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MODEL

Instructional Module 11.1

"Media Selection"

INSTRUCTIONAL
MODULE 11.1:
MEDIA SELECTION

by

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Instructional Module 11.1:

Media Selection

Steps Prior to Media Selection

Once one has analyzed a performance objective to identify its component parts, one then decides upon how to sequence the teaching of those parts.

For objectives in the domain of intellectual skills, a learning hierarchy results from the analysis of the objective (See module on Task Analysis). The subordinate competencies (or enabling objectives) are then arranged in a teaching sequence based on the learning hierarchy.

For other domains, the teaching sequence may be based on the order in which a task is done in real life. Other objectives may involve sequencing based on chronology of events in history. For some objectives it may not matter what the sequence is (learning a list of isolated, unrelated "facts"). For a detailed discussion of how to decide sequencing for components of objectives in various domains, see Gagne and Briggs, Principles of Instructional Design, 1974.

Size of Chunk

We have recommended doing the analysis of the objective and determination of the sequence for teaching its component parts before making media selections. But different people

prefer to do media selection at different levels or size of chunk. That is, one professor may make videotapes of all his lectures, and use the videotapes to replace the lectures for the next class. This is media selection at the level of an entire course.

Another designer may pick one medium for an entire unit or an entire objective.

The present writer prefers to consider media selection for each instructional event (teaching step) of a single competency, or part which is subordinate to the objective itself. By this method, one plans a lesson by listing the conditions of learning to be built into appropriate instructional events. Then in asking "how will each event be accomplished?", one is facing the media selection question. (See module 5.3, pages 13-14 for an example of a lesson based on the "instructional event approach.") Other references showing a highly structured method for doing media selection at the instructional event level, are:

(1) Briggs, L.J. Handbook of Procedures for the Design of Instruction, 1970.

(2) Briggs, L.J. Student's Guide to Handbook of Procedures for the Design of Instruction, 1972.

The Assumed Learning Environment

Whatever the size of chunk in which media selection is

made, one needs to be clear about the assumed learning environment in which the media will be used. Thus deciding that "individual learning carrels" will be available might result in different media than if the standard "classroom" is assumed. Also, a correspondence course might use different media than for either individualized or group instruction in a school environment.

Related to the learning environment is the "planning and development" environment. This, in turn relates to total resources for planning and selection or development of instructional materials in whatever media.

A large school district, for example, may provide specialized personnel and equipment to aid teachers in developing new instructional materials. It might also provide released time to teachers for such "developmental" undertakings.

In smaller school districts, there may be little or no centralized developmental staff, equipment, or budgets. In that case, individual schools may be able to provide only the minimal support, or even none, for developing new instructional materials (other than for duplicating outlines, reading lists, or tests.)

If a school provides practically no resources for developing materials in any media forms, then the teacher is obliged to "select" materials rather than to "develop" them. Even then, the teacher may have little leeway when the choice for a given instructional purpose is between a film and a less expensive

item, such as a slide-tape presentation or a booklet.

Even when the budget permits a teacher to choose among available items at various prices, there is still a major difficulty: such materials are seldom indexed to correspond with explicit performance objectives. In this sense, a teacher who has learned how to use performance objectives in his teaching is "ahead" of the way materials are catalogued. This means that the teacher must either preview the material, to see if he thinks it can be used for his objective, or he has to try to guess from the "title" or "topic" under which the item is indexed whether it might be suitable. In short, descriptions of most such materials may summarize what the media presents to the learner, but not what the learners can do after the presentation. But, as shown in another module, a teacher can often help determine whether a selected item is effective by telling the learners what they will be asked to do following the presentation. Also, of course, the teacher usually supplements the "presentation" by giving an introduction and transition, conducting preparatory and follow-up activities, etc.

Materials which are indexed by content rather than pupil performance often have not been tried out, so the distributor could not provide data on how successful the materials are, even if he stated performance objectives for the materials.

A few distributors do give performance objectives for their materials as well as data showing how well sample groups

of pupils performed after use of the materials. It is expected that this trend will increase as more pressure is exerted on the schools to be "accountable". If schools are to be accountable, they need access to materials which produce known results. So, the responsibility to be accountable must be shared by the developers and distributors of materials in the future.

While awaiting this improved "accountability" on the part of industry which supplies instructional material in various media, teachers can do their best to (a) develop special materials, when needed; (b) select the most appropriate materials, when a new development is not possible or not necessary; (c) provide performance objectives to the learner; (d) evaluate on basis of the objectives; and (e) improve their supplementary instruction to make up for weaknesses in available materials.

Cultural Considerations

A teacher is normally well aware of the culture or sub-culture in which he works. But developers of commercial materials often have no specific focus in this regard. They will try to make their products as widely acceptable as possible, but still some products will be unacceptable in content for some communities. So a teacher often must choose the most effective material for his objective, while avoiding objectionable

material. Sometimes a teacher can modify an item to achieve both of these conditions.

For professional designers of instructional materials and media, therefore, one requirement is for their products to be compatible with the culture the materials are intended for. Especially when intended for sale outside the United States, but also for sale within the nation, materials are needed which meet three requirements:

(a) no objectionable content

(b) no conflict with current, prevailing, educational conventions, and

(e) no failure to match the resources of the buyer.

Thus if a U.S. industry were preparing materials for both U.S. and outside distribution, he would need much information about his target populations. When products are intended for export outside the U.S., two additional precautions are needed:

(a) often a literal translation is unacceptable, due to use of slang words or other non-meaningful phrases, when translated,

(b) often a "cultural filter" must be added to the translation process to avoid offensiveness and references to matters unfamiliar to the people of the using country.

Finally, instructional media should not be recommended to a country if they are inappropriate to the resources and customs of that country. If a country does not have, or cannot

afford, or does not want to have electricity, then electric media would be useless. The educational levels of the teachers available would also be a factor in which media can be employed successfully. While it is tempting to impose the "newest media" of the U.S. upon other countries, this would be a mistake if the people of that country do not wish to introduce such media.

So, both within the U.S., and for materials intended for export, the teacher's acceptance of the materials is important. In part this acceptance is culturally based, and in part it may be due to the teacher's past methods and ideas about teaching. So a major innovation usually cannot be introduced without the willingness of school officials to receive it and without special training for teachers who are receptive to the innovation.

The Bases for Media Selection

Assuming that a teacher or other instructional designer has determined the sequencing of instruction, and has some idea of the "size of chunk" for which each media selection decision is to be made, what "guidelines" can he use?

It is suggested that the reader examine five types of guidelines that are available, and decide which seems most meaningful, considering the "size of chunk" in which decisions are to be made. In any event, one wishes to select media

appropriate for the learners and for the objective (or competency or instructional event, depending on the preferred size of chunk.)

At this point, please refer to the following four sections in Briggs, L.J., Handbook of Procedures for the Design of Instruction:

1. "The Briggs" method of media selection: pages 93-141.
2. "The Freeman" guidelines: pages 148-152
3. "The Wilshusen-Stowe" guidelines: pages 153-155
4. "The Mitchell" guidelines: pages 156-162.

Then, see the fifth guideline, based on Dale's "Cone of Experience", in Briggs, L.J. Student's Guide to Handbook of Procedures for the Design of Instruction, 1972, pages 28-32.

You have seen several examples of "guidelines for media selection". The first one (Briggs) is intended for media selection at the instructional event level. The others do not specify any particular size of chunk.

Whichever guideline you prefer, it is useful, we believe, to think of the type of stimuli needed for the instructional event, competency, objective, or other "size of chunk". Thus when one specifies "still pictures with spoken narration", for example, he can at once list some "eligible media" and some "ineligible" media, as follows:

Eligible Media	Ineligible Media
overhead projector and teacher	books
overhead projector and sound recorder	programmed instruction booklets
slide plus sound	computer-assisted instruction
motion picture	(unaided) lectures
videotape	group discussion

The ineligible media may often be more easily identified than the eligible media. At any rate, one can first eliminate some media from further consideration by placing them in the "ineligible" column, which means that these media do not have the capacity to provide both still picture and spoken words, either recorded or live. (We assumed the CAI equipment available did not provide sound recording.)

Turning to the "eligible" media, we could ask a number of questions:

1. Which one would teach best?
2. Which is the least expensive?
3. Which is the easiest to prepare?
4. Which could probably be employed well enough so that pupils would pass the test over the objective?
5. Which is most convenient to use?
6. Which do the learners prefer?
7. Which would leave the least supplementary teaching to be done by the teacher?

8. Which would require the least learning time?
9. Which might yield the best retention and transfer?
10. Which could be used also for the previous instruction or the next to be undertaken?

11. Which media least well uses the special capabilities it has when applied to this objective (or instructional event)? (This refers to "unused" or "wasted" capability, such as using a videotape to show still pictures and present a recorded narration, where no motion is involved.) It is mainly if such media are more expensive than others that this question needs to be raised.

12. Which medium is best for these learners, considering age, degree of present motivation, etc.

It may be noted that for well motivated students who do not need novelty of the equipment as an incentive, there is little reason to expect much difference in effectiveness among the "eligible" media. It would probably not be worth doing an experiment to look for "significant differences" among the media, since it is apparent that all the eligible media have the capability to present the required kind of stimuli. However one might judge, for these learners, whether teacher live narration or a recorded narration by a "stranger" would be most effective. If an attitude is involved in the objective, this would raise the question of whether the voice of the teacher or that of the "expert" would have more effect. In general, it

seems wasteful to use a "motion-capable" medium, such as videotape, to present still rather than moving pictures.

Exercise: Eligible and Ineligible Media

Now consider media selection for these situations:

1. Using the Briggs guideline, studied earlier, we want a medium for the instructional event of "motivate" as a first step in teaching children how physical traits of animals and plants are inherited from parents. The children are fifth graders, having their first lesson in "genetic inheritance".

List the:

- (a) type of stimuli desired
- (b) the ineligible media
- (c) the eligible media
- (d) your choice among the media, and reason for such choice.

2. We need to "provide a model of performance" to show the learners what they can do when they have mastered a unit on "using the pythagorean theorem to find the height of a flagpole without climbing it or measuring it directly". List the same solution elements as in problem 1.

3. We need to select a single medium to do the entire instruction on "explaining why Benedict Arnold has gone down in history as a traitor". Same response elements as above.

4. We need a single medium for teaching the competency "collecting terms", as a step in learning to "solve linear

equations with one unknown." Same response elements as above.

When finished, check your work with the answer key that follows.

Answer Key

1. Event, "motivate", heredity; fifth grade.

(a) Type of stimuli: a highly entertaining story presented by an animal family in its natural habitat. Need to be able to visually distort physical features for emphasis and comedy effect, and to present action as well as conversations of this animal family. For example, we need to show a little elephant with "baggy skin", exaggerated, to discuss why he is that way.

(b)

Eligible Media	Ineligible Media
Puppet show	Books
Motion picture	Lecture
Motion picture presented by TV or videotape	Programmed Instruction
	Slides and sound
	Group discussion
	Overhead projector
	Carousel projector

(Note: were it not for the "motion" requirement, a skillful teacher who is somewhat of an artist and a vocal "mimic" might prepare still pictures in a series to "simulate" action, as in comic strips, and to do his own "vocalization". Many teachers, of course, do not have these special skills. Also, the requirement to "distort" the animal features precludes use of live animals or pictures of them, thus

calling on either the motion-picture art of animation ("Donald Duck" kind of characters) or use of specially designed puppets.

(d) Choice of medium: motion picture.

Since either animation or puppetry is required, professional talent could do a better job than a teacher making his own puppet show, and hence motion picture is favored. Animation is, unfortunately expensive, but it might be worth it if sufficient demand were developed. (See the lively motion picture script by Beulah Cypress, "The Saggy Baggy Elephant", in Briggs (1972), pages 131-135. Since this film is very brief, it could be made available at a reasonable price if the demand could be developed.)

If such a film were made, it then might be presented in the classroom by TV.

2. "Provide model of performance": finding height of a flagpole by non-direct measurement.

(a) type of stimuli: actual demonstration by teacher, using a real flagpole, surveyor's transit, and computation on chalkboard.

(b) Eligible media (c) Ineligible media

This type of stimuli statement has dictated the media directly. Due to the choice made, not even a motion picture of such a demonstration would meet the specification. One could of course have specified "live demonstration by the

teacher" or "an equivalent film".

(d) Media chosen: The teacher takes the class out to the flagpole, and using the transit, demonstrates the sightings (angle) and measurement (on the ground, from flagpole to transit). Then, taking the class back to the classroom, demonstrates the solution by use of the chalkboard and oral explanation.

3. Single medium: re Benedict Arnold

(a) Type of stimuli: spoken words; printed words; action pictures to recreate historical incident.

Eligible Media	Ineligible Media
Motion picture	Books
TV or videotape	Still Pictures
	Slide-sound
	Lecture

(b) Videotape: This has already been done in the CBS "You Are There" series. It contains all the information needed for the viewer to accomplish the objective.

4. Single medium: Collecting terms in algebra

(a) type of stimuli: printed words and symbols; student written practice; feedback; testing.

(b) Eligible Media	(c) Ineligible Media
Programmed Instruction	Lecture
Self-contained "Module"	Sound tapes
Textbooks with exercises and answer key	Slide-tape (no workbook)
Slides plus workbook	
Motion picture or TV plus workbook	

(d) Choice: Programmed Instruction

It presents instruction in form of words and algebraic symbols; requires student responding and feedback; and tests for mastery. It is self-paced, another advantage, as compared to film or TV, which is arbitrarily paced, wastes the motion capability, and does not in itself provide the needed practice and testing, although at needless expense, it could be made to do so.

Deciding Upon Type of Stimuli

As you saw earlier, type of stimuli statements allow you to classify media as eligible or not eligible for consideration.

But how does one decide upon the type of stimuli?

Again one considers the learner's characteristics and the task characteristics.

Learner Characteristics

In Dale's guideline about which you read earlier, age of the learner was suggested as influencing the media choices. Young children are exposed to real objects, animals, persons or activities. These direct contacts are usually required as "meaningful experiences" for young children. Sometimes the twelve levels that Dale presented are classified as to degree of abstraction. Hence the terms:

1. Realistic: close to the real objects and actions
2. Iconic: pictures to represent things and actions
3. Symbolic: words to describe things and actions

As noted earlier, a college student can learn most objectives well and efficiently by use of symbols: printed words and signs and abbreviations. So except in such areas as art, music, physical education, and laboratory or field experiences,

the college student learns well by reading printed words, usually in books, but sometimes in modules or programmed instruction. A fast reader can learn more rapidly than he can by listening to lectures, partly because a lecturer cannot speak as rapidly as a good reader can read. Also, a book permits "backtracking" and "scanning ahead". Thus for comprehension of "easy" materials such as novels, "speeded speech" techniques can now close some of the gap between lecture speed and reading speed. Thus for much "substance learning", as in just "following the story" or "remembering the main ideas", speeded speech can rival reading, but it may stop somewhat short due to the "scanning" ease with a book.

For intellectual skills, it is not always desirable, especially, to read fast, but to practice doing what the materials are designed to teach. So, again, the domain of learning, as well as the reading ability and age of the learner, would be considered in identifying the kind of stimuli on basis of which to choose media.

Some authorities consider the above approach to media selection to represent a "stimulus oriented" theory of learning, in contrast to a "response oriented" theory, as in programmed instruction. But it should be clear, from only the preceding exercise alone, that the procedures advocated here are both stimulus-and-response oriented. For some

learning, such as "following the story", the stimulus features of the book or film can largely determine the success in learning, by use of humor, vividness, etc. But in learning to solve equations, the practice and feedback are highly important features of mastery.

Apart from age and reading ability, other learner variables may determine which media are most successful. A highly motivated student may learn well by reading; a less motivated student may need the novelty of film or group interaction to keep his interest up. There are also presumed to be different "styles" of learning among learners of the same age. Just what these style variables are has not been clearly defined by research to date. But some studies show that one person may learn by an inductive method while another will do better by a deductive method. Other variables may involve preference for abstract vs. concrete descriptions; liking for discovery vs. liking to "receive" instruction; or liking to work alone vs. working in a group.

Since research does not at present lead to many guidelines about learner "styles", teachers often, over a period of time, discover that, in general, one does well by reading, another by listening, another by group project activity, etc.

A study with adult learners, conducted in the U.S. Navy Academy, suggested that some learners were "media susceptible" -- that is, the different media vary greatly in success for

that person. But many other midshipmen observed (perhaps the majority), learned about equally well by all media available. Presumably, this means among what we call "eligible" media in this module: if "ineligible" media had been used (unreasonable media for the objective at hand), the results might have been different.

It appears, then, that in the media selection procedure described here, the choice of type of stimuli is the fundamental choice to be made, since all "eligible" media should be successful for most learners.

It should also be noted that other writers on media selection mean by "media" what we mean by "type of stimuli". This lack of standardization in defining "media" often may make different authors' views to appear more in conflict than they really are. But we prefer to use media as the physical means for presentation: a book; a motion-picture film; a series of slides and a sound recording. Other writers would take "printed word" to be the media, whether presented in a book, on a chalkboard, or on a poster. While both ways of defining media have advantages, it would be just as correct to describe this module as a "method of selecting type of stimuli" as a "method of selecting media". It really is both.

Task Variables

The entire concept of different domains of learning, and

the idea of different conditions of learning for each domain or type of learning, suggest that different kinds of stimuli may be employed as major aspects of teaching among the various domains.

For example "practice" will be prominent in motor skills. Recall of subordinate competencies is prominent in intellectual skills; "building a meaningful context" enhances retention of information. It is likely that the type of stimuli needed, and hence the media used, will often vary among domains.

Even so, one must look at the specific objective (or competency or instructional event) when going about specifying type of stimuli and media (in whatever size of chunk one decides to consider). One especially needs to note the verbs and the objects in the performance objective. Thus if one is to solve equations, the media used might be different than for explain the laws, or describe a process, or construct a model. Solving a riddle might be approached differently than solving an equation.

Unfortunately or not, there is no research evidence or valid theory for expecting that any one medium will be superior to any other medium for such broad classes of circumstances as these:

1. For teaching all objectives in a single domain of learning.
2. For teaching a specific subject area.
3. For different ages of learners.

4. For all learners at the same age.

In the writer's view, it is also unlikely in many cases that a single medium is optimal for all the instructional events for a single competency or objective. Therefore in the 1970 volume referred to earlier, it was anticipated that final media choices will represent compromises between optimal choices and realistic planning. Examples are given in the 1972 reference in which the "theoretically best" media choices differ from the "final choice", in order to avoid:

- (1) The inconvenience of changing media too frequently
- (2) The cost of using many media in a short period
- (3) The boredom which might result from prolonged use of a single medium.

One advantage of making media choices at the instructional event level, rather than at some larger size of chunk, is to accumulate experiences of designers to see how greatly the choices would differ if one used the "theoretically best" rather than the "final" choices. It is desirable to study such data to determine the most practical but still analytical (as opposed to chance or intuitive), method for making media selections. Ultimately such data could confirm or disconfirm the usefulness and validity of analyzing and making choices at the instructional event level rather than at some larger size of chunk.

Exercise

1. Write two objectives that appear greatly different -- that is, they fall into different domains, or one requires memorization but the other, problem solving.

2. Analyze each objective in reference to the teaching sequence for the various parts, or subordinate competencies, of the objective.

3. List the instructional events (teaching steps) for teaching one part, or competency.

4. For each event, list the type of stimuli desired.

5. Then list the "eligible" and "ineligible" media.

6. Then make a "theoretically best" medium choice for each event.

7. Then make a "final" choice for each event.

8. Write a discussion about why changes were made between "theoretically best" and "final".

Check your work with the instructor.