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The use of video technology in health care

Shari L. Scoggin
University of Northern Iowa

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Abstract

In 1947, at Johns Hopkins Medical School, the first recorded use of television in medical education took place. Five surgical procedures were viewed via television by those physicians and health professionals attending a meeting of the local medical and surgical associations. Seven hundred fifty participants watched a fuzzy black-and-white picture and heard the surgeon explain his technique as he worked. (Van Son, 1982, p. v)

THE USE OF VIDEO TECHNOLOGY IN HEALTH CARE

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Shari L. Scoggin
University of Northern Iowa
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Roger A. Kueter

7-19-89
Date Approved

Director of Research Paper

Robert R. Hardman

7/20/89
Date Approved

Graduate Faculty Advisor

Sharon E. Smaldino

7-20-89
Date Approved

Graduate Faculty Reader

Roger A. Kueter

7-24-89
Date Approved

Head, Department of Curriculum and Instruction

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CHAPTER I

Introduction

In 1947, at Johns Hopkins Medical School, the first recorded use of television in medical education took place.

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> (Van Son, 1982, p.v)

By 1963, according to a national survey, "47 of the 88 U.S. medical schools and 30 of the 48 dental schools were using television in some way" (Van Son, 1982, p.vi). Up to the late 1960s, the main use of television in hospitals was the documentation of psychiatric patients. It was found to be an effective means of recording and preserving patient progress because it had instant playback capabilities, it could be erased easily and was inexpensive enough to use routinely (Van Son, 1982).

With the 1970s and the implementation of private television in many types of businesses, the technology increased and the price dropped enough to make it relatively affordable to health care facilities. The value of video technology in medicine had already been established, so it

was at this time that video began to be considered cost-effective.

Since that initial wave of video implementation, many health care facilities have recognized the value of video technology and have adopted a variety of different systems to meet their medical and managerial needs. From teaching hospitals and medical centers to small town community hospitals and mental institutions. There are as many different types of systems in use as there are health care facilities using video. Several institutions, cited later in this paper, would have to be classified as avid video users while others just dabble. Some of the applications explored will be very unique.

In an attempt to make the extent of video in health care apparent, video technology usage will be broken down into six categories: training, education, patient use, medical treatment, management and general use. The examples presented can only serve as a sample of current uses of video in health care, as new technologies and implementations for those new technologies are being developed and tested at such a rapid rate.

Training applications of video in health care include job training, student training, orientation, and workshop and lecture taping. Education is enhanced through video by offering a means of teaching surgery and other subjects that are very timely and typically difficult to present due

to the critical nature of the experience. Video is used as a means of providing physicians with continuing education, as well as many other educational uses.

Patient use applications include patient orientation, religious programming, and patient education. With these applications of video, instructors and nurses are more free to attend to other duties.

Medical applications of video technology are growing rapidly. Video is being used in operating rooms, with psychiatric patients, and to measure patients' progress.

As in any business, video has a place in the management of a health care facility. Documenting case materials, recording meetings, management development, and helping employees to keep in touch with changing regulatory requirements, products and policies are just a few uses of this technology. General applications include videotaped patient referral reports, recording of special events, and staff entertainment.

Through these six categories, the uses of video will be examined. Who uses video, its applications, and why video is chosen will also be examined. Video has proven its value to the business community, and now health care administrators are recognizing the unique qualities that video can provide.

Video technology possesses qualities unlike all other media that make it specifically useful to the health care

field. These unique qualities include instant playback, ease of operation, and sending and receiving capabilities. After the presentation of how video is being used, it will be quite clear why video continues to grow as the media choice of health care professionals.

CHAPTER II

Review of Literature

Video Users

Who is using video technology in health care? Large, small, and rural hospitals, mental institutions, nursing homes, medical research facilities, teaching and university hospitals and other types of health care facilities are taking advantage of what video has to offer. The following examples are health care institutions who have found video suits their needs.

The first example of a health care institution that uses video is a children's hospital. Blythedale Children's Hospital in Valhalla, New York has been using video since 1968. Programming goals for the hospital's video technology are predominantly research and training, and they sell the tapes they produce to help support their operation (Barwick & Kranz, 1975).

An example of a medical school that uses video is Duke University Medical Center in Durham, North Carolina. Duke provides programming in education and patient care to its staff, as well as utilizing an ITFS system linking their system to the V.A. Hospital and the nearby community hospital (Barwick & Kranz, 1975).

Providing continuing education for their physicians and educational activities for all of their health care personnel via workshops, courses, and conferences is the

way in which the Milton S. Hershey Medical Center in Hershey, Pennsylvania implements television at their facility. This instruction is offered predominantly through video cassette viewing (Barwick & Kranz, 1975).

A good example of television utilization in surgery is at Wolfe Eye Clinic in Marshalltown, Iowa. The clinic uses video technology to enhance the view of the minute operating area during eye surgery by allowing the surgeon to view the eye, greatly enlarged, on a monitor. The surgery is simultaneously recorded for the patient and/or surgeon to review (Woodleif, Personal Communication, 1989).

An example of a videodisc application in health care is from a Canadian university. Due to the large amount of information that medical students are required to learn, the University of Western in Ontario has initiated a move away from teacher-centered methods of learning and implemented a computer-based instruction system. This system includes a videodisc player at each of sixteen work stations. Western hopes in the future these stations can be used to participate in interactive clinical simulations (Canadian Medical Association Journal, 1988).

And finally, at the Massachusetts Institute of Technology in Cambridge, Massachusetts, they are creating a visual-database that will provide campus-wide access to neuroanatomy visuals and data. This visual-database will include "thousands of slides available at various

magifications, video sequences of brain dissections, three-dimensional models, and a glossary" (Rizzolo, 1989, p.407).

As the various applications of video technology are explored, the number and type of video users will increase. These unique implementations are but a scratch on the surface of the variety and amount of uses for video in the health care field. From the casual user who videotapes worshops with a camcorder, to the more committed user with a three-camera, 1-inch format studio for weekly live broadcasts, there is a level of involvement for all facilities.

Video Applications

The application of video in health care, broken down into the six previously mentioned categories, is always changing and growing. Innovative media specialists are developing new uses constantly. They are examining the technology's unique characteristics and applying them to their facility's needs and problems.

Training

Training is greatly enhanced by the use of video. Whether you are dealing with specific job training of employees, orientation of new personnel, student familiarization with your facility, or performance appraisals, video can make the task easier, more

standardized, more interesting, and can free trainers to perform other duties.

Video advantages in training health care personnel include being able to present material that otherwise might be difficult to present. Video's ability to magnify allows for the examination of details and subtleties, and simulations allow personnel and students to increase their judgement skills before working with actual patients (Van Son, 1982).

Video has been found to be effective in basic and advanced skill training. The student can learn from a step-by-step approach. Through viewing the recording, the learner can evaluate their performance for tasks such as patient relations, listening, and public speaking. At Tucson Medical Center, they use video for feedback and modeling. They videotape participants holding performance evaluations then play back the recording for critiquing (Cartwright, 1986).

Management development is also possible through television. "Along with an increased demand for employee training, new technologies used in the health-care field made ongoing training all the more important for nonnursing and managerial employees - department heads, head nurses and first-line supervisors" (Lee, 1983a, p.73).

Training is an ever-present event. The same information must be presented in the same way to people on all shifts, possibly at more than one site. Video technology is a positive way to accomplish this. Training programs can be developed to serve your exact purpose, in your facilities, addressing your policies, with regard to your limitations and philosophies. This custom-designed program can be used and resused as long as the material stays current. It can be recorded for playback later, sent to rooms in your facility by cable, or broadcast to other locations by cable, microwave or satellite. Recorded training programs can be available on an individual basis for those who need special accomodations made.

Safety training is yet another area in which video has been found to have a strong impact. "Video dramatically models safety situations and drives important safety points home" (Cartwright, 1986, p.24). Television can help a subject achieve a greater impact on an audience and when safety is the subject, the impact can't be too great. "Video is a medium that presents 'actualities': slice-of-life situations, role-plays or other programs not involving elaborate techniques or astounding locations" (Smith, 1983, p.40). When it's important that the message be received precisely as it was intended and the audience should understand the ramifications of performing a task incorrectly, television has potential.

Education

Education of health care professionals, paraprofessionals, and students is served by television in many of the same ways as training, and more. Interactive video and interactive instructional television are two electronic methods of instruction available to the teaching facility. Through interactive video, instructors have the option of making the lessons individualized. With the implementation of interactive instructional television the hospital could receive or send classes with the local university or any other teaching hospitals. As was mentioned earlier, some hospitals utilize an ITFS system for exchange of information.

One recent application of video technology in health education is a program developed by David Hon and the American Heart Association which trains the viewer how to perform CPR. It is taught through an interactive television system including a videodisc player, a minicomputer, a monitor, and two mannequins with special sensors that will detect if the student is administering CPR correctly. The program reduces a two and one-half hour lesson into one hour of real time instruction. Potential buyers of the system include hospitals, police and fire departments, schools, and the military (Van Son, 1982).

Nursing education is a major use of video in health education. The need for interactive courseware in nursing education has been recognized and the Nursing Education Branch of the U.S. Division of Nursing has awarded grants to agencies for the creating and evaluating of interactive video software.(American Journal of Nursing, 1987).

The continuing medical education of physicians is also enhanced through the use of television. Cable narrowcasting via satellite on networks like the National Nursing Network and the Hospital Satellite Network, provide not only health information but also continuing education credits.

The American Medical Association has created a programming service called American Medical Television, which provides two hours of programming every Sunday on the Discovery Channel. Programs on ethical, clinical, regulatory, and socioeconomic issues are being presented by the service. "Dr. James Sammons, the AMA's executive vice-president, thinks the programs will have a major impact." He says, "Television is the latest example of the AMA's committment to good medicine through continuing education" (Lloyd, 1989, p.309).

Continuing education for hospital staff is also an important task for television. With current video technology, workshops both in-house and out-house can be recorded and presented to all shifts. Lutheran General of

Parkridge, Ilinois offers a variety of training for their personnel and students including clinical training for medical students, nursing, patient and community education, training for allied health professionals, and nursing staff development (Lee, 1983a, p.50).

The variety of uses of television in health care education is great. Some of these uses include curriculum support, lab demonstrations, supplements to lab assignments, demonstrations of surgical procedures, procedure review, instructor review, and mirror-image performance feedback.

Patient Use

Patient education is probably the most important use of video by patients. In the last ten years there has been a shifting emphasis toward patients taking an active role in their health care. This interest in participation has created the need for a great deal of patient education.

> At the Virginia Mason Medical Clinic in Seattle, patients are routinely taken to a Patient Information Center to watch a videotaped program about the disease they are suffering or the surgery they are about to undergo. Some of the tapes actually show the surgical procedure. Others, shown to patients

> after surgery or other treatment, explain how the patient should care for himself at home (Deluca, 1980, p.236).

Having information about the treatment or surgery they are about to undergo makes the patient feel in control. Another example of the growing use of video in patient education is:

> In the U.S., the number of hospitals with departments to coordinate inpatient education programs rose nearly 65% between 1975 and 1978, according to the American Hospital Association Survey. Nearly one-fourth (1,484) of the hospitals surveyed reported using video cassettes or closed-circuit television in patient education programs--an increase of 160% from 1975. (Not limited to patients, nearly 71% of the reporting hospitals indicated that they have programs for hospital employees, 55% for nonpatients, and 15% for business). (Van Son, 1982, p.10)

There are times when a preproduced program about certain illnesses, injuries, treatments, or surgeries can be helpful and comforting to the patient and their family. "One measure of teaching's importance is that the Oncology Nursing Society, in 'Outcome Standards for Cancer Nursing Practice', devotes the second of 10 outcome standards to

this information. This mandates nurses' teaching responsibility. Such patient education plays an important role in reducing anxiety" (Engelking, 1987, p.1439).

Another use of video technology for patients is in patient orientation. Orienting each new patient and their family is a long and repetitive task for an instructor. A videotaped message assures that each patient receives the same information about the hospital. After carefully designing the program, you know that each new orientation session will represent the hospital in the way that your experts have determined is best. Also, it can be viewed in private at the leisure of the patient.

Other applications of television in patient care include the documentation of treatment. The patient is able to see progress, which can be important if the treatment is spread out over a long period of time, the doctor is able to see that recovery or rehibilitation is progressing as planned.

If the health care institution has a religious affiliation, as many do, then religious programs as well as other programs designed to divert the patient's attention can be purchased, produced, or broadcast.

Medical Treatment

The most fascinating application of video technology in health care is in the area of medicine. Treatment is the most critical job that video will perform in the health care

field. It can be used to provide physicians where there are none, second opinions, or consultations. Television is used in some rural areas to bring in specialists via microwave or satellite. In Arizona, an experimental project exploring the diagnosis of patients long distance was sponsored by the National Institute of Health in conjunction with the National Aeronautics and Space Administration. The site of the experiment was the Papago Indian Reservation. Since the Indian Hospital was more than a hundered miles away, paramedics traveled in a special clinic on wheels and provided information to physicians by computerized records and television cameras hooked up to X ray and blood pressure machines. The physicians would provide a diagnosis and the paramedics would administer the treatment (Van Son, 1982).

"Videotape recording is often used in physical therapy, not only to document the work that has been done but to record and demonstrate the patient's progress over what is often a long period of time" (Deluca, 1980, p.237). It's much easier to measure progress over long periods of time if you can see it each step of the way. It's also more encouraging for the patient to see the progress occur.

Video is often used in surgery. A camera is mounted above the area being operated on and fed to a nearby monitor. Cameras are even attached to microscopes hanging over the patient. At Wolfe Eye Clinic, the surgeries performed there are so small and precise that using video

is standard procedure. By viewing the surgery from a monitor the image is greatly enlarged. Occasionally the nurse is asked to turn off the color on the monitor as the contrast of black-and-white makes the eye easier to see. The surgery is not only sent to the operating room monitor but also can be sent to a private waiting room monitor where the family of the patient can view the surgery live. Surgeries at the clinic are videotaped as well so the patient can view the operation and the surgeon can review the procedure (Woodleif, Personal Communication, 1989).

As mentioned earlier, one of the first uses of video in health care was in the field of psychiatry. Patients and physicians review recorded sessions and evaluate the behaviors expressed.

There are many individual and unique uses of video technlogy in medicine. Each facility uses it in a different way but all who use it recognize the value of it in many applications.

Management

A growing application of video in the management of a health care facility or office is that of malpractice prevention. The medical profession is aware and concerned about the possibility of patients filing suits against them. This acknowledgment of the malpractice situation has encouraged a growing number of physicians to routinely use video recordings as a means of insurance. They videotape

surgical operations as an exact record of what took place, both for protection against liability and for analyzing their work (Deluca, 1980, p.237).

Another means of malpractice prevention using video, is interactive videodisc instruction on the risks of treatments or operations. Many patients are filing informed-consent suits, stating that their physician didn't tell them of the risks involved. "It soon may become common for a doctor's aide to lead a patient through an interactive program detailing an upcoming operation. Afterward, the patient will sign a form affirming that he saw and understood the material" (Marans, 1989, p.27). With this document, the doctor will have a chance in court and the patient was able to make an informed decision about having the procedure.

Other management uses of video technology include implementations found in business. This includes internal and external communications, the presentation of policy statements or new regulatory requirements, advertising and public relations, the recording of meetings, and the documentation of case materials.

General Use

General uses of video in health care include patient diversion such as patient productions, entertainment for patients and staff, recording of special events such as holiday parties or dedication ceremonies, patient referral

reports, product information such as new safety requirements, and general information.

Reasons For Choosing Video

Video technology is chosen for many health care applications because it possesses qualities unlike those of any other medium. It is cost-effective, lightweight, relatively easy to operate, it can be placed in situations that are too dangerous for humans, it can be used in areas where humans could not fit, it can be attached to equipment and instruments to record results, and miniature video cameras can be inserted into the human body for the recording or simply viewing of what's inside. Video can provide vivid color or black-and-white at the flip of a switch, it can be played back instantly, and a digital display of the time can be placed on the tape for accurate time analysis of the procedure. In education, training, patient use and management, video is effective because people are familiar with watching television. Through videodisc players, images can be found in an instant and motion sequences can be used along with stills. Television is a broadcast medium therefore students, patients, or staff don't all have to be in the same room to receive information.

In comparison with other media, film costs too much to be used routinely, slides, photographs, and graphics have only limited motion capabilities, and most importantly,

none of the above have instant playback capabilities. The ease and releatively cheap cost of duplication of videotape saves money over the cost of producing and duplicating other forms of media of the same calibur. Also, videotapes can be used and reused. For these reasons video has become the growing choice of hospitals, doctor's offices, medical schools, and other facilities.

Medical schools are moving to video to make subject matter more readily available to students. Television is used to make operating areas easier to see by more students and physicians at one time. Television allows patients or tests to be viewed by many people simultaneously. Television also allows areas not visible to the naked eye to be viewed by a lot of people simultaneously.

It has always been a difficult task to allow large amounts of students to see medical procedures. This is a major problem when dealing with small areas such as the middle ear or nostril, and nearly impossible when dealing with areas that are invisible to the naked eye like the fallopian tube (Van Son, 1982).

Television has the capability of bringing people and events together.

> This solves a traditional problem affecting doctors and other health care workers who must await the diagnosis of a biopsy specimen which has been sent to Pathology, or of an

> X ray sent to the Radiology lab, before proceeding with the operation. How much time and anxiety could be saved if the surgery, pathology, and radiology departments were connected with picture and sound so that these vital images could be transferred and discussed simultaneously? (Van Son, 1982, p.9)

Video can attempt to overcome the limitations of other media. For instance, the Kaiser Foundation Hospital in Hayward, California previously provided education for its patients through media like brochures. "Printed materials did not sufficiently meet the needs of all involved. On a one-to-one basis, teaching time was limited, and the material became repetitive for the teachers" (Van Son, 1982, p.6). Sometimes it is necessary to give instruction on the weekends, this is a time when video can give assistance.

Television can help an institution save money. This can take place in a variety of ways. One such way is providing prerecorded instruction on video cassette for training, education or patient information. This will free instructors, trainers, and other personnel to attend to other duties. Nurses are often bogged down with monotonous tasks that could be performed easily and effectively with video technology. A study performed to measure how much money could be saved by utilizing video

found that one hospital saved $100,000 in nursing time per year by utilizing video in its patient orientation program (Gates & Reilly, 1985).

Video technology properly utilized can save money with regard to traveling. The time and expense it takes to send a person somewhere can be saved by sending the information via videotape. This information can be on a cassette sent through the mail or carried by a signal through the airwaves.

The reasons for using video technology in health care are very personalized to each institution. They recognize the potential of this medium and apply it to their specific needs.

CHAPTER III

Summary

The first recorded use of television during a surgical demonstration at Johns Hopkins in 1947 was the beginning of technology application that will continue to grow until a newer technology replaces it. As video technology is developing at such a rapid rate, it is doubtful that its value will decrease in the health care field. It is safe to assume that video, in fact, will increase as new implementations of the technology are found by medical facilities. The acceptance of technology applications already in place in many major hospitals, by more hospitals, perhaps even smaller facilities will also aid the video revolution in health care. It must also be noted that video is not just a tool for hospitals, it has found a place in research, nursing homes, doctors' offices, and mental institutions, but its most prominant home is that of the teaching hospital.

From the first experiments with overhead cameras in surgery, to the current practice of inserting miniature cameras into the human body, as long as there is a need to fill or a function to perform, video will be found in hospitals, clinics, and research facilities. It is understandable that it took as long as it did for the health community to recognize video technology as a tool with unlimited potential. Physicians' concerns are those

of the patient. In such a critical and precise field, professionals can't subscribe to technology that has not proven its effectiveness. But now, through the experimentation of a few brave physicians and a few innovative administrators, video has been recognized as a life-saving tool.

It was the intent of this paper to explore the different ways and areas in which video technology is currently being utilized in the health care field. This intent was chosen to cause the reader to wonder why comparitively few hospitals use television in the many ways examined earlier. True, many hospitals do use video for one task or another but it is not the norm to see television cameras recording surgeries, illnesses or treatments or to have patients viewing orientations in their rooms on cassette. It may be common to have an inexpensive half-inch video camera as a part of a hospitals media arsenal but why do administrators not see the value of using video more heavily for everyday tasks? The money that could be saved by the use of video is lost to trainers, instructors, nurses, and physicians who must repetitively explain procedures or fly out to other hospitals to present procedures that could simply have been mailed without wasting the time or expense of the flight and the missed work, leaving more time spent on patient care. With the use of satellite services, and only three of the

many services available are mentioned here, the knowledge so readily available is still not being received by the people who could use it most because health care facilities do not recognize the value of this means of communication. Hospitals don't have to have production studios to effectively use video technology to their advantage. A satellite receiver, a videotape recorder and a monitor on a cart is a smart, low investment, start to utilizing the potential of television.

Knowing the potential of video technology and convincing physicians and administrators of its value are two separate matters. Video has proven that it can help in the fight to save lives as well as make the lives of those who work in the health care profession a little easier and more interesting. It is time now for those health care professionals who want to improve their facilities and their employee, patient, and public relations to sample what video technology in the 1980s can do for them now and to wonder what the future of the technology can do for their facilities in the '90s.

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