

Instructional Media

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Introduction

The universal question so often asked by instructors is how does one choose which medium to use for different parts of a course. The questioner usually expects to be referred to a beautifully constructed algorithm or a carefully balanced analysis of pedagogical factors which will lead to a best choice. No such things exist. Instead choice of media is still very much controlled by logistical financial and internal political factors. 'Gut feeling' is still an important means of selecting media.



How do I select media?

The fact of the matter is that instructional researchers and designers have not yet provided even the foundations for constructing strong procedures for selecting media appropriate to given learning tasks. There has been no work in this regard in South Africa, and very little in Britain. In Germany a start has been made, whilst in the USA 2000 media studies have not produced the answer.

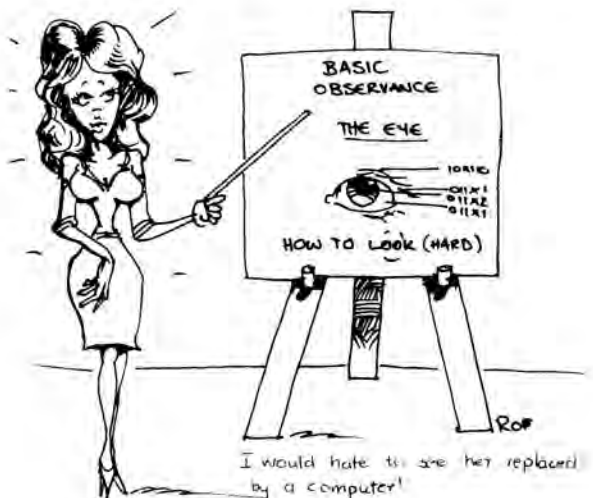
There is *no* shortage of research into instructional media. There is only a shortage of the kind helpful to the practical instructor. Most of the research which has been done has consisted of

experimental laboratory type experiments. Most have dealt with TV, programmed learning and film, in that order. Few experiments exist on radio, almost nil on filmstrips, slides, tapes and textbooks. Financial considerations have been the main cause of this imbalance since some media are fashionable and 'big', whilst the 'smaller' media are usually too insignificant to bother about. Let us have a look at some of the experiments which have been done:

Experiments on Media

***Experiments on using Instructional Television.** Most experiments compare instruction using TV, with the conventional classroom instruction by the teacher. The findings are clear. The more carefully such comparisons are designed and controlled, the more likely they are to show *no* significant differences in learning between the two sources.

Stickell in 1963 however found that from the 250 experiments, comparing conventional classroom instruction by the teacher with instruction by TV, only ten studies were acceptable in design and scientific reliability, and all of these showed no significant difference. Of the other experiments, 23 were partly interpretable, meaning that although there was a flaw in their design it was not sufficient to cancel out their findings. Only three of these showed a statistical favour toward instruction by TV.



Chu and Schramm in 1967 did 421 experiments in which conventional classroom teaching was compared with instructions by TV. Of these 308 showed no significant difference, 102 were for instructional TV and 89 in favour of classroom teaching.

In another series of experiments Dubin and Hedly (1969) showed that instructional TV with a telephone or radio link-up, permitting students to ask 'live' questions or make comments was *less* effective than 'one-way TV'. Could this be because the need for one person to ask questions and to comment is an annoyance to others in the situation? Is it possible that the best use of TV is not to try and duplicate conventional classroom teaching as closely as possible, but rather to teach in another way?



Another recent approach to using television in education was to put the 'best' teacher onto TV and let him teach as he would have done in a classroom. This was called 'sharing the teacher' or 'master teacher'. We in the RSA saw this technique demonstrated in a recent SABC TV programme 'Die Brandkluis'. However, we cannot really judge the value of this series because it was designed primarily to *entertain*. Audiences were entertained because they were not obliged to remember anything or to learn and retain anything which did not interest them. They have no commitment to evaluation and there was no feedback. It was a one-way, 'take it or leave it' situation wherein the 'teacher', could pick subjects that were interesting or easily demonstrated. Many instructors envied Mr Wijnbeeck on SATV – if only they too could teach the 'niceties' all the time.

Recent instructional TV research programs however have assumed that TV put different requirements on a teacher than the conventional classroom situation does. Research done by Niger Instructional TV claims that the best TV would seem not to be a teacher on camera, but rather 'shows for kids.'

In conclusion, the evidence shows that overall there is no basis in research for saying that students learn more or less from instruction by TV than from conventional classroom teaching. Under some conditions of teaching a certain medium *could* help *some* students to learn more of *certain* subject matter or *certain* skills, than another medium. However, the results of the broad comparisons say there is, in general, no significant difference.

Not all experiments concerning instructional TV are comparisons with conventional classroom teaching. Some have been measurements of learning, retention and reasoning using various media. A few of these experiments clearly show that students of widely different backgrounds and abilities *can*, and usually *do* learn a variety of subject matters efficiently when taught solely by TV. Experiments conducted on 'Sesame Street' for example, shown on open TV in England for viewing by preschool age children, without teacher supervision, but as entertainment, show that learning increased steadily with the amount of viewing.

***Experiments on Instructional Film.** It is generally assumed by Educational technologists that what can be said about TV can be said about film. The only difference relates to how the media is delivered. TV can be presented live, whilst a teacher has more control over film shown in the classroom. The evidence available leaves no reason to doubt that students can learn efficiently from instructional films.



***Computer assisted Instruction (CAI) and Programmed Instruction.** CAI is 'big' media, programmed instruction is 'small media'. CAI has been well researched while programmed instruction results are usually only released if they have been successful. Students learn from both media. The ability of CAI in particular to provide interactive drill and to save time over direct teaching has proved noteworthy. It has been found to be especially good for language teaching.

CAI and programmed learning are really methods of instruction rather than media. There is little doubt that students can learn effectively using CAI, but the choice between forms of computer instruction and other media depends on other considerations as well. Cost, class sizes, availability of software are but a few of the variables to be considered. Research offers little help on the problems of using the computer effectively, but like TV and film research, it leaves little doubt that students of many backgrounds and abilities *can* learn diverse subject matter efficiently from either CAI or printed programmed instruction.



Students of many backgrounds and abilities.

***Radio and Smaller Media.** There is less research on the less expensive, less complex, media; especially the older and better accepted media because the need has seemed less urgent. Most radio and small media research is old and not always valid because research has concentrated on the new media. Evidence shows that students do learn from instruction by radio. Research on the smaller media; tapes, filmstrips, slides, transparencies, photographs, models etc has been scant, but what has been done is favourable to them all.

What these experiments say

***Do Students learn more from the Big Media?** We are far from confident whether the 'big' media are proportionately beneficial to the student. The

picture is not complete. Very few of the combinations of media, subject matter and learners have been tested in comparative studies. There is a complete lack of research concerning the conditions and purpose under which one medium is better than another. We can only look for *trends* rather than conclusions.

There is some doubt as to whether the brain can absorb two channels of media at the same time. Thus the audio-visual media (TV and film,) where the audio and visual are presented together, may be less effective than the pure visual or pure audio medium. Any possible superiority of two channels over one depends on the rate at which the information is presented to the two senses, and the relation of the information in the two channels to one another. This is an important line of research to media planners because the most important Big media make use of both the audio and the visual senses. Bearing in mind the incompleteness of the evidence available, it cannot be assumed that Big media enable the student to learn more and is thus superior.



Media bombardment.

***Do Students learn more from a Combination of Media than from a Single Medium?** Almost all teaching is 'combined' or multimedia and 'teacher instruction' as measured in most experiments, is usually teacher, plus blackboard and other small media. In most experiments done, the question investigated was, whether by adding audio-visual or programmed media, instruction will improve (if the *time* for instruction is held constant.) Nevertheless the research on this question almost invariably indicates that the addition of one or more channels of instruction *does* make a difference for the better. The most impressive research results come from experiments where a 'media mix' is used to suit a particular course or class requirements. In this type of experiment

the strategy is to form different combinations using TV, radio, textbooks, films and anything else the learning task calls for. Such matching requires a discrimination among subject/media combination which is scantily supported by research but guided by expert experience and common sense decisions. The results show definite leaning gains.

This can be summed up in a few words: Students can learn a great deal from any of the media. Under most of the conditions tested, they could learn as much as from good face to face teaching – about many subjects. It hardly seems necessary to waste so many experiments underlining this conclusion. Both parents and teachers can testify that the ability of students to learn from any experience, under appropriate conditions is truly phenomenal.

In research, the question most often asked is in the form 'Can the media teach?' This question was prompted by early attempts to establish media with parents and administrators. Early media was emphasised, not to replace the teacher, but to take over some of his/her instructional time and thus relieve him/her for other responsibilities. Early researchers were thus concentrating on media for the amount of teaching which media could do, comparing it to the teacher alone. The idea of using media to 'replace the teacher' came later.

Proving that students could learn in general from the media was but a first step. When the experiments began to show no significant differences, experimenters turned to the question of subject matter, for example; could the media teach some things better than others? When the obvious answer to this was documented, experimenters looked at the different effects of media at the different levels of education – primary schools versus secondary, technical versus academic etc.

Thereafter the concentration of media research on TV reflected in part a search for the *super* medium. The wastefulness of this research was that investigators were looking for the medium that was best in general, and best for every kind of teaching, whereas all our experience tells us that there is no such thing. As a matter of fact the most regrettable characteristic of the long line of instructional media experiments has been their macro quality. This means that they have tended to prove repeatedly that students learn well from a given medium, thus treating the medium as a

whole and by studying an entire class period or school term, lumping together all kinds of teaching that might be done with the particular medium. Instead a larger number of micro studies, trying to indentify the unique strengths and weaknesses of a given medium for a given purpose, trying to maximise the learning from a particular medium and thus considering how it is used and how it can be used best, would have been more useful. Now, when the question is asked whether a certain medium can do a given instructional task, or whether one medium can do a given task better, the existing research fails us. We can only get a macro answer, for example 'Yes TV can teach algebra, but whether TV is best for algebra, and if so, we cannot say why'.

Problems encountered during experimenting

Even under the best conditions a study comparing the instructional success of the teacher alone with that of media or comparing the instructional successes of different media present special difficulties to the experimenter. There are very difficult problems of design in research and experiments to do with media. Realism tends to conflict with science. Another problem in designing rigorous and practically useful research is specifying what kind of learning effect will be measured. Formulating truly measurable objectives is an example. Measuring the achievement of such objectives is hardly equivalent to measuring the total effects of exposure to a teacher or a medium.

A result from research done in El Salvador suggests that some of the most significant results of using TV in schools may be the very ones that experiments neglect to measure. Much research is likely to be conducted in the next decades, not only to learn how to maximise the usefulness of a given medium for a given purpose, but also to probe beyond the surface measurements of learning objectives, in search of other effects. Some scholars would refer to this as 'humanistic' rather than a 'scientific' approach. Be that as it may, it is good pedagogics, and good Communication Psychology.

Another question brings another problem. Are the different media equally effective in a given task with different kinds of learners? Common sense and experience tell us that they probably are not. Beyond physical conditions (deafness) there is little reason to expect a differential media

capability in individuals. Mental ability (IQ) is the personal variable that has been most studied. The findings in general do not distinguish among the media, but show rather that more able students (everything else being equal) tend to learn more *from any medium*, than the less able ones. The macro studies available give us little help in selecting among the media relative to ability levels. There are essential limitations in this type of research. There are dubious assumptions about 'all things being equal'. There are many characteristics of the learner that interact and alter the effects for different individuals, more than a researcher can control and may be more than he knows about. To pin down all the interactions requires more data than the researcher can handle, also the conditions making for interactions change with time. This does not contend that it is undesirable or useless to conduct research, but that we must be wary of expecting such studies to produce immutable laws.

There is, also a considerable amount of research on methods of teaching with media which apply more often across the range of media available than to any one medium. Some of these results should help in any given case to guide the choice of media. For example there is a long line of studies emphasising the advantages of simplicity and clarity in media instruction. The implication of the many studies is that one should not select a medium for learning primarily because it can present the material with more embellishment or more attractively. Instead media should be chosen if its mode of presentation and symbol system can make the intended learning task easier and more effective than another mode and symbol can. Chances are that a simpler medium or simpler presentation can do a workmanlike job and accomplish as much learning at less cost.

Another line of experiments has emphasised the importance of involvement and participation by the student in all media teaching. Experiments show that activity can improve learning from 0 to

80%. Media experiments have echoed this finding. The general importance of these two lines of research is the desirability of *simple* media and *active* students.

Some studies are more directly relatable to media selection. Some excellent results are obtainable in respect of intelligence and ability in relation to media choice. It is out of studies like this that a usable research-based theory of media selection may ultimately emerge, but the difficulty of such a theory is illustrated by these words of Carpenter 1972:

'The central task is the precision matching of media and modes to instructional functions and objectives, to content characteristics, to target audiences' characteristics, to the logistics and strategies of designing and creating learning environments, and to providing for evaluations'.

Conclusion

Unfortunately research has not yet found the means for this to be done. Until then the instructor will need to rely very much upon experience, common sense and a 'gut feeling'. What is very clear however, is that the media ultimately selected must be based on the lesson planning (objectives, lesson phases, evaluation etc.), and that media cannot stand alone. Media cannot replace the teacher. Media is like a bandsaw. We cannot switch it on and walk away. It might sound like work being done if we hear the saw running, but to achieve any real objectives the skilled operator must still carefully guide every single cut of the saw according to what is drawn on the wood.

Adapted from Schramm, Wilbur 1977 *Big Media, Little Media*. SAGE Publications, Beverley Hills, California.

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