Videotaping as an instructional aid in children's optometric examinations

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Recommended Citation
Decenzo-Leitner, Teresa; Fahrer, Barbara; and Gibbons, Gerard, "Videotaping as an instructional aid in children's optometric examinations" (1983). College of Optometry. 646.
https://commons.pacificu.edu/opt/646
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Abstract
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Degree Type
Thesis

Degree Name
Master of Science in Vision Science

Committee Chair
Niles Roth

Subject Categories
Optometry

This thesis is available at CommonKnowledge: https://commons.pacificu.edu/opt/646
VIDEOTAPEING AS AN INSTRUCTIONAL AID IN
CHILDREN'S OPTOMETRIC EXAMINATIONS

by

Teresa Decenzo-Leitner
Barbara Fahrer
Gerard Gibbons

Thesis Requirement
Submitted to:
Dr. Niles Roth and
Dr. Norm Stern
April, 1983
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction - A. Innovation to Education</td>
<td>1</td>
</tr>
<tr>
<td>B. Effectiveness of Videotape as a Learning Tool</td>
<td>2</td>
</tr>
<tr>
<td>C. Examples of Videotaping in Other Programs</td>
<td>4</td>
</tr>
<tr>
<td>Methodology - A. Equipment</td>
<td>6</td>
</tr>
<tr>
<td>B. Setting</td>
<td>7</td>
</tr>
<tr>
<td>Results</td>
<td>10</td>
</tr>
<tr>
<td>Discussion</td>
<td>12</td>
</tr>
<tr>
<td>Appendix A - Questionnaire</td>
<td>13</td>
</tr>
<tr>
<td>References</td>
<td>15</td>
</tr>
</tbody>
</table>
I. Introduction

A. Innovation to Education:

There is no innovation in education which has been investigated and debated as thoroughly as instructional television. It has caused controversy and, in extreme cases, aroused gear or mistrust. These anxieties are readily overcome if television is concerned a means and not an end. It is an instrument that can be used to do certain educational tasks. Educators must forget the glamor and novelty of television and apply standards, philosophy, patience and comprehensive planning to use.

A well known characteristic of television is its ability to shape the educational message. Any videotape can have a flexibility that will allow its use for a variety of educational purposes (learning and evaluating interviewing technique, learning diagnostic skills and evaluating interpersonal and introspective factors) and for a variety of audiences.

No amount of equipment can magically produce a good instructor from a poor one or turn dull programs into exciting ones, but minimal amounts of video equipment can tailor instructional lessons to individual needs. A problem of even the most effective instructors is obtaining meaningful and timely feedback of the impact of their efforts. Videotaping is very useful in that a tape can be replayed until a student feels comfortable and sufficiently trained in regards to the material presented.

The camera has the potential for controlling and inflating specific content and skills. By carefully fusing close-ups with wide-
angle shootings, certain non-verbal and verbal cues are highlighted. In psychiatric training interviews the angle of the camera can be used to convey depression (an overhead angle) or hostility (taking the shot from below).²,³

The advantages then, of videotape over direct observation and other media includes: (1) videotape conveys more information than alternative media, particularly about relationships; (2) videotape is easily duplicated and edited and conveniently played; and (3) video conveys incomplete information, thus enhancing viewer involvement.⁴

B. Effectiveness of Videotape as a Learning Tool:

Videotaping as a means of an instructional tool is quickly emerging as a cost efficient system. By producing video tapes on library utilization, one study was able to show a 16% increase in utilization skills, while describing it as an economically inexpensive method.⁵

Another study utilizing cassette tapes as special instructional devices was able to demonstrate cost effectiveness in terms of: (1) substituting for manually staffed special help sessions, (2) freeing available office hours for more serious problems; and (3) utilizing facilities already available such that the production costs were minimal.⁶ This particular effort accounted for 70% of total TV tape usage at that particular university for 1978-79.

The unique educational attributes of videotape include: (1) a variety of educational material is immediately available through a library of videotapes; (2) any tape can be started, stopped or repeated at any time as necessary; (3) tapes can be used by a teacher with a number of students or by individual students; (4) the recordings are permanent and
the material can be reviewed as many times as desired; and (5) better use of teaching is possible as a teacher may devote more time to individual problems.²

Many studies have compared different forms of media as to their relative effectiveness in fostering cognitive learning. Although some studies such as that by Chu and Schramm⁷ found no apparent difference in learning from any instructional medium, whether it is television, film, radio, language, lab or programmed instruction under appropriate conditions other evidence points to overwhelming differences in cognitive retention. Ruth Machula presented one of three different forms of media each presenting the same content to students at the University of Illinois and the University of Michigan.⁸ Her results, through an analysis of covariance between pre- and post-test scores of cognitive learning, showed that subjects receiving audio taped version had learned significantly less than those receiving the video taped version and those receiving the printed version ranked slightly less than learning acquired from the video tape.

Elmo Roper and associates investigated opinions of various forms of mass media between the years 1952-1975 to assess the degree of credibility associated with one form of media as compared to another. There was an overwhelming preference for television, not only as the medium perceived as most credible, but also as the source of most news.⁹ Freneman concluded in a similar study that there is a strong suggestion that what can be seen (even if it is only a talking face) is more convincing or gives the impression that it is more easily verified than what is heard or read.¹⁰ The medium used can play an important role in
the reception of the content.

A comparative study between audiotape and videotape procedures concluded that the desirability and productivity ratings for replay were significantly greater for videotape than the audiotape conditions because of the visual cues afforded by this system. It is interesting to note that in this study where subjects viewed themselves they rated neither type of recording experience as negative or discomforting, but the recording procedure was slightly more distressing than the replay situation.\textsuperscript{11}

In any clinical work training videotaped interviews or examinations aid in the development of awareness of how individuals communicate. This includes an increased understanding of both avert and covert elements in messages, as well as the cognitive and effective components.\textsuperscript{12}

Aspiration is an impetus of learning and it can be generated by encouragement. Encouragement can be in the form of feedback from a prepared source (videotape, instruction manual) or from a teacher. The videotape instructor serves as a source of encouragement and as a role model of aspiration. A teacher who is physically present when students view a videotape can easily perceive and respond to the ambience of the learning experience. This teacher may serve to clarify and amplify the material presented as well as respond to the viewers' comments.\textsuperscript{2}

C. Examples of Videotaping in Other Programs:

Acclamations for the use of videotape for directing and recording in clinical work and training have grown tremendously since technology made this media available in the 1960's.\textsuperscript{11} Alger and Hogan went so far as to say that "videotape recording represents the technological breakthrough with the kind of significance for psychiatry that the microscope
has had for biology." It is quickly making headway in other programs also.

One program where videotaping has proven extremely successful is in preparing children and parents for treatment in a children's psychiatric clinic. Through an analysis of variance increased correct expectations concerning treatment were found. This, in turn, influenced the drop-out rate in that a high drop-out rate has been correlated to incorrect expectations. Also prepared families had fewer cancelled and failed appointments.

Another study evaluating the effectiveness of library instructional videotape showed an impressive 16% increase in library utilization skills among university students.

The University of Louisville School of Dentistry makes use of video feedback as a means to train faculty members, to initiate student discussion concerning office personnel situations, to train interviewing techniques to students, and as a testing method to evaluate a student's skills on a particular task. They feel that the video technique has expanded the dimensions of their educational program, maximized learning of students and improved instructional techniques.

Videotaped presentations have been used in some radiology departments at medical schools to bridge the gap between the shortage of academic staff and the increasing student demand for teaching diagnostic radiology. Within these programs it has been verified that the audiovisual tapes are very effective in providing students with knowledge and skills demanded for accreditation, but the most successful students were the most critical of this type of learning experience. The capacity of
television to enhance images with the close-up lens attachment was an important factor in its ability to convey detailed medical information and instruction.13

This study is designed to demonstrate the educational value of videotapes in optometric clinical instruction as it provides the uniqueness and diversified style of experienced clinicians. The tapes will be contained within the resource library at Pacific University College of Optometry and be available to students on a check-out basis.

II. Methodology

A. Equipment:

1 Hitachi Denshi color camera
1 Sony 2860 VTR with helical scan 3/4" format
1 Sony SM-11 noiseless lavalier microphone
1 Samson tripod and friction head
1 Sharp-Linytron plus 19" color monitor
1 Hitachi camera adaptor
1 Hitachi 28 mm - 200 telezoom lens
1 microphone stand
1 electovoice low impedance microphone
1 Smith and Victor photoflood assembly
1 box 3M 60 minute U-matic video cassettes
1 Sony RM400 electronic editor (remote)
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12. Sony RM400 electronic editor (remote)

B. Setting
2 rooms minimum required with two-way reflective mirror and window
1) examination room
2) videotaping room
B. Setting:

Two rooms minimum required with two-way reflective mirror and window:

(1) examination room
(2) videotaping room

(1) Examination Room:

Interaction with patient and clinician

Clinician wired with SM-11 microphone

Room light output (lumen) sufficient for video character and corresponding exam requirement

Patient will face mirror plan parallel

Clinician will orient towards patient, though slightly left center so that camera sees patient from a clinician's POV (point of view)

Shot characteristics; (over the shoulder clinician's POV); field of view zoom capability from 10-120

Camera distance from patient (through mirror) eight feet
(2) Video Room:

- Camera and appropriate equipment and monitor
- One camera technician
- No room illumination except residual from exam room
- Constant exam monitoring (recording) and appropriate shot alignment
- Appropriate levels video and audio and appropriate color correction video

Video product was mastered, edited and dubbed on location as necessary via Sony RM400 remote editor. Lights were pre-set to avoid distracting eye shadows on face of patient, particularly in regard to the orbit area. Clinicians wore (unless pre-arranged) Sony lavalier SM-11 microphone attached via tie clasp. Recommended exam time of less than one hour since convenient tape package time corresponds to this, though not necessary -- as editing and expansion of program can be done.

Vision examinations were performed on children of four distinct age groups: 0-2 years, 3-5 years, 6-9 years and 10-12 years of age. Four clinicians participated in the videotaped optometric exams. Following editing and tape mastering, the complete tape library includes:

<table>
<thead>
<tr>
<th>Footage</th>
<th>Age Range</th>
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<tbody>
<tr>
<td>1 hr. 15 mins.</td>
<td>0-2</td>
</tr>
<tr>
<td>2 hrs. 30 mins.</td>
<td>3-5</td>
</tr>
<tr>
<td>5 hrs. 45 mins.</td>
<td>6-9</td>
</tr>
<tr>
<td>3 hrs.</td>
<td>10-12</td>
</tr>
</tbody>
</table>

Two of the videotapes were randomly selected to be presented to the third year class of optometry (class of 1984) in the Developmental Vision course. Students in the study described their reactions to the
videotapes in questionnaires completed following the videotape presentation. They were given three choices of responses to statements addressing various areas of testing, such as exam delivery, patient report and sequencing of testing. Results are presented in the following section and the actual questionnaire is included in Appendix A.
RESULTS

Responses from the questionnaire were tallied and summarized as percentages for each question. Table 1 is a composite of questions and scores.

**TABLE 1**

<table>
<thead>
<tr>
<th>Questions</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>1. Will enable me to be more flexible in planning my sequence of optometric testing in order to increase effectiveness of my examination.</td>
<td>86</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>2. Will enhance my future patient interaction and communication.</td>
<td>68</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>3. Has allowed me to compare my instruction delivery with experienced clinicians and I feel I can now change some of my dialogue to improve my instruction delivery.</td>
<td>86</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4. Has directed my attention to areas of testing I had not considered before.</td>
<td>79</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>5. Points out some aspects of my prior examination routine that I can improve upon.</td>
<td>50</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>6. Will be helpful in assisting me in developing a better case history.</td>
<td>75</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>7. Has given me more direction in executing a children's exam prior to viewing tapes.</td>
<td>89</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>8. Has given me insight on how to use my time more effectively in obtaining data against a child's short attention span.</td>
<td>50</td>
<td>32</td>
<td>18</td>
</tr>
<tr>
<td>9. Has made me aware of specific developmental tests I had not heard of before.</td>
<td>54</td>
<td>42</td>
<td>4</td>
</tr>
</tbody>
</table>

A = Yes  
B = No  
C = Unable to determine
To summarize the students' assessments overall, the data shows a generally positive response in that students felt the tapes were helpful in their clinical learning experience in all the areas investigated. Specifically, the areas showing a 75% or greater positive response included: flexibility in planning sequencing of optometric testing, improving instructional delivery, expanding in new areas of testing, developing a better case history, and direction in executing a childrens' exam.

The students' reactions to the tapes emphasized two areas: valuable practical learning experience and a desire to see tapes involving diagnosis and remediation of the specific cases. With respect to the latter of the two areas, instructions on the questionnaire stated that the tapes were meant as a tool in improving the mechanics of an examination not as a means of identifying abnormal findings. The data then suggests a possible area for additional thesis work, that being videotaping of abnormal findings, case analysis work-up with diagnosis and specific recommendations. The students also expressed a desire to have themselves tapes to evaluate their examination performance.

Typical comments included: "Idea is super! It would be more beneficial to have an introduction of why child is having the exam." "Very valuable, worth my time and money." "Actually seeing a patient is infinitely more valuable than writing down some new list." "Tapes would be useful if clinician discussed diagnosis and remediation at the end of the tape."
DISCUSSION

Looking at videotapes of experienced clinicians enabled the observers to improve in several areas, including instruction delivery, flexibility in planning sequence of optometric testing, future patient interaction and communication and developing a better case history.

Overall the students indicated the tapes are a valuable teaching tool, particularly in contrast with traditional teaching methods. Executing an optometric examination such that it is effective, efficient and well organized demands more than an academic in-classroom kind of approach. Videotapes can then offer a middle step in making the transition from classroom to clinic.

Recommendations for further research stemming from this thesis include two areas:

1. Videotaping of children's exams to specifically identify and differentiate abnormal findings from normal, including discussions of diagnosis and remediation on tape.

2. Videotaping interns performing examinations, such that they can view themselves in an attempt to evaluate their delivery and clinical skills.
APPENDIX A

QUESTIONNAIRE

The videotapes you have viewed were submitted as part of a thesis requirement. Your evaluation is requested as a tool in assessing these tapes as an instructional aid. These tapes are not meant as a means of identifying abnormal findings but rather a tool in improving the mechanics of an examination.

Viewing the tapes:

<table>
<thead>
<tr>
<th>A(Yes)</th>
<th>B(No)</th>
<th>C(Unable to determine)</th>
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</table>

1. Will enable me to be more flexible in planning my sequence of optometric testing in order to increase effectiveness of my examination.

2. Will enhance my future patient interaction and communication.

Has allowed me to compare my instruction delivery with experienced clinicians and I feel I can now change some of my dialogue to improve my instruction delivery.

4. Has directed my attention to areas of testing I had not considered before.

5. Points out some aspects of my prior examination routine that I can improve upon.

6. Will be helpful in assisting me in developing a better case history.

7. Has given me more direction in executing a child's exam than prior to viewing tapes.

8. Has given me insight on how to use my time more effectively in obtaining data against a child's short attention span.

cont'd....
9. Has made me aware of specific developmental tests I had not heard of before.

Overall how do you evaluate these tapes as an instructional aid?

1 2 3 4 5 6 7 8 9

Please elaborate and add any further comments you feel would be constructive.
REFERENCES


