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New Audiovisual Methods in Veterinary Medical Education

R. Getty, D.V.M., M.S., Ph.D.*

In the years 1953–54 and 1954–55, the veterinary students afforded us the opportunity to discuss "Recent developments in veterinary anatomy at Iowa State College" as well as "Visual aids and their application to the teaching of veterinary medicine." I am indeed honored and pleased to again be given the opportunity, not only to review the progress made to date, but also to project, into the foreseeable future, our thoughts relative to the role of the multi-media approach to veterinary education.

In April of 1963, we discussed, at the All College Veterinary Medical Faculty Meeting, a ten year progress report of our department, at which time we also included a page of discussion of our thoughts relative to TV and its applications as an additional tool to the multi-media approach to teaching. Since this discussion is still applicable today I would like to quote a paragraph from page 7 of this report:

"May I take just a moment and indicate to you how anatomy can be incorporated in programmed instruction in teaching via closed circuit TV. Motion pictures, slides, and transparencies can also be transmitted via closed circuit TV. Several medical schools about the country are teaching histology and embryology as well as gross anatomy by this method. I think it is obvious to all of you that there are many structures in the body, whether it be human or animal, that can be demonstrated to only one or two students at a time. This limitation, however, is erased when TV is used. For example, the detailed anatomy of the eye, the ear, and the hoof can be shown to a group of ten or 120 students or more by closed circuit TV. By connecting our anatomy lecture room to the large auditorium in the Veterinary Administration Building, it would allow us to demonstrate special dissections and specimens to my large classes of approximately 200 students taking service courses in anatomy. Then, too, the surgery room in the Biomedical Electronics Building should be connected by coaxial cable to both the large lecture rooms in the Anatomy Department and the Administration Building, thus allowing viewing of demonstrations in this area."
In addition, it is interesting to note a second paragraph on this same page which is extremely relevant to the current discussion of curriculum changes and the recently approved curriculum for 1967 which encompasses, to a large extent, the integration of basic sciences with clinical areas, and I quote:

"The students located in a classroom or laboratory have the potential use of a vast array of teaching material from almost any location in the medical center. In turn, demonstrations from the basic science laboratories can be transmitted to the clinical areas. The integration possibilities of clinical and preclinical material via this video network is just now beginning.

NEED FOR AUDIOVISUAL AIDS

Because of the population explosion, the information explosion and the time factor, the value of audiovisual aids, and more recently, closed circuit TV and videotapes, has been enhanced over the years. Now, more than ever before, these audiovisual aids can be exploited successfully for undergraduate and graduate teaching, continuing education, post-doctoral education, clinical training, conferences, meetings, seminars, etc. and in certain instances for research. Critical tests have substantiated the fact that audiovisual materials enable one to: 1. learn more; 2. remember longer; 3. save time; 4. impart uniform information; 5. increase the student's interest; and 6. maintain a better morale or attitude.

For years there have been many visual aids at our disposal such as the old fashion chalk board or blackboard, lantern slides, black and white and colored films, the opaque projector and, more recently, 3-D lantern slides and transparencies which are used on an overhead projector. In most instances these audiovisual aids will increase the effectiveness of the presentation of the material. However, in recent years we have seen the increased impetus and impact of closed circuit TV, videotapes, the 5 minute concept film, programmed teaching, telelectures, teaching machines, and data retrieval centers.

The Spring issue of the Iowa State University Veterinarian presented the revised curriculum for the College of Veterinary Medicine which will become effective in the year 1967. A review of the articles indicates that it is the consensus of opinion that our profession is confronted with many new challenges and heretofore unanswered problems. There is general agreement that we as a nation and as a profession are confronted with an information explosion, that methods of medical teaching are being, not only scrutinized, but are being revolutionized, and that our profession, as well as the other health related sciences, is confronted with a vast amount of material which continues to accumulate at an alarming rate, but which must be presented and assimilated in less and less time. The overall trend throughout the country has been to decrease the time allocated to various subjects within the present veterinary curriculum in order to add new courses and much additional material within the respective disciplines. Thus, there is a wide discrepancy resulting between the vast amount of material that each student is expected to master and the time allocated to him in which to accomplish this feat. Faced with similar educational problems, the armed forces, industry, and educators in other fields have met this challenge by instituting various visual and audiovisual methods of presentation.

With the advent of the new curriculum, and the need for integration of certain disciplines and with the emphasis on the teaching of large principles and concepts, it becomes increasingly apparent that the student and staff must become more appreciative of the many implications and applications of audiovisual aids. Let us ask ourselves, are we effectively using the visual aids that we now have at our disposal? In other words, are we using them, and if so, using them to their fullest advantage? The next question might properly be raised: Do we have effective audiovisual aids, films, lantern slides, etc. for all subject matter at our disposal? The answer to both questions is a definite
and emphatic, no! It is a regrettable fact that although audiovisuals have been used successfully for years by our sister health professions we are far behind in the preparation and use of many audiovisual aids and methods.

**INTEGRATION OF MEDICAL FACILITIES**

However, we are pleased indeed that some of our recommendations as expressed in 1953-54 and 1963 have now become a reality, including, as of this month, the installation of a large screen TV projector in the Veterinary Administration Auditorium. We are hopeful that the facilities in the Biomedical Electronics Building and those available at the National Animal Disease Laboratory may also soon be connected via TV to the veterinary medical building complex. Thus, many areas of mutual concern and interest could then be shared, including seminars, etc.

In the year, 1965, the availability of a TV camera and its ancillary equipment became a reality in the Department of Veterinary Anatomy. At this time our department embarked upon the production of a series of videotapes on the anatomy of laboratory animals which were used in the teaching of a graduate course during the summer of 1965, and in the winter of 1965 for the seniors in Applied Anatomy. The years 1965 and 1966 also saw the preparation of several tapes emphasizing detailed dissections of the cranial nerves. Frequently, the areas demonstrated required 5-6 hours for preparation and dissection. However, they could be demonstrated by means of the TV camera, or captured on videotape, to be effectively presented to the students in a matter of 15-20 minutes. As time and money become available it is contemplated that more and more tapes will be made in the areas of macroscopic, microscopic, surgical, and applied anatomy which, hopefully, can be used, not only in the teaching of freshman anatomy and applied and surgical anatomy, but also for continuing education.

The equipment that is now in the Department of Veterinary Anatomy consists of a vidicon camera mounted on a discarded x-ray tripod. Lighting is furnished by two flood lights and reflectors. A zoom lens, motor driven, allows the instructor to have both hands free while demonstrating or dissecting since the zoom can be controlled by a foot pedal (Fig. 1). Direct cables in the wall connect the small TV demonstration room to the auditorium (Fig. 2) as well as with the local WOI-TV studios. This latter connection by coaxial cable allows our department to capture on videotape a live demonstration from the anatomy laboratory for future playback from the studio.

The month of October, 1966, saw the realization of a previous dream of 1963, in the purchase and installation of a large TV projector capable of filling an 8 x 10 foot screen. This additional new projector has recently been installed in the Veterinary Administration Auditorium.
Figure 2. Partial view of Veterinary Anatomy Amphitheater, Iowa State University, with television monitors in view. Photo by Dr. D. J. Hillmann.

(Fig. 3) which has a seating capacity of 250 students. A coaxial cable has been extended from the Veterinary Anatomy Department and its laboratory which will thus facilitate the demonstration of certain laboratory specimens which heretofore have been difficult or impossible to discuss or review because of the large class of 200 or more students.

The physiology department has since been connected by coaxial cable to the WOI-TV studios, allowing them to present various physiological and pharmacological experiments, both live and taped, to their undergraduate and graduate classes. Thus, in the case of at least two of the basic sciences we are fortunately able to streamline some of the major basic principles of these disciplines and capture them on tape to be played back at a future date.10 It is hoped and believed that this additional facility (Fig. 3) will be helpful to all the other departments in the College of Veterinary Medicine as well as departments in other colleges on the Iowa State University campus.

USES OF TELEVISION

Frequently, medical schools combine the use of television with an image amplifier system for radiology19,21 and/or cardiology. Some schools link the radiology department to classrooms and surgical rooms to facilitate clinical correlation. Basic science demonstrations can also be correlated with many of the clinical disciplines.

If one analyzes the uses to which television have been put by the medical profession, one finds that the most popular one is magnification of images. The magnifying capabilities of television enable the instructor to provide details of many subjects whether they be anatomy, histology, pathology, surgery, etc. Image multiplication can provide an entire class with exposure to the same stimulus simultaneously.

The use of TV also optimizes the viewpoint. It allows transport of the images. In the case of microbiology, for instance, TV can be used to show methods of isolation of a virus, bacteria, etc.25,26 It is

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hoped that in time the National Animal Disease Laboratory may also be joined to the Veterinary Medical Facility by way of microwave thus allowing a mutual exchange of information and seminars, etc. between the two areas.

TV can also relate various components of a demonstration. For example, the simultaneous presentation of EEG and fluoroscopic images facilitates understanding during a surgical procedure. Other instances of TV uses in medical schools can be listed, such as cardiac catheterization, pharmacological demonstrations monitoring peristaltic movements, diagnosing pediatric abnormalities, physiological measurements, etc.

As the cost of videotape recorders continues to decline the simple storage of unusual or complicated demonstrations, seasonal syndromes, rare clinical cases, animals showing toxicity symptoms, etc. may all be captured on tape to be re-run at a later time either by the staff or the student. Dangerous demonstrations can be safely studied and viewed by TV and tapes. By the same token the animal can remain in a normal environment devoid of large numbers of students and noise. Dangerous, rare, complicated and time consuming demonstrations need only be performed but once and captured on videotape. Thus, in a matter of minutes material can be demonstrated that ordinarily would take hours of preparation and many hours to demonstrate to small groups of individual students.8

Television for demonstration of gynecologic surgery presents a view of the operative procedure equal to the field of vision of the surgeon.11

The basic sciences and clinical facilities are connected by TV in many medical schools today. As a member of the Audiovisual Conference of Medical and Allied Sciences since its inception in 1952, as the A.V.M.A. official representative to same for many years, and as a member of the Council on Medical Television, I have been able to observe, personally, the activities of the other health related sciences. In fact, the veterinary profession, in large part, is ap-
approximately ten years behind our sister health professions in the use of TV.

The integration of certain subject matter can, in many instances, be brought about by programmed material as well as 5 minute concept films and videotapes (all of which the department of veterinary anatomy hopes to have available in the near future). The challenge and need to prepare and obtain this material is evident and the need for additional staff and larger budgets to fill this need is also apparent.

As the basic concept of modern teaching emphasizes more and more the need for conceptual methods of teaching large principles the need becomes apparent that the gaps of details must be filled in by newer and different teaching methods. It should be emphasized that any new medical facility should plan carefully in advance the physical plant construction to anticipate the use of closed circuit television. LEARNING RESOURCE CENTER

With the possible advent of new physical plant facilities at Iowa State University, it is hoped that a learning resource center will be built which will utilize and capitalize on the many available and newer facets of audiovisual education. This learning resource center should be composed of rooms in which the student can, on his own time, use any and all available visual and audiovisual aids (slides, 5 minute concept films, videotapes, programmed material, etc.). In other words, it would be a library of visual and audiovisual aids instead of textbooks. This would allow the student to preview and review material, to correct errors in his thinking which might be revealed on exams and actually take responsibility for his own education.

Many of the health related professions have a department of medical communications. This department is charged with the responsibility of developing audiovisual material and stimulating the use of audiovisual equipment as well as aiding in the technical and professional aspects of visual aids in general, and TV in particular. The establishment of such a center would facilitate undergraduate, graduate, postgraduate and continuing education. In many of the medical colleges, the director of such a program is listed as the Dean of Medical Communications. His staff should include a full-time artist, professional photographer and assistants.

The student’s dependence on dictation and formal lectures will, in time, be nullified by his ability to accept and assume responsibility for individual study. This realization that his progress in education is largely his own responsibility can be fostered and complemented by having at his disposal at all times of the day this learning resource center which will permit him to literally dial information from a retrieval center which will encompass visuals of all types. This type of presentation already exists in many of our health related professions. In fact, in many of the medical schools there are courses being taught in which the instructor meets with his class but one hour a week.

It is not to be inferred from the above remarks that the multi-media approach to education is the ultimate answer to all of our present day problems, whether they be in medical education or in education in general. Rather it is sincerely believed that these aids will complement the teaching and allow the instructor to spend more time with the students by freeing him from the many routine and time consuming preparations and duties of present day educational methods. All disciplines in the medical profession are now using these methods of presentation. Therefore, the implementation of the new curriculum in the year 1967 will offer a challenge, not only for the staff and faculty as a whole, but also for the student body to, hopefully, explore and to capitalize on the newer methods of automation as they apply to education. At the same time it will pose a challenge to the administration to obtain the necessary funds to employ more staff and have available monies to purchase said mechanical equipment, films, videotapes, etc. It would be folly to say that any one department or college would be in the position moneywise, timewise, or otherwise to pre-
pare all of the varied medical visual aids that should be at their disposal. Therefore, I would like to repeat a proposal that I made at the Meeting of Deans in Denver, Colorado, in 1956, at a Land Grant Association Meeting whereby we stated:

1. “Perhaps it would be wise if all colleges and universities would have a committee or department of medical communications charged with the responsibility of developing and stimulating the use of audiovisual equipment, films, etc. at their disposal in their respective institutions.”

2. “Perhaps a Quarterly or Bi-annual Newsletter circulated to the various institutions throughout the country, by a central agency such as the A.V.M.A., could keep us abreast of new films contemplated and in production, availability of 2 x 2 lantern slides, kinescopes and other audiovisual aids and tools.”

3. “Perhaps the publication and circulation of an audiovisual handbook enumerating the audiovisual materials available in the field of veterinary medicine would prove useful. The selection, evaluation, and proper utilization of the numerous multi-sensory materials available could be outlined and emphasized. It is hoped that this information would prove helpful to both administrators and teachers.”

4. “It seems imperative that we evaluate the present audiovisual methods now at our command and appraise their strength and their weaknesses as they contribute to our own university educational program.”

CONTINUING EDUCATION

I would be remiss not to mention our responsibility to continuing education and the fact that many of the facilities that, hopefully, will be available will not only be used for undergraduate and graduate teaching, but also for continuing education. (Certain far western states provide their physicians with audiovisual seminar kits containing a medical discussion on a long-playing record, a script, color slides and a table viewer. Thus, a series of rural seminars have been successfully conducted.)

The State of Iowa is fortunate indeed that educational radio and TV facilities connecting, not only the State Schools, but also some of the private colleges and universities will be available in the near future. Newspaper releases indicate that 15 million dollars are being requested from the new session of the legislature by the Board of Regents and the Iowa Department of Instruction to fulfill this long range educational need. It is within reason to foresee courses in comparative ophthalmology, for example, in which the professor at the medical school can be shared by students in the veterinary medical college here at Ames, and vice versa. Programs of this nature would not replace present instructors or staff but rather would allow the student body to “share the professor” from other campuses.

These facilities could also be used for the continuing education of the practitioner. The time is not too far distant when the practitioners throughout the state may, hopefully, be able to view educational programs on the TV sets in their own homes at a predetermined time, allowing them to keep abreast of new material in their own field, using short course methods of presentation. This type of program is already a reality in California (where 70 hospitals are linked together by using the “scrambled” set, a regular TV set with attachments which allows reception of open circuit broadcasts that would be “scrambled” on a conventional set), South Carolina, and Massachusetts in the medical profession and has been in effect for several years.

Based on our technological knowledge and the uses already being made of audiovisual aids in the medical sciences, the following predictions can be made:

1. Videotape will soon take over much of the work now assumed by textbooks.

2. There will be widespread TV hookups between schools of the medical related sciences for the purpose of exchanging and sharing research and teaching programs.

3. Medical information and other educa-
tional programs frequently limited to
closed circuit television will be put on
open circuits, which will be less costly
and will reach a greater viewing pub­
lic.

4. Veterinarians in Iowa will soon have
their own TV hookup for short courses
and diagnostic consultation.

5. There will be special channels on all
home TV sets where a person can re­
ceive emergency information by dial­
ing a telephone number and asking
their question.

6. Within a few years a great deal of
adult and continuing education will be
conducted via television instead of in
on-campus classes.

7. The old saying that the sky is the
limit may be paraphrased to state that
the time is near when commercial and
noncommercial educational programs
will be available across the country and
even around the world by means of a
satellite television system.

Unquestionably the need and the chal­
lenge are here and our only deterent will
be our vision and available funds at our
disposal to explore these challenges and
their many far-reaching ramifications.

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