14 for all non-print material--that is, to set up evaluation procedures to assess and recommend audio-visual materials, videotapes, filmstrips, computer programs, etc. There is a great deal of material that is just simply not adequate, he said, and the teachers can waste a great deal of time searching out suitable material. At least, he felt, there could be guidelines that help the teacher evaluate materials. One of the biggest problems a teacher faces is to find the time to keep up-to-date on new ideas and material.

The staff is well aware of the ministry's directive on copyright, and there appears to be centralized control of the photocopier and ditto machine for copying purposes. While there is relatively open access to the photocopies the machine is in the secretary's office and teachers are asked to sign a requisition that has to be approved by the principal.

The principal and the librarian felt that the half-dozen portable TV sets were not often used, although the audio-visual technician, who serves six schools and happened to be present that day, said that sets were in use almost every day. I did see one set in use when I sat with a Grade 1 class, and the teacher had one of the students turn on the set. The program happened to be "Sesame Street", and the teacher told me that this was a regular daily occurrence, with awards of jelly beans to students who were most attentive and best able to respond to her questions afterwards.

There was considerable interest in the advent of the microcomputer. The principal had developed a keen interest in microcomputers. Along with two other staff members, he attended the Conference of the Educational Computer Organization of Ontario held this spring at OISE. In the past fall his school, along with three other schools, took part in a project to acquire six PET microcomputers for the four schools. One of the projects in this Year of the Disabled is to open up a learning centre for the disabled, so that handicapped people will be able to have the experience of using microcomputers. In addition, the principal sent two teachers to George Brown Community College to take the BASIC Computer Programming Course, and the school now has about twenty students at the Grades 7 to 8 level who have had experience with BASIC. If all goes well, he said, they will have three more PET computers and a printer this fall. He and his vice-principal intend to take a course this summer at George Brown, and soon at least five of his staff of twenty-eight teachers will be qualified to use the microcomputer. By 1990, he said, "the teacher who cannot program will be an exception".

The matter of computer programming, he said, is worrisome and should be of concern to the ministry. The difficulty, he said, is that currently most if not all programming is made in the United States and, as he expressed it pungently, "I do not want programs that are made in the U.S."

If I might add an incidental note here, I believe it is in the interests of the ministry to move fast in considering setting up specifications and guidelines for the manufacture and purchase of microcomputers. Currently, there are several models available with programming that is not compatible, all competing very actively for the rapidly escalating microcomputer market.

There is much more that could be said about this exciting school from its lessons in Cantonese for Kindergarten-aged children to its classes for senior citizens learning English as a second language; and I was pleased to sit with a group of almost twenty students of all ages during their lunch break as they played "The Sound of Music" and "Eidelweiss" for me on their recorders.

SCHOOL 4

The fourth school I visited was a rural school located in beautiful lake country in a sparsely populated area whose main industry is tourism. In winter months snowmobiling is apparently the major out-of-doors activity. Many of the families, I was told, are very poor, with some homes not having either hydro or running water. Most do not receive a daily newspaper.

The school appears somewhat incongruous in its remote location. It is spacious and architecturally attractive. It opened in 1971, amalgamating the enrolments of several smaller schools in the district which were closed down. With classes from Kindergarten to Grade 13 plus a Trainable Mentally Retarded class, the school's enrolment is approximately 480. The Kindergarten and elementary enrolment, with 10 classes, is approximately 290, while the Grades 9 to 13 enrolment, served by 78 different classes with 91 options, comprises 190 students. It is of interest that 65 per cent of the secondary enrolment is female, although there is no apparent reason for this. The school has the equivalent of 29½ teachers, including the teacher for the Trainable Mentally Retarded.

While the school has been experiencing some decline in enrolment in recent years, this decline is expected to be somewhat more than offset in the coming year by the advent of a program for adults. The school is eagerly looking forward to this adult program. Seven courses are being offered, including an introduction to the computer, family law, an introduction to typing, small business management, and business investment. The planners for this venture had dared to hope that the enrolment would be approximately thirty adults. Currently, however, the prospective registration is about 100, with 30 wishing to take the computer course.

Approximately 94 per cent of the K-Grade 13 students are brought to school in a fleet of thirteen buses, several of which connect with smaller feeder buses at remote locations from the school. One student told me that he travelled about fifty-six kilometres from his home, arising every morning at 6:30.

The interior of the school is spacious and bright. Its two-level library located near the main entrance is attractively laid out and very busy. Its two floors--the upper floor for the younger children--are connected not simply by a stairway but also by an automated lift device for students confined to wheelchairs. There is one such student currently in attendance at the school.

The classroom for the Trainable Mentally Retarded class is similarly bright and cheery. The easy and loving rapport between the teacher and her students is immediately apparent and the teacher's progress has been evident. One autistic teenager, who was staining a picnic table that had been made at the school, had been brought along from a near silent manner to one of trying hard to communicate even with me, a total stranger.

The shop room was spacious and seemed well supplied with work materials. The music room was well equipped with instruments for the school's concert band. This band, by the way, had played in a school near Florida's Disneyland last year as part of a planned exchange program. The money from the trip, approximately \$7000, was raised completely by teachers, students, and parents through auction sales and other entrepreneurial activities.

In addition to the preceding rooms there is also an art room, a family studies room, two science laboratories, and a cafeteria. With the public library immediately across the road, the school is reasonably well supplied with reading materials.

On the first day of my visit I noticed students reading with obvious pleasure the school's yearbook for 1981. It is a professionally printed, attractive publication, one that would rival university yearbooks I have seen.

Teachers are well aware of the ministry's directive concerning copyright. There is open access to copying machines, with teachers recording the number of copies they have made and their departments being charged at the rate of 10¢ per copy. The charge is 25¢ per sheet for copies of any material for personal non-school use. With this open access approach, the vice-principal said, it is impossible to say what exactly is being photocopied, but his impression is that much of the material is for course outlines, assignments, and tests. Occasionally single sheets for maps, drawings, and poems will be copied, but, as one teacher told me, such copying is not from textbooks, which in any case are available to the students; and when it is done, it saves a tremendous amount of valuable teaching and preparation time. Without such copies the teacher would have to type out the material or try to draft maps and designs and then take in the sheets for copying. If copying were too rigidly enforced, I was told, the teacher would not have time to prepare such material, and the students would consequently not be as well served as they are at present.

Circular 14 seems to be very much appreciated, as is the Book Purchase Plan. The librarian ensures that the relevant teacher is made aware of new prescribed texts and that orders are appropriately completed. All Circular 14 books in the library have a specially designed colour strip on their spines to make them stand out.

In this school, as in the previous three I visited, I heard that funding had not kept pace with the escalating cost of paper: costs of textbooks, library books, workbooks, and paper for art classes had risen significantly. One teacher pointed out also that the cost of arts supplies in general had escalated enormously, not only for paper but also for paint, copper, glazing, and any supplies related to the oil industry. Costs had risen significantly for all photographic supplies in particular, because of the silver content in the film. These costs, I was told, have also outpaced general inflation. Partly because of funding constraints there has been some relative decline in the purchase of books in recent years.

Another factor in the decline in book purchasing, however, is that, as one teacher told me, teachers are being more eclectic and are encouraging their students to undertake more independent research; and students are generally more "innovative in their use of materials". Thus, teachers and students now seem not to rely quite so much on one text as they might have done ten years ago. Teachers are making up their own course outlines, study guides, and workbooks, and have been using the copying machines more and more in recent years.

Although most of the secondary students own hand-held calculators, the school library has its own set of six calculators, which are regularly borrowed by the students.

The school has a full-time audio-visual technician and is reasonably well supplied with equipment and resources. These include eighteen portable audio-cassette tape recorders, six reel-to-reel tape recorders, twenty-three record-players, five 16 mm film projectors, ten television sets, three videotape recorders, one videotape playback machine, two black-and-white video cameras, and one 35 mm Pentax camera.

The school is not hooked up to cable, however, and the off-air signals from CBC, CTV, and Global transmitters are not satisfactory for quality viewing. The audio-visual technician and one of the teachers complained that they were not able to receive TVOntario off-air and thus had to rely on TVO's VIPs tape distribution system.

There are several drawbacks to the TVO system, I was told. First, the descriptions of programs in the TVO VIPs catalogues are not sufficiently clear for judgements to be made on a prospective purchase. The National Film Board catalogues, by contrast, are said to be more adequate for teachers. Secondly, the school's budget does not permit the purchase of a number of TVO programs that they would like to order, in addition to NFB materials. The copyright expiry dates of the TVO programs, I was told, do not make them as much of a bargain as National Film Board materials, which now may be purchased relatively cheaply on videotape, and which may be played back in perpetuity without the

copyright's running out. "We can keep NFB programs forever," the technician told me. Thirdly, films may be borrowed from the board of education central office so that the school does not have to pay for its materials. Of the 223 videotapes on the shelves of the audiovisual office, only 79 were purchased from the OECA.

Undoubtedly, the greatest surprise in this school is to see the computer room in which there are currently nine microcomputers, all bearing the Apple II (PLUS) label. The planning committee for this project had carefully evaluated a number of the familiar trade name models of microcomputers and opted for the Apple II mainly because of its flexibility as compared with the others. This is an active room. On the occasions of my visits to the room there were students working on all of the machines. These students ranged in abilities from very bright Grade 13's to Special Education students.

One of the delights of one of my visits to the computer room was to sit with a Grade 4 student who had inadvertently selected a Grade 6-level mathematics program featuring the subject of the least common denominator. While he struggled with this subject, with which he had had no prior familiarity, he began to come to grips with it and achieve some success.

There is no elitism in the availability of the microcomputers to classes. Everyone seemed to have open access to them, and there was keen excitement on the part of the students and a number of the teachers whom I interviewed. The teacher in charge of the program told me that it was a delight to watch the elementary students and some from the Trainable Mentally Retarded classes when they first experienced "micros". There were no problems, he said. The students simply proceeded to use the machines without hesitation or fear.

The school will be moving the microcomputers into a more adequate room for the coming year, at which time it is expected that two of the machines will be set up on portable dollies so they can be moved into any room. It is hoped also that the school will receive five more Apple II machines. Currently, there is a student assistant to help the

teacher; and as part of the Experience '81 program the school has hired five students for the summer to be assigned to the computer room. While six teachers have been involved with the microcomputer program since it began in November 1980, it is expected that this number will increase significantly in the coming year as teachers gain sufficient experience to become active users.

At this school, as in the third school I visited, I was told that a set of guidelines similar to Circular 14 would be most appreciated for computer programming. "There is so much bad programming available," I was told, and "One of the fastest ways to kill computers in the schools is to have bad programs." In addition, the hope was expressed that the ministry would announce guidelines or specifications for the manufacture of hardware for the schools. "The Apple II is United States-made and while good," I was told, "it is not Canadian."

There is much more that could be said of this exciting school.

SCHOOL 5

The fifth school I visited was a Francophone school catering to grade levels from pre-Kindergarten to Grade 8. Its enrolment has been declining, though there was a very slight increase in 1981 over 1980. Its 1980 enrolment was 323; eight years ago it was 470.

It is located in a metropolitan district that is predominantly populated by apartment dwellers, most of whom live in low rental units. This kind of environment, the principal told me, creates many special kinds of problems for the school. He told me that approximately two-thirds of his pupils came from problem families, many of them being single-parent families on welfare. There are many social problems, he said, and with current decreased staffing, with no assistant, no counsellor, and a nurse who comes to the school only a half-day per week, the principal has to spend a great deal of his time tending to the needs of troubled children. A psychologist comes to the school a half-day every two weeks to test slow learners and those with learning disabilities; but this did not look after the ongoing problems of many of the pupils.

The principal was hopeful, however; he saw some slight signs that the district was beginning to "move upward". He thought that the school might be considered for inner-city status with a special grant to cater to its special needs. From his experience as a teacher and principal he felt that the resources to accommodate the needs of emotionally disturbed children were deficient. He suggested that the ministry might study the problems of learning resources for such children to accommodate generally two types: those, on the one hand, who were the more aggressive and hyperactive, and on the other hand those who were silent, quiet, non-aggressive, who were not the "nuisance type", but who often had far greater needs for special attention. There are fourteen teachers on staff, including a resource teacher. The principal does not himself teach a class. The student-teacher ratio is 27 to 1.

The school has a bright and spacious library with ten carrels for individual study. The librarian, however, serves a total of three schools and spends only two days per week here. In earlier years, before declining enrolment led to reductions in staff, this school had been served by a full-time librarian. Now, the librarian told me, she still has to try to provide full-time service to her three schools in her considerably reduced time at each school. During my visit to the library, the librarian was conducting a class for Grade 6. Two parents were in attendance, having been invited to see their children receive special awards. There is a room adjoining the school's library that is occasionally used as a viewing room. The students are encouraged to make use of the nearby public library and many of them have membership cards in the public library. The principal told me that many of them use the public library for study since their homes are not conducive to study.

Currently there are no microcomputers or computer terminal in the school, but there was considerable interest and anticipation in computers since, during the summer, the school expects to be equipped with six Apple II microcomputers. In preparation for their coming, the principal and six of his teachers will be taking a course at Ottawa University in July to study the BASIC computer programming in language. There is a planning committee for the computer project and its membership comprises all levels, including four students. The details of the handling of the computer project have not yet been completely worked out, but it is of interest that the principal wishes access for all levels, including the slow-learner class.

The school is equipped with a dry photocopier as well as a thermal fax machine and one Gestetner. It is obvious that the principal has imbued his staff with the message that they are to be sparing and cost-conscious in their use of the copying machines. Teachers have generally had open access to these machines. However, there is also an awareness among teachers and the librarian of the ministry's copyright directives, and it would appear that these are being closely followed. There is some copying of single pages--for example, of a poem, or a drawing, or of the catechism--but such copying, I was told by the

principal and teachers, is almost always from the workbooks published by the school board with the understanding that such books may be copied. It would seem wasteful, I was told, to order thirty books of this kind when thirty copies may be so easily made.

There was general satisfaction with the print material supplied by the board. "Our school board," one Grade 5 teacher told me, "has supplied us with a lot to rely on."

A room in the school is currently being used by a board audio-visual technician for the storage and simple repair of some audio-visual equipment. The technician serves many board schools, however, and his office may not be designated as an audio-visual centre for this particular school. There is no facility, for example, to play back videotapes in the school, and any reception of TV programming is done directly off-air. While there are conduits for cable throughout the school, the school is not yet equipped for cable reception, and any programs viewed by classes is via off-air reception. The classes on the lower floor where the younger children are in attendance are equipped with TV sets. There are six black-and-white sets and one colour, and these are used just about every day, I was told, by the Kindergarten to Grade 2 classes. Apart from some reception of news and current events, such as the opening of parliament, most of the viewing, it appears, is of TVO French-language programming, especially of the series "Passe Partout". There were no TV sets on the second floor, however, and little call for programming from Grades 4 to 8.

In this school there was ample reinforcement of the point made by one of the librarians in an Anglophone school I had visited earlier: that is, that French-language books cost considerably more than English-language books. While I gather that the special grant for French-language schools is expected to cover such additional costs, there was a strong feeling that this grant was not adequate. The librarian pointed out to me two sets of similar books, one set in English and the other in French: the French books cost approximately 27 per cent more.

A further problem faced by this school in its search for French-language materials is that the supply of French-language books, especially of materials suitable for Ontario, is not nearly as ample as that of English-language materials. There is a much bigger choice, I was told, of English books than of French; and, further, many of the French-language books are published in Montreal and some in Paris. I was given several instances of the need for Franco-Ontarian materials. One teacher said, "Our program in Ontario doesn't coincide with the program in Quebec." When using an exercise book published in Montreal, the teacher has to make a careful selection of excerpts from it. A book published in Montreal for Grade 5 students is "not what we are teaching". The concern for Franco-Ontarian materials is reinforced by the fact that most of the radio and television programming heard and seen by children in this area originates in Quebec. One teacher expressed this concern as follows: "Most of our children think that our premier is René Lévesque. They don't know Bill Davis."

Although I did not hear much about the currency or datedness of materials from teachers, I did have strong reactions from one of the Grade 8 students. He said that the science book prescribed for his class was published in 1959. In the astronomy section, he said, "I know more than the text does"; but he said they were asked nevertheless to "go along with the book". Both he and another Grade 8 student were critical also of the fact that so much of their material "seems to come from Paris, Brussels, or Montreal".

Costs of all materials have been rising with inflation, but, the principal said, the costs of print materials have been outpacing inflation. In 1979-80, he said, his budgeted cost for print materials had gone up by approximately 10 per cent, but in 1980-81 the same quantity of material had cost 20 per cent more. The increase in cost of consumable workbooks has been almost double the increase for textbooks.

Circular 14 and the Book Purchase Plan are well known to the principal. He controls the handling of orders and personally goes through Circular 14 to make selections he believes are appropriate for

his teachers. He is very cost-conscious in his use of the plan and orders only from the new texts prescribed, and then only if he believes that the texts are appropriate to his classes. He uses the plan "for getting samples" of texts "to look at first" and then, if they are suitable, to place an order. He was somewhat critical, however, of responses to his orders: "They never send all of them checked off. We got only three in the last batch, but I had checked off ten to twelve. Usually we receive only about a quarter of the books checked, and this is being very generous." Nevertheless, he said, orders for texts and workbooks are much more efficiently handled now that orders go through the superintendent's office rather than the board. During the past two years the system has been decentralized and is now more efficient.

The school will be receiving microcomputers this summer, and a number of teachers are eagerly awaiting them. However, there is a modest apprehension on the part of some of the primary teachers. One such teacher told me, for example, that she would not allow her children to use calculators in the classroom since it was important that they learn the basics of arithmetic through memorizing the tables first. One of the teachers of the Grade 5 class was not so opposed to the use of the calculator. She said that such use would help to teach the principles of mathematics; but she does not permit its use for test purposes in her class since most of her pupils do not have access to calculators, and she said it would not be fair to allow the use to only a favoured few. She herself is eagerly looking forward to the advent of the microcomputers. There is a similar eagerness on the part of many students. Many of the older students have had some experience in using a computer at the Museum of Science and Technology. They are looking forward to the summer when nine students from the University of Ottawa will be coming to the school to work on the development of computer programming so that some software will be ready in September when the microcomputers are placed in the classrooms. During the month of July, the principal told me, there is an open invitation to all students from all grade levels "to come in and play with the machines".

SCHOOL 6

This is a Francophone secondary school, located within 400 metres from the school on which I have just reported. Its environment, then, is the same as that for the fifth school. Serving Grades 9 to 13, including a Special Education class, this school has been extremely affected by declining enrolment. Ten years ago its enrolment numbered 1600 students. During the past year this has dropped to 923; and in the coming year it is expected that there will be a further drop to about 800. This trend is not expected to level off until about 1985, at which time the three secondary schools in this district are expected to have a total enrolment of approximately 1600 to 1700 students. In view of this trend, there has been some thought of amalgamating the three schools. With the decline in enrolment and consequent cutback in funding, there has been a decline in teaching staff. During the past year the total teaching staff had been the equivalent of ~~58~~ 1/6. In the forthcoming year there will be a further reduction of the equivalent of 3 5/6 teachers. In the six Francophone secondary schools of this metropolitan board there will be fifty-nine redundant teachers.

A problem faced by the principal in this environment is that teachers are so insecure, especially junior teachers, that sixteen of his current staff will be leaving for a variety of reasons; and in coping with logistical problems the school will receive seventeen part-time teachers, eleven of whom will be serving two different schools. This kind of decline of course has further implications. Three years ago the total cost per student at this school was approximately \$3000; now the cost is approximately \$4000 per student. But with fewer students the budget has also been falling behind relative both to inflation and to the decline in enrolment. Next year with 100 fewer students the school's budget will be approximately the same in absolute dollars as it was in the past year; yet, the so-called basic services of the school remain constant while costing more. Thus the price per student keeps escalating at an alarming rate.

Of the total "supplies" budget of \$69 545.00 approximately \$16 000.00 is spent on texts and teaching materials, of which \$5000.00 is received through the board, authorized by the French Language Advisory Committee. The amount of \$15 800 is spent on library materials, of which \$8000 is received through the board authorized by the French Language Advisory Committee. Approximately \$7000 is budgeted for videotapes, while \$1600 is spent on films, reel-to-reel tapes, transparencies, etc.

Currently the school has two PET microcomputers. In the coming year, however, the school has budgeted for six more PETs while the ministry has authorized a special budget for additional machines. It is expected that the school will have about fifteen PET machines with printers and two disk drives, plus an Apple II microcomputer with printer and drive. The school also plans to change its computer programming from BASIC to Structured BASIC. There will be a need for thirty chips, fifteen of these for Structured BASIC and fifteen for French BASIC. For its commercial program the school expects to acquire two keyboards at \$4000 each, plus printers, for a total of approximately \$11 000. The school also will probably acquire six electronic typewriters, and plans are for Grade 12 students to be the so-called "guinea pigs".

In the use of copying machines, the principal exercises control. The principal holds a centralized budget of approximately \$8000 to \$10 000, and all teachers through their department heads have to make requisitions for the paper and the use of the machines. "There's less waste this way," the principal said. As much as possible, orders for paper supplies and materials are placed through the board which then deducts the cost of orders from the school's budget. Since the board orders materials in large quantities and thus obtains discounts, the school saves money by ordering in this way.

The principal and his teachers are very conscious of copyright restrictions. While there are centralized controls on copying machines, there is relatively open access to teachers. Their judgements are respected. They would not feel guilty, I was told, about copying a small excerpt from a book; but the school's policy is very much against copying "extensively".

Again I heard from all members of staff that the escalating costs of books and print materials have been inhibiting. "We are spending about the same amount relatively, but we are getting less."

The principal and department heads are well aware of Circular 14 and of the Book Purchase Plan. When the Circular 14 sheets are received, the principal goes through the list selecting what is appropriate for the school. The list is then passed on to the department heads, and then the orders are placed.

The librarian told me that relatively much more of her budget is now being spent on periodicals. This part of the library's budget has doubled in the past three years. There are "so many new things" to keep up with in education, and "books are not coming out fast enough to keep up with the changes". This is especially the case, she said, in mathematics, business, current events, and things that pertain to law and psychology. With these rapid changes and the need for new and varied materials, she said, there has been a change in the work practices of the students. "They are now using a wider variety of resources." To accommodate these demands, library practices and procedures have changed. Now the school library receives at least fifty newspapers and magazines per day, including The Globe and Mail, Le Devoir, The Financial Post, and Financial Times. At least five of the top Grade 11 students, she said, are investing and are making money.

In this school, as in the previous Francophone school, I again learned about the considerable disparity between the costs of French-language and English-language books. The librarian told me that 50 French books would cost as much as 100 English books. This she said, is "very, very, painful". The cost of all books has been escalating rapidly, she said, and the school is buying fewer books today. She told me that she was now ordering only about half of what she ordered three years ago. She mentioned as an example a Readers Digest book that would have cost approximately \$10 three years ago, now it costs \$27.

The librarian also confirmed the control exercised by the school on photocopying. Although students may place orders for copying, they are not permitted direct access to the machines and must receive authorization from a teacher. Even then, however, the librarian physically undertakes the copying, and the student pays for this at the rate of 10¢ per copy or 25¢ for three copies. When the photocopier is used, the librarian said, about "99% of the time" it is only for a single copy. When a teacher wants multiple copies, he or she must place a requisition, and then the ditto machine or gestefax is used.

The librarian also was critical of the fact that it is very difficult to obtain Canadian, especially Ontarian, French-language books. She has had to order encyclopedias, she said, with hardly anything on Canada. European French-language books are in greatest supply, with Quebec-published texts next; and while she would prefer to have texts published in Ontario, she often has to order texts published in Montreal.

One of the teachers, who teaches history and economics for Grades 10 and 12, reinforced the views of the librarian. While there has been some progress made by publishers in the past four or five years, the problem yet remains that he is unable to receive what he would like in French-language texts, especially texts suitable for Ontario. This teacher expressed the view that Canadian publishers are sometimes too ambitious in that they publish a large comprehensive text with a number of sections that are relevant to his purposes but with many other sections that are not. He would welcome the publication of small texts, devoted to specific topics, from which he could make a selection. Since he, too, is always seeking new materials from a variety of sources, he makes a lot of use of the press. For example, every week he receives for his economics class thirty copies of the Saturday edition of Le Devoir.

This teacher makes regular use of the copying machines, but usually, he said, to copy maps or excerpts of articles from the press. When he does this, he submits a requisition to the principal's office through the school secretary two or three days in advance.

This teacher was well aware of Circular 14, but, he said, it is not adequate for French texts. There are, for example, relatively few French-language texts in history compared with those available in English, and many of the French-language texts are translations of English texts and sometimes "these are in bad French". He went on to say that there is a need for a more centralized system for co-ordinating materials for Franco-Ontarians. There is a need, he said, to move faster in supplying materials. "This week we received guidelines for economics---two years late." It is very hard to do any program only in French, he said. As much as possible, he went on to say, he tries to undertake programs only in French, but "this is very difficult".

The problem is especially acute for film materials. Film supplies are ordered through the school board, but they "are not responding to the present. English-language needs are better supplied." He would welcome more videotape materials for his subject at his level. He has not made use of TVO materials, although he has received their catalogue.

Another teacher of history and geography said that recently she has ordered fewer audio-visual materials and more text materials. There is always a problem, however, in that the history curriculum has changed so many times over the past few years. This teacher, by the way, is eagerly looking forward to the advent of the additional microcomputers. In fact, she has ordered a PET 32K microcomputer for her home use, her interest motivated by the fact that her son in Grade 11 has been taking a computer science course in his school. She herself will probably enrol in the University of Waterloo correspondence course on the computer.

Another of the teachers, who teaches the human values course for Grades 9 and 12, confirmed all of the concerns I have heard about the need for texts for Franco-Ontarian students. She and another teacher later suggested that the ministry might consider the suggestion, especially in this time when some good younger teachers are being "bumped", of having teams of experienced teachers given sabbatical

leaves to undertake the writing of Franco-Ontarian texts. Later in the day, the second day of my visit, the principal told me that this kind of suggestion has been discussed in meetings with his teachers.

Three of the students I met were more critical than the teachers of the English-language books that were often prescribed. Texts for English grammar, one student said, tended to be published initially in the United States, with stories on George Washington, Independence Day, Yellowstone National Park, and "our national bird, the eagle". They were critical, too, of the audio-visual equipment in the school, saying some of it had been purchased ten years ago, and that it was often in need of repair. These students are eagerly looking forward, however, to the installation of more microcomputers in the school.

INTERIM REPORT

(July 20, 1981)

This report, as requested, is an addendum to my presentation of the six case studies on July 10, 1981.

As I have indicated, I would not wish it to be assumed that the case studies may serve as a sufficient research base for definitive general conclusions. The case studies, transcribed from notes made during my visits to the six selected schools, should be taken as no more than that---that is, as case studies of six selected schools.

The interviews undertaken during the visits did, however, bring to light a number of questions that merit more thorough study. In that sense, then, the studies do serve towards fulfilling the objective of defining the methodology for any subsequent research project on uses of instructional resources in Ontario schools.

Some generalizations may be made on the basis of the visits to these schools, however, and, with the caveat that these may be qualified by a more extensive sampling, I will set down a number of impressions that I formed.

1. The questionnaire that served as a guideline for the interviews stood up reasonably well. (I appreciate the constructive criticism by MOE staff of the initial draft of this questionnaire.)

As I mentioned during our meeting of July 10, there are amendments that should be made, and I will undertake to recommend such changes when I submit my report in mid-August. In any follow-up study, for example, with the possibility of having more time for planning and field studies, I would recommend several other categories of people to be interviewed. When making arrangements for the visits to the six schools, I met with the senior research officer and the head librarian of one of our city boards, and the information I received from them was most informative and helpful. Such officers, as well as officers up to the level of the director of education, and perhaps a sampling of

elected trustees and parents, might well present insights that would complement information from the schools. It would of course be necessary to design sets of questionnaires to be directed specifically to the different categories of those to be interviewed.

In general, however, the questionnaire served reasonably well, and may be taken as a basis for a research design for any subsequent project.

2. In seeking to ascertain the actual current usage of instructional resources--from workbooks and textbooks to computers--perhaps the first point to be made, and one that merits more thorough exploration, is that in all of the schools I met teachers who encourage their students to undertake independent research and to make a wide and varied use of instructional resources. Several of the teachers said that since the late '60s there had been, so to speak, a "philosophy" of teaching that tended to lead away from reliance on one main resource, such as a textbook. Significant numbers of teachers make up their own workbooks and study guides, using materials from a variety of sources. Included in such resources are reports and articles from newspapers, magazines, and periodicals. There is encouragement, also, for students to become members of public libraries, where these are accessible. Within this "philosophy" of teaching there could well be a shifting of time, resources, and budgets away from some of the traditional approaches. There could be, for example, a shifting of allocation of funds within budgets for "supplies", although to ascertain this would require more time than I had available.

3. In keeping with this "philosophy", in all of the schools there appears to have been some increase in the use of audio-visual materials. Teachers at all levels, in all of the schools, use film, record-players, audiotapes, overhead projectors, television, and videotapes, etc. There is very little use of radio, however, although principals will relay occasional special current affairs programs through the school's speaker systems. There is relatively little use of television and videotape at levels above Grade 3--at least in the schools I visited. This, too, merits closer study.

4. There appears to be a relative decline in the purchase of textbooks, library books, and all other print materials, with the exception of periodicals.

There is no easy explanation for this relative decline. It could partly be explained by the two preceding points (that is, that teachers are encouraging the use of more varied resources, and that more audio-visual equipment and materials are in use). There are other possible explanations, however, which may be kept in mind when considering several of the following points.

5. In trying to find explanations for this seeming decline in the purchase of textbooks, I discovered a strong concern, in all six schools, about the escalating costs of print materials, which, I was told, were outpacing general inflation and the annual, increasingly constrained, funding for operating costs. This concern was most strongly expressed in the two Francophone schools, although a librarian in one of the Anglophone schools reinforced this view, pointing out the significantly higher costs for French-language books in the same formats. The special grant for Francophone schools seems not to have allayed these concerns.

6. On the subject of Francophone texts, a concern was expressed in both Francophone schools about the availability of texts and library books to serve Franco-Ontarians. Many of the texts were published in Montreal, with the published expression of Quebec political concerns. For example, in the frontispiece of Nouvelle Géographie du Canada, by R. G. Corder and R. R. Krueger, published by Holt, Rinehart & Winston of Canada (initially published in Toronto, published in translation in Montreal, copyright 1968-1974), one may read the following:

Avertissement du Gouvernement du Québec:

L'approbation de ce manuel par le ministère de l'Éducation ne saurait être interprétée comme une reconnaissance officielle, par le gouvernement du Québec, de la ligne frontière entre le Québec et Terre-Neuve.

7: In addition to the escalating costs of print materials, another possible factor in the relative decline in the purchase of textbooks is the fact that in all but one of the six schools there has been a significant decline in enrolment, and thus a relative decline in the operating budgets of the schools.

8. Principals, librarians, and most teachers are well aware of Circular 14. Teachers are less well aware of the Book Purchase Plan. The ministry should evaluate its current means for conveying information about its services.

9. Principals, librarians, and teachers are well aware of ministry directives on copyright, and I gained the impression that there is concern to abide by these directives.

Photocopying machines are used extensively, however, and most principals acknowledged that it was not possible to "police" every single use of the copiers. When texts and library books are used for photocopying, such use is usually for copies of single maps, diagrams, poems, and even prayers.

Schools would welcome more latitude and flexibility in the "permission to copy" approach, which some publishers are now permitting. One Grade 3 teacher showed me, for example, a "reader", Mastery in Reading, by Dr. Bill Martin, published by the Education Consulting Association, Englewood, Colorado, with "Permission to Copy" boldly printed at the front of the text. The same teacher lamented not having a Canadian text that she could use instead of the American one.

10. There is eagerness on the part of principals, teachers, and students to have microcomputers in their schools. This, too, could lead to a shifting of resources, budgets, and time away from traditional modes of instruction.

It would be of interest to undertake a more thorough, longitudinal study of a number of the schools now beginning to be active in the use of microcomputers, as well as the use of terminals linked to central main-frame computers, in order to ascertain the implications of such usage for traditional modes of instruction.

11. Ministry guidelines, analogous to Circular 14, would be most welcome, as soon as possible, for the following resources:

- a) specifications and advice for the purchase of "hardware";

The variety of options now open in micro-computers (such as Apple II, Apple II PLUS, Commodore PET, and TRS-80) is very confusing and worrisome to principals.

- b) a circular listing titles and summaries of "software" or computer programming, evaluated and approved by the ministry.

- c) a circular listing evaluated and approved titles, with descriptions of contents, for films, videotapes, and other audio-visual materials.

12. An overall impression that I must add, indirectly related to the use of instructional resources, is that in these six varied schools--- city, rural, elementary, secondary, Anglophone, and Francophone--- there is a great deal of dedication, caring, ability, and energy in the service being offered our young.

In each of the schools, also, I experienced nothing but friendly co-operation and a willingness to be of service.

SUMMARY REPORT AND RECOMMENDATIONS

(August 20, 1981)

1. The purpose of this draft report is that stated in the objective of the pilot study, as approved by senior staff of the Research Branch, Ministry of Education:

To define the methodology for a subsequent research project on current uses of instructional resources in Ontario schools.

In this report I will summarize results of the field trips for this study, undertaken in May and June 1981, with the Interim Report presented on July 10, 1981. I will then make proposals that may be implemented in any future study.

2. These proposals for future studies emanate from questions and tentative conclusions that emerged during the pilot study (see Interim Report). The method of the pilot study, as specified in the approved draft of May 18, 1981, was, in brief, to employ the personal-interview, case-study method of research, interviewing and observing a complete spectrum of staff and students in six selected schools.
3. An obvious limitation of this type of approach is, of course, that the sampling is arbitrary, although care was taken to select schools covering a wide spectrum. Moreover, the sampling was too narrow. The conclusions presented in my report of July 20 cannot be stated without caveats and qualifications.
4. The case-study method is of course also limited in being undertaken by one observer, and thus does not guarantee the same degree of social-scientific rigour as some other sampling methods. Thus any future study could be supported by adding an additional field researcher, as well as by conducting a random-sampling mail survey.

5. Nevertheless, the pilot study did have the merit of raising important questions that should be more thoroughly considered as a background for policy decisions relating to funding for instructional resources.
6. The pilot study especially had the merit of testing the design of the questionnaire that served as a guide for the field research. In general, the questionnaire held up reasonably well and may be used as a guide for any future research project in this area. It did appear to elicit the kind of information sought by the senior research staff of the ministry. It served, for example, to suggest that generalized statements by suppliers of resources, such as textbook publishers, producers of audio-visual materials, microcomputer manufacturers, and suppliers of software, cannot simply be accepted without question.
7. The pilot study also had its limitations, perhaps the first being the limited time for planning and undertaking the field activity, compounded by the fact that this took place in the concluding weeks of the school year. A more satisfactory time for such field activity, indeed for any more thorough research project, would be during late September, October, and November.
8. The main deficiency of the questionnaire was that it endeavoured to encompass a broader spectrum of subjects--from elementary students to principals of secondary schools--than was practicable with one questionnaire. This was of course appreciated in advance by those of us who were involved in the review of the drafts of the questionnaire but here, again, the limited time at our disposal militated against undertaking the requisite revisions. This did not serve as a deterrent in this case, since the questionnaire was used as a guide and thus could be adapted for each interview.

9. Any subsequent project of this kind, however, should have questionnaires designed for each specific category of subjects to be interviewed. Preferably, the questionnaires should be designed so that they could also be used in mail surveys, though this would not, of course, apply to questionnaires for use in the field observations of classrooms, especially in elementary classes. It is apparent that some field activity is important in order to observe at first hand activities that would probably not be elicited from a mail survey.
10. It became apparent, also, that additional subject categories should be interviewed, such as staff members of board offices within which the specific schools are located--e.g., a senior officer of at least the rank of superintendent, the senior research officer, senior librarian, and senior audio-visual co-ordinator.
11. In addition, within a more comprehensive study, the producers and distributors of instructional resources and materials, such as textbooks, videotapes, films, microcomputers, etc., should be interviewed in order to obtain a better understanding of their needs and interests, as well as to seek data on sales trends, trends in costs of production, how they plan to serve curricular needs, and any other data relevant to their concerns.

Summary of Recommendations

- a) The questionnaire, as approved on May 18, 1981, may serve as a guideline for future studies.
- b) Separate questionnaires, following the pattern of the approved version, should be designed for each category of subjects to be interviewed--e.g., one for principals, one for elementary school teachers, one for secondary school teachers, etc.
- c) The categories of subjects to be interviewed and surveyed should be broadened, to include, for example, senior officers of boards, senior research officers, librarians, and audio-visual co-ordinators.
- d) A mail survey of a significant random sampling of schools should be undertaken to complement the field interviews.
- e) Any follow-up study for the 1981-82 school year should be undertaken between late September and late November.
- f) A larger sample of schools should be selected for field visits, perhaps doubling the sample of the first pilot study.
- g) Guideline questionnaires should be designed for interviewing book publishers, videotape and film producers, microcomputer manufacturers and distributors, and other audio-visual suppliers.
- h) The ministry should examine, perhaps research, its information channels to ensure that important policy statements are made more fully known to teachers.

- i) The ministry should issue, as soon as possible, guidelines, analogous to Circular 14, advising on specifications for "hardware", especially for microcomputers. The question of compatibility of programming could become a serious obstacle to progress.
- j) The ministry should also issue as soon as possible, guidelines, analogous to Circular 14, for approved "software" or programming for videotapes, films, and computer programming.

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Literature Search: Effectiveness of Instructional Media

1. Introduction

This literature search has been undertaken in association with the pilot study to define a methodology for research in the uses of instructional resources in Ontario schools.

2. Methodology for the Searches

The focus of the searches was on the "effectiveness" of the new media, especially the microcomputer, compared with "traditional" or "conventional" classroom methods, which primarily use print materials, such as textbooks and workbooks. The searches were undertaken primarily through the services of the Information Centre, Ministry of Education, with its access to the extensive data bases of ONTERIS (the Ontario Educational Research Information System) and the U.S.-based ERIC (Educational Research Information Center).

In the following report I shall first summarize the procedures undertaken in the searches; next I shall summarize findings from each of these searches; and then I shall present a summary report, with suggested questions that emerged from the undertaking of this search. I shall also append what appeared to me to be the most relevant excerpts from several of the abstracts requested from the titles that emerged.

3. ONTERIS Search

Search request: Effectiveness of instructional resources

- a) impact of various media: their use and effectiveness
- b) evaluation criteria and measures
- c) attitudes of teachers and students to them

Search analysis

All general material on instructional resources (ONTERIS Search term: Teaching aids); and all specific types of resources.

Search strategy (terms used)

Teaching aids; audio-visual aids; auto-instructional aids; programmed instruction and materials; teaching machines; educational television; television-based learning; films; filmstrips; slides; tape recordings; textbooks; computer assisted instruction; and tests.

Results 115 hits.

Decision

Search was then limited by restricting materials to the above terms plus either attitudes of students or teachers, or "evaluation" as part of the subject or as a word in the title.

Results 35 hits.

Limiting the search by the terms mentioned might have cut out some useful documents, since "evaluation", for example, is implied in any research study; thus the results should be viewed with some caution.

The ONTERIS team was prepared to undertake further searches, but a review of the abstracts found in the searches to date did not indicate desirability of searching further at this time.

4. ERIC Search

Summary of searches undertaken

- a) three computer searches through ERIC/DIALOG, using different key words or combinations of key words, such as:
 - 1) instructional materials (e.g. textbooks); computers; effectiveness of materials as teaching tools
 - 2) conventional instruction; effectiveness
 - 3) effectiveness of instructional materials, such as computer assisted instruction
- b) manual search of vertical files under subject headings:
 - 1) computer assisted instruction
 - 2) computers
 - 3) educational technology
 - 4) textbooks
- c) manual search of Quill and Quire, from January 1979, for articles about the effectiveness of textbooks/ computers as teaching tools
- d) telephone calls to Canadian Book Publishers' Council and Association of Canadian Publishers (no response as at August 31, 1981)

5. Vertical Files and Manual Searches

The following documents were felt to be most relevant to the purposes of this literature search:

- a) Lindsay, Peter; Marini, Anthony H.; and Lancaster, Michael K. "Microcomputers in Ontario Schools". A study undertaken "in order to provide Ontario School Boards with information regarding the frequency and the nature of microcomputer applications across the province", OISE, September 1980. (See quotation, pp.52-53)
- b) Hallworth, H. J., and Brebner, Ann. "Computer Assisted Instruction in Schools: Achievements, Present Developments and Projections for the Future". A report presented to "Alberta Education", June 1980. (In this report, in making their general statements on the effectiveness of CAI, the authors cite ten research studies. (See quotation, pp. 53-54.)
- c) Kormos, Jim. "Educator and Publisher Perceptions of Quality Curriculum and Instructional Materials during Declining School Enrolments". Report to the Commission on Declining Enrolment, Toronto, 1978 (Information Bulletin #17). An abstract of this report may be obtained through the Information Centre, Ministry of Education: ARCH00328. (See Appendix A.)
- d) Swick, Kevin J. "Evaluation of Textbook and Non-Textbook Approaches to Learning". College Student Journal, Vol.6, No.1., 1972 (See Appendix B.)

6. Summary of Findings

a) ONTERIS

Search on "Effectiveness of Instructional Resources"

In this search there were thirty-one (31) titles that seemed sufficiently relevant to warrant the copying of abstracts. On examination, however, most of these did not provide data on the "effectiveness" of a specific resource in terms of either its usage in a test situation or on attitudes of users to such usage: whether or not they approved of the usage of the resource, what were the constraints on their being used, and how the resource should be used to achieve most "effect".

Twelve (12) of the thirty-one abstracts do have some information on comparative effectiveness, however, and Appendix C contains excerpts from the abstracts of these reports (with the ONTERIS code numbers if the reader wishes to see the full reports). In this group, however, it should be noted that there is only one relatively recent report (1980), and this is on CAI. There are eight (8) reports on ETV, and of these only two (2) are sufficiently recent (1976) to suggest that the programs evaluated will have copyright renewals. The remainder are more dated and in all probability are no longer available to the schools.

b) ONTERIS

Search on "Textbooks; Computer Assisted Instruction"

In this search there were twenty-six (26) titles that seemed sufficiently relevant for requesting the copying of abstracts. Of these, two (2) had been drawn in the

earlier research (reported above); thus this section deals with twenty-four (24) titles.

Here, again, most of the titles are not, per se, "effectiveness" studies, but rather reports on the usage of resources and attitudes towards such usage. There is clearly a dearth of research studies on the "effectiveness" of specific media.

Of further significance is that of the fourteen (14) reports on computer assisted instruction, seven (7) are dated no later than 1976; thus the computers reported on would have had to be terminals linked to centralized main-frame computers. The use of the microcomputer appears to be absent from any of these reports.

There are only two (2) reports in the ONTERIS data base, as found in these searches, that deal with the "effectiveness" of CAI: these are ON00003, 1972, and ON00514, 1973. These, as indicated, would have had to be reports on the use of a main-frame computer. The available data in the ONTERIS base on "effectiveness" are thus too out-of-date to be of much use; and since the remainder of the reports are little more than status reports on trials and uses, it would appear that if it is desired to have recent data on the "effectiveness" of the instructional resource now being so rapidly adopted in the schools (that is, the microcomputer), then there is a need to motivate research projects at the earliest opportunity. (Reports ON00003 and ON00514 are contained in Appendix C.)

Also contained in Appendix C, are summary descriptions of the searches as undertaken by staff of the Information Centre, Ministry of Education.

c) ERIC

Search as indicated in section 4 above.

In this search only twenty-three (23) titles seemed of sufficient relevance to warrant the printing of abstracts. Of these abstracts only two, finally, were selected for inclusion in this report:

ED003314, "A Comparison of Programmed and Standard Textbooks in College Instruction" by Margaret B. Fisher and Leslie F. Malpass.

ED021445, "Computer Science Instruction in Elementary Grades, an Exploration of Computer-Based Learning Methods".

(See abstracts in Appendix D.)

7. Summary Report

The main objective of this report, as requested by the Research Branch of the Ministry of Education, was to undertake a literature search to seek titles of specific studies that had been undertaken in North America, especially in Canada, on the "effectiveness of instructional media or resources". The question, however, immediately evokes another set of questions: Effectiveness in what way? By what criteria? Compared with what? and What are the norms by which one makes a judgement of "effectiveness"?

One is reminded of a similar kind of question that was prevalent about twenty years ago when educational television was beginning to be strongly promoted by its pioneers. New media, especially those that capture major attention, seem always to evoke both strong support and scepticism. Socrates, we may be reminded, was sceptical of print, although this, fortunately, did not deter his print-oriented pupil and disciple, Plato. The promotion and questioning of educational television, in any event,

led in the United States to the publication in 1962 of a major study, Educational Television: The Next Ten Years (published by the U.S. Department of Health, Education and Welfare). The general consensus, at that time, in assessing the "effectiveness" of this new medium, compared with "traditional" instructional media and resources, was that there was "no significant difference", and the initials "n.s.d." began cropping up in numerous reports. Now the question is not often heard. Television, it seems, has taken its place as another medium of instruction, used effectively by some teachers, abused by some, and ignored by others; and that was the same generalization that emerged from the H.E.W. study back in the late '50s. The "effectiveness" of television as an instructional medium had most to do with the purpose of its use and the way in which it is used, by whom and for whom. Under the direction of a good teacher, the report concluded, television can be "effectively" used.

Today another new medium has captured the attention of a broad spectrum of educators, from pioneers to traditionalists. The computer is at centre stage, and we are hearing the same kind of questions as were asked of television, as were, indeed, once asked of print when the Gutenberg "revolution" threatened the domains of the clerical controllers of the medium. Now, however, the domains of the modern controllers of print are perhaps even more vulnerable, since some of the advocates of the computer dare to speak of the "paperless society". The escalating cost of paper magnifies the concern. We might pay some heed, nevertheless, to the fact that the electronics firms Radio Shack and Apple, for example, spend considerable amounts of money on print advertising for "printers" to provide "hard copy"; printers are seen as essential complements to their microcomputers.

Of course some of the toughest questions are those of concerned educators. How "effective" is the computer, or computer assisted instruction, compared with "traditional" or "conventional" media and modes of instructions?

This was the question I put to staff of the Information Centre of the Ministry of Education; and, as indicated above, they undertook extensive searches (via computer) through the data bases of ONTERIS (Ontario Educational Research Information System), and ERIC (the U.S.-based Educational Research Information Center). They also undertook a manual search through their comprehensive "vertical file" system. The second question was, simply, What research studies are available on "the effectiveness of instructional resources"?

While there are many thousands of titles of research papers and reports indicating extensive usage of instructional media of all varieties, there are very few, it appears, that deal specifically with comparative evaluations of new media compared with the "traditional". In the ONTERIS data base for example, there is a record of little more than a handful of studies done on the effectiveness of specific ETV programs (such as the Ontario Educational Communications Authority's primary level series Readalong); but the most recent of these are six and seven years old. This suggests that either there is little demand for such studies, or that indeed there is a need for motivating specific research studies on the kinds of questions that appear yet to be nagging the more "traditional" educator.

There is a growing list of titles on the increasing use of microcomputers in the schools; but these are reports, surveys, and case studies on "use" rather than evaluations of "effectiveness". Perhaps the most relevant, as well as most recent, of such studies is "Microcomputers in Ontario Schools" by Dr. Peter Lindsay, et al, of the Department of Special Education of the Ontario Institute for Studies in Education. Published in September 1980, this study was undertaken "in order to provide Ontario School Boards with information regarding the frequency and the nature of microcomputer applications across the province". One of its findings is as follows:

...over 50% of the responding boards indicated that they currently had at least one microcomputer in use. For these boards, the average number of microcomputers was 13.6, the median 7, the range 1 to 79. In total, 652 micros were reported to be in use in Ontario schools, 624 of these were designated exclusively for instruction. These 624 computers were distributed across a total of 157 different applications. (p.2)

So, as most of us are all now so well aware, there has been a remarkable increase in the use of microcomputers in the schools. But, again, how "effective" are they? The writers of this report provide an interesting suggestion:

Interestingly, one of the least chosen implications (of the use of micros) was the lack of research demonstrating the benefits of microcomputers in education. One interpretation of this pattern is that educators don't need further research to persuade them of the value of microcomputers as a teaching tool. Limited courseware and financial resources are seen as the principal barriers to implementation. As micros become increasingly cheaper, presumably the financial barrier will be reduced. (p.4)

One report that does provide helpful leads to effectiveness studies is "Computer Assisted Instruction in Schools: Achievements, Present Developments and Projections for the Future", a report presented to Alberta Education, by H. J. Hallworth and Ann Brebner, in June 1980. The authors of this report sum up the results of their searches on "Student Achievement" as follows:

CAI has generally been introduced into schools as a supplement to ongoing instruction. Summaries of studies in the 1960's and early 1970's showed students receiving CAI in this manner generally had a higher level of performance than students who did not receive CAI (Jamison et al, 1974; Edwards et al, 1975). A recent survey (Thomas, 1979) has indicated positive effects on achievement in mathematics (Bukoski and Korotkin, 1975; Taylor et al, 1972; Wright, 1977); biology (Broderick, 1974); algebra (Morgan and Richardson, 1974); and reading (Fricke, 1976). In the Los Nietos Elementary School district the use of CCC materials led to a reversal of a decline in achievement test scores which had continued over 16 years.

Such reviews indicate, that, in a great majority of cases, CAI has produced better achievement. Moreover, this is the case whatever the form of CAI: drill and practice, tutorial, or problem solving; whatever the type of computer system: CCC, PLATO, or IBM; whatever the grade level: elementary, junior high, or high school. In some cases the improvement in achievement was dramatic...

Other studies have shown CAI to be equal to or better than 'traditional' instruction... (p. 175)

It would appear, then, that CAI leads to much the same conclusions reached by the ETV researchers twenty years ago: at worst, "no significant difference", at best, improvement, depending on how it is used, by whom, and for what purpose.

While I shall append copies of the abstracts of several of what appear to be the most pertinent studies undertaken in recent years--at least the most pertinent seen through the ONTERIS and the ERIC data bases--I must point to one of the most useful texts I have seen on this general subject, Wilbur Schramm's Big Media, Little Media (Sage Publications, 1977). In this text, replete with an extensive bibliography of research studies, Schramm's purpose is stated as follows:

...to assemble and review the existing information that bears on the choice of media for instruction, and especially on the choice between Big and Little Media, so that the state of the art can be known to the teacher or planner who wants to understand as much as possible about the decision he or she has to make. (p. 23)

Schramm reminds us that "the origin of media of instruction is lost in the haze of pre-history. So far as we know, there has always been instructional technology."

The cave dwellers had stone edges for demonstrating and practicing the skills of cutting and shaping, bone needles for demonstrating and practicing the skills of sewing, small bows and arrows for demonstrating and practicing the skills of hunting. (p. 12)

He reminds us, too, that "the ancient technology of the slate still exists in our schools in the form of chalkboards".

Schramm is most helpful to our purposes when he faces the question of the effectiveness of media. His general statement bears repeating:

During the last few decades we have frittered away an enormous amount of research time asking relatively useless questions about the media of instruction. Can the media teach? has been asked over and over again, and over and over again the answer has come back; of course, students can learn effectively from the media, from any medium. Can they teach as well as the teacher? The answer: what they can do, they can do as well as a classroom teacher, sometimes better. It depends on the performance of the teacher, the content of the media, what is being taught, and to whom. Is one medium any more effective than others? For some purposes, probably yes, but overall there is no superlative medium of instruction, any more than there is one simple algorithm for selecting one medium over others. We have come to realize in recent decades that learning from the media is not an area that lends itself to simple algorithms. It is an extremely complex multivariate process that challenges us, if we are to understand it, not to ask the simple questions, but rather to concern ourselves with the conditions for selecting one medium over another, for combining and using media. (p. 14)

Schramm's point, finally, is that instructional media, whether they be pieces of chalk, textbooks, or microcomputers, "are simply information-carrying technologies that can be used for instruction", and "the media of instruction, consequently, are extensions of the teacher". The teacher, then, is and will probably remain the focal point for the selection and use, and the effectiveness, of a medium of instruction.

8. Conclusions

From these searches it is difficult to draw any recommendations concerning the need for specific research projects on the effectiveness of the different media of instruction. What research has been done to date, however, suggests that, in general, any medium of instruction may be used effectively by good teachers. This suggests, then, that perhaps the main focus of attention should be directed towards teacher training in the use

of the various media. Since today the computer is the principal medium in question, attention may be directed towards its use in the schools. This suggests a number of questions that may be asked of, and by, the Ministry of Education and school boards throughout the province:

- a) In Issues and Directions, the ministry's response to the Commission on Declining Enrolment, the ministry has been explicit in directing attention to the need for teacher training and to the use of computers in the schools. But what follow-up activity has there been in support, guidance, supervision, monitoring, and evaluation to ensure that such directions are being followed throughout the province? If there is such activity, is it adequate? Should it be reinforced?
- b) Have there been significant changes in the curricula of teacher training institutions? What are these changes?
- c) During the interviews in the case studies, I heard the need expressed for data banks and computer programming that would meet the needs of Ontario, or at least Canadian, schools. What are the sources of computer programming, and of data banks, that are now serving Ontario schools? To what extent are the producers of such programming meeting Ontario curriculum guidelines?
- d) Are the ministry and school boards aware of the needs for compatibility (in "hardware" and "software") in computer activity in the province? Are guidelines to be issued, analogous to Circular 14?
- e) Is there a need for more extensive communication links and information exchange between the ministry and boards, and within boards, about available programming and problems that individual boards have faced which could be of value if more widely shared?

- f) Within the information links, is there a need for liaison among teachers within subject groups, so that needs can be expressed and information provided on the effectiveness, or lack of it, of specific programming and media?

9. References

Educational Television: The Next Ten Years. Washington: U.S. Department of Health, Education and Welfare, Office of Education, 1965. Studies of the problems and potential of educational television, by Ashheim, Brish, and twenty-four other experts.

Schramm, Wilbur. Big Media, Little Media: Tools and Technologies for Instruction. Beverley Hills: Sage Publications, 1977. This is a summary report: "Our purpose in this volume is to assemble and review the existing information that bears on the choice of media for instruction..." Schramm lists 374 research reports in the fifteen-page bibliography.

APPENDIX A

EDUCATOR AND PUBLISHER PERCEPTIONS OF QUALITY
CURRICULUM AND INSTRUCTIONAL MATERIALS
DURING DECLINING SCHOOL ENROLMENTS

Jim Kormos

August, 1978

This paper was commissioned by and prepared for the Commission on Declining School Enrolments in Ontario and is not to be cited or quoted without the permission of the Commission and the author.

This study reflects the views of the author and not necessarily those of the Commission or the Ministry of Education.

Data Analysis

Of the forty-eight sets of instruments distributed, only four instruments (all from the same company) were returned at the time of this writing, August 1978.¹⁷ As the author felt this would not be representative of the industry as a whole, emphasis was placed instead on writings about the publishing industry with information obtained largely from their own publication (*Quill and Quire*) and from other authoritative sources on educational book publishing.

*BOARD INSTRUMENTS**Development*

A total of seven instruments were developed for school boards by the Curriculum Task Force. Two of the instruments, Instrument V,¹⁸ (Curriculum and Instructional Materials) and Instrument I,¹⁹ (Educational Goals and School Programs: Section F, Program Change and Section G, Solving the Problems) served as sources of data for this report. Instrument V obtained board personnel opinion as to the effect of declining enrolments and reduced resources on the preparation and use of quality curriculum materials.

Survey Procedure

The seven instruments were sent as a package in March 1978 by special delivery to all 193²⁰ Ontario school boards. Addressed postage-paid return

¹⁷Distribution of the instruments with the logistical support of the Canadian Book Publishers' Council and the Association of Canadian Publishers would no doubt have resulted in a higher rate of return. This was not considered a feasible alternative due to the constraint of time.

¹⁸Instrument V, Curriculum and Instructional Materials. See Appendix E.

¹⁹Instrument I, Educational Goals and School Programs: Section F, Program Change and Section G, Solving the Problems. See Appendix F.

²⁰Directory of School Boards for Ministry of Education, published by Ministry of Education, 1978.

APPENDIX B

The following paper is from College Student Journal,
Vol. 6, No. 1, pp. 38-42, 1972

EVALUATION OF TEXTBOOK AND NON-TEXTBOOK APPROACHES TO LEARNING

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A great deal of time is often spent in the basic methodology of teaching courses dealing with "definitive content and knowledges specifically related to the broader processes of the teaching act." Usually these knowledges are considered general concepts and/or processes needed by the teacher-trainee before proceeding to more specific pedagogical processes (i.e.: reading methods, science methods, social studies methods, etc.).

In many present teacher training programs a large elementary methods textbook is used as the primary reference for helping teacher-trainees gain the general knowledges considered by authorities in the field as requisite pre-laboratory teaching skills.

Considering the amount of time spent in developing these bible like methodology textbooks it would seem rational and most worthwhile to examine the effectiveness of such textbooks in accomplishing the objective of helping teacher-trainees gain requisite pre-laboratory skills.

Certainly the specialists who write the textbooks include coverage of most of the essential methods and suggested approaches for teaching elementary school children. Yet this is obviously no assurance that such textbooks are good learning tools. Nor is it an assurance that use of the textbook by the student insures a sound grasp of the content or processes involved in elementary school teaching. These are obvious learning principles which are usually not examined.

Purpose of this Study. The main purpose of this study was to provide some research insights (exploratory insights) into the actual resultant knowledge gains of college juniors enrolled in a basic elementary education methods course. A sub-purpose of this study was to examine the differences

in resultant knowledge gains of textbook oriented methods courses with non-textbook oriented methods courses. It would seem that these students who read the textbook would gain higher percentage recall scores of such knowledges when tested as compared to those students not utilizing the textbook.

Another often held belief is that general elementary teacher training knowledges are not known until the trainee has been inducted into the arena of teaching methods via the basic methods course. The needed knowledges are supposedly gained through the process of "course content" which is pulled together in the basic methods textbook.

In summary, the main purpose of the study was to measure resultant knowledges gained by the students enrolled in a general elementary education methods course. Two sub-purposes of the study were to find out if the textbook oriented groups gained measurably more knowledge recall versus non-textbook users; and to find out if students had already integrated certain teaching knowledges before their requisite entrance into the basic methodology course.

Research Design. A pre-post test format was utilized with the experimental group and the static control groups. The course lasted twelve weeks for both the experimental and control groups. The tests were given at the first and last class meetings to both groups of subjects.

The test utilized to measure general elementary education knowledge gains was developed by selecting various test items used in a major elementary methodology textbook test manual, (Klausmaier and Nellwig, *Teaching in the Elementary School*

N.Y., Harper and Row revised 1969). The items used in the general knowledges test were randomly selected from the test manual with only one variable controlled; that variable being that an even number of items were selected from nine general knowledges categories. Those categories were: reading methods, science methods, social studies methods, art and music methods, physical education methods, classroom discipline methods, and general elementary education methods (i.e.: curriculum, school organization patterns, and other areas).

Each of the nine areas considered were represented with nine test questions. The entire general knowledges test took approximately one hour to administer and could be hand or machine scored. The test statements were item analyzed and were analyzed according to category (i.e.: science methods category, social studies category, etc.).

The experimental group (n-31) was taught by the researcher and no assigned textbooks were used and no basic elementary methods textbooks were included on the reading lists. The control group (n-95) was selected on a random basis from six traditional methods classes where the required text was used (Nerbovig, Klausmier, revised 1969).

The Experimental Treatment. The experimental treatment was differentiated from the normal (control treatment program) methods course program in the following ways. (1) No methodology textbook was utilized during the twelve weeks experiment. (2) A variety of paperback books relevant to an initial orientation to elementary teacher education methods were provided for the students.* (3) Many field trips and field activities were arranged for the experimental group to become involved in traditional classrooms, non-graded classrooms, and open-classrooms. (4) Lecture-discussion sessions were conducted on the topics of discipline, classroom control, school organization patterns, and other re-

lated topics. (5) Visiting specialists skilled in the content-methodology areas of reading, language arts, social studies, science, mathematics, art and music, and health and physical education presented materials and programs on their specialization to the students in the experimental group. (6) Students involved in the experimental program were provided various opportunities to simulate teaching styles and to develop learning materials and units for public school involvement.

The Control Program. The control program was the traditional elementary methods course. A basic methodology textbook is required reading in all of the control group courses. In addition lectures are presented on all of the main topics covered in the textbook.** Students in the regular basic elementary methods course are also required to observe children in a laboratory school and in a public school setting.

Results of the Study. The test results (*General Knowledge Test: Elementary Education*) were codified in the following manner. Mean percentages of correct answers for the group were recorded for the pre-test and post-test. Mean percentages (correct answers) were tabulated for both the control and experimental groups on their overall test performance in each of the nine content-methods categories.

The overall performances of both the control and the experimental groups are presented in the following table.

*Some of the paperbacks provided were: George Dennison, *The Lives of Children* (New York: Vintage Books, 1959), Sylvia Ashton Warner, *Teacher* (New York: Bantam Books, 1963), Jerome Bruner, *Toward A Theory of Instruction* (New York: W. W. Norton Co., 1956), Philip Jackson, *Life in Classrooms* (New York: Holt, Rinehart, and Winston, 1968). Many additional titles were used by the experimental group.

**Marcella H. Nerbovig, and Herbert J. Klausmier, *Teaching In The Elementary School* (New York: Harper & Row, 1959). 2 (2nd Ed.) Note: All of the control groups used this as the basic textbook.

TABLE I
PRE-POST TEST GROUP MEAN SCORES:
Experimental and Control Group
(in percent correct)

Treatment Group	Pre-Test Score	Post-Test Score
Combined Groups (n-126)	61.97	74.12
Experimental Group (n-31)	61.71	76.42
Control Group (n-95)	65.23	71.82

The *General Knowledges Test* results indicate that both the control and the experimental group had substantial understanding of some concepts and knowledges before they entered the basic methodology course.

Combined, the control and experimental groups, answered 61.97 percent of the test questions correctly on the pre-test. On the post-test the combined percent correct answers was 74.12. Although the percentage differences between pre and post testing were around ten percent no significant growth took place.

The experimental group did increase (as a group) the most in percentage of correct answers from pre to post test time. An

11.71 percentage points gain was recorded for the experimental group while the control group registered only 6.19 percentage gain in correct answers. Neither gain is that significant in terms of cognitive gains or in terms of content recall.

The two most significant implications of the overall test results were that apparently (in this situation at least) many students had a good grasp of methodology content upon entrance into the course; and clearly (again at least in this instance) the utilization of a methods textbook in an initial elementary education methods course had no real value in increasing the recall or knowledge gains of the students. In fact, the experimental group (which used no specified textbook) made more percentage gains in answering the test items than the control group—even though neither group showed significant cognitive gains.

When the test data is sub-divided into specific content areas some significant points evolve as pointing to the need for a serious look at what is done in the basic pedagogical course. Table II presents the pre-post test results for the experimental and control groups in relation to specific content areas included in the *General Knowledges Test*.

TABLE II
PRE-POST TEST RESULTS: EXPERIMENTAL AND CONTROL GROUPS
Specific Content Areas of General Knowledges Test
(in percent correct)

Content-Methods Area	Control (n-95)		Experimental (n-31)	
	pre	post	pre	post
Reading Methods	72.00	73.60	53.60	30.00*
Language Arts Methods	74.00	82.20	80.00	89.10
Mathematics Methods	57.66	64.00	55.33	65.16
Science Methods	57.66	53.33	52.33	62.33
Social Studies Methods	67.14	77.00	65.50	80.16*
Art and Music Methods	78.33	83.33	32.33	90.33
Health and P. E. Methods	62.16	71.10	63.33	71.33
Class-room Control Methods	51.00	57.75	59.75	72.50*
General Methods	67.16	73.50	66.13	72.63

When the test data is analyzed according to content specialization several implications are apparent. (1) In the content-methods areas of science and mathematics both groups recorded pre-test percentage scores indicative of some definite weaknesses in these areas. (2) Both the experimental and control groups recorded good pre-test percentage scores in the area of art and music methods; and recorded reasonable growth in the same on the final testing. (3) The experimental group recorded the only significant growth in any of the content-methods areas; those areas being reading methods (11.40 percentage gain), social studies methods (14.66 percentage gain), and classroom control methods (12.65) gains.* (4) No significant per-

centage gains were recorded for the control group (which used the textbook approach).

When the item analysis results on the test results were recorded according to "item difficulty" it was apparent that both groups answered the low cognitive questions (factual recall) with proficiency. However, test items that called for evaluating and synthesizing data gave both the control and experimental groups much difficulty (see Table III).

*The rationale for significance was: that at least an 11.00 percentage gain must have been recorded on the post test and that more than fifty percent of the percentage gain must have been made on items (test items) which called for more than simple recall. (The latter was done by manual check.)

Table III
Pre-Post Test Scores: General Knowledges Test Results
Comparison of High-Low Cognitive Questions Responses
(in percent correct)

Item Difficulty	Control Group		Experimental Group	
	pre-test	post-test	pre-test	post-test
Low Cognitive	85.20	91.45	83.73	92.65
High Cognitive	19.10	22.73	16.80	21.75

The data in Table III indicates that students involved in both the experimental and control programs were clearly not called upon to analyze, evaluate, and/or synthesize the knowledges they learned. Both groups of students were unable, even on the post test, to answer more than twenty-five percent of the test questions which demanded higher level cognitive thought. This would certainly be an indictment of the teaching styles in our teacher training efforts.

Summary of Test Results. The overall results of the *General Knowledges Test* showed that both groups had high pre-treatment elementary education knowledges. No significant general knowledges growth took place in either the experimental or the

control group. Yet the experimental group did record higher percentage gains in correct answers on the test than the control subjects. When the test data was codified according to specified content areas the experimental group showed significant percentage gains in reading methods, social studies methods, and classroom control methods. Both the experimental group and the control group recorded low percentage rates in science, mathematics, and classroom control methods. Finally, when the data was organized into high and low cognitive test question items it was apparent that all participants in the study had difficulty with test items that called upon the student to evaluate, analyze, and/or synthesize his learnings.

Implications for Further Study. The results of this study point to the need for a re-evaluation of the content and methodology of the traditional methods course in elementary teacher-training. It was significant that both the experimental and control groups answered more than sixty percent of the test questions on the pre-treatment test. It would also seem that textbook oriented groups do not learn more than non-textbook oriented groups; although this needs to be studied further (with a variety of test instruments).

Two very significant by-products of this study were: (1) Both the control group and the experimental group showed a distinct need for more challenging material; material that would force them to analyze teaching knowledges more deeply and synthesize data into new organizational patterns. (2) Both the control group and the

experimental group showed a need for more thorough preparation in science and mathematics methodology, and the need for a more complete knowledge of classroom control techniques was evidenced by all participants of the study.

Although the experimental group showed more significant gains in general knowledges than did the control group; the real significance of the study would seem to be in the finding that both groups new more than given credit for (indicating pre-assessment procedures were not utilized very effectively), and did not learn as much as is often thought to be learned.

The major implication of this study is that further study should be undertaken by all universities with regards to the effectiveness of the teacher-training program they are utilizing to prepare the nations' teachers.

Memoirs of a College Professor. Vergilius Fern. The Christopher Publishing House, North Quincy, Massachusetts, 1971. 428 pp., \$6.95. The book was written for several groups of people the author maintains: (1) academic folk who will appreciate the story of one's pilgrimage in the fierce battle toward recognition by the professional people, (2) the young who have some spark of ambition who may profit by how the author has met obstacles in life, and (3) those interested in what the author calls "Aermicana"—life in America during the early and middle twentieth century. It is the recording of the author's journey through life, and he says the song, "I've gotta be me" illustrates the theme of his life. The author spent fifty-seven continuous years on campuses of colleges and universities and tells his story in an interesting manner. He tells about the drives which he possessed to achieve, and maintains that once they are in the system, they never leave. The book covers a wide range of subjects which include philosophy, religion, theology, and education.

APPENDIX C

ONTERIS REPORTS: EXCERPTS

ON00003

Crawford, Douglas H.; Burnett, J.D.; Tappay, A. R.; Tennant, J.F.;
Joyce, Carol

-- AN EXPLORATORY STUDY OF MATHEMATICS LEARNING BY MEANS OF FILM, TV
AND COMPUTER, JANUARY 1 - JUNE 30, 1972.

Findings:

1. The Grade 6 students having both the filmstrip and CAI had significantly lower post-test scores than the control group and the group having just the film; the group having just CAI had significantly lower scores than the group with just film.
2. The Grade 8 students receiving both CAI and the television program had significantly higher post-test scores than the other three groups.

Conclusions:

1. Although experience was gained in using film, TV and CAI, no reliable conclusions can be drawn from either of the two experiments.
 2. The comparative results of the two experiments suggest that the Grade 6 students were overloaded with both test and learning experiences over too short a period of time.
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ON00514

Peebles, Dorothy

-- THE NEW INSTRUCTIONAL TECHNOLOGY: A REVIEW OF RESEARCH AND
LITERATURE ON PROGRAMMED AND COMPUTER-ASSISTED INSTRUCTION. --

WILLOWDALE: NORTH YORK BOARD OF EDUCATION, EDUCATIONAL RESEARCH SERVICES, 1973.

Subject:

Computer Assisted Instruction and Programmed Instruction.

Findings:

6. Research at the post-secondary level suggests that CAI enables students to start at a higher level of understanding and to progress more rapidly.

Conclusions:

PI and CAI offer the potential for making teaching and educational administration more creative.

ON00122.

LEARNING MATERIALS SURVEY. -- Toronto: Systems Dimensions Ltd., 1974.

-- 989 P. in 4 V.

Subject:

Teaching Aids. Elementary Schools and Secondary Schools. Ontario availability and use.

Evaluation by Librarians, Principals, and Teachers.

Purpose:

To assess the nature, availability, and use of teaching aids in Ontario elementary and secondary schools.

Sample:

Random samples of 5,463 elementary school teachers, 607 principals, and 607 librarians; 11,358 secondary school teachers, 607 principals, and 607 librarians. Data collected October 1973-March 1974.

Findings:

5. All groups, except elementary school principals, judged available materials as generally good.
6. All groups expressed various degrees of dissatisfaction with availability and quality of Canadian materials.
7. All groups indicated cost as most limiting factor in obtaining sufficient materials.

ON00193

Russell, H. Howard; Robinson, Floyd G.; Wolfe, Carla; Dimond, Carol
-- CURRENT ONTARIO ELEMENTARY SCHOOL MATHEMATICS PROGRAMS: A STUDY OF
THE CHARACTERISTICS OF CURRENT ELEMENTARY SCHOOL MATHEMATICS PROGRAMS
IN ONTARIO -- Toronto: Ontario Ministry of Education, 1975 -- 305 P.
(OISE project; 5528-50).

Subject:

Mathematics. Curriculum subjects. Elementary schools. Ontario
programs. Attitudes of principals and teachers--teaching aids.
Utilization by teachers--teaching methods.

Purpose:

To examine the range of topics, resource materials, teaching methods,
evaluation of academic, promotion, and perceptions by teachers and
principals of the effectiveness of the program in their own school.

Findings:

2. Teachers made little use of available learning materials, testing materials, and the Ministry's PIJ1 guidelines, all of which were designed to broaden the content of the mathematics program.
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ON00200

-- STUDY OF TELEVISION AS AN EDUCATIONAL MEDIUM: STUDY NO. I. --
Toronto: Toronto Board of Education, Research Dept., 1960 -- 62 P.

Subject:

Educational Television. Schools. Toronto: Evaluation.

Purpose:

To evaluate the role of ETV as a teaching aid for Toronto schools.

Methodology:

13 15-minute programs were prepared by the Teaching Aids Centre and televised by the CBC.

Findings:

1. The instructional guides distributed in advance to the schools were helpful.
2. The length of each lesson and the material presented were satisfactory.
3. The reception was adequate; there were some problems due to outside interference and mechanical failure.
4. The time for follow-up after each telecast was inadequate.
5. The series formed a basis for further work in the subject presented, assisted in later recall of the information, and stimulated teacher and student interest.
6. In the controlled experiment students retained as much factual material from viewing black-and-white television programs as from viewing colour films.

ON00351

-- EVALUATION OF GAGE READING MATERIALS. -- Etobicoke: Etobicoke Board of Education, Dept. of Research and Educational Measurement, 1967.

Subject:

Reading achievement. Students. Grade 2.

Compared by textbooks: Copp Clark-Nelson, Gage, Winston-Nelson-Copp Clark.

Purpose:

To test West Humber principal's hypothesis that Grade 2 students' superior showing in reading comprehension was due to the use of Gage reading materials.

Conclusions:

1. There is no evidence to support the hypothesis that Gage reading materials enhance reading comprehension performance.

ON00866

Keller, Donald M.

-- EVALUATION OF CASTLE ZAREMBA: EFFECTS ON LANGUAGE AND KNOWLEDGE OF CANADIAN LIFE. -- Toronto: Ontario Educational Communications Authority, Research and Development Branch, 1972. -- 80 P.

Findings:

3. ...results showed that CZ had no effect on attitudes.
4. CZ led to greater knowledge of those aspects of Canada mentioned in CZ, than did the C course, (i.e. the control group).

Conclusions:

1. CZ is an effective means of teaching facts about life in Canada.

2. In improving aural comprehension, CZ is just as effective as conventional lessons.
-

ON00867

Fleming, W.G.

-- EVALUATION OF FOUR TELEVISION PROGRAM SERIES PRODUCED BY THE ONTARIO EDUCATIONAL COMMUNICATIONS AUTHORITY. -- 1972.

Methodology:

Classes were divided into experimental (E) and control (C) groups. E groups viewed the series on videotape; C groups had special activities on the same topics without an audio-visual component.

Findings:

2. In each pair of E and C classes in the "DORPP" title of program series experiment, C classes improved more.
 5. Post-test results and interviews with viewers of the geography series indicated that the programs contained too much material, used too complex a vocabulary and had too rapid a pace; E groups gained marginally more than C groups.
 7. There were some gains in knowledge as a result of the series on the law; for most classes.
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ON00868

McLaughlin, G. Harry

-- EVALUATION OF THE RYERSON OPEN COLLEGE INTRODUCTORY SOCIOLOGY MULTI-MEDIA COURSE. -- Toronto: Ontario Educational Communications Authority.

Findings:

5. Students who gained an A grade viewed considerably more broadcasts than either average students or dropouts.
 6. The more radio broadcasts listened to the higher the ultimate grade.
 7. There was no consistent relationship between the time spent on assigned reading and success in the course.
-

ON00871

McLaughlin, G. Harry

-- EVALUATION OF "NATIONAL MULCH". A TV SERIES ON NUTRITION FOR TEENAGERS. -- Toronto: Ontario Educational Communications Authority, 1973.

Purpose:

To evaluate the degree to which the National Mulch series is effective in altering the attitudes of young people towards proper food selection.

Findings:

4. Between the 2 interviews, there was a drastic decline in the proportion of both E and C subjects eating at snack breaks.

Conclusions:

3. Exposure to one or more programs had no significant effect on eating habits or on attitudes toward nutrition.
-

ON00872

McLaughlin, G. Harry

-- EVALUATION OF A MEDIA-BASED CREDIT COURSE, DEVELOPMENTAL PSYCHOLOGY, OFFERED BY RYERSON OPEN COLLEGE. -- Toronto: Ontario, 1973.

Purpose:

To compare the course given by radio and TV by Ryerson Open College (ROC) with a developmental psychology (DP) course as given in a classroom by Ryerson Polytechnical Institute (day).

Findings:

1. The average ROC scores on the post-test were 10% ahead of the day scores; however, the percentage of improvement shown by the average day students was just double that of the ROC, possibly indicating relative degrees of test sophistication rather than knowledge.
3. Employed students learned less than students who stayed home, partly because they gave a disproportionate time to optional reading at the expense of more essential course components.

ON00887

Hodapp, Timothy

-- READALONG IN STANDARD CLASSES EVALUATION REPORT -- Toronto: Ontario Educational Communications Authority, Research and Planning Division, 1976.

Purpose:

To determine if Readalong programs provide primary readers with the basic vocabulary upon which to build other reading skills.

Findings:

1. In test period 1, all E grades had higher positive differences than C classes.

Conclusions:

1. Readalong and supporting materials are an effective educational system for teaching reading.
2. The series was fully effective only for Grade 1 students.

ON00888

Hodapp, Timothy

-- READALONG AS AN INSTRUCTIONAL AID FOR PRIMARY READING -- Toronto: Ontario Educational Communications Authority, Research and Planning Division, 1976.

Findings:

2. All specific program objectives received high percentages in the category indicating student improvement; over 50% of teachers stated their students improved very much in desire to read and engagement in reading.

ON01653

Knights, Robert M.; Cunningham, S. June; Hardy, Madeline I.

-- BASIC READING SKILLS REMEDIAL PROGRAM: EVALUATION IN COMPUTER-ASSISTED AND WORKBOOK FORMAT. -- Ottawa: Carleton University London: London Board of Education, 1980.

Purpose:

To evaluate: use of the basic reading skills (BRS) programs by parents, teachers, and education assistants; the validity of the BRS test program as a kindergarten predictor of Grade 1 reading achievement; and the effectiveness of the BRS Training program.

Findings:

3. Students deficient in basic reading skills showed significant improvement on reassessment, following the remedial program.

Conclusions:

1. The BRS program is useful for the diagnostic assessment and remedial training of students with problems learning to read in the primary grades.

APPENDIX D

ERIC SEARCH: EXCERPTS

ED021445

Computer Science Instruction in Elementary Grades, an Exploration of Computer-Based Learning Methods. Final Report.

During the exploratory phase of this two-year project, 234 instructional computer programs were written by 167 junior and senior high school students, instructed as individuals, in small groups, and in whole classes. Then a doctoral study investigated the effectiveness of computer assisted instruction in the development of problem-solving skills. The study compared three conditions of learning from booklets, three conditions of computer training, and one untutored group in each of six Grade eight classes, all crossed on sex and two IQ levels (above and below the class average). Data analysis showed that students below the class IQ average of 113 who used a combination of two types of computer training materials outperformed every other group in the three main problem solving functions. A study of paired learners at different IQ levels used the same design as the doctoral study, but no significant results emerged. Negative results were also obtained from another small study which investigated ability changes in Grade 7 students following experience in computer programming. Finally, two versions of the language COMPUTEST for the IBM 1620 and a conversational language for use on the IBM 360 remote terminals were developed. The dissertation provides the bulk of this document. (BB)

A COMPARISON OF PROGRAMMED AND STANDARD TEXTBOOKS IN COLLEGE INSTRUCTION.

FISHER, MARGARET B. : MALPASS, LESLIE F.

University of South Florida, Tampa.

1963 116P.

Report No.: CRP-1921

EDRS Price - MF01/PC05 Plus Postage.

Language: ENGLISH

Journal Announcement: DH6667

This study was designed to determine whether significant differences occur in mastery of a college course lecture-discussion type for freshmen and sophomores when students use programmed materials of instruction rather than standard textbooks. Four standard and four programmed sections were used for comparative purposes. Students selected these sections without advance notice of instructional technique. Comparisons were made between the sections and other relevant subgroups by appropriate statistical measures, with grades being the principal criterion for subject-matter mastery. Few significant differences in mastery of subject matter were found between students in the two major groups. Several direct expressions of preference for programmed material were obtained, however, some students felt that programmed material demanded more time and study than they wished to give, and several students in standard sections expressed resentment of an advantage in preparing for multiple-choice examinations that they felt must accrue to students using the programmed textbooks. The preference for vertical over horizontal program format was expressed very strongly. (LP)

APPENDIX E: Design of Method and Questionnaire

I Objective

To define the methodology for a subsequent research project on current uses of instructional resources in Ontario schools.

II Method

1. In undertaking this pilot study the personal-interview method will be used in each of six selected schools.
2. In each school the following categories of subjects will be interviewed:
 - a) the principal or vice-principal if delegated by the principal;
 - b) the librarian and/or audio-visual co-ordinator;
 - c) at least three teachers, representing different levels; The principal will be asked to name three types of teacher, representing a range of "innovativeness", from "more" to "medium" to "less"; but the category to which each teacher belongs will not be identified to the interviewer.
 - d) At least two pupils from each of the three levels. Teachers will be asked to supply names of two sets of three pupils each, from each class, again representing the three levels of innovativeness, from which the interviewer will randomly select two names for each class.
3. Each school, principal, staff, and pupil will be given a code number by the interviewer, and will not be identified by name in any of the submitted or published reports.
4. Initial interviews will be with the principal or delegate, and a review or summary session will be held with the principal or delegate prior to the interviewer's leaving the school.
5. A draft report for each school will be discussed with each principal prior to any publication or circulation of a final report.
6. The anonymity of all respondents will be ensured.
7. The Director of Education for each district within which a school is selected will be approached by the appropriate MOE officer prior to any approach to the school.

III Content

The following questions are intended as a guideline for the interviewer; that is, this is not intended as a questionnaire to be submitted to the respondents.

Some of the questions may be addressed to the principal only, some are of more direct concern to the librarian or audio-visual co-ordinator, some to teachers; relatively few are to be addressed directly to students. For the most part, information on students will be obtained through observation of their activities.

For purposes of self-direction, I have placed in front of each question the following code letters to indicate those to whom the questions are to be addressed: "p" for principal or delegate; "t" for teacher; "l" for librarian or audio-visual co-ordinator; and "s" for students (for this reason the word "student" will be used throughout, rather than "pupil").

- (p) 1. What was the enrolment for 1980?
- (p) 2. How many grade levels?
- (p) 3. How many classes?
- (p) 4. How many teachers?
- (p) 5. What is the student-teacher ratio?
- (p) 6. Is the enrolment trend one of growth or decline?
- (p) 7. Does the school have:
- a) a library?
 - b) an audio-visual centre?
 - c) a viewing room?
 - d) carrels, for individual study?
 - e) ready access to any of above facilities nearby (e.g., in district office, public library, etc)?
If so, describe.
 - f) computers accessible to students?
 - g) other? (specify)
- (p) 8. Does the school have:
- a) photocopier?
 - b) therma-fax?
 - c) mimeograph?
 - d) TV sets (how many?)
black and white?
colour?
 - e) videotape recorder and playback machine?
 - f) videotape playback only?
 - g) off-air reception or cable?
 - h) film projector?
 - i) overhead projector?
 - j) radio?
 - k) videodisk machine?
 - l) microfiche projector?
 - m) audiotape or cassette recorder/playback?
 - n) record player?
 - o) filmstrip machine?
 - p) earphones (for "silent" listening in class)?
 - q) computer terminal, to a central data bank?
 - r) microcomputer?
 - s) hand-held calculators?
 - t) other? (specify)

- (p) 9. What was the total budget for 1980?
- (p) 10. How much of this was for instructional materials?
- (p) 11. How much of this was for equipment and operations, including maintenance and repairs of equipment, and how much for materials or content?
- (p) 12. How much of the budget goes to acquisition of:
a) texts, for individual use?
b) library books?
c) texts, reference?
d) videotapes?
e) audiotapes?
f) phonograph records?
g) films?
h) filmstrips?
i) instructional kits?
j) computer programs?
k) other? (specify)
- (p) 13. How much of the budget is used for stationery and supplies? How much is used for paper for duplicating and photocopying? How much paper is used?
- (p) 14. Do you acquire materials from or through the school board, or district office, or elsewhere? (specify)
- (p) 15. Has there been any significant change in the percentage of expenditures for different materials in recent years (i.e., do you spend relatively more or less on texts or library books or films or videotape, etc., than previously)?
- (p) 16. Have costs of some instructional materials increased faster than others? (specify)
- (p) 17. Are funds for instructional materials increasing faster than others? If not, how are they allotted?
- (p) 18. Are there any funds that are conditional, with fixed costs for specific purposes?
- (p) 19. Is there a school policy with respect to the use of the following copying and recording devices? If so, what is it? (for example, is there open access to teachers, or is access available through a requisition and/or signing system?)
a) photocopier
b) therma-fax
c) mimeograph
d) video-cassette recorder
e) audio-cassette recorder
f) film and/or video camera
g) other (specify)

(p,t,l) 20. What class or classes do you teach?

(p,t,l) 21) For what purposes are the following devices used?
a) photocopier
b) therma-fax
c) mimeograph
d) video-cassette recorder
e) audio-cassette recorder
f) film and/or video camera
g) other (specify)

(p,t,l) 22. What is the process for a teacher's ordering materials?
(Does a teacher have the privilege of independent use of a portion of the budget, or does a requisition have to be approved at a more senior level? If so, at what level?)

(p,t,l) 23. What time problems, if any, exist in gaining access to text and other materials when they are needed? (specify)

(p,t,l)

24. In what quantities does the school have, or have ready access to, the following materials? Where are they held? How readily are they available? (scale of 5 to 1, from "immediately" to "not at all"). How often are they used (daily, weekly, monthly, several times yearly, rarely, never)? Are they available to students for individual use? Are they available through inter-library loan, or order (e.g., tapes from TVO)?

<u>Resource</u>	<u>Quantity</u>	<u>Where held</u>	<u>Availability</u>	<u>How often used</u>	<u>By students</u>	<u>Inter-library loan (TVO, etc)</u>
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a) texts, for individual use

b) library books

c) texts, reference

d) instructional kits

e) films

f) filmstrips

g) phonograph records

h) videotapes

i) audio cassettes

j) videodisks

k) computer programs

l) other (specify)

- (p,t,l) 25. How do you become informed about the titles, themes, and content of the following materials?
- a) texts, for individual use
 - b) library books
 - c) texts, reference
 - d) instructional kits
 - e) films
 - f) filmstrips
 - g) video cassettes
 - h) audio cassettes
 - i) videodisks
 - j) phonograph records
 - k) computer programs
 - l) other (specify)
- (p,t,l) 26. Do you have access to catalogues for the above materials? Specify what ones are available.
- (p,t,l) 27. Within catalogues you have seen for the following materials, how relevant are the listed materials for your classroom use? Comment on each category.
- a) texts, for individual use
 - b) library books
 - c) texts, reference
 - d) instructional kits
 - e) films
 - f) filmstrips
 - g) video cassettes
 - h) audio cassettes
 - i) videodisks
 - j) phonograph records
 - k) computer programs
 - l) other (specify)
- (p,t,l) 28. What is your opinion of the informative values of the information provided by catalogues with respect to the materials listed in the above section (on a scale of 5 to 1, from "very informative" to "not at all")? If different catalogues vary in their informative values, please comment.
- (p,t,l, 29. s) Do you have any comments on the datedness or currency of the materials you order or use? (for example, are some materials too dated for use, such as: "In two years time man will probably land on the moon.")
- (p,t,l, 30. s) Do you have any opinions about bias or stereotyping, concerning, for example, race, colour, religion, and sex, in the contents of the materials made available to you?
- (p,t,l, 31. s) Does such stereotyping influence your decision about acquiring some materials? Specify.
- (p,t,l) 32. Do you have any comments about non-Canadian content in the materials made available? Specify.

- (p,t,1) 33. Do you make use of materials packaged and distributed by commercial companies (such as "McDonald's Starters")? Do you have any comments about such materials?
- (p,t,1) 34. Do you have any estimate of the percentage of students who own or have access to hand-held calculators? Are any lent by the school?
- (p,t,1, 35. s) Do you know of any students who make use of computers for assignments, in school, in their homes, in public libraries, etc.?
- (p,t,1, 36. s) How are students given experience in the use of instructional aids, such as television, film, overhead projectors, computers, etc.? Specify.
- (p,t,1) 37. Have you made use of the Book Purchase Plan?
- (p,t,1, 38. s) For whom do you see the following resources being most appropriate in your school, class?
a) texts, for individual use
b) library books
c) texts, reference
d) instructional kits
e) films
f) filmstrips
g) video cassettes
h) videodisks
i) phonograph records
j) computer programs
k) other (specify)
- (p,t,1, 39. s) Do you have any thoughts you would wish to express arising from this session we have had together?
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IV Schedule

To be based on discussions around proposal of May 5, 1981.
