# THE ROLE OF TELEVISION IN LITERACY PROGRAMS

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## Introduction

The authors have approached the preparation of this paper with the following assumptions:

The purpose of the paper is not primarily to review literature on the psychology of cognition, theories on the teaching of reading, or theories and experimentation on how the skill of reading is acquired. Literature, theories and research will, however, be considered where they provide illustrations of the advantages or disadvantages of television as a medium of instruction.

What is crucially important is developing a good instructional system. Without it, there is no possibility of an effective television presentation; with it there is an opportunity for one. Therefore the first consideration is to have a sound instructional system for literacy training that can serve as the basis for the use of television.

Different subsets of the population will probably pose different questions for literacy training. Illiterate adults, disadvantaged school children, and ordinary school children, for example, pose different instructional, motivational, and transmission problems.

There is a great danger in using ad hoc television presentations. They may be effective, or they may not. They may not tie into a well-based instructional system, but they are not likely to be effective

unless they are developed as an integral part of such a system. Ideas for televised literacy programs must be pretested and modified on the basis of such testing as they are being developed.

Universal literacy is accepted as a good and reasonable goal, reflecting the need for citizens of a democratic, technical society to be able to communicate and obtain instruction and recreation via printed media. Most important of all, citizens who are literate can achieve the knowledge and sophistication of thinking essential to effective and rational participation in modern, democratic self-government.

## General Problems in Literacy Training

### Instruction

Both scientific knowledge and empirical processes must be used in designing the instructional system. The medium of transmission is part of the instructional system and as such deserves consideration during the development process. Development of a course of instruction entirely apart from television, for example, with the intent of eventual transmission by television, would be a mistake. Nevertheless, many phases of the developmental process can be undertaken without constant recourse to the specific medium of transmission. On the one hand, one wants to avoid having the media dictate what is done. On the other hand, one wants to take advantage of medium-related creative design.

Motivation

Available knowledge and experience should be employed to gain and to keep the attention of the audience. No instructional system can succeed if the students do not interact with that system.

It would be wrong to consider this problem to be one of "in school-attention controlled" vs. "out of school-attention not controlled." It is clear that controlling attention within school is a key problem for nonreaders, and attracting and holding the attention of home viewers is a key problem for teaching them at home via television.

Treatments, however, can be readily filmed or videotaped in rough form and pretested. What is being suggested here is not formal testing with large numbers of cases, but rather a more qualitative form of pretesting, in which it can often be discovered with very few cases sometimes only one or two -- that a given treatment needs changing. Film makers and program producers should take advantage of the experience of researchers who are willing to forego elaborate designs involving large N's during the process of development in the interest of improving and helping to build good programs, rather than concentrating only on elaborate evaluations of completed programs.

Transmission

Television is both an instructional medium, in the sense that it has certain stimulus capabilities, and a transmission medium, in the sense that it is the means for providing the student with appropriate stimuli.

Its principal uniqueness lies in its transmission capability rather than its instructional capacity. That is, other media have comparable stimulus presentation features, but none can transmit these features in a like manner. For example, it makes sense to use TV to transmit film or print or audio stimuli, but the relationships are not transitive.

Considerations should include not only the medium of transmission, but also the control of other, potentially competing stimuli during transmission time, particularly for non-school students. For example, are other self-selected activities such as eating, sleeping, and recreation more likely to compete at one transmission time than another? Should all channels or airways be preempted during the time of instruction? How can members of the intended audience be reached who do not have access to the reception system? What will the transmission and reception system cost? What amount of time will be necessary to prepare materials for one transmission system versus another? To what extent should the plan involve a major promotion effort to attract the appropriate audience to televised literacy programs? Would it be feasible to have utilization agents who make home visits to assign lessons and facilitate integration of televised learning with other materials?

## Assessment and Feedback

The system should include provisions for collecting data both during development and during use. Data are needed on within-course

performance, immediate-terminal performance, and delayed performance. Within-course and immediate post-course assessment and feedback are more difficult to design, distribute, and to obtain returns for some media of transmission than for others.

## The Instructional System

A number of general characteristics of a good instructional system can be discussed in the context of television as a transmission and presentation medium.

It must be valid. Validity refers first to the validity of the final tests as measures of attainment of the objectives. Secondly, it refers to the match between the subordinate, in-process tasks given the students, and the final tests. If these measures validly indicate performance of the objectives, instruction which produces good performance on them will itself be valid.

The overall objectives should be prepared before the course is developed, probably in the form of a comprehensive test. Representative portions of this set of objectives can then be used as final tests of students' capabilities, thus providing an assessment of how well the instructional system meets the goals of instruction. The medium of transmission is not a primary consideration here.

It must be reproducible. In this instance the medium of transmission is important. The potentiality of television to control real time can contribute to the reproducibility of the instruction. This control

potential is greater than that which is afforded by presentation media which do not control time, and beyond the control of media, such as lecture, which control real time but which are not reproducible in a scientific sense. Print media, for example, permit reproducibility of static visual stimuli, but timing of presentation will vary among students, and sequence will vary among some. Critical dimensions of "live" presentations are usually not possible to reproduce reliably.

It should have an integral assessment and measurement system. This cannot be provided if television is used alone as a medium. Thus we conclude that whether or not television is used as a principal medium, it cannot be used exclusively.

It should be based on research and generalizations of principles, whenever possible. Television has the broadest presentation capability of any common mass medium. It employs both sight and sound and can be transmitted over great distances. It has the advantages of film, in being able to shift dramatically and instantly from one location to another, from one time to another, and from long shot to tight closeup (although not as effectively as film, owing to screen size and definition). It can shift from the speaker to what he is describing and back again. It can show the printed word and emphasize in closeup the relevant part of the word, etc. Therefore, a broad range of principles can be employed via television presentation.

It can be tried out and revised as often as necessary before release. This is possible with television, although more expensive than with some

other media if studio costs are involved. Although television tapes can easily be rerecorded, detailed editing and fine grain revision cannot easily be accomplished without recourse to other technological resources.

It can be called back for revision after release. In view of the ease of control of the distribution system for television presentations, this is one of the great advantages of the medium. Accomplishment of the actual revision may, as previously stated, be somewhat expensive.

It is carefully sequenced. This is a characteristic of the instructional system which should not be affected by the transmission medium.

It should arouse initial interest and maintain motivation. Television has excellent potential for this. It is well established as a source of recreation, relaxation, and entertainment for much of the population. Whether this initially positive valence can be maintained is the responsibility of the instructional system. Certainly many "educational" presentations have failed. On the other hand, "Sesame Street," of the Children's Television Workshop, apparently has been remarkably successful in holding the interest of its intended audience. Again, the capability is intrinsic to the instructional system, not to the medium of transmission alone.

It should actively engage the learner's participation. This has been hard to engineer with television, and for that reason has been largely omitted from most television programs. Again, "Sesame Street" has evidently achieved notable success in this dimension. Careful instructional engineering can usually overcome the problems which

television poses for active participation in at least two ways: First, empirical work with "spot check" overt responses in developmental stages can be used to engineer covert responses with fair certainty. Second, overt responding can be accommodated via deliberate response requests, timing of the presentation, and manipulation of external contingencies. In this latter regard, other media, such as printed workbooks will be needed, along with procedures, rewards, etc. for encouraging their completion. Such overt response provisions can be interspersed during the television presentation, and can also be independent of it from a timing standpoint. Presumably as skill increases, more independent reading would be encouraged.

It should provide for feedback to the designer. Any mass medium is inherently a one-way transmission channel. Feedback to the designer should be liberally used in development to minimize problems in transmission. It will be necessary, however, to use other means of communication to obtain feedback for the designer and evaluator during the actual presentation of the course via television, for example. Paper media, as suggested above, would have to be relied upon for some types of evaluation and feedback. Personal contacts (interviews) could be used for others.

It should inform the student of his progress. Mass communication media fix the pace of presentation. Thus some students may receive feedback too early, others too late, for "real time" overt responding coordinated with a presentation. This can be accommodated to some

extent with techniques which reduce response time variance. Empirical means can then be used to plan timing of feedback which is least undesirable. Timing of feedback is less troublesome for print media supplemental materials.

It should be optimally economical. The first economic considerations should be of the students' time and money; the second of design, production, and transmission time and money. Television is probably economical of the student's money, and if proper considerations in scheduling, etc. are made, television can be economical of the student's time as well. Design costs for any materials which are developed rigorously using empirical methods will be high, compared with non-empirical text "authorship." These costs are small, however, compared with professional media-specific design costs when theatrical and broadcasting rates apply. Production time and costs are relatively high for television, but a minimal use of "professional" time and facilities should reduce costs considerably. Although professional production "knowhow" should not be overlooked, most evidence indicates that many production techniques which are used in commercial films and television either do not facilitate learning, or are inconsistent with design requirements which have been identified empirically (Markle, 1967). Finally, almost no matter how high the production costs may be, the cost per student, if audiences are at all numerous, can be quite moderate.

Many features of instruction which are generally accepted as desirable are means to the ends which have been enumerated above. Such features as optimal step size; suitable pacing; appropriate media;

simulation of real conditions during instruction so transfer is not a problem; controlling and monitoring of student response, and use of reward, rather than punishment, as a general instructional philosophy are only meaningful in so far as they lead to improved learning in the situations in which they are employed.

## Advantages and Disadvantages of Television

### General Advantages -- Not Necessarily Unique Advantages

Television is widely available as a medium of reception. For those who cannot read and write, television is more widely available even than paper media -- or perhaps we should say functionally more available than paper media, for obvious reasons.

Television has great popular appeal. This is one of the strongest points in its favor. Radio also has great popular appeal, as do other entertainment media. Nevertheless, given the present standing of the various media, non-readers and poor readers are more likely to be reached by a widely publicized presentation on television, than by any other available medium.

Many people now allot large portions of their non-working time to viewing television. Habituation is well established. Further, there are no age limitations or social sanctions associated with television. Television is not confined to a single method of presentation. Almost all other presentation media can be used via television. Thus all or nearly all of a production can be coordinated through television.

Television can use important or statusful figures to present content. It can also be used to depersonalize instruction if that is desirable. This is a major advantage over nearly all other media. For example, radio can use statusful figures, (with some loss in personal impact), but would not be nearly as successful in depersonalizing content.

Television can employ both motion and sound, with control over synchronization, an advantage shared only by live and filmed presentations.

Size of step and pacing of presentation are controlled in televised presentations. This can be a disadvantage, but in this case, where the audience has little or no experience in choosing a suitable step size or pace, the fixed presentation could be turned into an advantage. This pacing could be especially effective over television if it were based on careful pretesting of the material to be taught and were carried out with selected individual learners from the target audiences (Sheffield and Maccoby, 1961).

Television is locally controllable in videotape form, but it can be centrally controlled via broadcasting if that is desirable.

## General Disadvantages of Television -- Not Necessarily Unique Disadvantages

The most needful portion of the intended audience for literacy instruction may not possess or have access to television. This is especially true of the rural black population in the southern United States. More persons have radio, and that medium should be considered.

Television is expensive as an original medium. Costs of design and production are inflated by non-subject matter professionals. Television is especially expensive compared with paper media, and to a lesser extent compared with slides and filmstrips. Nevertheless, the practical unavailability of paper media to the non-literate and the actual unavailability of slides, filmstrips and sound-motion pictures to all but those with special projection equipment, argue that television and radio are "first choice" media.

Television, like film, is a medium which is likely to seduce the developer into concentrating on "artistic" considerations which may be irrelevant to instruction. Proper development should control and constrain this, but this caveat is more difficult to obey than it may seem.

More generally, television is stimulus oriented rather than response oriented. To be colloquial, this puts the reward in the hand of the experimenter, rather than in the mouth of the rat. Stimulus oriented systems, consequently, can fail to produce the desired behavior.

The expense and trouble of manipulating videotape may deter tryout and revision of instruction. Planning early developmental tryouts in which a TV presentation is simulated with other presentation means can partly obviate this cost. Paper media are clearly superior in this regard. If paper media were easily distributable and had the intrinsic motivational aspects and auditory advantages of television, they would be superior to other media.

Television cannot completely provide active practice, feedback to the student, and feedback to the designer. It may be necessary to

present material simultaneously or in coordination by more than one medium, probably including print media. This will cause students difficulties with manipulation and coordination of more than one medium difficulties which are especially serious with poor readers and non-readers. Of course, media coordination will be a problem with any system in which the student must do some of the coordination.

Some research shows that certain personality types learn more from live presentations (Snow et al.1965), but the study is of doubtful generalization to the intended population. In any event, there is no reason to suppose that human teachers will not be a functioning part of the system, no matter what other media prove useful.

## What the Research Shows

There are a number of models of the cognitive processes employed in reading and in learning to read (as represented in Singer and Ruddell, 1970).

Reading research and methods of teaching reading are much more in the province of the other contributors to this Committee. Research findings have been specific, and numerous, but have thus far not provided a complete gestalt which can guide the preparation of effective courses in reading for any given population at a moment's notice.

Research specifically upon the use of television as a transmission system for literacy training is very scarce. In 1968 the United States Office of Education and the Carnegie and Ford Foundation began sponsorship

of a project called the Children's Television Workshop. The objectives were to teach classic stories, the alphabet, language, and the art of reasoning to preschool children. The program "Sesame Street" resulted from this project. We have not yet seen the evaluation of this program, but popular acceptance has been very high. Additional programs of this nature -- not, however, specifically on literacy -- are presently underway. Literature in this area has been well covered in reviews by Chu and Schramm (1968) and by Wade (1969). We have been unable to find much research which includes rigorous evaluation of programs using television to teach reading. We would, therefore, like to turn our attention to goals for the future.

## What Research Is Needed

Programs which will teach all our citizens to read cannot wait for all the research which would be valuable or interesting. It is for this reason that empirical development, using what research has indicated thus far, is recommended. But it is not for that reason alone that empirical development should be employed. Empirical development will be needed even when scientific knowledge is far better established. For example,let us assume that it has been established that active practice, when combined with demonstration, will enhance the effectiveness of instruction and learning. How does one apply that principle to teaching a youngster to read via television? We submit that considerable creativity, coupled with repeated testing and

evaluation at each stage of development, is needed to make maximum application of such principles to teaching children to read via television or, for that matter, any medium.

If literacy training is to be presented via television, then research on reading should involve television. Theory-testing research, which is not operationally specific to the literacy program to which this Committee is addressed should be undertaken independently with other funds, by other agencies.

## What Should Be Done

### Motivation

In investigating television's motivational capacity, attention should be devoted to ways of capitalizing upon the initial positive valence, which will quickly disappear if the treatment does not maintain interest. Here are some guidelines: Some portion of the program ~~should~~ have real persons with whom the student can identify and/or who are acceptable to the student as models. This is a very important point, since the educationally deprived population does not identify with traditional figures of status and authority, nor with the so-called "average man." Motivational techniques known to succeed with the white middle class population will not in general succeed with the educationally disadvantaged.

The program should take the dignity of the student seriously. Not being able to read is a serious deficit in our society, but it is neither childish nor undignified. Teaching techniques that talk down to the

the student (as opposed to making the task simple for him to complete) will instantly lose the audience. Empirical development methods often identify trouble spots, but they do not uniquely identify how to revise materials. It requires fine judgment and restraint to simplify materials without making them simple-minded and offensive. It will be difficult for the developers, no matter how highly motivated, to avoid becoming hostile about their students' failures, and equally difficult to keep from letting their hostility indirectly affect the nature of the materials. These problems are common with less difficult subject matter areas and students. We cannot ignore them here.

Materials, instructions, and all portions of the lessons should be attractive, but clear. Elaborate "window dressing" should be avoided as potentially more confusing than anything else. This guideline applies under the headings of both instruction and motivation. Active practice is good for maintaining interaction with specifically that which is being practiced. Whether the active practice leads to the intended learning depends upon what is practiced, how much at one time, for how long a period of time, and with how many repetitions, and so forth. These questions can only be answered by empirical tryouts. The answers are different for different kinds of material and for different presentations of the same kind of material. Regardless of mode of presentation, however, the basic task is to engineer frequent or continuous practice of an interesting nature.

Probably the most powerful motivator overall will be success. Success is defined here in the students' terms, not the all too convenient middle class teacher's terms. Success is the intersection of tasks that are meaningful to the student, correct performance, and perceptions of success. Perceptions of correctness alone will not do. There will be some students who fail. There will be some small failures for each student. Nonetheless, the system should be developed with the goal of eliminating failure.

A contributor not only to maintaining interest but also to success is proper pacing of the presentation. In fixed-time presentations, now common to television, proper pacing will be one of the most difficult engineering tasks. Presentations too slowly paced will bore the faster students, while presentations too rapidly paced will lose the slower students. Perhaps this difficulty can be avoided by making a multi-track presentation, in which the student is asked to do a "core" task first, with increasingly enriched but not basically crucial tasks being available to those who finish each core step.

Ideally, the materials will have a variable, controllable pace. This implies, however, that national mass presentation via commercial or educational television is not feasible. In the long run, the pacing problem should probably be dealt with on the assumption that mass presentation will be the only way to reach many adult non-readers. Materials for use in the schools, on the other hand, could be packaged for videotape viewing, controllable by the individual teacher or student

using them. Funds to purchase such viewing facilities should be provided to schools which cannot equip themselves.

If organization of the material to be presented is appropriately conceptualized, it may be possible to maintain a given rate of presentation successfully to a relatively large audience containing individuals who differ widely in their usual rates of learning. The concept developed by Sheffield and Maccoby (1961) of the demonstration-assimilation span -- the largest amount of material that could be demonstrated and result in successful practice -- could perhaps be applied to reading. General percentage criteria for course success can be set before instruction is developed or as a product of development or both. Sheffield and Maccoby settled for a D-A span that was successful with 75 percent of their audiences. As students learn, larger units -- hopefully natural units -- could be employed for demonstration and practice, and finally still larger units could thus be employed. These principles could undoubtedly be engineered for reading instruction over television.

Although use of color may make presentations more attractive, we cannot assume that color reception is universally available. Therefore, the lessons should be developed, tried out, and revised in black and white. The decision of whether to make the final filming or taping in color then becomes purely economic. There is nothing in the psychological literature to indicate that color pictures instruct better than black and white pictures, <u>unless</u> the instruction is color relevant (Kanner, 1968). With limited availability of color receiving TV sets, it would seem unwise to make

treatments for mass projection which use color-dependent teaching techniques. Color may serve as an "irrelevant" motivator, however, so broadcasting in color may be worthwhile, as long as black and white viewers are not penalized.

Attractive sound can play a role in maintaining interest, but irrelevant musical backgrounds, extraneous or simply distracting noises should be avoided. The professional broadcaster's notion that every moment of "air" time must be filled with some noise or the other can be dysfunctional to portions of a good instructional system.

Research on extending motivation to engage in a desirable activity (in this case, reading) outside of the instructional setting was reported by May and Lumsdaine (1958). Essentially, the findings indicated that more school children who had seen movies of a specific story or book checked that book out of the school library than did those who had seen no movie. This indicates that a familiarization program could be used as a motivator preceding introduction of desirable reading material in printed form. This notion should, however, be investigated further with educationally disadvantaged students before the same means of enhancing motivation can be certain to apply to them.

We must distinguish between two types of motivation: the first in which the student is motivated simply to watch, listen, and be entertained, and the second in which the student is motivated not only to watch and keep watching but also to participate actively in specific ways. Clearly, the second will be much more difficult to achieve.

Current techniques used on television tend to be aimed toward the first type of motivation. Whether or not those same techniques can be

applied toward the second type of motivation is an open question. They include, for example: canned laughter; stories which are predictable, non-threatening, easy to follow and highly redundant (you miss nothing if you miss one or a piece of one); sex; violence; background music and/or popular music; action, in the sense of "something always happening;" appeals to the need to escape; etc. Although many of these techniques may not be useful in instruction, we should not expect that traditional classroom motivational techniques would be useful either, nor can we expect to get motivation out of a paper bag.

Transmission

Television as a transmission and reception medium exists. The question of whether it is the logical choice for a universal literacy program can only be settled when it is determined that television reception can be made available widely enough to the relevant population. Radio should be considered as an alternative to television, even though the instructional problems are much greater because it is more widely available and lower in cost.

If we assume that television is chosen as the major medium, there are several considerations about the type of transmission:

For the adult nonliterate population, mass presentation with all other air time preempted would be a powerful attention-securing device. Whether or not other air time is preempted, mass broadcasting either on a national or on a local scale is the simplest answer for the adult population.

Scheduling the mass presentations could be done many ways. If all air time is preempted for literacy during prime time for approximately one-half hour daily, other TV channels can have visual programs showing only the texts of various books or printed word media (newspapers, etc.). These texts on other channels would be of varying difficulty levels -- none would be of intrinsic interest (visual, audio, etc.) beyond that conveyed by the verbal text. The sound track for these other texts could be dead or have occasional sound effects -- none of any intrinsic interest. Alternatively, or concommitantly, many different difficulty levels could be accommodated. Television stations not presenting one level or the other of the literacy program, and radio stations as well, could present public service programs: how to register to vote; economics for the housewife; ecological preservation; population planning, etc. For all competing programs, time could be sold (as well as for the literacy program if control could remain with the designers rather than with the admen), but these other programs would be supervised by the literacy team, who would have veto power as well as advisory power. (Remember, this would not be for a long period of time nor for very long in any one day. It must, however, be during prime time, say between 7 and 8 p.m.)

For the person still in school who is not learning to read at a satisfactory level or rate, materials different from those for the nonliterate adult would be needed. Lessons which can be teacher or student paced and controlled would be best for in-school situations.

For prereading training of the child, or better still for reading training of the child, beginning at the prereading level, still another set of materials is needed. Self-pacing or teacher-scheduled pacing is most desirable. Perhaps all three kinds of material (adult, in-school reading disability, and entire reading instruction program from preschool up) could be generated from the same set of basic objectives, but the interim goal points and the lessons themselves would differ from one another.

Two basic kinds of transmission must, then, be planned: mass transmission for mass consumption, and individual packaging for individual (or small group) control and consumption. We should consider also a multiple channel approach beyond the radio-TV parallelism suggested above. If, for example, the print media ran the same lessons for "readers," there would be added reward for non-readers to keep up with the audio lessons so they could interact with the readers about the "same" material.

Assessment and Evaluation

Television, or any other mass medium, poses severe problems in obtaining ongoing assessment and evaluation. Sampling schemes are necessary, and the proper sampling plan will provide the necessary information for revision and evaluation of the course as a whole. The problem of providing rewards and feedback to the student is a separate one, and although a report is being prepared for the Committee on the topic of rewards, we would like to suggest some elements of a reward scheme: The system could be administered from offices much the same

as the motor vehicle licensing program is. Graded printed reading material with contributing illustrations could be provided, on loan, contingent on passing a pre-reading test in the office, and registering for the literacy series. If the learner finished the course satisfactorily (i.e., came in and passed intermediate tests, turned in workbooks, and passed the final test in the office), he would be given all the books. During the time of the broadcast, all pencils, free paper, and free workbooks, as well as free "reading" books would be provided for coming in and passing tests and turning in work in the office. Payment of welfare money might be made contingent on trying the reading course, but it would be destructive to make welfare payments contingent on passing the reading course.

A further consideration is that for some persons who cannot read, association in any way with "welfare people" could stop them from participating in the program.

If competing programs presented on radio and TV are all to be literacy related, they could be stratified by first language, age, geographic region, etc. -- all the branches or tracks discussed later in the portion of this paper devoted to instruction.

## Instruction

Since this paper is not addressed particularly to the topic of instruction, our comments will be restrained to some general ideas about how to approach teaching of reading and to a methodological discussion of recommended empirical development techniques and procedures.

General

Use of rote memorization is probably valuable in teaching spelling, letter names, and increasing vocabulary. Repetition in various contexts, visual, auditory, tactile, etc. would aid learning and retention, and various attractive settings would help insure motivation. Overlearning of many basic tools, such as the alphabet, is critical for the proper utilization of these building blocks easily and accurately in subsequent learning. The optimal degree of overlearning almost always involves practice.

Camera and sound devices can be used to focus attention on critical elements of the presentation. All of the aforementioned devices have been employed successfully on "Sesame Street," as well as in many non-television productions. We wish merely to point out their potential generality.

In the process of collecting more information specifically about the disadvantaged nonreader and the disabled reader, two sources are suggested. First, a large amount of often ignored information can be obtained by talking with some of the "patients who actually have the disease," especially with older students who have gone through the educational system without really learning to read. Testing, etc. with willing members of the specific populations would be invaluable. Second, interviews and observations of teachers known to be especially good instructors of reading or known to be more than usually successful with students who have reading problems should be useful.

Techniques and Procedures

After over 200 years the United States has not been successful in attaining the formal goal of having every citizen able to read.

The teaching of reading is often approached in practical settings through theory supported by "fiat" empiricism. That is, 'what works' is taken to be important, but usually insufficient rigor is maintained in setting objectives, mapping behavior expected, and/or obtaining feedback and cycling through systematic course revisions.

Programs intended to teach those who have not learned or who potentially will not learn to read have to be built by rigorous empirical development. Motivation, Transmission, and Evaluation must be made part of the design setting. A satisfactory combination may be very difficult to attain and may take many trials and revisions.

A rigorous system of course design would follow a pattern similar to the one below, and should produce a course of instruction which reaches the objectives reasonably well in the setting for which the course is designed:

1. Set objectives and decide upon or design whatever tests will show when the objective has been achieved.

    a. Make and validate, norm, etc. a final test or tests or agree upon an already standardized final test, or do some combination of both (the combination is probably the best, but we are not aware of all possible available tests of reading and comprehension).

b. Also make or agree upon tests which show progress through the system.

2. Make a criterion behavior outline or map. This is a set of 'test' items intended to measure incremental behavior. Such a map could be week by week, day by day, hour by hour, second by second, etc. The more time accounted for, i.e., the less time between measures the closer the map will resemble the final instructional system.

Building the criterion behavior outline will probably be more of an empirical process than we might expect. Although we can rationally specify difficulty level of text for conventional reading instruction, it seems likely that we don't know enough about what really comes after what for the target populations. That is, we probably don't know for a certain difficulty level whether the next increment is in terms of printed vocabulary or syntax or phonics or visual tracking or speaking vocabulary or some combination of these. It seems characteristic of "problem" readers to reach plateaus which are not well enough described by normal testing methods to enable the teacher to find easily the behavioral key to the next one. The ready answer, "He can't read polysyllabic words, but he can read all the second grade readers." probably means there is a behavioral step which has not been specified.

We propose that a way to minimize this kind of problem may be to generate a large pool of criterion items for every conceivable level of reading competence which can occur within the course of instruction, then scale these items, using tryout students of all relevant levels of reading

competence. For scaling purposes, each item should measure some isolable skill. Since this won't be possible to achieve neatly, items will have to be generated according to a scheme which maps the intersections of skills. If this is done, we then can isolate the effects of single skills even though they are not easy to isolate in single items. Also it will then be possible to evaluate the effects of single skills in context -- probably a critical step. Consistencies which emerge should tell us something about how to sequence the items, and should also suggest items or gradations of difficulty or context-related issues which are not included in the initial design.

a. There should be teaching materials between steps in the criterion outline, to be tested with adults, older children, and younger children.

b. These should be revised to <u>minimal</u> content. Three versions should be made; one for adults, one for older children, and one for younger children. Each of these versions should have material added and revised to suit the particular audience. Later, if it appears necessary, practical branches can be collapsed or further branching may be undertaken. Branching on the simple basis of age might be only the first way of discriminating among learners, but other ways could be used either at first or later: e.g., sco: on some general "intelligence" measure, whether or not standard English is the first language, geographical area, etc. Age was selected here because it is often relevant and because it costs little or nothing to obtain. Age probably also has a good deal to do with what kinds of material will be interesting to the

student. The material he learns to read should in some sense be worthwhile for him to read, and different ages will have different requirements, if only because "adult" reading materials can't be given to school children by a nationally organized instructional system. Age is also a predictor of peer group pressure effects -- the young school child may put up with a school-like presentation while the 20 year old male won't, especially if his friends can observe him.

3. Each minimal content version should be tried out with a few persons representative of the intended audience.

a. Tryouts might be conducted with six different members of each of the three intended populations. Intelligence test-scores could be obtained if this appeared useful. Empirical data would then be gathered on the basis of the two brightest, two medium, and two dullest, by running each tryout with a B-M-D triad, and doing minimal revising afterward before trying with the second B-M-D triad.

b. Revisions should then be made on the basis of these tryouts.

4. Median content level:

a. Materials should then be tried out with a few of each intended population. Tryouts by levels, as suggested above might be useful. The same method of obtaining levels could be used, or some other variable such as socio-economic standing, median yearly income, geographical area, ethnic background, English as first or non-first language, etc.

b. On the basis of information gained in tryouts, the content should be raised to the optimal level. This step may have to be repeated many times in many settings with different level subjects on many different discrimination variables.

5. Optimal content level. At this point an optimal content level should have been narrowed down for each of the various branches or tracks which have developed from previous tryouts.

a. The system should be further smoothened and improved by further tryout and revision.

b. Field testing. Test data should be obtained, but this should not exclude further revision. At this point the whole system should be in testable operation: motivation, data collection, transmission and all. Field tests in diverse areas should indicate further problems, but ways to solve should be fairly clear to designers at this point.

It is clear that television has limitations as a medium for literacy training. Television cannot readily be adapted to individual differences in readiness to learn to read, and in the rate and depth of learning to read. There also exist important limitations on the provision of active practice by the learner and provision of knowledge to the learner of the results of such practice. In spite of these and other limitations of the medium, we have seen that television can play an important role in a major effort to increase and improve literacy. It will take, however, a considerable investment in people, equipment and funds if any such effort is to be even moderately successful.

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