AN EXPERIMENTAL STUDY OF AN AUDIO-TUTORIAL
SELF-INSTRUCTIONAL SYSTEM AS AN AID TO
PRE-ADOLESCENT SCHOOL CHILDREN IN
DEVELOPING A SEARCH STRATEGY FOR
LOCATING AND SELECTING MATERIALS AND
INFORMATION IN A RESOURCE CENTER

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ABSTRACT

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This study considers the problems that pre-adolescent school children have when locating and selecting relevant materials and information in a resource center.

It is hypothesized that a solution to some of these problems may be the development of a self-instrumental procedure using the audio-tutorial method to train children to develop an overall search and retrieval strategy in locating and selecting needed materials. It is further hypothesized that this audio-tutorial project will create positive attitudes towards library use.

Activities leading up to the initiation of this study are briefly discussed. Also, a survey of related literature is shown to support the need for such a study.

To determine the effectiveness of the audio-tutorial program, an experiment involving sixty, randomly selected, grade six pupils is carried out. As a result, the null hypotheses that assumes there is no significant difference between the post-experimental and post-control groups at the .05 level of significance, or less, are rejected. Therefore, it is suggested that the hypotheses be accepted.

The locally developed measuring and evaluation instruments are also described.

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

The proposed instructional system is to be part of
an instructional package designed to help teachers and pupils
to use a resource center effi-iently for independent study and
learning. The initiation of research into the possibility and
feasibility of such a package was carried out by
Dr. Gary M. Boyd, Assistant Professor of Education, Sir George
Williams University. His basic hypotheses were:

> ... that it is possible to teach pupils autonomous
> learning strategies through exercises conducted in
> school resource centers. A secondary hypothesis
> is that audio and video taping can provide more
> efficient means of evaluating and fostering projects
> than heretofore have been available.[1]

The starting date of the project was September, 1969 and the
terminal year set for 1972. When I joined the project in 1970,
studies of pupils' use of a school resource centre had been
carried out in one school in the Greater Montreal area. In
these studies mirror television was used as a research and
behavioural shaping tool. During 1971-72 further research was
carried out in the form of observation of the research
behaviour of Grade VI elementary school children in several
other schools in the Montreal area.

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[1] G. M. Boyd, "A Description of a Resource Center
Oriented Learning Project," Sir George Williams University,
Montreal, January 15, 1971, p. 1. (mimeographed.)

As part of this investigation discussions were held with students, librarians, resource people, principals and teachers.

This introduction is primarily concerned with some aspects of our observations of students which were mainly responsible for the development of my hypotheses concerning the proposed instructional system.

At first, Dr. Boyd intended to include what he considered six phases of autonomous learning: disengagement, exploration, combination, elimination, cultivation and sharing. But a pilot study revealed that, under the circumstances, this was too wide a scope. He decided to concentrate on one phase of the problem — the exploration phase. Briefly, our (Dr. Boyd and assistants) procedure was as follows:

Seventy-five elementary school children in their sixth year, were randomly selected from six classes in two schools in the Montreal area. Each student was asked to choose a topic which interested him or her from a pictorial interest inventory. (This inventory was previously developed by the investigators for children at this level). The investigators then asked each student to carry out search procedures in order to obtain as much information as possible on his/her chosen topic.

As the pupils were going about their tasks, their performances were observed and recorded on a check list. Some of the observations recorded by the check list are summarized as follows:

In locating documents the students used two main means: The Card Catalogue (69%) and going directly to the book shelves (60%). Of those who used the card catalogue forty-five percent indicated ability to use the alphabetical arrangement with facility. Forty-seven percent displayed capability of using the subject headings. (They were not required to use author or title headings.) Only twenty-seven percent noted the call number. Yet, upon finding the call numbers some attempted to find, often unsuccessfully, the article using the numbers from memory. Neither titles of articles nor other information was noted even when it was considered a possible source of information on the topic. By far the major source of information was books, followed by encyclopedias. Some pupils indicated ability to evaluate the usefulness of books through skimming the table of contents (38%); but comparatively few used the index (15%). Other chief means were through evaluating the title of the book and skimming it.

Information was gained from encyclopedias by matching their target description alphabetically with a volume and then skimming through to find their clue word.

Other resources such as magazines, picture files, and film strips, although not numerous, were available but not necessarily easily accessible. These were seldom consulted.

Of all the most easily accessible resources, the dictionary was the least consulted. I believe that this is fairly significant, since it could have been used to find other

clue words than those determined by the students. In fact this is probably related to one of the main problems that pupils displayed in their search procedures. I refer to their inability to either generalize, specify or develop substitute descriptors for their search topic. This may also be seen as a part of a larger overall problem. That is, although the pupils were often knowledgeable regarding the various technical procedures of locating and selecting documents and information, they were generally unable to synthesize the various tactics into an overall strategy. Some specific reasons for this may be:

1. Library instruction, when given, is carried out in a haphazard manner.

2. Students lacked guided practice in the retrieval process.

3. Teachers were unfamiliar with library — search procedures, and available resources.

4. Pupils resorted to textbooks and class encyclopedias rather than letting themselves be confronted with a seemingly confusing mass of materials.

5. Consequently, pupils have developed negative attitudes towards retrieving information from the library.

CHAPTER II

THE PROBLEM, TERMINOLOGY, AND HYPOTHESIS

The Problem

Statement of Problem

The background and general nature of the problem were
discussed in Chapter I. The problem that this study is
concerned with then may be stated as follows:

Elementary school children, when confronted with their
own search problem or one that is assigned, are unable or are
insufficiently motivated[1] to organize specific knowledge and
skills in order to locate and select relevant materials and/or
information from an organized body of resources (in a limited
amount of time).

Importance of Problem

This is an important area of research because:

a) without the necessary skills and knowledge
involved, the student may be unable to carry out independent
learning and study activities which are becoming increasingly
important as such concepts of non-graded, non-text, and
individualized instruction become increasingly important in

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[1]Here I am thinking more of motivation as a result of
having retrieved usable materials from the resource center, not
of the type where the student is given a problem requiring use
of the center or where he is simply sent.

our society.

b) without the necessary ability to retrieve information from resource centers, pupils often become frustrated when given assignments for which library use is required. They therefore, often with the encouragement of the teacher, tend to rely upon a limited number of readily available, although not the best, resources for their information.

c) the more creative aspects of the learning process such as evaluation, elimination, combination, cultivation and sharing cannot be carried out in an efficient and less time-consuming manner unless students have developed an integrated, systematic and almost automatic procedure for exploring and using available resources.

Solution

The suggested solution to the problem was to develop an audio-tutorial program using light-weight portable cassette players to provide instruction for children in the effective locating and selecting of relevant information and documents from a school resource center or library. It was hoped that the program, with minor changes, could be used in other elementary school libraries to achieve similar instructional objectives.

The long range instructional goals were that this program, having proved successful, would further enable pupils to carry out independent learning tasks with a minimum of frustration and at a higher level of confidence and attainment

than previously possible.

Terminology

Before going further, a brief explanation of some of
the terms used in this study might be in order.

Resource Center

This term is used interchangeably with library. That
is, it refers to any centrally organized body of learning
materials. Others may also refer to it as an instructional
materials center.

Independent Study and Learning

When the term independent learning is used it supposedly
refers to the idea of learning brought about by independent
study. When I use the term independent study, I mean study
activities carried out by the student with little or no help
from teachers, librarians or others - although this does not
preclude the possibility of using these as resources. The
study activities may be self-initiated or other-initiated.

Audio-Tutorial Method

Audio-tutorial method means an instructional program
which is primarily based on audio-taped instruction, but which
at the same time relies on other media, situations, or activi-
ties which are determined applicable to the particular learning
situation. As S. N. Postlethwart describes it:

> In a study of plant science the major objective is
> to learn about plants. It makes sense, therefore,
> that a study of plants should be conducted where
> plants are available for observation. Diagrams,

charts, models, photographs, and other such devices
should be a 'means to the end' so that the students'
attention is directed to the literal plant itself.
The audio-tutotial system provides an opportunity
for the student to have an object available at the
time he reads about it, does experiments, etc.[2]

For the audio-tutorial system in question, the "object"
is the resource center.

Self-Instruction

The system is also described as self-instructional.
This means that the instruction is designed to be used by the
student with a minimum of other people's help or guidance.

Retrieval

This term is used specifically to refer to the students'
obtaining actual materials which could aid him in, solving his
informational problem. However, it is possible that these
materials may be of very little or no use to him.

Selection

Because of this it was necessary to ask the subject
to determine which of the retrieved materials he considered
most relevant to his topic. To do this he was asked to make
his selection by placing his collected materials in order of
most importance. This is what is meant by selection. At the
same time, however, it must be remembered that, although it
was emphasized to the pupil that he must collect the material

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[2]S. N. Postlethwart, "Teaching Tools and Techniques:
An Audio-Tutorial System," in Developmental Efforts in
Individualized Learning, ed. by Robert A. Weisgerber, (Palo
Alto, California: American Institute for Research, 1971) p. 318.

and then select, the selection process may have, and indeed most likely had, pervaded the whole retrieval process. No check or formal analysis was made in connection with this. (But see Appendix D.)

Hypotheses

It was hypothesized that one possible solution to the problem was to design and develop a self-instructional system which would train pupils to develop an overall strategy in using their resource center effectively so that they might retrieve materials and information which were relevant to their search. It was also hypothesized that the proposed program, because it enabled the pupils to achieve success in using the library, would help develop positive attitudes toward its use.

CHAPTER III

REVIEW OF THE LITERATURE

Overview of the Literature

A survey of the literature on library or resource
center instruction indicated that:

1. Those interested in this matter are primarily

    librarians and that most projects, studies, or

    experiments in this field are initiated by

    them or those closely related to their profession.

    Seldom does one find the teacher or educator

    displaying keen interest in this area.

2. Most of such literature comes under the heading

    of library orientation, library services or

    library instruction.

3. By far, most agree that library instruction is

    needed by most users.

4. Generally, the literature, with some notable

    exceptions, is concerned with library

    instruction at the university or college level.

5. Much of the literature consists of articles in

    library magazines which are descriptive, and/or

    prescriptive rather than experimental.

6. Bibliographies were an important source as an

    aid in obtaining literature on this subject.

Other main sources were, the <u>Education Index</u>,

and <u>Library Literature</u>.

Survey Literature

In 1967, Mary L. Woodworth carried out a study which

attempted to identify "research problem areas in school

librarianship"[1] and to indicate, "The relative importance of

the areas"[2] Her method was to send a questionnaire on this

matter to one hundred and eighty-four "leaders in school

librarianship."[3] The results indicated that this group's

chief area of concern was library instruction. It was ranked

first in order of importance for "research needs in their

field."[4] Also, this study describes some of the results

obtained by research related to this area. For example,

she reports that:

> Gengler, 1965, examined the differences between sixth
> grade students' ability to apply selected problem
> solving skills, one group being instructed by a
> classroom teacher and one group receiving additional
> instruction by a school librarian. She found a
> significantly higher mean in schools where additional
> instruction was conducted by the school librarian.[5]

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[1]Mary L. Woodworth, "The Identification and Examination
of Areas of Needed Research in School Librarianship. Final
Report." Wisconsin University, Madison: Office of Education,
U.S.A., November, 1970. Abstract.

[2]<u>Ibid</u>.

[3]<u>Ibid</u>., p. 10.

[4]<u>Ibid</u>., p. 219.

[5]<u>Ibid</u>., p. 188.

Woodworth however, does not deal very thoroughly with the elementary school level, although she summarizes some previous research in the area and provides a very good general bibliography.

Mary Virgina Gaver, in an article entitled "Research on Elementary School Libraries," summarizes the research up to 1961. She claims that:

> The provision of an elementary school library does have a positive relation to student outcomes and by inference to quality education. The important factor, however, is not the possession of a school library, per se, but the program of services to individual students and teachers which is carried out with the human and physical resources provided in the school with a library.[6]

Although she does not emphasize library instruction in her list of areas needing research, she does state that several research findings indicate that,

> children who have had systematic instruction in library skills closely related to the curriculum and the opportunity to use an organized library collection consistently score higher on work-study tests and/or on tests of library skills than do children lacking this opportunity.[7]

Whether this indicates that they can "perform" better in information retrieval is open to question.

Frederick Hartz, Assistant Professor of Library Science, claimed that "the library's major concern should be with developing a pattern of habits that will lead the individual to

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[6]Mary V. Gaver, "Research on Elementary School Libraries," ALA Bulletin (February, 1962), p. 122.

[7]Ibid., p. 121.

information sources that verify or extend his knowledge."[8] In

order to achieve this through formal instruction, Hartz outlined

four phases for secondary school library instruction. The first

two are what I was basically concerned with in this project:

> ...acquaint the student with the physical arrangement
> of the library, the rules and regulations, and the
> special collections, and it should fix in his mind
> the general location of all major resources.

> ...detailed instruction in the use of the card
> catalogue including treatment of the more important
> filing rules, newspaper and periodical indices,
> selected works and a general introduction to the more
> important reference sources.[9]

These are basically the tasks outlined later. They would

certainly differ in amount of detail involved.

Although he claims it is the responsibility of the

librarian to devise and carry out such instruction, he later

states that, "only one librarian in four is sufficiently familiar

with classroom activities of her school to analyse the teaching

methods employed."[10] This would seem to indicate that the

librarian at this stage, and with present teaching methods,

would have serious difficulties in carrying out the necessary

library instruction. Neither does it seem that the teachers

are in a place to carry it out; "since a majority of the faculty

themselves have to be prodded into making better use of the

library, it is doubtful whether they could stimulate better

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[8]Frederick R. Hartz, "Library Instruction in the Secondary School," _Journal of Secondary Education_, Volume 41 (May, 1966), p. 201.

[9]_Ibid._, p. 203.

[10]_Ibid._, p. 204.

student use."[11] Perhaps this indicates a justification for

outside assistance of the nature proposed in this study.

In "School Libraries: A Look at the Future,"

Richard L. Darling, describes the increasing trend toward using

the school library as an instructional tool:

> Patterns of school library use have also changed. The
> traditional interpretation of the library as one of
> three teaching stations in the school has rapidly
> given ground to the idea that the library is a service
> agency supporting the whole curriculum. One result of
> this new idea is the abandonment of rigid scheduling
> of classes and the library. In today's school library
> program teachers encourage pupils to use the library
> individually and in small groups whenever the need for
> material arises, and bring whole classes to the
> library only irregularly and for specific purposes.[12]

This would seem to contradict the stand taken by Hartz above.

But the key word here, in this excerpt, is "encourage." Except

for the piece-meal instruction mentioned earlier in this

proposal, it seems, from my experience, that what the students

often get is "encouragement." This is not enough. He goes on

to say that:

> The time formerly used for extensive and often wasted,
> library lessons for entire classes, will be devoted to
> helping students locate materials or finding materials
> for them, to assisting them in assessing the value of
> materials for their assignments and to teach them the
> value strengths and limitations of each medium.[13]

Although the proposed instructional program does not claim such

a wide scope, I feel it is a step in this direction.

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[11]Hartz, op. cit. p. 204, ibid.

[12]Richard L. Darling, "School Libraries: A Look at the
Future," Maryland Libraries, (Fall, 1967), p. 12.

[13]Ibid., p. 12.

Ralph Perkins highlights the potential importance of this project when he says, "the most important question today is the unresolved problem of yesterday: how can people be taught to make efficient and intelligent use of the library's resources?"[14]

Perkins' studies show that teachers and prospective teachers often have limited knowledge of library usage. In connection with this he states that, "our experience has been that teachers do not know where the students should look for needed materials, nor do they have any inkling of what can be found."[15]

He suggests a possible procedure for library instruction; but, at the college level. He also offers thirteen conclusions from his studies. Four seem to be particularly pertinent to this particular project:

> While introductory lectures seem to be a necessity, the student learns to use the library by using the library.[16]
>
> ...students learn by doing and not by looking or by being lectured.[17]
>
> Library orientation is valuable to a student only at that specific and unpredictable period when he feels an individual need for such instruction.[18]

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[14]Ralph Perkins, "Realistic Library Orientation – A Necessity," Library College Journal, Volume 3 (Fall, 1970), p. 20.

[15]Ibid., p. 26.

[16]Ibid.

[17]Ibid.

[18]Ibid., p. 27.

Library test scores tend to be much higher than the
student's ability to make use of such library tools
as periodical indexes, reference books, and the card
catalogue.[19]

D. H. Revill, in "Teaching methods in the library; a
survey from the educational point of view," describes library
instruction methods using: the lecture; "notes"; text book;
programmed tests; tape-slide presentation; film strips; overhead
projector transparencies and tapes. This is a very helpful
survey. In connection with taped instruction, he states:
"Tape recorded material has been used to some effect. Many
libraries have used a portable tape recorder to provide a
personalized tour of the library."[20] He also discusses some
of the capacities and limitations of the various approaches.

Finally, Shores and Snoddy agree that a systematic
approach to research skills is essential. As they describe it:

Increasing maturity in the manner in which students
approach work independently, correct and efficient
use of a variety of informational sources, and student
initiative in obtaining useful information from
printed sources are the values gained from systematic
attention to research study skills.[21]

I would extend the sources beyond "printed" ones to all available
media.

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[19]Ibid., p. 25.

[20]D. H. Revill, "Teaching methods in the library: a
survey from the educational point of view," Library World,
Volume 71 (Fall, 1970), p. 245.

[21]J. Harlan Shores and James E. Snoddy, "Organizing and
Teaching the Research Study Skills in the Elementary School,"
Elementary English (October, 1971), p. 651.

Research Studies

A survey of the research studies in this area shows that relatively few actual controlled experiments have been carried out at the elementary school level, or, for that matter, at any other level.

One of the most extensive research projects was carried out by Patricia Knapp and others. Although this study is primarily concerned with the library from a sociological point of view at the collegial level, it does offer some guidelines in library instruction, especially in the area of research techniques. (See "Evaluation Studies," p. 20.)

Mildred L. Krohn, in her description of the Shaker Heights experiment, concludes that elementary school children can acquire, and use library research skills effectively. She feels that:

> individual ability to get information on a topic or problem independently, but under the general direction of the teacher, is now most important and results in the communication of ideas between (elementary) pupils and teachers as they share the use and presentation of appropriate materials.[22]

As a result of an experiment to determine "the influence of library work in improving English Language skills at the High School level, Hastings and Tanner conclude that, "it is indeed worthwhile for English teachers to provide systematic experiences in library reference work throughout the course

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[22]Mildred L. Krohn, "Learning Center Experiment at Shaker Heights," School Libraries (May, 1963), p. 28.

of instruction,"[23] since they found, for their groups, those
who received little or no formal instruction in grammar and
spelling, but were provided systematic work in the library did
better, statistically, than comparison groups who were treated
in the traditional manner. This would seem to indicate that
library training may be closely related to academic achievement.

In comparing two methods of library instruction based
on undergraduate students' abilities to develop bibliographies,
on their knowledge of library skills, and their attitudes,
Thomas Kirk found that, "the instructional method is superior
neither in its ability to teach the use of the library, nor in
its ability to promote an appreciative attitude toward the
library."[24] He suggests four other criteria in determining
which methods to use. These are: preparation time; flexibility;
student time; extra problems in use. The literature seems to
indicate that the main reasons for selecting instructional
practices are frequently based on other than instructional
criteria. The reasons for this are many and are frequently
obvious. But this is not strange in most educational matters.

Edward L. Peterman reported that an audio-tutorial
approach was very successful in teaching young college students

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[23]Dorothy M. H. Hastings and Danniel Tanner. "The
Influence of Library Work in Improving Language Skills at the
High School Level," The Journal of Experimental Education,
Volume 31, number 4 (Summer, 1963), p. 405.

[24]Thomas Kirk, "A Comparison of two Methods of Library
Instruction for Students in Introductory Biology," College and
Research Libraries (November, 1971), p. 47.

the use of the library. Pupils were provided with cassette

recorders with pre-recorded tapes on various aspects of library

usage. The student carried these around the library while

performing activities and manipulating materials in a real

situation as instructed by the tapes. He reported that this

procedure was not only successful in aiding the student to

perform better in the library, but also brought about a positive

attitude change towards using the library--as indicated in an

opinionaire and interviews, which were used to evaluate the

program.[25] In September, 1971, he reported that this method

was progressing very favourably and that,

> The principal of the Sierra Vista Junior High School
> in La Puente, Calif., took part in a study to see if
> a slightly modified program would work with students
> in his school. Thirty students chosen at random took
> the card-catalog tape and then the reference tape.
> They experienced no major difficulties in following
> instructions and completed the tapes as easily as did
> the college students. Moreover, they seemed to enjoy
> it.[26]

This seems to indicate that the method is transferable from

one age group to another.

But in reply (February 23, 1972) to my letter, in which

I sought more information on the subject, he was unable to

supply further details than that already reported.

However, although the evidence is scanty, I feel this

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[25]Edward Peterman and Jim Holschaw, "Library Orientation
in a New Mode," <u>Audiovisual Instruction</u>, February, 1972, pp. 63-4.

[26]Edward Peterman, "The Transfer of Orientation
Techniques to School Libraries," in "Library Orientation in the
College and University," Verna Melum, <u>Wilson Library Bulletin</u>,
(September, 1971), p. 63.

approach is a worthwhile one and similar to the one used in my experiment. This will be described below.

Evaluation Studies

The literature indicates that there are at least three main areas which should be tested, if possible, to determine success in library instruction. These are: Knowledge, Performance and Attitude. One of the most common procedures is to use a test such as the Iowa Work-Study Skills Test, which is based primarily on knowledge of library science information. Sometimes other tests, such as questionnaires or interviews are administered along with such tests. Pencil and paper tests are quite widespread, but performance tests of one kind or another have been used. The general feeling seems to be summed up by Knapp when she concludes that:

> The correlation between the composite scores on these tests (performance tests) and the Library Orientation Tests indicates that use of such standard paper-and-pencil tests is justified, because it is inexpensive and easy to administer, wherever a gross measure of fairly elementary library knowledge and skill is all that is required... Performance tests of the sort we used are feasible. They show considerable promise as tools to be used in further investigation of the nature of library competence, in the development of learning experiences designed to foster it, and in the study of the factors involved in its attainment.[27]

There are, of course, different types of performance

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[27]Patricia B. Knapp and Others, "An Experiment in Coordination between Teaching and Library Staff for Changing Student Use of University Library Resources," (Wayne State University, Detroit: Monteith College, 1964), p. IV-17.

tests, but here I am concerned with the general approaches as recorded in the literature.

Shores and Snoddy also agree somewhat with Knapp:

> Parts of the _Iowa Tests of Basic Skills Test W:_
> _Work Study Skills and the Work Study Skills_ booklet
> of the _SRA Achievement Series_ provide useful informa-
> tion about abilities and growth in certain of the
> research study skills. For others, published tests
> provide no measures.[28]

They continue with what might be considered a peculiar description of the need for tests of instruction:

> There is a real need for short, quick, diagnostic
> appraisal instruments in these skill areas that are
> less concerned with reliability than they are with
> data to provide hunches about needs as the instruction
> progresses.[29]

D. H. Revill indicates agreement with this when he claims that, "Validity and reliability are unable to be computed as there is a multiplicity of test performances each with its own reliability-i.e. on the individual rather than the group level."[30] This may be true for the pencil-and-paper test, but I feel it is not necessarily so for performance tests which measure primarily overt behaviour. This reasoning may also be a rationalization to get around the situation which Melum describes:

> Tests in library skills are hard to devise; they tend
> to include too much library science detail or to be
> too obvious. The work a student does for his classes
> is the practical test. It reflects his knowledge of

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[28]_Op. cit._, p. 649.

[29]_Ibid._

[30]_Op. cit._, p. 248.

library resources and is the best evaluation of the library instruction given.[31]

Since at the elementary school level we are not primarily interested in "library science detail," the best course of instruction and evaluation would be one concerned with the actual performance of the student, and with his attitude. Devising tests for this situation, as the literature indicated, involved locally devised performances and tests to measure these performances.

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[31]Verna V. Melum, op. cit., p. 61.

CHAPTER IV

EXPERIMENTAL DESIGN

General Assumptions

It was assumed that:

(a) The resource center would have materials which were selected on the basis of user levels of abilities and interests.

(b) Students and teachers used the center as a supplement to their learning activities carried out in the school.

(c) Pupils would have had some information retrieval instruction, but not of a systematic nature, requiring complete attainment of performance criteria.

(d) Centrally organized school resource centers and independent student use of them will increasingly be the rule rather than the exception.

(e) Knowledge and skills of information retrieval, although essential, are secondary to those of using and sharing the information to increase the individual's store of knowledge. They are not an end in themselves.

(f) Use of the resource center is usually a result of a task assigned by the teacher or otherwise arises out of the school's curriculum.

(g) School librarians, where they exist, do not have
the time or inclination to carry out library instruction, on
an individual basis. (This is especially true in the case of
classroom teachers).

(h) Teachers frequently overestimate their own and
their students' capability of obtaining desired information or
documents from a resource center.

Task Analysis

Pupils' search and retrieval tasks were to:

(a) Locate the main general sources of information
in the school's resource center (e.g. card catalogue, encyclo-
pedias, and magazines).

(b) Obtain from the card catalogue references to
resources by using subject citations which have been supplied.
Having located these references, the student judges whether
they are relevant to his needs, and chooses them in their order
of importance.

(c) List as many descriptors as he thinks suitable for
his subject and use these to find references in the card cata-
logue, making a note on the references and finding them in the
library. He then attempts to select the items thus found in
their order of importance.

(d) Survey the different types of encyclopedias
available, and categorize them according to the kind of informa-
tion each contains. He is to decide which volume is appropriate

for his topic. This is to be done by either, using the index provided or the alphabetical arrangement of the volumes. Finally, he is to locate the related item by finding the page or heading which is alphabetically arranged. If several items of information are obtained, they are to be put in order of importance or relevance.

(e) Survey the different magazines available, categorize them according to general interests (e.g. sports) and to flip through some of them. It is unlikely that the library has a "Junior Reader's Guide" so that if the student is not satisfied with the results of his search he indicates this by approaching the librarian or librarian's aide for help, or possibly some other person. He makes his selection in a similar manner as described above in book selection.

(f) If there are any other special sections or lists of materials (e.g. film strips, lists, picture file index) these will also be included as potential sources of information and treated accordingly.

NOTE: Choice of item is to be based on one or a combination of the following: title; familiarity with author; skimming summary of article; skimming table of contents; skimming index for clue word; skimming section headings; skimming summaries; skimming captions, as in film strips.

NOTE: Use of hardware is not to be considered a factor of importance in this experiment--if children wish to use a

projector or other piece of equipment, the observer or librarian will help him set it up.

Population Analysis

(a) The population was to be pre-adolescent school children. The sample of the population was sixty pupils chosen from an elementary school where English was the language of instruction in the Greater Montreal area.

(b) The school was chosen on the grounds of availability, willingness to cooperate, and on the quality of its library.

(c) The pupils were of both sexes ranging from ages 11 years to 13 years.

(d) It was assumed that they would possess the following knowledge and skills in varying degrees of proficiency.

    i. They would be able to find words or phrases by using alphabetical arrangement in a dictionary, encyclopedia, index, etc.

    ii. They would be able to use synonyms or other means for developing a descriptor list.

    iii. They would be able to recognize: titles; tables of contents; headings; summaries; pictures; graphics; and dates as possible means of evaluating the relevance of an article.

    iv. They have performed or attempted to perform most of the tasks listed above under 'task analysis' with varying degrees of proficiency and enthusiasm.

Behaviour Analysis

Cognitive

Behaviour would involve such cognitive factors as:

(i)   Recall - recall of the meaning of such terms

as: alphabetical order; Dewey Decimal

Classification; Call Numbers; Card Catalogue;

book spines; synonyms; key words; clue words;

guide words; index; table of contents; some

common abbreviations; and date of publication.

- recall of the process of gaining

information from books, magazines, encyclopedias,

pictures, film strip, and other pertinent media.

(ii)   Recognition - Pupils would be required to

recognize the deliberate pattern which has

been set up in the resource center for the

facilitation of information retrieval.

(iii)   Manipulation - Pupils would have to be able to

manipulate the different resources at their

disposal in order to gain sufficient and

relevant information to enable them to solve

their particular problems.

(iv)   Discrimination - It would be necessary for

students to discriminate between relevant and

irrelevant information using the clues stated

above.

(v) Problem Solving - Pupils must be able to translate study skills and knowledge into capabilities for solving different types of information retrieval problems, in terms of performances.

Attitudinal

It was hoped that the provision of interesting and meaningful instruction in the course of actually retrieving relevant materials would create or enforce positive attitudes toward library use.

Motor

Students would possess all the necessary physical capacities for motor performances. No new motor learning skills would be introduced at this stage.

Objectives

Having completed the instructional program the subject would be able to perform as follows:

(1) Demonstrate his familiarity of the school's resource center by locating the different sections of the library while solving his information problem.

(2) Having been assigned a topic, he was to circle the important clue words which he thought would lead to discovery of information on the topic. A dictionary or thesaurus or other source could be used as an aid, if he needed other clue words.

(3) Having decided on the necessary clue words, he would use them to search the card catalogue under "subject" to

locate items which seem relevant to his topic. On a card

provided, he would record the information he needed to locate

such items in the library.

(4) Having discovered and recorded the leads obtained

from the card catalogue he would proceed to the different areas

containing the items--the bookshelves, picture file, film strip

collection or other source.

(5) For each medium he discovered he would indicate

his ability to locate (and select) at least one item relevant

to his topic.

(6) Using his clue words the subject was also expected

to consult the encyclopedia best suited to his topic. Using the

index or alphabetical arrangement of the encyclopedia he would

find a minimum of one article of relevance to his topic.

(7) Using clue words he was to select magazines which

he thought were related to his topic, he would scan these using

table of contents and section and paragraph headings to enable

him to judge its relevance. If there was no obvious order to

the magazines, or they were unobtainable, he was expected to seek

help from the librarian or aide present.

(8) All retrieved materials were to be assembled on a

table in the library.

NOTE: No time limit was set; it was estimated that the whole

instructional program would be approximately one hour in length.

(9) After he had assembled retrieved materials he was

to examine each item and, using the guide provided on the
instructional tape, he was then to select and evaluate each
as a source of information by placing them in their order of
relevance.

The Library and Resources

This experiment required two major resources: a well
organized library and a light-weight cassette player with a
headset. The former was obtained through the cooperation of
the Lakeshore Protestant School Board, St. Claire, Quebec, and
Mr. Edwin Knight, Principal, Valois Park School, Valois. It
contained approximately six thousand catalogued books, an
encyclopedia section containing fourteen sets of encyclopedias,
a modest collection of filmstrips (catalogued) and a dictionary
section. All this was managed and organized by approximately
twenty volunteer ladies of the community. There was no
professional librarian, but help and advice was obtained from
a nearby media center which served the schools in the area.

The slides of Appendix H will give a fair idea of
these resources and the library in general.

The cassette player used was a Bell and Howell, Model
3020, Educator Series Cassette Tape Player (see Appendix G
for sketch of player). It was ideal for the experiment, since
it is made of a durable plastic, has a jack outlet on one side,
and an operating lever located on the other side which controls
the "Play", "Fast Forward", "Rewind", and "Stop", actions. The

volume control is conveniently located on the top. Especially helpful were the two metal tabs which permitted the application of a shoulder strap instead of the small hand strap which came with the player. These considerations were very important because they enabled the students to use the player with little or no inconvenience.

The script was recorded in a professional radio studio by two local radio announcers on reel to reel audio tapes at $7\frac{1}{2}$ i.p.s. These were then duplicated onto BASF cassette tapes.

The cost of the materials was as follows:

2 - Cassette Players at $29.00 = $ 58.00

2 - Mono Head Sets at $12.50 = 25.00

4 - BASF C60 Cassettes at $1.84 = 7.36

8 - Type "C" Alkaline Batteries
    at $0.80 = 6.40

Total (Provincial Sales Tax = $96.76
      not included)

An A.C. adapter was not purchased, although one was available. In order to save batteries another A.C. operated cassette player was used. The extra materials were purchased to be used as developmental and back-up systems.

Pilot Study

In order to discover and eliminate operational problems and any difficulties in understanding the content of the program, a pilot study was made involving five grade five students in the school where the experiment was to be carried out. This

also helped the observer gain familiarity with the observational procedures while using the performance evaluation sheets. This pilot study was carried out the week prior to the experiment.

Formal Experimental Design and Procedures

Formal Design

The independent variable was the prepared audio instruction procedure and the dependent variable was a change in the ability of those instructed to retrieve and select information from a resource center. The sample involved in the experiment was chosen from eighty-six, grade six students in a school in the suburban area of Montreal (see above). Sixty of these students were randomly assigned to two groups. Random sampling was carried out by matching student numbers with a table of random numbers.[1] One group, the experimental, received the instruction while the other group, the control group, did not. Comparisons were made between the two groups in connection with sex, age, and academic achievement and attitude. These checks indicate that the randomization technique used was a valid one. Sex-wise the procedure yielded almost perfectly split groups: the experimental group contained fifteen boys and fifteen girls; the control group comprised fourteen boys and sixteen girls. The ages of the two groups

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[1]Murray R. Spiegel, Theory and Problems of Statistics (New York: Schaun Publishing Co., 1961), p. 349.

were also evenly distributed: the mean age of the experimental subjects was 11.57 years; that of the control group was 11.62 years.

In order to determine if a significant difference existed in achievement between the two groups, the means of grade scores of both groups as obtained from a Stanford Achievement Test, Intermediate II, were subjected to a t-test. Table 1 summarizes the results of this comparison.

TABLE 1

ACHIEVEMENT

Group	N	Mean	df	Difference	t	p
Experimental	29	7.30	54	0.02	0.05	N.S.*
Control	27	7.28				

* At .05 level of confidence.

Thus there were no significant differences between the two groups as indicated by the grade scores on the Stanford Achievement Test.

The attitude test results, obtained a week prior to the experiment, also indicate that there was no significant difference between the two groups. Table 2 summarizes these results.

TABLE 2

ATTITUDE PRE-TEST

Group	N	Mean	df	Difference	t	p
Experimental	30	49.73	58	0.20	0.16	N.S. [*]
Control	30	49.93				

[*] At the .05 level of signifidance.

Null Hypotheses

It was hypothesized that there would be no significant difference between the experimental group receiving the taped library instruction and a control group not receiving this instruction in their ability to retrieve and select resources from the school library as based upon scores obtained from a performance evaluation of retrieval activities and retrieval and selection scores based on observers' ratings of retrieved materials.

It was also hypothesized that there would be no significant difference between the experimental and control groups in their attitude toward use of the library after the experimental group has experienced the instructional program. Judgement on this matter was based on the locally devised attitude test described earlier.

If the null hypotheses could be rejected at the .05 level of significance or less, the hypotheses as stated earlier would be accepted.

Instructional Procedure

As stated, both groups were given the attitude test one week before the instructional period. Prior to the students' receiving the instructions, the experimenter developed the research problems after analyzing the resources available on a given topic. If the resources were sufficient, the topic was chosen and instructions were prepared and written down in the manner shown in Appendix A. Also, instructions for the operation of the cassette were prepared and written down. The instructional content was written in script form and submitted to a professional narrator. The script is Appendix C and a duplicate cassette is also provided (see Appendix I). Instructional content was based on the task analysis described earlier.

Also, the weekend prior to the experiment, the library was checked to guarantee that most of the related materials were still available. Where there was too large a quantity of similar materials listed in the card catalogue, the "extra" ones were removed. Other than that the library environment was "as usual."

Having made the appropriate arrangements with the teachers concerned, the experimenter sent for each subject as they were randomly selected. Teachers were unaware of who would be called next. When the pupil arrived at the library he was greeted and given a brief explanation of "what was going on." He was then presented with the problem (Appendix A)

and the instructions for operating the cassette player (Appendix
B). If he had any questions concerning this matter, the author
helped him with brief explanations. As instructed, he took the
cassette player equipped with a shoulder strap and headphones,
and performed the activities required by the voice on the tape.
The length of the tape was seventeen minutes but the student
was required to stop it at certain intervals to perform tasks.
So, it took him on the average forty-five minutes to complete
the procedures. The observer remained in the background and
interfered as little as possible, except where such problems
as operation of equipment, rescuing subject from onlookers, or
explanation to library aides. Having performed the retrieval
activities, the subjects were instructed by the tape to analyze
the materials and select them for relevance. This experimental
procedure took five days to complete. The following week, both
the experimental and control groups were given similar research
problems. This was a performance test evaluated by two observers
as described earlier. This also took a period of five days.
At the end of the following week, the post-attitude test was
administered by the teachers to all grade six students - as it
was with the pre-attitude test.

CHAPTER V

EVALUATION METHODS AND PROCEDURES

Performance Evaluation

As a test to determine whether the student could
perform according to the instructional objectives stated
earlier, the pupil was given an information retrieval problem
of the type which requested him to find materials and
information on a given topic - for example, "Explain How
Volcanoes are Formed." This task was assigned to each pupil
in the manner shown in Appendix A, Assignment of Problem.

The selection of topics was made so that they would not
be too familiar to the students, (It was previously verified
with the teachers that the students had not had any special
assignments in the problem areas chosen), and at the same time
materials were available concerning these topics.

Not all students had the same problem, but it was made
certain that as each member of the experimental group was given
a problem, he was matched with a control member receiving the
same problem. The order in which pupils received the problem
was determined earlier so the evaluators would not know which
pupil was from which group.

In order to evaluate the pupils' performance as set out
in the objectives, an evaluation form (an outgrowth of the check
list described earlier in connection with Dr. Boyd's

observational procedures) was drawn up in coordination with Mrs. Yetta Garrelick who was developing a library game designed mainly to develop positive attitudes toward using the elementary school library.

The performance form (Appendix D) consisted of six statements concerning the subject's ability to use the main areas of the library and to decide which materials collected would be the best. The rater was asked to judge the performance of each subject as he carried out his retrieval and selection activities. He rated the student on a five-point scale where 5 was the ideal performance and 1 its opposite. Each of the six areas of evaluation were subdivided into subareas and were used to guide the evaluator. In the case of this experiment two evaluators were used. Both met beforehand and discussed what was expected of the student as set down by the objectives, and further defined in the addendum to the performance evaluation form. Each simultaneously observed and rated the performance of the individual members of the experimental and control groups. Later an inter-rater reliability coefficient (Pearson r) was obtained. It was .91. (This indicates that raters' judgements of individual subjects were highly consistent.)

If the pupil used the card catalogue he was evaluated on items 1, 2, 4, 5 and 6. If he did not he was judged on items 3, 4, 5 and 6. The evaluation is thus weighted in favour of the person who used an overall systematic approach - use of

the card catalogue was considered a very important systematic means of obtaining materials. However, as explained in the Addendum to Appendix D, it is recognized that pupils display systematic research behaviour without consulting the card catalogue. It was therefore determined that credit should be given for this. It should also be recognized that the ones most likely not to use the card catalogue are members of the control group, who did not receive the instruction. In this experiment the total number who did not use the card catalogue was four. All were members of the control group. The content validity of such a "test" is based on the criteria that the research problem was of the type which stimulated the pupil to carry out the measured research activities, and that the performances evaluated were based on the instructional objectives. Examination of Appendixes A and D provide verification of this.

Attitude Evaluation

The attitude test (Appendix E) was developed to be used primarily as a rough indicator of any change in attitude of the experimental group between the time prior to the experiment and the time after the treatment. It was developed from information obtained in the two-year study mentioned earlier, an analysis of different attitude tests[1] available and

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[1]For example, H. H. Remmers, ed. The Purdue Master Attitude Scales (West Lafayette, Indiana: University Bookstore, Purdue University, 1960).

in coordination with Mrs. Yetta Garrelick and Mr. George Iwasechko, who used it also in their experiments involving elementary student use of resource centers. Numerous items were considered and "tried out" on different university students for content, understanding and clarity. The resulting test items were then administered to one hundred and sixteen grade six and grade eight students in the Montreal area, according to the instructions of Appendix F, Teacher's Administration of Library Attitude Tests. Each student indicated the degree of his agreement or disagreement on a five-point scale since, "primary and most secondary school children find a five-point rather than a seven-point scale easier to handle."[2] At the same time the pupils' teachers were asked to judge whether each pupil had a positive or negative attitude towards using the library.

When the tests were returned, each subject's score was totaled. Then, an item analysis and the median test was applied, and a 2 x 2 chi-square test was run on the data.

The item analysis was based on a method suggested by J. D. Nisbet and N. J. Entwistle; "the test booklets of the trial sample are divided into three equal piles, the top third on total scores, the middle third, and the third who have the lowest scores."[3] In our tests the scores ranged from 19 to

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[2]B. Nottingham, "The Measurement of Pupils' Attitudes," Educational Research, Vol. 12, No. 3, June, 1970, p. 248.

[3]J. D. Nisbet and N. J. Entwistle, Educational Research Methods (London: University of London Press, Ltd. 1970), p. 88.

the maximum of 60 points. We then compared the differences obtained in each item for the top third and the bottom third. We obtained an index of discrimination which, if it was large, we could "assume (though with some reservations) that the items are measuring the same ability: they are at least working together (are intercorrelated)."[4] Table 3 summarizes the results.

TABLE 3

ATTITUDE TEST ITEM ANALYSIS

Item No.	Percentage Scoring 4 or 5 on each item[*]			Index of Discrimination
	Top	Middle	Bottom	
1	94	67	32	62
2	97	100	63	34
3	88	75	33	55
4	94	87	75	19
5	88	85	38	50
6	80	55	40	40
7	97	83	53	44
8	80	43	17	63
9	86	53	18	68
10	78	70	18	60
11	92	75	68	24
12	100	98	75	25

[*]Where Nisbet and Entwistle use "percentage of correct responses"[5] we substituted the top scores on the scale, 4 and 5, which indicated a positive or "correct" response to the item.

[4]Ibid.

[5]Ibid.

Although items 11 and 12 do not reach the discrimination levels of 30 per cent recommended by Nisbet and Entwistle as "justifying inclusion,"[6] we felt that they were "reasonably" close.

Item 4 was included because it was moderately high, and content-wise we felt it was very appropriate. A brief check on a correlation matrix being prepared on item inter-correlation seems to agree with these results.

The validity of the attitude scale was checked by comparing the scores obtained by the 116 pupils with their teachers' judgement of their attitude toward library use. A median split was performed on the scores. Thus, the teachers' judgements created positive and negative groups, and the median split divided the group into high and low groups. Table 4 registers the frequencies obtained for the respective blocks.

TABLE 4

TEACHERS' RATINGS AND ATTITUDE SCORES

	High	Low
Positive	56	40
Negative	2	18

$x^2 = 13.59$

A 2 x 2 chi-square test was run on this data as an approximate test to determine if the obtained distribution

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[6]Ibid., p. 89.

significantly differed from the theoretical distribution of equal medians.[7] The resulting x^2 was 13.59. This exceeded the critical value with 1 degree of freedom at the .001 level of significance. This would imply that, according to the teachers' judgements, this test measures the students' attitudes towards library use.

Attempts were made to have a test-retest procedure using the same 116 students but this did not work out. To check on the reliability the pre- and post-attitude test situation of the experimental situation was considered as a test-retest situation. Thus the pre-attitude scores of the control group were correlated with their post-attitude scores. The Pearson r thus obtained was .71, indicating a fair degree of reliability. There was an interval of three weeks between administration of the tests.

Teacher Assignment

In an earlier quotation, it was quoted that in measuring library skills, "the work a student does for his classes is the practical test."[8] In order to determine if the proposed instruction affected class work an academic performance test requiring library work arising out of the regular class routine was proposed. A pre-experimental

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[7]Maurice M. Tatsuska and David V. Tiedeman, "Statistics as an Aspect of Scientific Method in Research on Teaching," in Handbook of Research on Teaching, ed. by N. L. Gage (Chicago: Rand McNally & Company, 1963), pp. 164-5.

[8]Supra, p. 21.

assignment was to be compared with a post-experimental assignment. However, circumstances did not permit this procedure to be completed.

Retrieval and Selection

Perhaps an even more "practical test" would be an analysis of the materials retrieved and selected, since the variables in measuring the effects of library skills on class work are quite considerable. In this experiment the students recorded the items they retrieved. Each item retrieved was analyzed independently by the two observers and rated as Very Good, Good, Fair, Poor, Very Poor, as sources of information for grade six students on the given topic. If there was disagreement between the ratings, when they were compared, a rating half-way between was given to the item. Table 5 shows the resulting scale.

TABLE 5

ITEM RATING SCALE

Very Good	9
	8
Good	7
	6
Fair	5
	4
Poor	3
	2
Very Poor	1

Thus, if one observer rated an item as Very Good (9) and

another as Good (7) the item was rated as 8. Each retrieved item was given a rating and the retrieved score for each pupil was determined by summing his total points. This provided the basis for a statistical comparison between the control and experimental groups. It was hypothesized that the experimental group would retrieve more and better items than the control group after the instruction.

It was also hypothesized that the experimental group, having received the instruction, would be more capable of analyzing and selecting retrieved materials. In order to lessen the influence of the retrieval factor on the selection factor, and produce a selection score which discriminated between students' ability to select relevant material collected, the students' first choice was weighted by a factor of 9 — the largest quantity of items retrieved by any individual in both groups. His second choice was weighted by a factor of 8, his third by a factor of 7, until all choices were accounted for. Thus, if the student retrieved five items rated as 5, 5, 4, 4 and 3, he would receive an unweighted score (retrieval score) of 21. If another retrieved only three, but more highly relevant items rated as 9, 7, 5, he would also receive an unweighted score of 20.

As we can see from Table 4, if they chose the items according to their importance, Pupil B received a higher selection score even though he had less number of items. The weighted scores also discriminate better between people who retrieve the

TABLE 6

SELECTION WEIGHTINGS AND QUANTITY

Choice	Pupil A	Pupil B	Pupil A weighted Score	Pupil B weighted Score
1	5	9	45	81
2	5	7	40	56
3	4	5	28	35
4	4	-	24	-
5	3	-	10	-
	21	21	147	172

same quantity of materials of the same retrieval value, but chose items differently according to the item's relevance to the given topic. For example, if Pupil C retrieved items rated 8, 7, 5, 4 and Pupil D retrieved items rated the same, but selected them differently, he would receive a different selection score. This is shown by Table 7 below.

TABLE 7

SELECTION RATINGS AND CHOICE

Choice	Pupil C	Pupil D	Pupil C weighted Score	Pupil D weighted Score
1	8	5	72	45
2	7	7	56	56
3	5	8	35	56
4	4	4	24	24
	24	24	187	181

We can see that pupils who selected the items in order of their relevance, as determined by the observers, obtained a higher selection score.

CHAPTER VI

EXPERIMENTAL RESULTS

Performance Evaluation

One of the main questions to be answered by the experimental results was: Did the members of the experimental group obtain significantly higher scores on the performance evaluation, the retrieval rating and the selection rating? Table 8 below reveals that the experimental group received a mean score of 20.17 as compared with 15.52 received by the control group on the performance evaluation. The mean difference between the two is 4.65. This shows that the experimental group received a higher mean score than did the control group. To determine the significance of the obtained difference, a two-tailed t-test was performed. A t-ratio of 3.74 was obtained. With 57 degrees of freedom the probability of obtaining such a ratio by chance is one in a thousand. Therefore, the null hypothesis that states no significant difference in performance was rejected.

TABLE 8

PERFORMANCE TEST EVALUATION RESULTS

Group	N	Mean	df	Difference	t	p
Experimental	30	20.17	57	4.65	3.74	.001
Control	29	15.52				

Performance Time

Since no time limit was set for the performance test it could be argued that this was a significant factor in determining this difference. In view of this, a t-test was performed to detect any significant differences between the groups in amount of time spent on the performance task. The ratio obtained was 1.18 which with 57 degrees of freedom, did not prove to be significant at the .05 level.

Retrieval and Selection

Table 9 reveals that there was a significant difference between the evaluation of the items retrieved by the experimental and control groups.

TABLE 9

RETRIEVAL EVALUATION

Group	N	Mean	df	Difference	t	p
Experimental	30	26.60	57	6.32	2.38	.05
Control	29	20.28				

This indicates again that the experimental group proved to have performed better than the control group.

The experimental group also performed better in selecting relevant materials. The experimental group obtained a mean of 188.37 as opposed to 146.76 for the control group. A t-test showed that, with 57 degrees of freedom and a ratio of

2.88, these were significantly different at the .01 level. Table 10 summarizes these results.

TABLE 10

SELECTION EVALUATION

Group	N	Mean	df	Difference	t	p
Experimental	30	188.37	57	41.61	2.88	.01
Control	29	146.76				

Both the retrieval and selection results give added weight to the rejection of the null hypothesis that there was no significant difference in the performance of the two groups, and correspondingly give added weight to the acceptance of the related hypothesis stated earlier.

Attitude Evaluation

Statistics were employed to decide objectively whether there had been any change in the attitude of the experimental and control groups from the pre-experimental to the post-experimental conditions. Homoscedasticity, or homogeneity of variance, as was the case with previous statistical procedures was assumed. Pre-attitude test scores were compared with post-attitude scores for each group by means of a t-test for correlated samples. Table 11 summarizes these comparisons.

TABLE 11

ATTITUDE, EXPERIMENTAL GROUP

	N	X	df	D	t	p
Pre-	27	49.78	26	1.52	2.44	.05
Post-	27	51.30				

ATTITUDE, CONTROL GROUP

	N	X	df	D	t	p
Pre-	27	49.85	26	.41	.47	N.S.*
Post-	27	50.26				

* At .05 level of significance.

These results provide us with the information necessary to reject the null hypothesis that there would be no significant change in attitude after administration of the instructional program and the hypothesis concerning attitude is upheld.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

A survey of the literature has shown that this study
deals with a very important area that is in great need of
thorough experimental investigation and research. More and
more students, because of changes in the educational environ-
ment in the school are required to do independent study that
requires library usage. This has also been borne out in this
study by the reported observations of Dr. G. M. Boyd's investi-
gative team which studied elementary school children's use of
school libraries in the Montreal area. Both these observations
and the literature survey point out definite weaknesses in the
school's handling of this matter. My hypotheses arose mainly
out of my observations during the two-year, 1970-1972
investigative and observational study.. My hypotheses, restated,
were:

Elementary school children, when confronted with their
own search problems or one that is assigned, are unable or
insufficiently motivated to organize specific knowledge and
skills in order to locate and select relevant materials and/or
information from an organized body of resources in a limited
amount of time. It was hypothesized that one possible solution
to this problem is to design and develop a self-instructional

system which would train them to develop an overall strategy
to use their resource center effectively so that they may
retrieve materials and information which would be relevant to
their search. It was also hypothesized that the proposed
system would, because it enabled pupils to achieve success in
using the library, help develop positive attitudes towards use
of the library. Underlying these hypotheses was the belief
that for this type of learning situation the student would achieve
best by interacting with the actual environment in which he was
expected to perform, or "that students actually needed to use
the library to attain competency."[1]

An experimental design was then developed. For the
main part, it was what Campbell and Stanley call, "The Posttest -
Only Control Group Design."[2] They claim that this is a highly
acceptable form of design for educational research, when the
subjects are chosen randomly as, for example, was the case in
this experiment. They state:

> ... the most adequate all-purpose assurance of lack
> of initial biases between groups is randomization.
> Within the limits of confidence stated by the tests
> of significance, randomization can suffice without
> pretest.[3]

Nevertheless, in the related experiment, certain checks were
carried out on the randomization procedure used. These proved

[1]Mary L. Woodworth, op. cit., p. 171.

[2]Donald T. Campbell and Julian C. Stanley, "Experimental
and Quasi-Experimental Designs for Research on Teaching," in
Handbook of Research on Teaching, ed. by N. L. Gage, op. cit.,
p. 195.

[3]Ibid.

to support the stated claim for randomization.

Null hypotheses which stated that there would be no significant differences between the experimental and control groups with regard to ability to use the library and attitude towards it use as a result of the instructional procedure were rejected at the .05 level of significance or less.

The mode of instruction was the audio-tutorial approach. The experimental group was given a problem and explanations for use of a cassette player. Each member then performed according to instructions contained on the tape (see Appendix I) with very little help, which, when given, was mainly in the area of technical problems. Following this, the experimental and control group were given a search problem. Each member was independently evaluated on his performance.

Tools for the evaluation of attitude were locally developed in conjunction with Dr. Boyd and his research team. Also, attempts were made to establish the validity and reliability of the evaluation methods. The attitude test was of the pencil and paper kind (see Appendix E). It was administered to all the grade six students in the school in question one week prior to the experiment and one week after the experiment. Teachers did not know which students were to be involved in the experiment.

The performance test was the presentation of a search problem which required the pupil to retrieve articles from the library and to select the ones retrieved in order of relevance.

Their performance was evaluated by using the evaluation form
as reproduced in Appendix D.

Conclusions

From an analysis of the statistical data, it is
concluded that the instructional method has produced very
desirable instructional results, and that these results weigh
heavily in favour of accepting both of the experimenter's
hypotheses. The observations of the experimenter concerning
this audio-tutorial approach in action also agree with some
of the previously formulated learning characteristics of this
approach.[4] Summarized, these are:

-- this method offers a one-to-one instructional
situation which places control of the instructional pace in
the hands of the learner. (Instructional time on the part of
the experimental group varied from twenty minutes to seventy-
five minutes. The average was 45.4 minutes).

-- it reduces the amount of transfer necessary (as
opposed to such instructional procedures as slide-tape
presentations) because the students are involved in the actual
retrieval operations while learning and interacting with the
actual environment. The experimenter was truly surprised at
the extent to which the experimental subjects became involved

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[4]S. N. Postlethwart, J. Novak and H. T. Murray, *The
Audio-Tutorial Approach to Learning*, Second Edition (Minneapolis:
Burgess Publishing Co., 1969).

in what they were doing. The apparent concentration while performing even withstood the traditional forays of whole classes charging the library for their library periods. (The library functioned as normal, and no special consideration, such as cancelling library periods, was given for the sake of this experiment.)

-- because of the programmed and technological nature of this method, instruction can be available with relative ease when needed by the student.

-- learning is reinforced in the immediate instructional situation, the pupil retrieves a "concrete" object; and at the same time he is rewarded intrinsically. This, in turn, increases motivation to further use of the library.

-- and finally, as has been demonstrated, the success or failure of the instruction can be measured in terms of observation of overt behaviour and actual materials retrieved.

In the light of this, I tend to disagree that instructional methods do not vary in their degree of superiority of instructional effectiveness, but as Kirk has demonstrated, criteria other than instructional effectiveness are often used to determine which method to implement. Briefly interpreted, these are: Instruction preparation time; the student time necessary for the instructional program; flexibility of the program; the effect it has on the normal operation of the library.[5] Cost in dollars should also be added to this list.

_____

[5]Thomas Kirk, op. cit., p. 473.

Admittedly, these have been barely touched upon in this study. But it is the feeling that, since the proposed system is highly adaptive to most library situations with locally produced software, it will measure up favourably in most of these aspects. Indeed it is the opinion of the experimenter that these are the next steps to be taken up in an on-going, longitudinal study on this approach to library instruction.

APPENDIX A

ASSIGNMENT OF PROBLEM

Problem:

Hi, thank you for participating in my project.
Let's suppose that you have to find information in the
library in order to do an assignment or project to
"EXPLAIN HOW VOLCANOES ARE FORMED." Copy the problem on
your pad. Then, locate and choose the information you
would use for this assignment. When you have collected
the materials needed, bring them to your carrell and choose
them in order of importance by placing the best to your
right, the next best to the left of it, and the next best
to the left of that and so on.

You are not required to do the assignment, and your
work in this matter will not affect your class work in a
harmful manner.

APPENDIX B

OPERATION OF CASSETTE PLAYER

Operation of Cassette Player:

Place the cassette strap over your right shoulder
so that the player is on your left side or the other way
around if you are left-handed.

Before starting the player be sure to <u>check the</u>
<u>volume</u> level. (Lowest volume is indicated by a white stripe
on the volume button; highest volume is indicated by three
stripes.) Make sure that the volume is down as low as it
can go. You can slowly adjust the sound to your required
level after you have placed the earphones on your ears.

<u>To start</u> the player push down on the button on the
side of the cassette. To put the player in <u>fast forward</u>
press in on the button while it is in play.

<u>To rewind</u> the cassette press in on the button while it
is in the off position.

THE PLAYER MAY BE STOPPED, REWOUND, OR PUT IN FAST
FORWARD AS YOU NEED.

APPENDIX C

LIBRARY INSTRUCTION SCRIPT

Hello, welcome to your library. Do you

have a problem?...You do? Then, I'm here

to help you solve it. I'm going to guide

you in locating and selecting the information

you need.

Before we get started in our search, let's

take a survey of the important resources

in our library. Start by facing the card

catalogue, a very important aid in helping

you locate materials in the library...

(5 SECOND PAUSE) Facing the card catalogue?

...Good!... If you look to your left to

the front of the library you can see a stand

with the latest magazines on it...

(5 SECOND PAUSE)... To the right of that

is the vertical file...(5 SECOND PAUSE)...

then the office...(5 SECOND PAUSE)... Then

shelves with back issues of magazines, and

dictionaries...(5 SECOND PAUSE...) Continuing

to your right, along the sides of the walls

are located the story or fiction section and

the easy reading sections...(10 SECOND PAUSE)...

At the back of the library are located the

non-fiction books. These are arranged in a

certain order using numbers and letters in
what is called the Dewey Classification
System... We shall use these numbers when
locating the addresses of books through the
card catalogue. Also, at the rear of the
library is a special section for encyclo-
pedias...(5 SECOND PAUSE)... Now that we
have briefly refreshed our memories on the
important sections of the library...let's
get on with using them!

If you do not have your topic or problem
written down, or do not have a pencil and
paper, turn me off. When you have these,
turn me on again...(7 SECOND PAUSE)...
First of all, look carefully at the
statement of your problem... Circle the
important words...(10 SECOND PAUSE)...
I shall call these clue words. If you
have more than one clue word, consider
the most important one and look it up in
the card catalogue... This is done by
selecting the drawer which has the beginning
letter or letters of your clue word...
(5 SECOND PAUSE)... For example, if your
clue word were dog, then you would open
the "D" drawer. Very carefully remove your

drawer and bring it to a nearby table...
(10 SECOND PAUSE)... Flip through the cards
alphabetically until you come to your clue
word...which is written at the top of each
card related to your topic...(20 SECOND
PAUSE)... If your first clue word is not
recorded on any of the cards then try
another clue word. If you are unable to
think up clue words on your topic or another
related topic then a dictionary may help.
If you need to find clue words, turn me off
until you have done so. If not, let's
continue! (5 SECOND PAUSE) Begin with the
first card, and examine each card carefully.
If it has a green stripe along its top...
(3 SECOND PAUSE)...it refers you to a film
strip...(5 SECOND PAUSE)... If not, it may
say, "see also"...(5 SECOND PAUSE)... and
refer you to an item in the vertical file,
a magazine, or another area in this card
catalogue...(10 SECOND PAUSE) If it is
neither of these, then it refers you to a
book in the non-fiction or Dewey Classifica-
tion section. In this case note that there
is a number recorded at the left hand side
next to the author's name. Beneath the

number are the first three letters of the
author's name. These numbers and letters
are referred to as the call numbers. They
are the addresses of the books in the Dewey
Classification section and will appear on
the spines, or backs of the books, on the
shelves. Also recorded on the cards are
the title of the article, the author's name,
and a few words describing the contents of
the article. Now analyze each of the cards
and select the ones which you consider
related to your problem. When you have made
your selection be sure to record the informa-
tion which will help you locate it. If it is
a book, this should include: the Call Number;
the Author's Name; and the title of the book.
Got that?...Call Number...Author...and...
Title... If it is a reference to a magazine
be sure to write down: the name of the
magazine; the title of the article; the date
and year; and the page numbers. Got that?
Once again...For magazines, record...Name of
Magazine...Title of article...date and year...
and page numbers... If the card is a reference
to the Vertical File, write on your pad the
following: Vertical File; the topic under

which the item is filed; and the name of the
article. Again...Vertical File...topic under
which article is filed in the vertical file...
name of the article... If it is a film strip
card, record: the number of the film strip,
it begins with the letters FS; and its title.
This procedure will make it easier for you to
locate the articles and save you time. Now
turn me off, until you have selected the
cards and recorded the information necessary
to find them. Then turn me on again.
(5 SECOND PAUSE)
Now that you have written down call numbers,
authors' names, titles, page numbers, and
other information, let's proceed to locate
the articles. First, find the books in the
Dewey Classification Section at the back of
the library, by matching the call number,
author's name, and title with those on your
pad. When you have located these bring them
to your carrell. Then locate the other items
such as: film strips; vertical file materials;
and magazines. Bring these to your carrell
also. Pull my button to the off position.
When you have collected all the items turn
me on again. Good luck! (5 SECOND PAUSE

By now you may have collected a number of
items. But there is one important area
left to explore. That is...(3 SECOND PAUSE)
...right! the Encyclopedia section. Let's
go there now...(10 SECOND PAUSE)... You can
see several sets of encyclopedias here. Most
of them are general information encyclopedias,
that is, they cover many kinds of subjects.
One that is not so general is the Book of
Popular Science. It will contain mainly
information on scientific topics. Therefore,
it may be helpful if your topic has something
to do with science. If you take up the
volume with the number ten on it...(5 SECOND
PAUSE)...and open it to page 331 (15 SECOND
PAUSE) you will find the beginning of an
alphabetical index. If you examine the
entries, you will find the topics recorded
in alphabetical order. To the right of them
are given the number of the volume and the
page numbers dealing with those topics.
If your topic is related to science (that is,
concerned with such subjects as physics,
geology, chemistry or other branch of science)
then perhaps you will find your clue word here.
If so, record the name of the encyclopedia,

the volume number and the page numbers listed
in the index. Locate the appropriate volume
and bring it to your carrell. If this is
necessary, turn me off until you have done
this. If it is not necessary then perhaps
you can find a special subject encyclopedia
which deals with your subject. If you can
then turn me off while you locate it. If
none of these actions is required please
continue. (5 SECOND PAUSE) If you were
unable to find an encyclopedia dealing with
your subject, then a general encyclopedia
may be very helpful to you. One example of
this type is Comptons. It is the black and
white set...(5 SECOND PAUSE)... Found it?...
Good!... To find your clue word in this kind
of encyclopedia...match the beginning letter
of your clue words with that on the spine of
the appropriate volume. Select the volume or
volumes and bring them to your carrell. Turn
me off while you do this. Turn me on again
when you get to the carrell. (5 SECOND PAUSE)
You probably have collected an assortment of
books, encyclopedias, materials from the
vertical file and film strips...although it
is not necessary to have one of each type.

Before actually reading or viewing all this
material, you should analyze it and try to
decide which would be most helpful in doing
your assignment. The following hints may
form a guide in analyzing the books,
magazines and pamphlets. Have you a pencil
and pad ready?...(10 SECOND PAUSE)...
Locate the table of contents found near the
beginning of these items. To help you
remember write on your pad...Table of
Contents...(15 SECOND PAUSE)... Also check
the index, if there is one, at the back of
the article, to determine the pages which
deal specifically with your topic. Write
index...(15 SECOND PAUSE)... Then go to
the pages indicated by the table of contents
and index. Check to see if there is a summary
or brief description of these pages. If so
skim it to see if it is what you want. Write
...summary...(15 SECOND PAUSE)... Sometimes
there are paragraph or section headings.
Check these. Write...headings...(15 SECOND
PAUSE)... Also, check to see if there are
interesting diagrams or pictures... Write...
diagrams or pictures...(20 SECOND PAUSE)...
Finally, check to see if you can easily read

the writing. Write...able to read...

(20 SECOND PAUSE) Got those points written

down now? Once again they are:...Table of

Contents...Index...Summary...Headings...

diagrams, pictures...able to read.

With the encyclopedia you should pay

particular attention to headings...your

ability to read the writing...and the

pictures and diagrams... Some encyclopedias

have indexes in each volume. You can check

the film strip by holding it up to the light

or by using a previewer if one is available.

Pay attention to the statements or captions

and the pictures or diagrams.

Following these hints as your guide go over

the items you have collected. Once you have

done this place them in order of importance

from right to left. That is, place the one

you think best for your project on the right...

the next best to its left and so on with the

other items. Check the items with those

listed on your pad. Put a check mark next

to the ones you would be likely to use in

your assignment. This list we call a

bibliography.

Before you go through your analysis, I would

like to thank you for your attention and cooperation. So until we meet again... happy hunting!

APPENDIX D

PERFORMANCE TEST EVALUATION FORM

Name of Subject _____   Date _____

Topic _____   start _____
                                    Times
                                             stop _____

1. The subject demonstrated his ability to USE THE CARD
    CATALOGUE

VERY	CAPABLE	FAIRLY	INCAPABLE	VERY
CAPABLE		CAPABLE		INCAPABLE
5	4	3	2	1

2. The subject indicated that he was capable of using the
    information found in the card catalogue to FIND ITEMS in
    the library.

| VERY | CAPABLE | FAIRLY | INCAPABLE | VERY |
| CAPABLE | | CAPABLE | | INCAPABLE |

3. Although he may or may not have consulted the card catalogue,
    did he demonstrate his ability to LOCATE ITEMS in the
    different sections of the library?

| VERY | CAPABLE | FAIRLY | INCAPABLE | VERY |
| CAPABLE | | CAPABLE | | INCAPABLE |

4. The subject demonstrated his ability to locate appropriate
    volume in the sets of encyclopedias.

| VERY | CAPABLE | FAIRLY | INCAPABLE | VERY |
| CAPABLE | | CAPABLE | | INCAPABLE |

5. The subject demonstrated his ability to analyze collected
    items by examining them.

| VERY | CAPABLE | FAIRLY | INCAPABLE | VERY |
| CAPABLE | | CAPABLE | | INCAPABLE |

6. This ability (6) was further indicated by the subject's
    organizing the items in order of importance.

VERY	CAPABLE	FAIRLY	INCAPABLE	VERY
CAPABLE		CAPABLE		INCAPABLE
5	4	3	2	1

6. This ability (6) was further indicated by the subject's organizing the items in order of importance (SELECTION).

VERY CAPABLE	CAPABLE	FAIRLY CAPABLE	INCAPABLE	VERY INCAPABLE
5	4	3	2	1

ADDENDUM APPENDIX D

1. The observer's rating is based on some or all of the
   following factors:

   a. use of alphabetical order
   b. use of clue words
   c. noting call number
   d. noting author's name
   e. noting title
   f. paying attention to other information
   g. selecting and eliminating items

2. Factors in judging:

   a. matching call numbers, titles, authors with books,
      film strips, vertical file materials, magazines or
      other items.
   b. displaying recognition of the sequential order of
      books in the Dewey Decimal Classification System.

3. Consulting special sections: for example, areas on
   animals, vertical files, encyclopedias, magazines, film
   strip supply. (It is recognized here that many students,
   through previous use of the library know where to find
   materials in a systematic manner without consulting the
   card catalogue, or, having consulted it, resort to this
   practice.

4. a. Locating and using index, either in a special volume
      or index in each volume.
   b. Using alphabetical system.

5. a. consultation of table of contents
   b. consultation of index
   c. skimming section headings
   d. skimming summaries
   e. skimming articles

6. Placing them from right to left in order of importance
   and checking on pad which ones he would use.

APPENDIX E

ATTITUDE TEST

Student's Name _____   Date _____

		Very true of me........	Usually true of me......	Do not know.........	Usually untrue of me.	Very untrue of me.....
1.	I enjoy looking for information in the school library..............	( )	( )	( )	( )	( )
2.	I believe use of the library improves assignments or projects...	( )	( )	( )	( )	( )
3.	I feel lost when trying to find something in the school library....	( )	( )	( )	( )	( )
4.	Trying to find something in the library is a waste of time........	( )	( )	( )	( )	( )
5.	The school library is very helpful when I have to do assignments......	( )	( )	( )	( )	( )
6.	I prefer to use my own or class books rather than the materials in the library.....................	( )	( )	( )	( )	( )
7.	I don't like finding information on my own in the library..........	( )	( )	( )	( )	( )
8.	I use the library only when I really have to.....................	( )	( )	( )	( )	( )
9.	More pupils should use the library for assignments............	( )	( )	( )	( )	( )
10.	I could do my work just as well without the library..........	( )	( )	( )	( )	( )
11.	I wish I could use the library better............................	( )	( )	( )	( )	( )
12.	It is very important to know how to get information from the library	( )	( )	( )	( )	( )

APPENDIX F

TEACHER ADMINISTRATION OF THE
LIBRARY ATTITUDE TEST

All level six students will receive the test at the same time. Among these students will be the control and experimental groups. Each student will be handed a copy of the test and, using a pencil, complete it in the following manner:
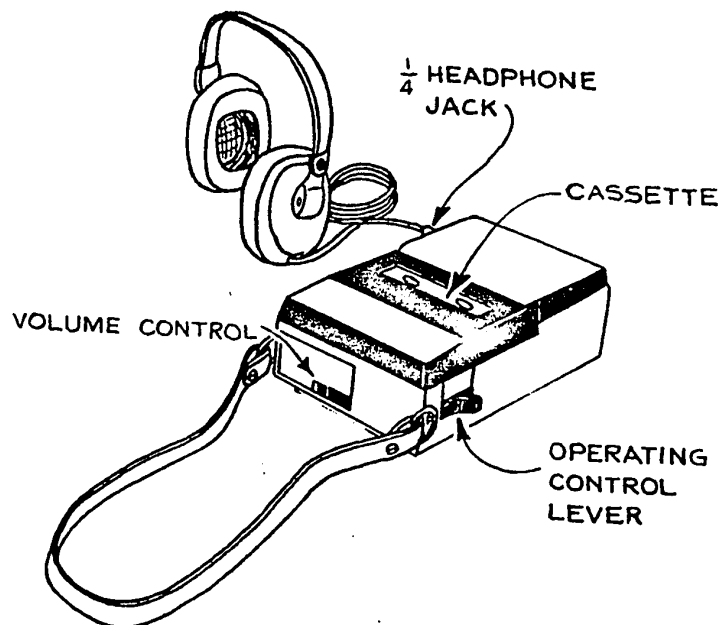
Teacher's instructions will be as follows:

On the sheet of paper handed please write your name in the top left hand corner, and the date in the top right hand corner. Read each statement carefully and place a check mark under the statement which most closely agrees with the way you feel. For example, on this transparency (Board)

	Very true of me.......	Usually true of me.....	Do not know........	Usually untrue of me...	Very untrue of me....
I like going to the movies	( )	( )	( )	( )	( )

is the statement "I like going to the movies." If you really like going to the movies a great deal, then you would check in the parenthesis under "Very true of me" (Teacher places a check mark in appropriate patenthesis.) If you generally like going to the movies then check the parenthesis under the statement "Usually true of me." (Teacher checks the appropriate parenthesis.) If the teacher finds this is sufficient explanation, then the student proceeds, and when finished passes it up to the teacher. If instruction is insufficient, then the teacher may fill in the other parentheses in the example above as in the above examples.
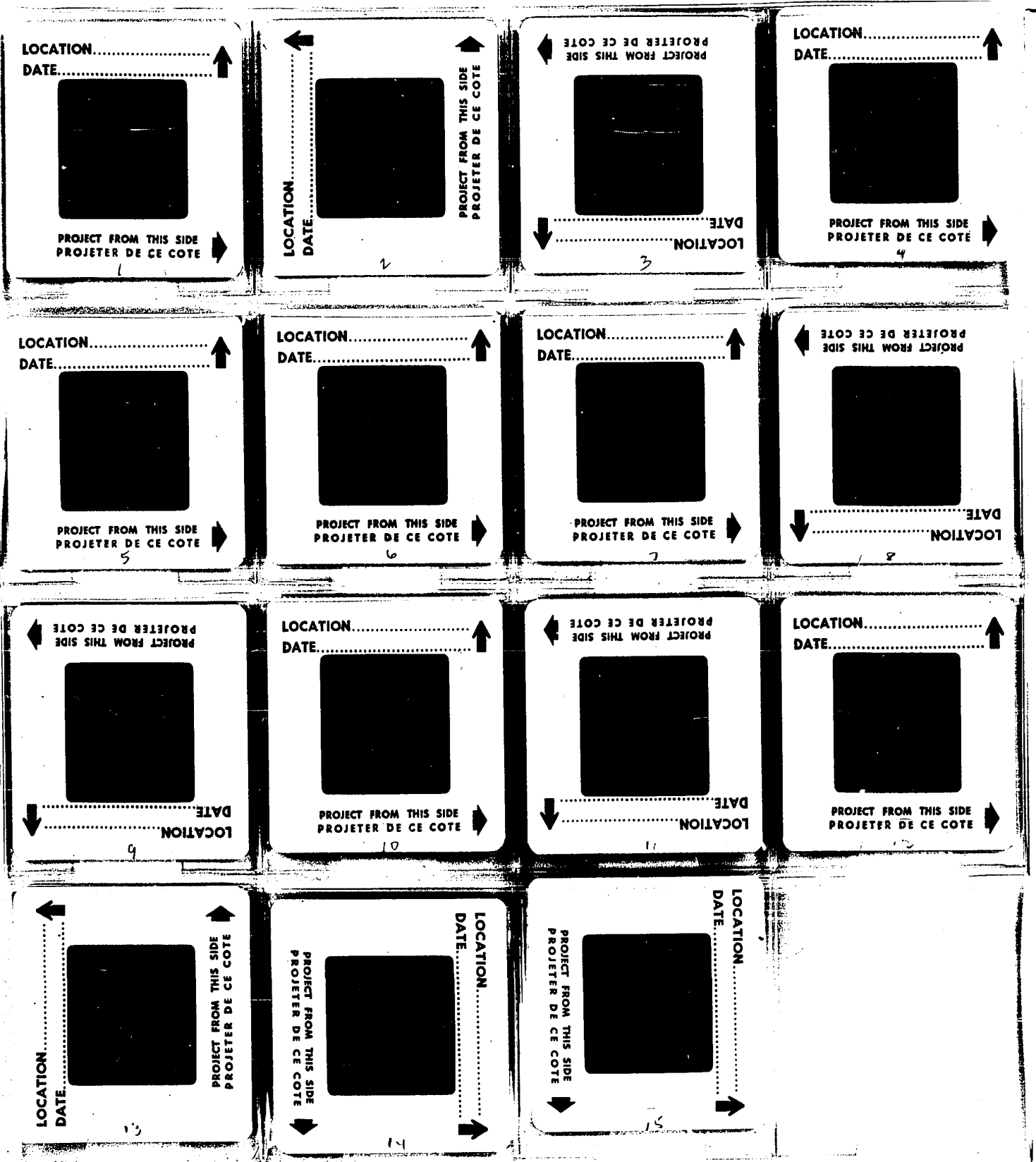
APPENDIX G

THE BELL AND HOWELL
MODEL 3020
EDUCATOR SERIES CASSETTE PLAYER

$\frac{1}{4}$ HEADPHONE
JACK

CASSETTE

VOLUME CONTROL

OPERATING
CONTROL
LEVER

APPENDIX H

SLIDES

LOCATION......
DATE......
PROJECT FROM THIS SIDE
PROJETER DE CE COTE
1

LOCATION......
DATE......
PROJECT FROM THIS SIDE
PROJETER DE CE COTE
2

LOCATION......
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PROJECT FROM THIS SIDE
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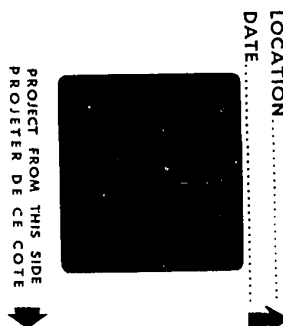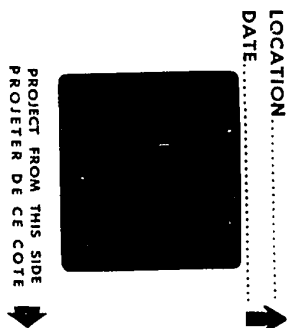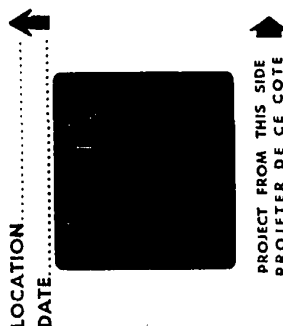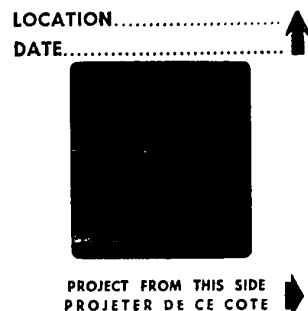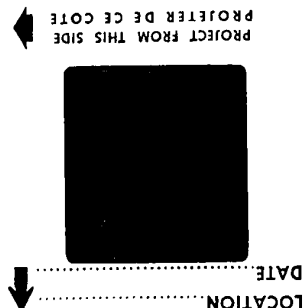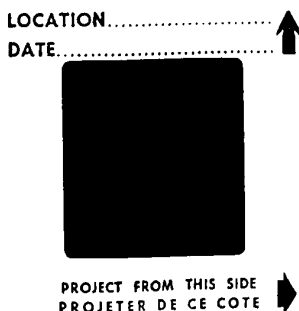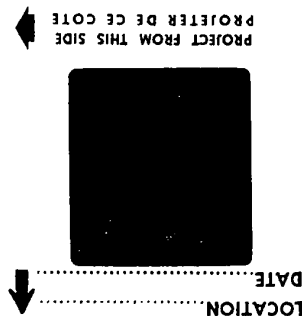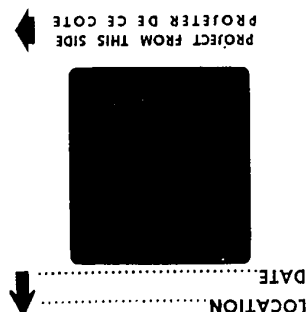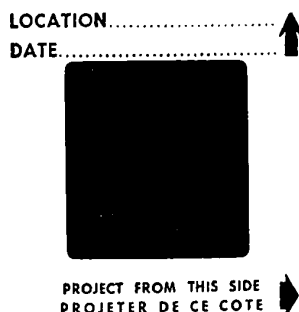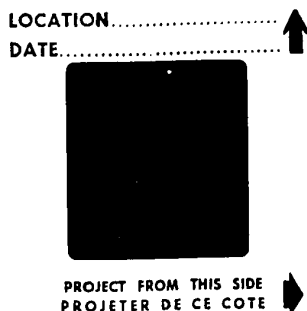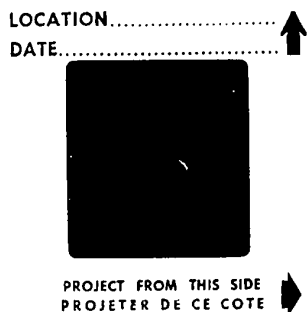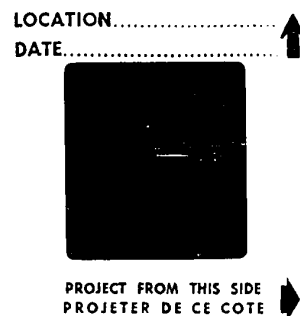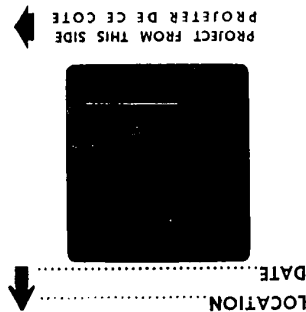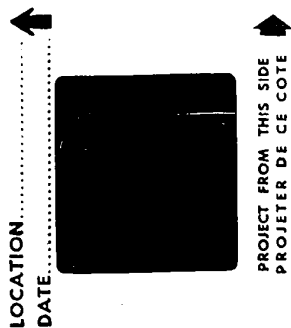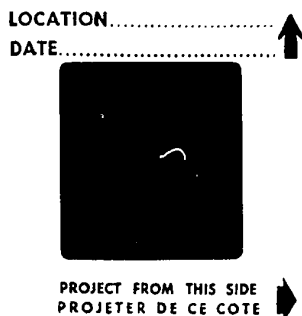
APPENDIX I

AUDIO CASSETTE

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