REVIEW OF LITERATURE

A comprehensive review of literature is a must in any research endeavour. Apart from determining the previous work done (both theoretical and empirical) the other main functions of citing review of literature is to provide a base for developing a theoretical framework, provide insight into the methods and procedures, suggest operational definitions of major concepts and finally to work out a basis for interpretation of findings.

The major purpose of this chapter, therefore, was to review and summarize the relevant theories and generalizations related to learning, learning process, retention and relationship between personal attributes like age, socio-economic status and learning and retention, and relative effectiveness of aids in learning. A survey of literature dealing with the effectiveness of audio-visual aids especially the traditional aids in relation to age and socio-economic status of the respondent revealed that there had been very limited studies made under rural situations both in India and abroad.
Although there was a general lack of available literature directly relevant to the problem under study a critical review presented below was comprehensive and fitting to the scope and requirements of this study. The review was organized around the following central areas of relevance:

(a) The learning process  
(b) Theories of learning  
(c) Principles of adult learning  
(d) Factors affecting adult learning  
(e) Retention  
(f) Factors affecting retention  
(g) Steps in teaching  
(h) Setting up learning situation  
(i) Role of audio-visual aids in learning process  
(j) Relative effectiveness of audio-visual aids

The Learning Process

Learning is basic to all educational process and is considered as a fundamental process or characteristic of mind. Gagne's definition of learning is a change in human disposition or capability, which can be retained and which is not simply ascribable to the process of growth. According

to him learning is a change in behaviour. Another point of view expressed by Vesey on learning is that it is acquisition of something by a process other than maturation. Psychological literature provides the working definition of learning as under:

"Learning is a life long process in which experience leads to changes within the individual which are characterised by some kind of improvement."

Learning may be defined in non-technical terms as the acquisition, retention and application of knowledge, skills, attitudes, ways of thinking, or some other type of new response. The outcome of learning is always a modification of the learner's behaviour. As a consequence of the learning process the learner comes to act in a new or different way. These behavioural changes are not, of course, restricted to overt acts. They include what and how the person knows, feels, believes and values as well as what he does manifestly. If there is no change in the behaviour of the individual, no learning has taken place.

Postlethwait, Novak and Murray⁶ point out that learning is an activity done by an individual and not something done to an individual. Learning is a personal matter and people learn only when they want to. They either learn in order to satisfy some need which they recognize consciously or subconsciously, or to avoid some unpleasant situation which would occur if they had not learnt⁷.

According to Sorenson⁸ learning is relatively permanent change in behaviour resulting from a sequence of instructional experience. Bad habits seem to be learnt in the same general ways and for the same general reasons as good ones.

Scientific investigation of learning involves exposing an organism to a highly controlled environment and observing the effect of systematic manipulation of this environment upon measurable aspects of ensuing behaviour.

Learning is revealed by a correlated, systematic and orderly change in the force, immediacy, frequency, or resistance to change of the relevant behaviour. Any environmental manipulation which predictably and reproducibly effect any of

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these changes is established as a determinant of learning. Once the determinants of learning are known the possibility for constructive education and reeducation are obviously enormous. They significantly increase understanding of the causes of much ongoing behaviour.

Learning process involves mental and physiological changes which make it possible for an individual to do something he could not do previously. These changes result from the interaction of the individual with his environment as he attempts to satisfy his needs and interests. These needs and interests become his goals — his aims and purposes — and form the basis for what he will learn. It is through his experiences in attempting to achieve his goals and to adjust to his environment that a person learns. Learning is defined as the relatively enduring change in the response to stimulus according to Everett M. Rogers.

Welford observes that there are six stages in the learning process.

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1. Perception and comprehension of material to be learned.

2. Some form of short term storage of the material for long enough to enable longer term retention process to take place.

3. Retention by means of some more or less enduring biochemical or structural change.

4. Recognition of a further situation demanding the re-use of the particular material learned rather than any other item of knowledge.

5. The recall of the material retained.

6. Its use, with adaptation; if necessary, in the new situation.

These six stages can be grouped in the following three main groups:

(a) Acquisition
(b) Retention
(c) Retrieval

Lewin takes a different approach and says: "Within what we call learning we have to distinguish at least the following types of changes:

1. Learning as a change in cognitive structure (knowledge).

2. Learning as a change in motivation (i.e., learning to like and dislike).

3. Learning as a change in group belongingness or ideology.

4. Learning in the meaning of voluntary control of body musculature (acquiring skills, such as speech and self control).

In essence, learning is the process by which a person's behaviour is modified as he acquires, retains and applies knowledge, skills, attitudes or mode of thought.

Theories of Learning

Several theories of learning have been advanced, which may be classified into two main schools: Association and field theories. Both association and field theories are based on monistic concepts of human nature. But within the framework of monism, there is difference of opinion as to what man is.

To an associationist man is little more than complex machine. His behaviour is largely, if not entirely, determined by his environment. His purpose or goals are often irrelevant. Cognition is either denied or minimized. To a field theorist man is an energy system, an adaptive, purposeful, creative, whose behaviour is determined by the manner
in which he perceives his environment. Both of these schools have their factions or splinter groups, so that even all those who are classed as associationist, for example, are not in complete agreement with one another on all relevant points.

I. Association Theories

(a) Connectionism: Formulated by Edward L. Thorndike\textsuperscript{13} and modified by some of his disciples, it is also known as the stimulus response or bond theory. According to him learning is the formation and strengthening of bonds or connections between stimuli (S) and responses (R). The term 'connection' refers to a tendency or predisposition of the organism to react in a particular way to given situations. It signifies the degree of probability that a certain response will be made under certain stimulative conditions. When the probability is great, the connection is said to be strong; when the probability is slight, the bond is weak.

The law of effect, which underlies the use of incentives and systems of reward and punishment, has proved to be Thorndike's most significant contribution to the learning theory. According to this law, if a child responds to a

\textsuperscript{13} Thorndike, E.L. The psychology of learning. Educational Psychology, Teacher's College, Columbia University, New York, 1913 (Vol. 2).
situation correctly and is praised or rewarded for so doing, the next time he is confronted with the same situation, he will respond in like manner; whereas if he is punished for an incorrect response, the probability is that the connection will be weakened and the next time he will respond differently.

The manner in which connections are made, according to Thorndike, is largely the result of trial and error. When confronted with a novel situation, the learner's first tendency is to use activities which he has previously mastered. He tries out various ways of acting until he eventually hits upon one that brings success. Thus a correct response is selected and associated with the corresponding stimulus.

(b) **Conditioning**: The second major type of association theory has as its prototype the classic experiment by Pavlov in which a dog learned to salivate at the sound of a bell. Conditioning always involves the substitution of one stimulus for another and the forcing of an association between them.

(c) **Conditioning and Human Learning**: John Watson and other behaviourists are of the opinion that all human learning is the result of conditioning. Following the general pattern of Pavlov's experiment, Watson conditioned a baby to fear a rat by substituting the rodent for a loud, sudden noise
which would naturally be frightening to an infant\textsuperscript{14}. He further explains that people, for example, react with fear and disgust to the word snake, much as they would to the reptile itself. Also with no deliberation at all, people respond, "You're welcome" to the stimulus "Thank you".

(d) Hull's Systematic Behaviour Theory: Among the more prominent of modern association theories is that of Clark Hull\textsuperscript{15}. This theory, which in many respects is a refinement of Thorndike's, is based on the principle of reinforcement and substitution of stimuli. According to Hull, the connection between stimuli and responses is determined by their relation to drive and reward.

(e) Guthrie's Theory of Contiguity: Edwin Guthrie's theory of learning is rigorously simple. He offers but one law of learning, from which all else may be deduced: "A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement."\textsuperscript{16}

According to him, if any stimulus is acting upon an organism while it is behaving in a certain way, that stimulus will

\textsuperscript{14} Watson, J.B. and Rayner, R. Conditioned emotional reactions. J. Experimental Psychology 3: 1-14, 1921.

\textsuperscript{15} Hull, C.L. A behaviour system: An introduction to behaviour theory concerning the individual organism. Yale University, New Haven, Conn. 1952.

cause the organism to behave in the same way in the future. What the original or adequate stimuli were, does not matter.

(f) **Skinner's Reinforcement Theory:** The cornerstone of Skinner's theory of learning is Thorndike's law of effect. He uses the principles of conditioning through substitution of stimuli or simple contiguity but he relies most heavily on the principles of reinforcement. To him, however, it is not a specific connection between stimulus and response that is strengthened. It is, rather, the tendency to respond in a certain way which is reinforced. By reinforcement or the "contingencies" of reinforcement, Skinner means the relationship between behaviour and the consequences of behaviour.

II. **Field Theories**

Learning, to a field theorist, is not so much a matter of reacting to stimuli as it is a process of discovering and understanding relationship in one's environment.

(a) **Gestalt Theory:** The basic field theory is the Gestalt theory. According to Gestaltists as well as proponents of other field theories which have been derived from

their's, a person's response to a situation depends upon the way he perceives it. The sensory field is organized with respect to "figure" and "ground". That is, the object perceived stands out as part of the whole picture. The manner in which an individual perceives the field ground relationship determines what he 'sees' and what he learns as a result of his sensory experience. Perception is the power by which he relates or interprets or understands experiences. Perception is, therefore, a critical factor in learning as well as in all other forms of human behaviour.

Learning according to field theorists is the development of insights which means sudden awareness of perception of the essential relationship in a situation. From their point of view, learning is more complex, abstract and meaningful than it is to an associationist. It is cognitive rather than simply reactive process. The term cognitive refers to the mental process which intervenes between the sensing a man's knowing, thinking, desiring, believing and anticipating. When confronted with a new situation, the learner analyses his problem, discriminates between its essential and non-essential elements, brings relevant knowledge and skill to bear on the problem and eventually comes

to perceive a pattern of relationships of which he was previously unaware.

Since man and his environment are constantly changing learning is, therefore, a matter of so reorganizing or restructuring experience that one comes to perceive things in a new way. Learning is, therefore, the dynamic interaction of a developing organism with its changing field.

Each individual perceives an object in terms of his own experience. He cannot interpret the idea in any other way. No two people have exactly the same perception.

For the most part, the association and field theories of learning which have just been discussed are based on laboratory experimentation, often involving infra-human animals. None of the theories has been primarily derived from observations of children as they learn to read or write. Too little has been done to integrate the understandings from these various areas to translate them into writings directly relevant to the adult education. Still these theories have great implication on adult learning.

Principles of Adult Learning

On the basis of the learning theories put-forth by eminent persons, a few principles of adult learning have been evolved. These principles have great implication on adult
The statements below represent what must be true if learning in an adult setting is to be optimally effective.

(a) **Learning Must be Problem Centred:** When the learner sees a real problem he is motivated to seek some kind of solution. In learning situations the problems must arise in the experiences and thinking of learner. Adult educator can provide situations to make the learner understand the problem.

(b) **Learning Must be Experience Centered:** The problem for the teacher who is to help provide the optimal kinds of experiences that will relate to the problems of the learner.

(c) **Experiences Must be Meaningful:** The experience that bears upon the problem must be suited to some degree to the learner's innate capacity to perceive, his age, his interests, his readiness and his capacity to understand.

(d) **Learner Must be Free to Look at the Experience:** Learning is the social process and people learn from other in social situations. The learner who is emotionally and psychologically free to look at experience is ready to start on the process of acquiring the necessary behaviour with which to learn and to grow.

(e) **The Goals Must be Set and the Search Organized by the Learner:** In order to find solution to the problem by the
learner, it is significant that the goals of the broad learning quest be set by the learner.

(f) The Learner Must Have Feedback About Progress Toward Goals: Evaluation of progress towards goals, particularly when goals have been set by the learner, is highly important.

Factors Affecting Adult Learning

Learning does not take place by itself. There are certain factors which affect the process of learning. These factors can be grouped as internal and external factors. The external factors are guidance, length of task, meaningfulness of task and learning the task as a whole. Similarly, there are several internal factors, such as age, intelligence, previous experience, motivation and reinforcement. Among the internal factors age plays an important role in the acquisition phase of learning process. Aging is a process affecting all living organisms. This process can be divided into two stages: Growth or evolution, and shrinkage or involution. It is generally conceded that both stages are at work throughout the life span, although growth is predominant until maturity. In the later years atrophy or shrinkage exceeds growth, but certain things like mind continue to grow in the healthy
organism until the end. Hand lists several major biological changes in the human organism correlated with aging that have relevance to education: Decline in visual acuity, loss of hearing, diminishing motor abilities, decreased speed, strength, and endurance of skeletal neuromuscular reactions, degeneration of the nervous system with impaired attention, memory and mental endurance, and general aging of tissues, cells and other organs of body. Several studies conducted in this field in India and abroad put forth two main streams/schools of thought. According to one theory there may be degeneration of the basic potential of the brain and nervous system rather than further maturation, so new learning is registered in the system with greater difficulty. The other theory suggests that as people grow older and experience a wide variety of situations, their mental structures become adapted to deal with the expected expense of flexibility. The older person is at an advantage where he can apply his experience but is greatly hindered in circumstances, such as a novel learning situation, where his past experience is not relevant.


Ruch supported the second view and predicted that role learning of associations which ran contrary to past experience should be differentially harder for older subjects than the learning of nonsense equation and much harder than the learning of meaningful word pairs.

Welford notes that older people take longer to understand fully what they are required to do in a novel situation, and this difficulty in comprehension is especially marked if the material is complex or if the pace at which it is presented is not under the subject's own control. Old people also have greater tendency to jump to wrong conclusions regarding the task and seem to have greater difficulty in dropping this erroneous interpretation. As people grow old they rely more on their store of experience and are less influenced by external stimuli.

Welford further reported that in some cases, even before reaching age forty, adults lacked confidence in their ability to do things outside of the familiar or routine.


has also been noted that in test situations highly anxious individuals learned less rapidly than others. His study indicated that older people put more effort in learning tasks than younger and were more accurate though slower. Many adults avoid education because of their firm belief that they are 'too old to learn'. Although, research has proved beyond doubt that older people can learn, there is a known decline in certain kinds of learning abilities, or in learning under certain circumstances as age progresses through the middle and later years. The adults can learn, but at a slowly declining rate of about one per cent a year from ages 45 to 70 years.

Sorenson adds that lower scores achieved on new learning by adults are often chargeable to the disuse of their powers to learn rather than the lack of them.


24 Irving Lorge et al. Psychology of adults, adult education theory and method series. Centre for the study of liberal education for adults, Chicago, 63


Jones, Conard and Horn\textsuperscript{27} have conducted an experiment with people in the learning and remembering of things seen in an ordinary picture. They asked 765 subjects, aged from 10 to 60 years, to sit through three picture shows and immediately after each one to take written quizzes on what they had seen. They reported that the rapid rise in average scores come between ages 10 to 20. The peak of ability comes at about the age of 23, then a slow decline sets in until the age of about 45 and a more rapid decline after 45. In this experiment they measured learning and not the ability to retain for any appreciable length of time.

John McGeech\textsuperscript{28} in discussing the relation between learning and age, writes: "For some time after maximal rate of learning has been reached, it is maintained without important decrement, but eventually, and usually by the fourth decade of life, a slow decline sets in to continue for as long as measurement can be made.

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Ashel Woodruff\textsuperscript{29} reports that it is a serious error to assume that because all individuals go through approximately the same steps in learning, they all go through those steps in the same way, at the same speed, for the same reasons, with the same inner emotional reactions, or with the same net results. Some of the educationally significant differences to be recognized are the health of the individual, the capacity for learning, the psychological, personal and ego needs, the previous educational achievements, and qualities of social and personal adjustments.

William Carpenter\textsuperscript{30} concluded that there was some decline in information processing capacity as age of the subjects increased. He further reported that both information processing capacity and information channel capacity would decline as the human organism aged; that this decline would be more pronounced as the complexity of the stimulus presentation increased.


Irving Lorge on adult learning reported that whenever the simple letter encoding experiment is given to groups differing in age like 20 to 25 years, and 30 to 35 years, etc., it was found that the best performances, on an average, were made by the younger age groups. He further writes that the basic difference is psychological. Individuals after twenties, become slower; they take a longer time to do any of life’s tasks. Studies have demonstrated that aging beyond twenties is associated with reduction in speed of performance. The rate is reduced, but not the underlying ability. The ability to learn is maintained in the individual from the early twenties to the late sixties.

Lorge says that whenever learning ability is measured in terms of power ability, i.e., learning without stringent time limits, the evidence is clear that the learning ability does not change from 20 to 60 years.

Wilson and Gallup stated that the interest of the older people in acquiring information that would help solve

problems or contribute to farm and home improvement counter-balanced any lessening in ability to learn because of advancing age. Age of the adult is not an important factor in extension teaching. They reported that the women over 50 years adopted about as many practices owing to extension as did the women 30 years and under.

Siegle\textsuperscript{34} in his article on the adult learner has summarized on researches conducted that adults never cease to be able to learn but some significant physical changes do occur with age. As the adult grows older, his speed of reaction and the tempo of his life slows down. His eyesight and hearing lose their youthful acuteness and he tires more easily. If ability is reckoned only in terms of speed of reaction and physical stamina, then there can be no doubt that adults have less ability than younger people. But learning ability like other productive capacities, consists of social and psychological as well as physical factors. Where speed and stamina are not of prime importance, adults do well. Sorenson\textsuperscript{35} adds that lower scores achieved on new learning by adults are often chargeable to the disuse of their power to learn rather than the lack of them.

\textsuperscript{34} Peter E. Siegle. The adult learner. Adult Leadership Vol. 3, No. 9, March 1955.
Several studies conducted in India also are in line with the above mentioned studies.

Bhardwaj\textsuperscript{36} and Sharma and Dey\textsuperscript{37} reported that age-group between 30 to 39 years of age showed highest gain in knowledge than those who were above 45 years of age when they were exposed to radio programme.

Potti\textsuperscript{38} found that the above fifty age groups tended to show less response in case of field trips. Sharma\textsuperscript{39} brought out that farmers in lower age groups indicated maximum change in behaviour when the approach was through personal contact, while farmers in the age group of 46 years and above showed maximum change when approached through group discussion. Bhosale\textsuperscript{40} pointed out that age was not a criterion to influence the cultivators when approached through demonstration.

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Singh and Akhouri\(^4\) studied the influence of age, education and size of holding on the effectiveness of selected extension methods. They reported that age of the respondents did influence the effectiveness of selected extension methods. The gain in knowledge through these methods decreased as the respondents advanced in age beyond 45 years.

Mundra\(^2\) reports that the age of the VLW was found positively related to their information handling effectiveness. The results showed that VLWs in age group of 26-35 were more effective than age group of other categories below 25 and above 36.

Prema\(^4\) has also reported that age of the rural women who participated in training camps had a positive influence on acquiring more knowledge on better practices in cooking.


\(^{43}\) Prema, L.(Mrs) and Menon, A.G.G. Study on the effectiveness of training for farm women on their gain in knowledge in human nutrition. Indian J. Home Sci. 8 (1): 57; 1974.
In another study conducted by Dubey, Chaturvedi and Sharan, it is reported that age group 28-37 was the most sensitive age group and best for learning as compared to other groups of 18-27, 38-47 and above 47 years. Ryon and Gross, and Wilkening found that younger farmers were more likely to learn new practices. Rao and Raheja noted that as the age of the cultivator advances up to 45 years, there is an increasing response but as the age advances above 45 years the response is lesser in comparison to younger age groups. Subramanyam reported that old farmers above 31 could retain knowledge as much as young farmers (below 30 years) because of the reinforcement at three times. It was further reported that youngsters were superior to older people in retention of knowledge if there was no reinforcement.

Effect of Socio-Economic Status on Learning

The other factor which was considered to affect learning and retention was the socio-economic status of an individual. The socio-economic status refers to the position of an individual in the social group of which he is a member. The relevant literature is compiled here.

Wilson and Gallup\(^49\) revealed on the basis of analysis of studies made in Lousiana that where farmers and homemakers were high on the socio-economic scale, greater use was made of extension information.

Kishore\(^50\) reported that farmers belonging to different socio-economic strata changed their knowledge significantly when exposed to broadcast. Knowledge after 15 days and 30 days of broadcasts was significantly retained by the farmers of all socio-economic strata. The subject matter of broadcasts was significantly retained by all the five groups even after 15 days of broadcasts. Even after 30 days of broadcasts the farmers of all the five groups possessed equal knowledge.


Singha\textsuperscript{51} reports that socio-economic status as well as formal education of farmers did not make any significant difference in the amount of knowledge gained by them either from a telecast or from the televiewers.

Shankaria\textsuperscript{52} found that in both the progressive and non-progressive villages, farmers showed upward communication preferences. According to him socio-economic status has a great influence in Indian villages.

Sharma and Dey\textsuperscript{53} reported that radio listeners of higher economic status gained and retained higher amount of knowledge than those of medium and lower economic status in case of programme 3. However, there was no difference between respondents of medium and low economic status with respect to gain and retention of knowledge in case of programme 1 and 2.


Retention of Knowledge

Retention along with acquisition is an integral part of learning process. Whenever any task is learnt it is retained too. During the process of learning a person acquires knowledge but with the lapse of time he forgets a bit of the knowledge. Hence the retention refers to the amount of knowledge retained over a particular period.

Retention is the ability to recall or repeat a performance or learning outcome that has been previously acquired and to incorporate it into the learner's behaviour pattern. Retention involves such phenomena as remembering, forgetting, transferring and organizing knowledge. Retention is related to learning in that what is not retained in the memory is not truly learned, according to Lewin Kurt.

Retention is an integral part of learning process. Learning represents an increase in availability of material whereas forgetting is a decrease in the knowledge.

Good retention depends on the quality of learning, qualities of the learner and utility and applicability of

the subject matter to the learner. Research studies indicate that an intellectual performance is likely to be well retained if it is an organized, meaningful whole, if it was thoroughly learned originally, or if there are occasional opportunities for participating with feedback during intervening years. Things important to remember are remembered better than things that do not make any difference to the learner. Similarly, things pleasant or congenial to remember are remembered better than things unpleasant to remember. The most obvious factor which favours long term retention is the strength of original learning. Another important factor regarding retention is that anything which is learnt with thorough understanding will be remembered for a long period. Retention, learning and recall is filled with inactivity. Retention may deteriorate as the post learning activity increasingly resembles the learning task.

Retention is an unconscious activity. As a result of learning and experience our brain undergoes changes, so that certain of the nerve cells are more likely to be excited again, given the slight stimulus. Retention depends upon chemical or physiological changes, and as long as these remain unimpaired we retain the power to remember each specific thing we have learnt. Most material that we learn is slowly forgotten presumably because these changes in the brain do not persist indefinitely.
There are several measures to find out the retained knowledge. The most widely used methods are recall, recognition and relearning or save method.

Factors Affecting Retention

The first quantitative work on retention was done by Ebbinghaus. He found that forgetting of meaningless material is extensive and rapid, especially immediately after learning. Relatively meaningless lists of associations and the detached facts are forgotten almost as quickly and completely as are nonsense syllables. He conducted an experiment. He found that three months after completing a course in botany college students had forgotten almost half of the numerous facts they had learned. After 27 months, they remembered only 24 per cent of those facts.

Factors Promoting/Affecting Retention

1. Meaningfulness of Content and Approach: Meaningful content and a meaningful approach rather than a rote approach to learning facilitate both original learning and retention. In order to enhance the retention of meaningful content, learning

approach should be meaningful. Steele\textsuperscript{57} found that students who were taught fractions with emphasis upon understanding and the inductive discovery of principles did better both on end of course tests and on retention tests even after seven months later than did the students whose emphasis was on verbatimism mastery by repetitive drill. Tyler\textsuperscript{58} confirmed the findings on rapid and extensive forgetting of isolated details but show that general principles and ability to apply them are well retained even after a year.

Meaningful material is forgotten far more slowly than relatively meaningless material. This is supported by several studies. In one investigation\textsuperscript{59} the subjects learned passages of difficult but meaningful prose. They went through each of these passages four times. Then they took true-false tests, some of which were on exact wording of the passages, while others were on content. Memory for exact wording showed a rapid and very marked decline. But memory for content that had been understood did not decline at all for as long as seventy days.

\begin{itemize}
  \item \textsuperscript{57} Steele, D.C. Teaching and testing the understanding of common fractions. University of Pittsburgh Bull. 37 (3): 317-328; '1941.
  \item \textsuperscript{58} Tyler, R.W. Permanence of learning. J. Higher Educ. 4: 203-205; 1933.
  \item \textsuperscript{59} English, H.B.; Welborn, E.L. and Killian, C.D. Logical learning - A general review of experiments with meaningful verbal materials. Psychological Bull. 34: 1-20; 1937.
\end{itemize}
In another study subjects studied sets of cards in which each card pictured an office scene. Three sets of eleven questions were given at different intervals, dealing with what was shown in the pictures. Forgetting was measured by the number of items a subject could mention when he was questioned. There was some falling off in retention. After 48 hours a group of subjects could mention 85 per cent of the items they had noticed.

Another study dealing with learning and retention of concepts revealed that in difficult and complicated illustrations learning was delayed and confused, and retention was diminished, the reason being that under these circumstances the subjects did not understand the concepts so well as when they were given simple illustrative material.

Meaningful material is easier to memorize than non-meaningful material, and once learned, it is retained longer. McGeoch says that the word lists are learned faster than lists of nonsense syllables, and nonsense syllables that approximate or suggest words are learned faster than those that do not.

60 Gilliland, A.R. The rate of forgetting. J. Educational Psychology, 34: 19-26; 1948.
The basic effects of meaning on memory can be distinguished by the two basic meanings of 'meaning'.

Meaning as Previous Familiarity: The fact that words are easier to memorize than nonsense syllables suggests little more than that it is easier to learn something that is already known, or that resembles something already known, than it is to start from scratch.

Meaning as Pattern: The things which are in a pattern can be remembered/retained easily and for longer than unpatterned content.

2. Organization: Retention of facts, concepts, and skills is greatly facilitated by effective functional organization. Especially over long intervals, organizational categories for classifying or interpreting separate details determine the number and quality of ideas learners retain. It is demonstrated that learned rules of organization can systematically influence both the amount and quality of retention. The greater use learner makes of organizational concepts, the more effectively they recall the items. Hall has shown that meaningful, well organized verbal content is quite resistant to retroactive inhibition.

To facilitate retention and effective recall of many concepts of school curriculum is to develop interrelated functional classification of them.

3. **Thorough Mastery:** Poorly or barely mastered concepts and skills are soon forgotten. Material that one wishes to retain for long periods needs to be studied and restudied. On recall there is less interference of retroactive inhibition if there has been thorough mastery, both of the material originally learned and of the material interpolated before the retention test. The role of original mastery in sustaining retention is also important in delayed retention.

Added practice is not the only way to facilitate mastery or retention of concepts and skills. Giving proper attention to all the conditions of effective learning — readiness, motivation, appropriate guidance of the trial and check process — emphasis on transfer principles and the cultivation of mental health will enhance both original learning and retention.

4. **Reviewing:** Effective review, systematically scheduled review sessions, periodic retests, continued use of concepts, expansion of previously accumulated concepts and their integration with new concepts can sustain retention.
5. Integration: Retention can be improved by integration of topics in a sequence. With integration of topics in a sequence the interactive inhibition does not occur. The integration of new concepts into learner's functionally organized background of concepts not only keeps the background facts alive but probably gives them broader and enriched meaning. As a consequence, the possibilities of both retention and transfer are enhanced.

6. Dynamic Factors in Retention: (a) Interest: Interest becomes dynamic core for the organization, extension and search for new related knowledge or skill. Highly motivated learning and use of concepts reinforce them for permanent retention.

(b) Intention to Remember: The interested and motivated child learns concepts with intention to remember them which facilitates retention. Intention to remember must be operated during, not after, learning. Effective learning is goal-directed; and that anticipation of using the concepts and skills we learn enhances our retention.

(c) Set to Recall: Retention depends upon intention to remember and the mental set up at the time of recall. If the learners can develop a mental set to remember and to apply to transfer general concepts and skills, they can develop the retentive power.
(d) Beliefs, Attitudes and Self Concept: A motivational bias in harmony with the concepts being learned tend to facilitate both the learning and retention of material.

In general, retention depends upon the nature of what is learned and upon the opportunities for review and application. Meaningful, well mastered and frequently reviewed or applied concepts are retained for long periods of time.

Rate of Forgetting: Jones\textsuperscript{64} tested students on the facts presented in a college psychology lecture, and retested them at intervals. The average on each test is expressed as a percentage of the average score immediately after the lecture:

<table>
<thead>
<tr>
<th>Interval from lecture to retest</th>
<th>Percentage retained</th>
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<tbody>
<tr>
<td>1/2 week</td>
<td>80</td>
</tr>
<tr>
<td>1 week</td>
<td>58</td>
</tr>
<tr>
<td>2 weeks</td>
<td>48</td>
</tr>
<tr>
<td>8 weeks</td>
<td>36</td>
</tr>
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There is a steep initial drop and the ultimate leveling off at some low percentage. This is true with nonsense syllables and has also been reported in many factual learnings.

Nonsense associations can be well remembered. Underwood reported that forgetting curve traditionally reported applies only for learners who have studied many different lists of association. Past learning interferes with the new responses, where such confusion is present, forgetting is rapid. When the learner learns only one list of associations, little interference occurs and responses are retained with very little loss.

Details are subject to interference and most of them disappear rapidly, but general ideas and thoughts are well retained. Tyler reported several retest studies of various outcomes from college science courses. Tests were given before and after the course and again one year later. Facts about animal anatomy and classification were almost entirely lost. There was substantial forgetting even of the facts more strongly emphasized. But application of big ideas of the course was retained at the end of course level. And the interpretation of experiments, a high level reasoning process, continued to improve even after instruction in zoology ended. Broad generalizations and methods of analysis have more meaning than the specific facts. They are, therefore, better retained.

Broadly significant ideas are remembered best

<table>
<thead>
<tr>
<th>Items</th>
<th>Average score at start of course</th>
<th>Average score at end of course</th>
<th>Average score on retest on year later</th>
<th>Percentage of gain retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naming structures of animals in diagrams</td>
<td>22</td>
<td>62</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>Identifying technical terms</td>
<td>20</td>
<td>83</td>
<td>67</td>
<td>74</td>
</tr>
<tr>
<td>Relating structure to function in type forms</td>
<td>13</td>
<td>39</td>
<td>34</td>
<td>79</td>
</tr>
<tr>
<td>Applying general principles to unfamiliar situations</td>
<td>35</td>
<td>65</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>Interpreting experimental results</td>
<td>30</td>
<td>57</td>
<td>64</td>
<td>125</td>
</tr>
</tbody>
</table>

Gain and Retention of Knowledge: Audio-visual aids help in increasing the knowledge of the learner. This has been established by several studies.

According to Philippines publication it was proved that when visual aids were used with a lecture, about 20 percent of the information was understood and acted upon by a

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group of people. When lecture alone was used only five per cent of information was understood and acted upon. It was also reported that people trained through audio-visuals were able to learn 25-35 per cent more and remembered 35 per cent more information than they did when lecture alone was given.

Marks reported that most of the people retained 10 to 15 per cent of what they had read, 20-25 per cent of what they had heard, 30-35 per cent of what they had seen, 50 per cent or more of what they had seen and heard at the same time and upto 90 per cent if they had participated involving all the senses.

Penders stated that man has five senses. In general, the more of these senses that are stimulated in the extension work, the message will be transmitted to the farmers and the more thoroughly the message will be retained in his memory.

UNESCO reports that it is a recognized fact that people retain 20 per cent of what they hear, 30 per cent of what they see and 50 per cent of what they hear, and see, and 70 per cent of what they actively do for themselves.

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Greater understanding of what is taught produces more rapid learning, better retention and better adaptation to new conditions. In teaching fractions to second-graders by a meaningful method, Moser\textsuperscript{71} found that on a retention test several weeks later the pupils did better than they had done at the end of instruction. Even though they were assigned no work on fractions in the interim. The pupils had found fractions so much fun that they made up problems for themselves, 'playing' with fractions and so learning more and more. Learning that breeds more learning is common when pupils enjoy the work and take pride in it.

In a study conducted by National Institute of Nutrition\textsuperscript{72} it was reported that 50 per cent of the information contained in the broadcast was retained by the listeners. The information was retained by listeners with successive broadcasts. Bhaskaram and Mahajan\textsuperscript{73} reported that young farmers (upto the age of 35 years and middle aged, 36-50 years) retained more knowledge as compared to older groups (51 and above).


\textsuperscript{72} National Institute of Nutrition, Hyderabad. Study on the impact of radio broadcast in nutrition on an urban population. ICMR Annual Report (1975), page 174.

Steps in Teaching

In the preceding discussion of the learning process, attention has been focused upon the learner — the adult. In order to bring about desired changes in behaviour of people, the adult educator needs to organize activities so that there will be repetition of the desired behaviour, each successive repetition building on the one before it. The skill with which the adult educator sizes up the learning situation of individuals and employs the techniques appropriate to leading each individual through the succeeding stages of the learning process determines the effectiveness of teaching. Obviously, the steps in teaching closely parallel the six requirements in the learning process. The repetition in the following six steps in effective teaching will further serve to emphasize the basic elements in the teacher-learner relationship.

Step 1. Getting the Attention of the Learner: The adults are not always aware of the improvements they can make as a result of higher learning. In such instances the first task of the educator is to direct the attention of the prospective learner to the new or the better idea. Until the individual's attention has been focused upon the change that is considered desirable, there is no recognition of a problem to be solved or a want to be satisfied. Attention is the starting point to the arousing of interest.
Step 2. **Stimulating the Learner's Interest:** Once attention has been captured it becomes possible for the teacher to appeal to the basic needs or urges of the individual and arousing his interest in further consideration of the idea. The teacher, in stages, reveals to the learner how the new experience will contribute to the learner's welfare.

Step 3. **Arousal of the Learner's Desire for Information:**
The teacher is concerned with the continued stimulation of the learner's interest in the new experience until that interest becomes a desire or motivating force sufficiently strong to compel action. The teacher convinces the learner that the information applies to the learner's situation; that the doing of the thing will satisfy significant want or need of the learner.

Step 4. **Convincing the Learner That He Should Act:**
Action follows when desire, conviction, and the prospect of satisfaction make it easier for the person to act than not to act.

Step 5. **Getting Action by the Learner:** Unless conviction is converted into action the teaching effort is fruitless. It is the job of the teacher to make it easy for the learner to act.
Step 6. Making Certain that the Learner Obtains Satisfaction From His Action: The end product of the teaching is the satisfaction to the learner as the result of solving problem or meeting a need. Follow up by the teacher helps the learner build confidence in his ability to continue the action with increasing satisfaction.

Setting Up Learning Situation

An effective learning experience can only be had in a well structured and skilfully executed learning situation. The role of a teacher, therefore, is to create learning situations that stimulate and guide learning activity.

An effective learning situation consists of five essential elements:

1. An effective instructor or leader.
2. Learners who want or need to learn.
3. Content or subject matter that is useful to learners.
4. Appropriate instructional equipment and materials.
5. An appropriate physical environment.

The task is a highly professional one that calls for deep insight into the educational process and great skill in the teaching art. At this point the total range of teaching methods enter the picture.
The learner is the central element in the learning situation. This is significant, as it should be, since the entire purpose is to cause them to learn. Learning on the part of students, therefore, becomes the objective, or the end to be attained, while the other four elements become the means for achieving this end product.

Role of Audio-Visual Aids in Learning Process

The purpose of audio-visual education is to improve learning. Educators have come to recognize that traditional methods of teaching by lecture and textbook frequently result in students memorizing meaningless facts without actually learning. It has been determined that the most effective learning takes place when the individual has experience with the subject under study. Learning is defined as change in behaviour. This indicates that a student learns best by doing. However, all the subjects cannot be taught through direct experience. Hence there is a need for instructional methods and materials that provide real or near to real situations as an effective substitute for direct experience. Numerous investigations have suggested that the use of audio-visual materials together with the textbook and other devices make an improvement in student's performance, that is statistically measurable by testing procedures.
Educational theorists point out that perception is largely visual experience reinforced by auditory and other senses. This phenomenon suggests that experiences rich in visual stimuli should evoke the strongest responses in a classroom or other learning situation as well as in other kinds of human activities. Thus the audio-visual medium can contribute to the creation of more meaningful learning experiences. Kidd\(^74\) writes that audio-visual devices do not replace the teacher, but they can be effective and economical means to good learning.

Dale and Haboan\(^75\) indicate that significant gain takes place in informational learning, retention, recall and thinking reasoning, interest and imagination and better assimilation and personal growth when audio-visual materials are properly used. It has been recognized that the best teaching is accomplished by qualified teaching using audio-visual tools of instruction. Audio-visual materials have proved effective in all areas of learning in all subject matter fields and at all ages.

James Knowlton has defined audio-visual communication, in its role as a potential scientific discipline, as designating that part of the broad field of education concerned with the study of pictorial (and other iconic or analogic) messages as these have a bearing on the learning process.

There are three modes of communication: "Speaking — listening", "visualizing — observing", and "writing — reading". Audio-visual materials are used in all the three types of communication. Dorris stated that visual instruction simply means presentation of knowledge to be gained through the seeing experience. According to Robert visual education is a method of imparting information which is based on psychological principle that one has a better conception of the thing he sees than the thing he reads or he hears about.


78 Robert, A.B. An introduction to visual aids, School activities. 10: 212-214; 1939.
Dent\textsuperscript{79} stated that each visual aid would produce extremely satisfactory results in education if properly used at the appropriate place and time. Each aid had its place and there was a place for each in nearly every teaching situation.

Kursell\textsuperscript{80} has mentioned for the effectiveness of learning or successful teaching that every thing depends on how these audio-visual aids are used. Teachers must learn to use them, always to improve psychological organization and in particular to get up a better context. Audio-visual aids must be used, not as an entertainment but as a contact vitally related to the contemplated learning and calculated to help with the learning. The great advantage of audio-visual materials is that these help in organizing learning in concrete setting — a setting of actual hearing and seeing rather than of mere talk. Blake and Bates\textsuperscript{81} mention that visual and audio-aids offer the extension worker unity of opportunities to increase the effectiveness and clearing ideas being transferred. They enable learner to see and hear.


Allen\textsuperscript{82} found that both bright and dull students learned from audio-visual materials and that the effect of audio-visual materials was particularly noticed with dull students.

**Relative Effectiveness of Audio-Visual**

Wilson\textsuperscript{83}, and Wilson and Gallup\textsuperscript{84} found variation in effectiveness of extension teaching methods. They further reported that this variation was due to the nature of teaching methods.

Tripathi and Pandey\textsuperscript{85} also revealed that the effectiveness of extension teaching methods for all improved practices differed significantly as a whole. The effectiveness of extension teaching methods differed significantly from each other for the same practice and the effectiveness of extension teaching methods differed from practice to practice. While the effectiveness of different visual aids does not differ significantly due to the change in the practice\textsuperscript{86}.

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\textsuperscript{82} Allen, W. Research verifies the value of audio-visual materials. J. National Education Association, 1952, p.49.

\textsuperscript{83} Wilson, M.C. Effectiveness of extension in reaching rural people. USDA Bull No. 1384, page 20; 1926.


\textsuperscript{85} Tripathi, O.L. and Pandey, L.R. Comparative effectiveness of the extension teaching methods in C.D. Block. Indian J. Ext. Edu. 3 (3): 161; 1967.

Radio: Radio has been utilized for learning and is the most widely accessible of all mass media. The potentiality of education by radio was recognized within a year after the first commercial broadcast in 1920, but effective education through radio did not begin until a decade later. A number of research studies have been conducted in India and abroad to find out the effectiveness of radio as an educational medium. Radio is considered as a credible source of information and is taken as authentic, trustworthy and prestigious medium of communication. It is really effective not only in drawing attention and creating awareness, but also in developing interest, through well-planned repetitive messages treated and presented in a variety of ways. Radio can be most effective if followed with group and intra-personal communications.  

According to a study "Fact finding with rural people" conducted by FAO in Japanese rural community, it is revealed that the women attributed their changed habits first to meetings then to neighbours, then to advisers and fourthly to radio.

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Bharadwaj\(^{89}\) found that gain in knowledge resulted in farmers hearing radio programme. Sharma and Dey\(^{90}\) reported that the respondents gained and retained knowledge when they were exposed to radio programme. Sharma and Kishore\(^{91}\) reported that radio is an effective mass communication medium in bringing significant change in knowledge and attitude of the farmers of various socio-economic strata. Farmers also significantly retain the communicated knowledge even after 15 and 30 days of broadcast.

Palled\(^{92}\) reported that there was significant difference between the 'before' and 'after' knowledge scores of farmers exposed to farm broadcast.

Kidd\(^{93}\) concludes that radio is now used for a wide range of purposes: (i) Providing information, facts or theories, (ii) showing proper execution of skills, (iii) raising questions and providing a background of experience for group

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discussion, (iv) motivating study and action, (v) stimulating appreciation of arts, and (vi) research in learning theory and practice.

A study of the extent of use of radio by extension workers in nine north central States of U.S.A. indicated that 60 per cent of agricultural agents, home demonstration agents, and 4-H club agents and 87 per cent of state subject matter specialists were utilizing radio for disseminating information to their clientele.\(^{94}\)

Tripathi and Pandey\(^ {95}\) reported that radio, filmshow and meetings were moderately effective accounting for 40.24, 38.59 and 33.33 per cent effectiveness respectively, in disseminating and adaption of improved agricultural practices in a community development block in Uttar Pradesh. While studying the effectiveness of these extension teaching methods for different important practices they found that radio, meeting and group discussion were found to be poorly effective (below 20 per cent).

Kishore\(^ {96}\) found that there was gain in knowledge and retention of information among farmers listening to radio.


Rao and Patel\textsuperscript{97}, and Agarwal\textsuperscript{98} found that exhibition and radio were most effective at the awareness and interest stages of adoption.

Nagoke\textsuperscript{99}, in the study of a Block, found that radio was first among mass media methods in the adoption of seeds and fertilizers.

The possibilities of the radio in doing an effective job of extension teaching under favourable conditions were brought out by a study conducted at Kansas State\textsuperscript{100}. The survey indicated that 80 per cent of families listened to the educational programmes. And of the families who listened 26 per cent were able to recall the improved practices.

\begin{itemize}
\item \textsuperscript{98} Agarwal, S.S. A study of the extension teaching methods influencing adoption of selected improved agricultural practices among farmers of the villages of the development block. Unpublished Master's Thesis, University of Nagpur, 1968.
\item \textsuperscript{100} Jaccard, C.R. and Sabrosky, Laurel K. Listening habits Station KSAC, Kansas State College Extension Service, 1949, pp. 20.
\end{itemize}
Regarding the mode of presentation of information through radio, Pandey and Khanna\textsuperscript{101} reported that the group exposed to interview mode of presentation gained and retained more knowledge than the one exposed to discussion and informal dialogue. They further reported that mean score of retention was less than mean score of knowledge gained by all three modes, which indicated that with the passage of time there was decline in the amount of knowledge gained. John and Singh\textsuperscript{102} reported that there had been significant gain in knowledge from pre-broadcast to immediate post-broadcast stage in all the three treatments, i.e., straight talk, interview and discussion modes of presentation. The interview mode was found to be most effective in gaining knowledge at immediate post broadcast and 30 days after broadcast with different groups of farm broadcast listeners.


In another study Singh and Sandhu\textsuperscript{103} reported that the discussion mode of presentation was rated best among other presentations in a study conducted at Jullunder All India Radio. It was further revealed that involvement of scientists, farmers and extension workers in the broadcast was welcomed.

In the South Pacific\textsuperscript{104}, some nutritionists found that short impromptu discussions were the most effective type of radio programme for disseminating information among villagers. Conversational mode of delivery is superior than dynamic one in terms of change in attitude and knowledge and retention of knowledge after 15 and 30 days of broadcasts reported by Sharma and Kishore\textsuperscript{105}. They further reported three important factors for effective subject matter broadcast. These are: subject matter should be related to 'felt needs', dialogue should be able to create a mental picture of the subject matter in the mind of the listeners and clear summaries should be given in the end of radio talk.

\textsuperscript{104} Ritchie, Jean A.S. Op. cit. page 137.
Puppet

No communication can exist fully in a cultural vacuum. No one can afford to ignore the cultural norms and attitudes in planning communication strategies. For rural communication the traditional folk media are, therefore, of a great importance 106. Many of these traditional media of communication are in the form of folk songs, folk dramas and folk story-telling. In Bolivia, Mexico and Argentina extension workers use puppet as a means of communication. In Bolivia they found puppet show very effective in teaching the farmers 107.

Fred 108 reported that illiterate adult villagers preferred decorative, wall painting and puppet style methods, while literate adults in the villages preferred more realistic forms.

In another study 109 on the effectiveness of puppetry and film conducted by the Indian Institute of Mass Communication, New Delhi (1973) it was reported that both puppet

108 Fred Zimmer. Indian signs and symbols. A study of their relevance in present-day communication and education. Published by Literacy House, Lucknow, page 79; 1967.
play and film had their own areas of appeal. The media equally proved popular with 250 respondents of 16 villages near Delhi. However, among the uneducated audience, puppetry proved more communicative in as much as its techniques were simple and easy to follow. This medium may be directly exploited by media users wherever the literacy level is low and the message reach through electronic media needs face to face communication extension.

Kavad

No research study has so far been done on the effectiveness of kavad. However, a brief mention of a few experiments have been mentioned by Parmar\textsuperscript{110}. He reported that in Bastar district of Madhya Pradesh an experiment was conducted to convey the message on nutritive diet to tribal boys through kavad. Each visual illustration was supported by suitable explanation. He used kavad with other age groups on aspects like disadvantages of large family, illiteracy and superstitions. He concluded that all these experiments worked well. The kavad is also used by agricultural extension workers in Rajasthan.

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The explanation in kavad is usually given in poetic or musical form. Drake and Nainudel\textsuperscript{111} compared the effect of poetry and prose. They conducted experiments with secondary school students before and after they listened to poetry and prose. Influence of poetic form was studied on factual recall, immediately and after 24 hours. It was reported that recall was significantly better after hearing prose than listening to poetry. Their possible reason might be that the poetic version contained more unfamiliar words or turns of phrases which impeded learning. Furthermore, concentration on the aesthetically enjoyable form of poetry might have deflected attention from the factual content. They suggested that emotional learning could result from exposure to the content of a poem.

Slide

Bacon\textsuperscript{112} found that in many respects slides and filmstrips were better than motion pictures. In discussing the effectiveness of slides, Singh\textsuperscript{113} reported that slides were


\textsuperscript{112} Bacon, B.L. Extension for extension workers. USAID Publications, New Delhi, pp. 72-194; 1965.

next to filmstrip in effectiveness in gain in knowledge, while slides were superior to photograph, flannel graph and flash cards in imparting knowledge. Zyve\textsuperscript{114} analysed the relative effectiveness of slides as a device for teaching maths as compared to the use of blackboard. She concluded that two days of teaching arithmetic combinations with slide gave approximately the same results that three days teaching gave when using blackboard presentation.

Rao\textsuperscript{115} studied the relative effectiveness of visual aids in diffusing information and acceptance of hybrid maize in the villages of Kanjhawala block. He found that slides and film strips were superior to lecture in persuading the farmers to adopt hybrid maize.

Jalihal\textsuperscript{116} found that the use of slide presentation helped in increasing the effectiveness of village meetings.

\textsuperscript{114} Zyve, Claire T. Experimental study of the teaching of arithmetic combination. Education Methods 12: 16-18; 1932.

\textsuperscript{115} Rao, C.S.S. Assessment of teaching value of visual aids on selected farmers in Kanjhawala block (Delhi) in imparting information and acceptance of hybrid maize. 1966.

\textsuperscript{116} Jalihal, K.A. The procedure followed in effecting a breakthrough from demonstration to adoption stage in fertilizing dry land ragi in Mysore State. Souvenir, Alumni Association, Agriculture College, Hebbal, Bangalore; 1965.
Filmstrips and slides add materially to learning efficiency particularly when motion is not essential to learning. In a UNESCO experiment\textsuperscript{117}, the value of visual material in teaching health principles to a partially literate rural population was clearly demonstrated. Of all the materials used, slides and filmstrips were considered the most effective means of reaching large groups of people and of making the deepest and most lasting impressions.

Young\textsuperscript{118}, Badley\textsuperscript{119}, Park and Stephenson\textsuperscript{120}, and Waddle\textsuperscript{121} studied picture magazines, slides, and flat pictures. They found that these materials were effective means of teaching and learning.

Regarding the content of slides, Sands\textsuperscript{122} reported that transparencies for home economics animated the study.

\begin{flushleft}
\begin{enumerate}
\item[]{\textsuperscript{117} UNESCO experiment, using visuals in agricultural extension programmes. Op. cit., page 18.}
\item[]{\textsuperscript{118} Young, W.E. Methods of learning and teaching. R. Ed. Res. 2: 446-453; 1941.}
\item[]{\textsuperscript{119} Badley, T.T. An analysis and evaluation of magazines as collecteral materials in social studies programme of secondary school. Master's Thesis, Ohio State Univ., USA, 1938.}
\item[]{\textsuperscript{120} Park, Joe and Stephenson, Ruth. A teaching experiment with visual aids. Edu. 58: 498-500; 1938.}
\item[]{\textsuperscript{121} Waddle, T.I. The use of stereographs in fifth grade geography instruction. Master's Thesis, Univ. of Pittsburgh, 1937.}
\item[]{\textsuperscript{122} Sands, Lester B. Audio-visual procedures in teaching. Ronald, New York, pages 315-316; 1956.}
\end{enumerate}
\end{flushleft}
of foods, clothing, housing and world-wide customs and standards of living. The widespread living standards, even among different groups in his own country, could be vividly illustrated with slides. The teachers who mean to elevate their pupils' ideas of anything, from more physical comfort and domestic efficiency to the definition of good life, will find the slide a very potent propagandist.

According to Illinois Teacher\(^\text{123}\) still pictures (slides) were less likely than motion pictures to involve emotions and influence attitudes, but they were often at least as effective as motion pictures in conveying information and stimulating discussion.

Mendenhall and Mendelhall\(^\text{124}\) reported that pupil-expressed distinct preferences tended to be intensified as the showings were repeated. The pictures which appealed most were those of a representative type, conventional in content, style and colour; natural scenes were preferred to portraits and figures.


\(^{124}\) Mendenhall, J.E. and Mendenhall, M.E. The influence of familiarity upon children's preferences for pictures and poems. Lincoln School Research Studies. Teachers Col., page 74; 1933.
In a study conducted by Gopaldas\textsuperscript{125} on 'poshak' it was reported that slide shows were next to an actual film show, and attracted larger audiences.

Sheila\textsuperscript{126} says that slides are easily projected and can be very useful, for anything with light and colour attracts the eye and attention.

**Flipbook**

Reddy\textsuperscript{127} reported that flipbook helped to create a more positive accurate word pictures in the minds of the farmers. Somasundaram\textsuperscript{128} reported that flipbook could help in communicating the subject matter in an interesting and effective way.

Baral\textsuperscript{129} also found that flipbook was significantly effective in gain and retention of knowledge. In a study

\begin{itemize}
\item \textsuperscript{125} Gopaldas, Tara. Poshak Project. Vol. 2, CARE (India), New Delhi, 1975.
\item \textsuperscript{126} Sheila Macrae and Margret Edwards. Home Economics 22 (8): 9; 1976; published by Forbes Publication, Hartee House, Queensway, London.
\item \textsuperscript{127} Satyanarayan, Reddy. Study of effectiveness of some selected audio-visual aids in teaching farmers in certain villages of Andra Pradesh. A.P. Agric. Univ., Rajendranagar, 1966; page 70.
\item \textsuperscript{128} Somasundaram. Effectiveness of certain visual aids in comparison with oral communication for popularizing I.R. 8 paddy. A.P. Agric. Univ., Rajendranagar, 1965;
\item \textsuperscript{129} Baral, Jagdish Raj. Relative effectiveness of some group methods in agriculture information communication in Nepal. Unpublished Master's Thesis; Udaipur Univ. 1971.
\end{itemize}
on 'Poshak Project' Gopaldas and others reported that flip chart was found to be effective in communicating nutrition knowledge to the village women. The attention-getting quality of illustrations was satisfactory. Comprehension of message by the rural mothers was fairly good and credibility was high except in case of advice on early introduction of solid foods and use of purgatives.

Rao reported that specimens and objects proved superior to many visuals and equally effective to flash cards and flip book to convince the farmers.

Reddy and Somasundaram studied the effectiveness of audio-visual aids singly and in combination with regard to their teaching effectiveness. The combination of poster plus specimen, and poster plus specimen plus flipchart created interest among all the farmers, their effectiveness being the same.

Reddy and Somasundaram studied the effectiveness of certain visual aids in comparison with oral communication

133 Reddy Narotham and Somasundaram. Effectiveness of certain visual aids in comparison with oral communication for popularising IR 8 paddy. A.P. Agric. Univ.1968.
for popularising IR 8 paddy. The result indicated that all the three aids — flash card, flannel graph and flipchart — were superior to oral communication in their effectiveness, while flash cards were found to be more effective than the other two visuals used.

Coppen\textsuperscript{134} reported that flipbook is often used in scientific conferences and by creative teams during the 'brain storming' sessions. It is pointed out in 'using visuals in agricultural extension programmes' that flipbook is used to develop a story or a lesson in a progressive, step by step sequence which makes learning easier\textsuperscript{135}.
