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ABSTRACT

Although there have been great developments in motion picture technology, such as super 8mm film, magnetic sound, low cost color film, simpler projectors and movie cameras, and cartridge-loading projectors, there is still only limited use of audiovisual materials in the classroom today. This paper suggests some of the possible reasons for the lack of utilization of educational films. The author points out the advantages of films in classroom use, especially in the context of a systems approach to education. He discusses some of the work the Eastman Kodak Company has done in developing films for educational use. He also offers suggestions for ways in which to foster the use of films in the classroom. A reference list is appended. (JY)

FILMS FOR LEARNING*

Some Observations On The Present, Past, and Future Role of the Educational Motion Picture

By JOHN FLORY**

WHAT THIS REPORT IS ALL ABOUT:

When we talk about film in the classroom today, we are really talking about a paradox.

On the one hand, there have been tremendous developments in motion pictures:

- A new, compact film format
- Shortfilms that deal creatively with single concepts
- Cartridge-loading projectors
- Widespread availability of color film at low cost
- Easy-to-use movie cameras
- And, screens that work without dimming the room lights

On the other hand, educators who have studied the use of A-V materials in the classroom today, tell us:

> *"...the so-called educational revolution in America's schools (is) in the skies...There is little use of film, filmstrips, tapes, and other instructional aids."*

It appears on the surface to be a stagnant situation.

Film has been proved to be a effective teaching tool, offering motion, color, sound, accessibility, and "creatibility."

Yet teachers are still clinging to the old lecture methods for the bulk of their instruction.

The reasons for this resistance to film are complex -- stemming perhaps from early experience with complicated projectors... "red tape" scheduling procedures for film and equipment...sketchy catalogues...and even the old axiom that "teachers teach as they themselves are taught" -- i.e., without film.

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The overall picture looks bleak, but there are some bright spots -- teachers and students in classrooms around the country who are doing exciting things with the film medium. For example:

- There are 250 teachers in Chicago's poverty areas who have been equipped with cameras and film to record their students' field trips to such "institutions" as the fire station...the airport...and the police headquarters. Through these films, the youngsters can re-live and re-tell their experiences...can begin to adjust to a here-tofore alien, adult world.

- There's Douglas MacArthur High School in Saginaw, Michigan, with its two Multi-Media Learning Centers. Here, eighty students and four team teachers have access, at the same time, to a variety of facilities: commercially produced films, slides, tapes, records, and educational TV broadcasts.

- There's the Sobrante Elementary School in the "curfew" district of Oakland, California. Since the librarians began putting films, tapes, and records right alongside books, the use of the library has increased tenfold. As the principal says, *"Youngsters with marginal reading skills now find that the library is the place to watch films or listen to tapes and records...And they can produce reports on what they see and hear, rather than what they read."*

- There's the social studies teacher in Ossining, N.Y., with her students who's been making films for several years -- *"to show my classes, in their own idiom, a point I want to emphasize."*

Film is the medium of the "now" generation.

Some experts contend that today's teen-agers spend ten times as many hours in looking and listening to film and TV as they do in reading the printed word.

And somehow they manage to sandwich in all those hours outside the schoolroom...because it's fairly certain that the majority of students aren't seeing many films between 8 a.m. and 3 p.m. each day!

Film, it turns out, is also a compatible medium -- it gets along well with computers...TV...and even textbooks, which are now being published with coordinate motion pictures.

Furthermore, the systems approach to education -- the development of carefully produced materials in every subject area, utilizing all the technology at our disposal -- holds a vital key for the future.

But what's even more significant is that the film medium itself is here <u>today</u>.

Its low cost, clear picture resolution, capability for bringing the outside world inside the classroom -- all this is available now to help us meet the staggering problems of mass education in the United States.

Here, then, is a closeup view of the fascinating world of the educational film...from the earliest days of the "silents" at the turn of the century...to the advances of today -- with behind-the-scenes examples of what's really happening with pilot programs in film in the schools.

And, finally, we take a look at tomorrow:

Beginning with the goal of a film library for every classroom in the country...

and closing with our recommendations for the development of an integrated systems approach...to put 20th-century technology to work in the educational process.

###

Diana is black, 16 years old, and angry. The reasons for her anger are complex, stemming from a tangled home life with a father who is a jazz musician, and her own long-standing problems in school.[1]

At one time or another, she's been rebellious, uncooperative and a perennial runaway.

In the past few months, however, there's been a tremendous improvement in Diana's behavior and outlook. What happened?

The key development, it seems is that the principal of her school obtained a new, easy-to-use movie camera. He sold Diana on the idea of "telling it like it is" by making her own film about what it's like to be a teen-ager today.

Under the guidance of a teacher who had film experience, Diana created a script, recruited other students as her "cast," and put together a 20-minute production that was described by a faculty member as "one of the most imaginative and sensitive films I've ever seen." The film has made her a celebrity among her classmates and has earned her an "A" rating -- her first! -- from the English teacher, who accepted the film as a term project in lieu of a written paper.

An isolated example of what film can do in education?

Yes and no. Yes, in terms of what's actually happening in most classrooms in the U.S. today; no, in terms of the potential of the film medium itself.

TODAY'S CLASSROOM

Let's look for a moment at the ubiquitous classroom that everybody talks about. If you were a full-time teacher today, chances are very good that you'd find yourself faced with:

- 45 students in a classroom designed for 30.
- Textbook materials that were published five years ago and are already out of date because of the phenomenal growth of information.
- Increasing clamor on the part of supervisors, parents, and professional journals to devise "individualized instruction" for each of the 45 youngsters in the class.

Multiply these problems by 2 million such classrooms and add in the poverty and alienation of the inner cities and the rural areas; the worn-out school buildings that are health traps and fire traps; and the awful fact that 8% (about 160,000) experienced public school teachers give up their profession each year, taking their skills and talents out of the classroom.[2]

It's readily apparent that the problems of education today are so immense that they boggle the imagination. That doesn't mean, however, that we view the situation with alarm and then give up.

It was the Chinese philosopher, wasn't it, who said that a journey of a thousand miles begins with but a single step. We can apply the same reasoning to our search for solutions to the problems in education: Film is not a panacea for all the ills in the classroom, but it does offer some important steps in meeting the vital and basic needs in the teaching-learning situation.

TEACHING AND LEARNING

The teaching-learning situation....that sounds like a phrase in "education-ese" calculated to anaesthesize all but the most ardent readers. And yet, that's really what education is all about. The emphasis, these days, is on getting the learner to learn -- getting the message across -- using whatever teaching devices are necessary to do the job best.

At this point, I suggest we look beyond the educational scene for a moment to another industry that depends for its very life-blood on "getting the message across": the world of advertising. There can be no doubt about Madison Avenue's effectiveness.

In fact, the awesome power of advertising was made crystal-clear to me the other day when I made a rare excursion into a supermarket. On three different occasions, I watched with amusement and astonishment as toddlers ticked off the advantages, as well as the musical slogans, of one brand of cereal or candy over the choices their mothers had put in the shopping cart. The kids won.

Clearly, the message had gotten across to these children. But how? They can't read or write or clip coupons or boxtops. The answer, of course, is that they got the message through the filmed commercials they see daily on television.

These 50-second mini-films offer children the excitement of motion; sound; and, in more and more homes, color. The film attracts the child's attention and never lets go, while at the same time, it directs the youngster to "ask Mommie to get Hum-Dum cereal for you at the food store today." And little Johnny or Susie does just that, as I can testify from my own observations!

STIMULUS-RESPONSE

In reality, what we've been describing from the world of advertising is the classic stimulus-response-reward pattern that psychology professors have been lecturing about for decades. The advertiser, who must make sure his potential customers learn to want and buy his product, has found that he can reach people through the motion-color-and-sound of film. And the amazing thing is that he can get his film message across to any age group -- from 2 to 92.

Now let's return to our focal point of interest -- film in the world of education. What do we find when we pry open the school-room door today? Most likely, the teacher will be lecturing at the front of the class and the only "audiovisual devices" on hand will be the bulletin board and the blackboard.

Hard to believe? Listen to a report by John J. Goodlad at a recent Washington symposium on education:[3]

> *I began to suspect that much of the so-called educational revolution in America's schools was in the skies. The instructional process in the classroom was characterized by much talking, with the teacher by far the dominant participant. There was little child-to-child interaction and relatively little use of films, filmstrips, tapes, and other instructional aids.*

Dr. Goodlad concludes that neither teachers nor children seemed enthusiastically involved in their tasks.

The California educator, William H. Allen, points out:

> *"In today's schools, the educational media are not treated as integral parts of the instructional process. They are superimposed on an existing pattern of teaching and administration."*[4]

> *"Practicing educators,"* says Dr. Allen, *have not created a favorable climate for innovation."*

That seems to take us full-circle, doesn't it?

- We have severe problems in the educational world: Exploding student populations; mushrooming stores of information, bursting upon an already-crowded curriculum; increased emphasis on the need to individualize instruction for each student.

- We have surveys and reports from both within and outside the "educational establishment" that tell us how we're missing the mark in meeting these problems.

- We have a dozen or more major teaching resources, products of 20th century technology, that we could use now to improve our efficiency and output in the classroom. Yet, we seem unable to let go of the traditional concept of Mark Hopkins, the master tutor, on one end of the log, lecturing to the student(s) on the other end.

Finally, among these teaching resources we have the proven performance of film as a means of getting the message across. In commenting on the use of film, Warren S. Williams of the University of Rochester has written:[5]

> *The sound movie projector and accompanying library of films are effective teacher aids. A number of researchers investigated the classroom use of movies and the majority concluded that correct use of this audiovisual aid improved learning.*

Furthermore, experts tell us that the *"eye outranks all other sensory organs put together as a pathway to the brain. When you couple to this the sense of hearing, it is no wonder that the sound motion picture is a potent tool for persuasion..."*[6] *"A good film, used on appropriate subject matter, can teach students twice as much. Retention is high."*[7]

THE BUSINESS OF EDUCATION

Our own experience with massive educational programs in the industrial and business setting substantiates the effectiveness of film in the "classroom"

At the Eastman Kodak Company, for example, a total of 35,000 people participate in some sort of formal learning every year. These efforts -- which, together with less formal training on the job, account for at least 10% of the company's annual paid time -- range from courses to upgrade manual skills to seminars on problem-solving and corporate management for the executive staff.

Within a company such as Kodak, which develops a new product or a significant improvement in an existing product on the average of every three days, it's not surprising that the continuing process of education is a top priority item.

Furthermore, because of the "manpower investment" that Kodak makes in education each year, we are eager to find and use the tools that get the message across most effectively.

One of the Kodak training departments,[8] for example, has built a substantial library of films, each about two minutes long, on the common personnel problems that range from the use of the suggestion system to on-the-job evidence of an employee's severe emotional problems.

These simple productions, shot in the company's plants and offices with employees as "actors," present open-ended situations that are used as the focal point for discussion.

We have found that this material can be presented much more effectively and efficiently on film than in written or verbal form.

As one seminar leader put it:

"The reality of the films provides a direct challenge to the new supervisors. They can see the action for themselves -- how an employee looked, what he said, his gestures. It's almost impossible to capture these nuances in words; yet, they are important factors for the supervisor to gain insight into the problem being studied."

This commitment to education has also led the company to establish a series of Marketing Education Centers planned for four major cities. These facilities are designed not only for educating Kodak employees and dealers, but also for observing the effectiveness of new techniques and devices that might be useful elsewhere in the field of education.

In the recently completed center in Atlanta, Georgia, for instance, a computer and photo-assisted learning unit, which employs a text with super 8 motion pictures and 2" x 2" slides, is already installed and in use. What we gain from this experience, teaming films and slides with a computer, may be of future value in the schoolroom.

The point is that business and education have much to give to -- and gain from -- each other. The knowledge industry, growing at 2½ times the rate of the national economy, is a vast new market for companies that can listen to what educators want and come up with the products that meet these needs.

At the same time, industry is the major customer for the product that the schools turn out, i.e., educated men and women. As one of old Henry Ford's right-hand men once wrote:

"We at Ford Motor Company rarely select a man entirely for what he knows. It is his capacity to learn, particularly the capacity to learn that about which he knows nothing."

In the final analysis, then, the goals of education and the needs of industry are the same: creative, self-reliant people. It's imperative, in my opinion, that we nurture this partnership, share our insights, and search together for the most effective ways to teach people to learn.

CAPSULE CASE HISTORIES

If we turn back now to our discussion of what happens with audiovisuals in the schoolroom, we find ourselves facing a bleak picture as described by observers of the educational scene: a talking teacher; little use of A-V materials; burgeoning problems in class size and curriculum.

Fortunately, we don't have to stop here. We can pry open some other classroom doors around the country to give you an exciting glimpse into what does happen when innovative teachers apply their talents to the learning potential of film.

- Take the Douglas MacArthur High School in Saginaw, Michigan, with its two Multi-Media Learning Centers. Eighty students and four team teachers can use these facilities at one time: 16mm motion pictures, slides, tapes, TV, and overhead projectors.

  In describing the Learning Centers, one school administrator says: *"Teachers can be more creative and imaginative in their approach...(with) a wealth of audiovisual materials readily available. Equally important, this team-teaching approach gives four different teachers an opportunity to reach the students."*[9]

- The Granite School District, near Salt Lake City, Utah, has set up a Media Center to train teachers to produce and use audiovisuals in their classrooms.[10] Open evenings, week-ends, and summers, the Center is usually filled to capacity by some 60 teachers. They preview films, work with technical staff on the final touches of a motion picture they produced themselves, or learn how to use any of the A-V equipment on hand.

- In Chicago, some 250 teachers at schools in the city's culturally deprived areas[11] now have movie cameras, projectors and raw-stock film. They are encouraged to plan field trips with their classes and to record their experiences on film. Later, the youngsters write and narrate the commentary for the productions.

"The emphasis for these trips," explains one administrator,[12] *"is on the 'institutions' of society: the fire station, the police department, the airport. Once these kids have seen these places from the inside and have sorted out their impressions to make a film record of their trip, they no longer regard policemen and firemen and other authority figures as mysterious and alien. They develop a strong sense of participation."*

- Or look over the shoulder of a co-ed in the computer programming class at San Jose College in California.[13] She's missed several sessions and now she's having trouble operating the key-punch machine. Meanwhile, the teacher is busy with a group doing more advanced work.

  What happens? The girl picks out a shortfilm[14] from a file in the study carrel at one side of the room. She reviews the film, which was made by the course instructor, finds out what she's doing wrong, and returns to operate the machine successfully. When the teacher comes to her, she's ready to go on to the next step instead of reviewing the last.

- The Sobrante Elementary School, in the heart of the "curfew" district in Oakland, California, puts films, tapes, and records alongside books on its library shelves. The principal[15] reports that the use of the library has increased by at least ten times. He adds:

  "Youngsters who have reached the sixth grade with marginal reading skills now find that the library is the place where they can watch films or listen to tapes and records. They can produce reports on what they see and year, rather than what they've read...Once they begin to taste success with language skills, then we can begin to reach them, to teach them other things."

- With the realization of what film can do, there has been a new look at the classroom where the film will be shown.

  "There's an entire new approach to the construction of the educational plant," reports the director of

the Audio-Visual Center at Western Michigan University.[16] *"When new building committees are formed throughout the state, they include a repsentative of our organization. As a result, new schools have classrooms with built-in screens; the rooms can easily be darkened; there are proper electrical outlets; and there are facilities for storing projectors and films."*

- At an elementary school in Ossining, N.Y., a social studies teacher began working with sixth and eighth graders several years ago in the production of films that make the most of the teacher's and students' time.[17]

  "The key word is accessibility," she explains. *"When I get hung up in explaining a point in geography or history, I can now say 'Look here,' pop into the projector a film that these or some previous students have helped me make, and show the class in their own idiom exactly what I mean."*

TODAY'S IDIOM

The teacher put her finger on it; didn't she? She wants to show the students in their own idiom. Visual media today are not super-imposed on the lives of children. They are a part of these youngsters' everyday experience.

As one example, more than half the audiences in movie theatres today are 14-24 years old. As Merle Steir, an independent film producer, has commented:[18]

> *"Film is the medium of the Now Generation. At Expo 67's Youth Pavilion; in 100 college degree programs; in 1200 college film societies; anywhere that youth gathers, film is happening."*

Or to quote Dr. Williams of the University of Rochester once more:[19]

> *"Movies are not only more effective than other means of instruction but are also preferred by many students. D. W. Redemsky distributed questionnaires at Michigan State University to determine student attitudes about the classroom utilization of films. Although Redemsky studied college students, some of his findings are important to lower level teachers.*
>
> *"Most of the students questioned had a positive attitude not only toward the showing of films, but also any discussion which followed."*

Even with this realization of the integral nature of film in the lives of today's youngsters, we still read and hear about motion pictures as an "audiovisual aid" in the classroom -- a kind of extra resource that's tacked onto the regular course work.

There's an executive in my company, in fact, who would like to get rid of the term "visual aids" altogether.

> *"The term itself seems to carry over from the past,"* he says.[20] *"It's like first aid... rather than an integral part of the learning process. Visual media are not 'aids' to anything; they are 'ways to discovery.'"*

WHAT FILM OFFERS

At this point, it becomes fairly obvious that film is a valuable classroom tool. Film offers:

Motion -- The image can record and illuminate the live action of a person or the microscopic twitches of a paramecium. Film can be used to "break-up" a complicated maneuver and make it understandable, via slow motion or animation. Motion pictures can "grab" the learner and hold his attention, presenting him with a constantly changing scene. *"The motion picture is the way par excellence of presenting visual cues."*[21]

Color -- Similarly, film offers motion pictures in color, adding greatly to the dimension of realism for the learner. The importance of these color cues, moreover, may range from merely strengthening the visual excitement of the image to the crucial color differentiation to be observed in a filmed laboratory experiment.

Sound -- With its own sound track, a film can become a self-contained teaching unit, presenting the student with complete visual and verbal instructions for a complicated manual skill or enlarging his scope of experience with the sights and sounds of a major space shot.

Flexibility -- Depending on how it's projected, the same film can be viewed on a screen large enough for 50 people or small enough for an individual study carrel.

Film can be used anywhere -- classroom, auditorium, library viewing station, study hall, in the home. The introduction of a new Ektalite high-brightness screen has nullified the need to darken a room in order to show motion pictures today.*

*Kodak introduced this new projection surface in 1967. The screen -- which is now available in 40" x 40" size suitable for class and conference rooms -- is actually a reflecting surface of specially treated aluminum foil that offers:

> Evenly bright images as seen from any viewing position over a moderately wide horizontal and moderately narrow vertical angle.

Image brightnesses six or more times as great as with screens now in general use (for the same image size and projector output).

Almost total rejection of stray light falling on the screen from outside normal viewing positions -- permitting excellent image contrast and color saturation, even in brightly lighted areas.

A reflecting surface which should last indefinitely with reasonable care.

Film lends itself to use with other media, e.g., TV, computers, and even textbooks which are beginning now to offer coordinated motion pictures for each chapter.

Universality -- The film gauges -- 35mm, 16mm, super 8mm -- are standard the world over. That's one reason why the major TV networks have chosen film as the prime distribution medium for their program materials, both in this country and abroad. This advantage, coupled with the flexibility and low cost in shooting and editing film, has meant that 80% of the prime TV network time emanates from the motion picture medium.[22] In addition, film represents 75% of the program source for daytime broadcasts and independent stations.

When the importance of the event warrants real immediacy (such as a space shot, presidential campaign, major sporting event), then the networks go to live broadcasts or sometimes to videotape.

Accessibility -- A teacher who has a projector and library of films in her classroom has quick and easy access to motion pictures as a learning resource. Furthermore, she can project a film whenever the class is ready for it, not at some pre-scheduled broadcast time. She also has the option of repeating the film for the entire class or selected students.

"Creatibility" -- Just as a teacher can write an original poem for an English class or suggest a new analysis of current events for a course in political science, so today, the instructor himself can produce a film to show a lab experiment or the results of

a field trip or even the classroom activities of his students. And students, too, are making their own films:

"One can hardly attend a public event -- be it a football game, a rock concert, a yacht club regatta, or a street fair in a slum -- without encountering young people taking light readings, staging vignettes, and checking lens angles."[23]

Recent Developments -- Teachers are beginning to realize that films, in addition to conveying large chunks of information effectively, can also serve as vehicles for specific drill and testing. A film, for example, is tireless in presenting the slow learner with repeated drill in such areas as multiplication tables or word syllabication. Films for classroom use are being built with several "stopping points," with discussion questions presented by the narrator to probe students' reactions to what they've just seen.

Some educational films are also constructed today with a test for a climax instead of the traditional "Hollywood" fade-out. In addition, filmed segments can provide more challenging exams than older, written-type tests in such fields as biology, medicine, art, and even advanced psychology, where students can be presented with a realistic clinical "case" on film.

RESISTANCE TO FILM

We've been talking in general terms about what film can do. If we are saying, on the one hand, that film is such a significant educational tool then why are we also saying that many teachers aren't using it as anything but an auxiliary resource?

It's an important question, and the roots of the answer lie in many directions.

A major stumbling block to film use has been the central storage and scheduling systems in some schools. A teacher had to go through laborious procedures to get the film she wanted, often ordering the print weeks in advance with no guarantee it would be delivered when her lesson plan called for it.

Film catalogues have often been difficult to use, with sketchy information provided on the content of individual pictures. While no catalogue can serve as a complete guide to the value of a film for a particular learning situation, better descriptive material could ease the problem in which many teachers have been faced with the choice of "taking a chance" on a film whose title sounded good or spending hours in previewing sessions.

Many of the older type educational films tried to be "all things to all learners" -- which meant that a production that was ostensibly on one topic usually dragged in material that was far afield of the unit under class study. The object was to cram dozens of concepts into a twenty-minute film.

And, finally, there is the whole, complex cycle of teachers teaching as they were taught. In other words, teacher-training colleges employ professors who lecture their students. Then, these students, as teachers in their own right, continue the tradition by lecturing their own classes, and we are back again to Mark Hopkins and the log!

Of course, as far as film is concerned, teacher training institutions have faced the same problems that have confronted other areas of education over the years: a limited number of commercially available motion picture titles in the specialized subject areas; restricted budgets for purchase or rental of A-V supplies; complicated projection equipment and scheduling requirements.

Here is a critical area, it seems to me, where Federal support could break this dulling "lecture cycle." The teacher training institutions should be the centers for research into new ways of teaching teachers to teach, including exploration and creation of resources in film. Today's classroom teacher should be exposed to the best and most efficient methods of education during his own undergraduate years. Then, as experience has shown, he will be likely to apply these same innovative techniques in his professional approach to the learning problems he encounters as a teacher in his own right.

While we have explored teachers' resistance to using film in the classroom, we should underscore the fact that things are changing. Films and film equipment have become easier to use with the development of cartridge-loading cameras and projectors. Schools are recognizing the need to get films out of locked vaults and into the individual classroom. And new film formats are changing our ideas about what a motion picture, a screen, and a projector "must" look like.

FASCINATING FILM

Now, let's turn for a moment and look at film itself. Please don't "tune out" here with visions of an involved, technical discussion. Actually, film has a fascinating history, and from its very inception, it's been an educational medium.

It was Thomas Edison himself -- a key pioneer in the motion picture -- who envisioned his discovery as a great educational tool in the 1890's. His prediction, however, has been a long time in coming to fruition.

For one thing, the earliest film stock was made on a nitrate base. It was highly flammable and could only be shown in fireproof projection booths. Hardly the kind of accessibility that educators are demanding today!

A major breakthrough came in 1908 when Kodak manufactured its first non-flammable film using safety cellulose-acetate base. Although this film gradually replaced the highly flammable cellulose-nitrate type in educational situations, it did not become commercially successful until 1923.

That same year (1923), 16mm reversal "safety" film was introduced and was supplemented by 16mm safety-base, positive film; a decade later, sound was added to 16mm and we were in the era of the "talkies."

Over the years there have been some noteworthy films sponsored by business firms with the classroom in mind. A pioneer series was the Ford Motor Company's, "Ford Educational Weekly" (1916-1920). With the guidance of William M. Gregory, Director (1910 to 1945) of the Educational Museum of the Cleveland Public Schools, this program -- circa 1920-25 known as, "The Ford Educational Library" -- provided curriculum-oriented motion pictures and accompanying teacher guides to many, many hundreds of schools on such subjects as agriculture, civics, industrial and regional geography, history, nature study, health, and other topics.[24]

The Rockefeller Foundation's General Education Board focused attention on the academic community as an educational film producer in 1938 with a $125,000 grant to the University of Minnesota. The project is chiefly remembered for having established a professional 35mm production unit which produced an epic

on the history and problems of the State of Minnesota. This experiment inspired a number of other universities at a later date to plan and produce their own films.[25]

Yale was another institution of higher education that took an even earlier interest in the motion picture medium. In 1923-24, its Yale University Press produced "The Chronicles of America Photoplays," a series of history films that were subsequently shown in thousands of classrooms. Great effort was expended in trying to make the costumes and settings meticulously accurate.[26]

One of the largest ventures in the early days of educational film was the Eastman Teaching Films, Inc. -- some 300 titles in many areas of the curriculum. Orders for prints of several of these productions topped the 2800 mark!

The series grew out of a massive study of film in the classroom that was financed by the Eastman Kodak Company. It all began in February, 1926, when George Eastman announced that during the preceding three years his company had conducted a survey of the whole field of teaching films. The survey showed in substance the following:[27]

1. That few pictures adapted to classroom use had been produced.

2. That the cost of equipment and films had made the use of films as regular classroom instrumentalities prohibitive.

3. That large capital investment would be required to produce films on a scale adequate to school needs.

4. That adequate experiments had not been made in the practical use of films in classroom work to establish their value as aids to teaching.

5. That school authorities would not be justified in making the expenditures required for film service until adequate experiments were made and the value of films as teaching aids definitely determined.

Mr. Eastman also announced[28] that the Eastman Kodak Company had decided to undertake a practical experiment in the use of films in the schools to study the following questions:

1. Can films be produced which are correlated with standard courses of study?

2. Can the teaching value of these films, when used to supplement the usual pedagogical devices of the teacher in the classroom, be measured?

3. Is the educational value of the contributions of the films sufficient to justify the expenditure required to make them a regular part of the equipment of the schools?

The two men who conducted the study -- leading professors at Columbia's Teachers College and the University of Chicago, respectively -- were Drs. Ben D. Wood and Frank N. Freeman. When they published their findings, here's what they had to say:

"...under the conditions which were obtained in this experiment, which probably reflect normal school conditions reasonably well, the use of the films materially increased the effectiveness of instruction."[29]

"If the motion picture film is to be of maximum service in instruction it should form an integral and regular part of the curriculum and of classroom work."[30]

"Usefulness of the films will be seriously limited if they demand that all teachers who use them follow a rigidly uniform course of study. The films should be so flexible that they can be incorporated into a variety of different courses."[31]

"We believe that the Eastman teaching film experiment has uncovered only a small part of the film contributions, but that the demonstrated contributions amply justify the extensive use of films of this type in our schools."[32]

The results were so overwhelmingly in favor of films that the Company decided to continue the work. The experiment had started with 10 geography and 10 general science productions used with 11,000 school children in 12 cities. Over the next 15 years (1928-44), Kodak prepared 300 films in a wide range of subject areas, which were distributed to thousands of classrooms across the U.S. and in 30 foreign countries.

In the more recent days of high priority military training, films have played a vital role. As Major General H. C. Ingles, the Chief Signal Officer - United States Army, declared in 1945, *"Among the major problems confronting the Army at the outbreak of war was the task of getting the message of military techniques to the millions of troops being trained in all branches of the Service. The use of training films took on magnitude during World War II and constituted a real factor in military operations by reducing the time required for converting a civilian into a skilled soldier capable of taking care of himself in the field."*[33]

Likewise, the sister service, the Navy, attested to the efficacy of the motion picture in a 1945 report by Rear Admiral D. C. Ramsey, USN, Chief, Bureau of Aeronautics, *"...it has been recognized that training films as used in the Navy's effective training program contributed in a very large measure to building the most powerful fighting force afloat."*[34]

A captured German commander confirmed this evaluation when he admitted that the Nazis had grossly miscalculated how rapidly the U.S. could build its armed services out of civilians. *"The American military made use of film on a scale that we never dreamed possible,"* he said.

If we return once more to motion pictures in the elementary and secondary school classroom, we find that 16mm has been the dominant format used in education. In fact, a recent survey[35] shows that school systems own only enough 16mm projectors and films to place two projectors and twelve prints in each school in the country. Obviously, this "hardware and software" is not evenly distributed around the U.S., and even these totals fall far short of the guidelines recommended by DAVI (Department of Audiovisual Instruction, National Education Association)[36] for at least one super 8 projector and approximately 50 super 8 prints at each teaching station (classroom).

It's evident that 16mm has made a significant contribution in education, as well as in countless other areas, and we feel certain it will continue to do so.

But an interesting trend has been taking place in education...a trend that has placed new demands on film. We've mentioned it before: a shift in accent from teaching to learning. This new approach calls for shorter films that teachers and students can use anytime, anywhere, in any way. With this approach, we've added a new term to the lexicon of film: super 8.

THE SUPER 8 STORY

Although we talk a great deal about super 8, it might be helpful to review some basic facts about the format of this new medium, which has been termed the economical, "paperback book-type breakthrough" of films.

Basically, super 8 film offers a larger and brighter picture area than traditional "cine" 8mm. Because of improvements in design, each frame of super 8 is 50% larger than cine 8, which means a bigger screen image. In addition, the larger frame allows more light to pass from the projector through the film, making for a brighter and sharper picture.

At the same time, super 8 also offers the compact film size that teachers want for ease of storage and portability. For example, you can store 1320 100-foot reels of super 8 (in cartridges) in a steel 71" x 35" x 16½" standard-size film cabinet. That would add up to about 110 hours of continuous-viewing -- more than enough film to "saturate" the average 5-day-a-week, major subject class for an entire school year!

The compact format also means economy in film and projector costs, and super 8 color prints are available at little more cost than black and white. Manifestly, there is economy in shipping a super 8 print rather than its 16mm counterpart.

SOUND SYSTEM

The image from super 8 is not only clearer and brighter but the sound system is also superior. At the present time, there are two methods used for soundtracks: optical and magnetic. Traditionally, optical has been the sound system for 16mm film; however, the new direction of super 8 film has emphasized the excellent properties of magnetic for its use with this flexible motion picture system.

Magnetic Sound Advantages:

1. Good quality magnetic sound is ·er to obtain, easier for a lab to process, and equires less complicated projection equipment.

2. For the same reasons, magnetic sound is the choice for home projectors, thus increasing the compatibility of school and home visual resources.

3. Soundtracks can be readily changed to suit a specific audience.

4. Magnetic prints, in classroom and laboratory tests, last up to four times as long as optical prints because the film rides through the projector on the tiny tape soundtracks. As a result, the film surfaces do not rub against each other, and there is less chace for damage to the emulsion.

THE CARTRIDGE QUESTION:

This brings us, finally, to the method of packaging and projecting super 8 film: the closed-loop cartridge and the reel-to-reel design. It is evident that the public wants projectors that offer the ease of cartridge loading. While the initial cartridge design on the market was the continuous, or closed, loop, it is clear now that, in the educational setting, the so-called reel-to-reel system offers more advantages.

Advantages of Reel-to-Reel

1. Easy to snap regular film reel into cartridge.
2. Fast forward, reverse, and rewind capabilities.
3. Easy to project, repeat, or review any desired segment of the film.
4. Lower initial cost of reel-to-reel cartridge.
5. Automatic re-wind of film to heads-out position, assuring next user of seeing the production from the beginning.
6. Film can be removed from reel by local A-V coordinator for cleaning, editing, splicing.
7. Cartridge provides convenient labelling and storage container.
8. Reel can be easily removed from cartridge for use on home projectors, adding the dimension of compatibility for home and school visual resources.

After much research and study in an effort to assess the film system that offers the most advantages in the educational setting, the Eastman Kodak Company has decided to incorporate magnetic sound and the reel-to-reel cartridge in its super 8 film system.

In June, 1969, Kodak will introduce its cartridge design for 50- and 100-foot capacity super 8 reels. Later, 220-and 400-foot cartridges will be available. Furthermore, the company has shared the design plans with a wide cross-section of other manufacturers both here and abroad in an effort to foster interchangeability of "software."

SYSTEMS APPROACH

Now that we have looked at film as an entity, we must also explore film as one of the most flexible modules in a coordinated group of learning resources. What we're talking about, of course, is the Systems Approach.

We feel, naturally, that the photographic system -- 16mm and super 8 cameras, films, and projectors -- is going to have an increasingly important place in the educational setting. But too much enthusiasm for the superiority of one medium can mask its potential for use with other approaches.

Film, for example, is essentially a storage medium. And we generally think of projection as the means of access to what is stored on it. But coupled with the computer for retrieving information and the electron for transporting it, film capable of storing a billion bits of information per square inch is something else again!

Combine the realism and impact inherent in the film image with recorded sound and the computer's infallible memory and endless patience, and you have a system that can meet the challenge of recognizing and coping with individual differences among children.

In the same vein, films can be incorporated into broadcasts on educational TV and we can envision a time when 30 or more electronic channels could service every learner in the classroom with films, computer-programmed courses, and video-tape beamed on individual TV screens at the pace set by the individual student.

At present, the compatibility of film and educational TV has not been fully explored. A major factor in this dilemma is budget. Even though film is an economical visual medium, effective motion pictures, to be used on a broad scale, cannot be produced for the $250 we now spend on an average half-hour of educational TV.

The film industry, aware of this difficulty, is constantly searching for new technical developments to cut further the cost of motion picture production. Recent improvements, such as front screen projection; new editing and dubbing systems; lightweight and less expensive camera, sound, and lighting equipment; and new shooting techniques offer partial solutions.

At some point, however, the Federal Government should try to stimulate greater and more effective use of specially designed motion pictures as a prime source for educational television programming.

In dealing with the immediate needs of education, however, we run into problems when we examine the present "state of the art" of the electronic marvels at our disposal. It is prohibitively expensive to provide a few, let alone 30, TV screens and transmission channels with the color and high picture resolution available already via film and the projector. Similarly, computer outlets are costly, and because today's "electronic brains" can remember only words and numbers -- not pictures -- it is still necessary to integrate the projected image into the system if we are going to offer the visual dimension to the learner.

What is here right now -- and what has already caused a great stir in educational circles -- is the Kodak Ektagraphic MFS-8 Projector. At the flick of a switch, this machine will project individual still frames of a super 8 motion picture for as long as the user wishes. Or press a button, and the projector shows the film at normal movie speed. The dimension of sound is available through a coordinated cassette tape recorder with a binaural track.

This means that in the very near future, we can program learning situations in which a computer can present the student with written and verbal information and through an electronic signal, trigger the action of the MFS projector to show either "still" or "motion" pictures.

On a more modest scale, the projector itself can be used today in the average classroom to meet visual learning needs at relatively little expense. A single 50-foot roll of super 8 movie film contains as many separate still pictures as would a 3,600 frame filmstrip.

When we come right down to it, some teachers, for years, have been combining different kinds of materials -- films, filmstrips, still pictures, models -- to meet their teaching goals. These are instructional systems at the simplest level. Yet, the fact that educators have been obliged to develop their own "systems of instruction" points up the need for a more comprehensive attack on the problem.

Now commercial producers are beginning to do systematically what teachers have done informally -- "package" related materials for specific curricular areas.

As an outstanding example, take the Physical Science Study Committee's approach to teaching high school physics. Here, millions of dollars have been spent to produce materials, but only after a thorough study of the needs of physics teaching in certain types of high schools.

The Committee of experts has supervised the production of more than 80 films; dozens of paperback books; and laboratory apparatus. It's all happening around a central concept -- a point of view -- as to what the content of high school physics should be. Possibly the key to its success is the fact that it was planned and that there was a reason for everything that was produced.

If we are going to make the systems approach work, we need four things:

1. Centralized planning

2. The involvement of people who are not now working side-by-side -- curriculum specialists, AV experts, book publishers, equipment manufacturers.

3. Access to top scholars and content specialists.

4. Highly qualified classroom teachers to bring their own skills and imaginations to the effective use of the "hardware" and "software" in the system. For, like systems anywhere, these in the field of educational technology are only as good as what goes into them.

A LOOK AHEAD

And what about the future? One key question, it seems to me, is whether the educational problems that loom so large today can be made irrelevant through the technical resources we have at our disposal.

The shortage of classroom space, for example, is tied to numbers of qualified teachers and optimum class sizes. But what if we decided to spend the money to train staff people in the use of new media techniques and other learning resources? The teacher-pupil ratio might rise to 50-to-1, the basic instructional unit to more than 100....and "that teacher," with a team of assistants and technicians, would have the time for the individual attention that students and parents are asking for.

In terms of the sheer amount of information and accelerated change in every field...in terms of the trend to individualized instruction...the teacher today cannot hope to bear the whole burden of instruction. Furthermore, as the emphasis shifts from "teaching" to "learning," there is no reason why he should try to be all things to all students.

The teacher who can use technology to advantage -- to fulfill his role as a director of learning -- surrounds his profession with new prestige.

There is a wide gap today between the promise of educational technology and the day-to-day reality in the classroom. None of us single-handedly can make the sweeping innovations and changes that will close that gap. But we can start, I believe, by seizing every opportunity to help create the "climate of innovation" that observers of the educational scene have found so sadly lacking now.

THE SUMMARY

In the final analysis, we find that film offers a number of advantages in the educational setting:

1. Motion
2. Sound
3. Color
4. Low Cost
5. Expansion or compression of time and size
6. Flexibility
7. Repeatability
8. Accessibility
9. Universality of film size
10. Creatibility
11. Compatibility with other media -- including TV, computers, books, tape recorders, overhead projectors, slides, and filmstrips.

In addition, the super 8 system, as a relative newcomer in the world of film, should be considered for its:

1. Potential for making film readily accessible
2. Bright, clear, and large images in color
3. Compact size and low cost
4. Simpler projection devices.

At the Eastman Kodak Company, furthermore, we have announced our intention to follow through on the development of magnetic sound and the reel-to-reel cartridge in the super 8 system.

And finally, if film is to become a viable part of the educational scene, we must take some specific actions:

1. Support the introduction of first-rate audiovisual courses and day-to-day usage in the teacher training institutions. Perhaps incorporate a requirement for "visual literacy" into the state certification procedures for new teachers.

2. Support research into the development and use of specially tailored films and other audiovisuals to meet the needs of the teacher training institutions.

3. Arrive at a "basic standard" of film hardware and software for effective use in each classroom. Perhaps the DAVI recommendation of one super 8 projector (in this case sound) and 50 prints per classroom is a good starting point.

4. Make the support available to school systems to buy the basic equipment, with parallel support for in-service audiovisual workshops for teachers.

5. Provide the support for leaders in subject-matter areas and experts in film production to work together on integrated series of motion pictures for coordinated use throughout a semester or school year.

6. On a larger scale, provide the impetus for the "systems team" from a variety of fields to investigate what we can do now, and what we must do in the future, to make full use of the technology at our disposal, in terms of both accessibility and cost.

The prophetic words of Freeman and Wood in their landmark 1926 study of film seem to sum up our present situation with uncanny accuracy:

"We believe the present experiment has uncovered only a small part of the film contributions, but that the demonstrated contributions amply justify the extensive use of film...in our schools...

"The classroom film is, or will be, a social agency whose power is felt far beyond the walls of the classroom...

"Film has already revolutioned our ideas, customs, tastes, and mores."[37]

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