

CHAPTER EIGHT

THE ROLES OF LEARNING THEORIES IN DESIGNING, PRODUCING AND SELECTING EDUCATIONAL MEDIA

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Objectives

At the end of this chapter you should be able to:

1. Explain what educational media are
2. Explain what learning theories are
3. State the roles learning theories perform in the design, production and selection of educational media

Introduction

The framework of every designing, production and selection of educational media should be rooted and guided by the varieties of learning theories if only to obtain valid and meaningful results in teaching and learning. These theories can be grouped under Behaviourism and cognitive learning theories (Coppen, 1972). The designing and production of educational media have over the years been commercially done by persons other than experts in the field of education and has therefore led to the inclusion of very many features which deter learning, made such media rather a trash into the classrooms or teaching learning environment. The need therefore for teachers to partake in the designing and production of educational media is paramount if only to reflect learning theories.

Educational Media

Media, plural of medium is a channel of communication, derived from the Latin word meaning "between", the term refers to anything that carries information between a source and a receiver (Heinich, Molenda, Russel & Smaldino, 2002).

Media is defined as channel of communication through which means of communication are conveyed. Means of communication are spoken words, gestures, pictures, diagrams and written words; while media are the several different channels that can carry these means of communication (Obi, 2001). Spoken words for example are means of communication that can be conveyed by different channels or media like air, radio, telephone, tape recorders to mention among other, still pictures and diagrams are means of communication that can be channeled by book illustrations, photographs, chalkboard, flannel board and charts. Similarly, moving pictures can be carried by media such as cinefilm and television (Coppen, 1974). When these and many such channels as video, printed materials and computers are used within or outside the classroom for teaching and learning purposes, they are called *educational media*.

The sequential arrangement of how an educational media will be made or produced, what to include and what not is often done by the educational media designers and afterward the scheme is forwarded to the producers, where the designers are different from the producers. Producers ensure that whatever is spelt out by the designers are achieved to a certain level of satisfaction. Most often than not, most educational media are only designed by the teachers. Where the production is done by persons other than the teachers, instructors or experts in the field, the need for teacher's supervision is paramount. Teachers who are selecting media not designed or produced by them should ensure the satisfaction of such media for their instructional objectives. For greater achievement and efficient utilization of educational media in teaching and learning processes, the designing, production and selection of such media should only be done based on the consideration of one or more of the learning theories.

Learning Theories

Individuals learn in a variety of ways. Proponents of learning theories tend to look into these diversifications relating to learning. Learning theories are organized set of principles explaining how individuals acquire, retain, and recall knowledge. Learning theories describe how students receive, process, and retain knowledge. By studying and knowing the different learning theories, teachers can better understand how learning occurs, and the principles of the theories can be used as guidelines to help them select instructional tools, techniques and strategies in a bid to promote learning (Kelly, 2012). Below are some of the learning theories;

Stimulus – Response Theory of Learning

The stimulus – Response theorists' efforts to understand learning of animals was pioneered by Edward Thorndike by performing experiments on cat in the puzzle box in 1898 (Obi, 2001). Thorndike emphasized that the basic unit used for describing behaviour was stimulus – Response (SR) connections. He proposed that all learning involves the formation of new stimulus – response connections.

In his experiment, a hungry cat put into a puzzle or problem box was placed near an Odoriferous fish (food stimulus) was able to make the cat pull a string of the box (response) in order to obtain its freedom to have access to the food outside the box. Over a series of successive trials, the cat became increasingly efficient in getting out of the puzzle book. Thorndike concluded that what made the cat learn how to open the box was the strength of the bond connection or association that existed between the food (Stimulus) and the cat's pulling of the string (response). He emphasized that for learning to occur, two important factors must be achieved;

1. that the cat should be hungry; meaning that there should be some motivation in the cat for learning; and
2. that the food should also be ready to satisfy the hungry cat. Thorndike gave the concept of reinforcement; the idea that learning occurs when response produces a particular kind of event like satisfying state of affair.

The responses according to Thorndike refer to the behaviour of learners, acquisition of skills to write, read, calculate, development of attitudes, beliefs, values and cultural milieu. Each specific reaction is an exact response to specific spoken or written words (stimulus). Much instruction is of stimulus – response type. The stimulus – response theories (behaviouristic) is implicit in the programmed instruction approach. The emphasis here is on the learner and the correctness of his or her response to questions as the instruction proceeds. In programmed

instruction, each sequence of learning is broken into small steps, requiring an appropriate response to each item followed by immediate knowledge of results known as feedback. If the response is correct, the knowledge is reinforcement, a rewarding recognition of each correct response. Kemp and Dayton (1985) stressed that most of the attentions being given to individualized learning follow this pattern. The teacher presents instructional messages utilizing a variety of educational media to bring about these changes in the behaviours of learners either separately or together in a multi-media model learning (Obi, 2001).

Another facet of behaviouristic theories is the social learning behaviouristic theory developed by Bandura and Waters (1961) to explain personality development. They theorized that "an individual attempts to imitate the behaviour of the model whose behaviour he has observed" (Obi, 2011). They based their theory on the premise that all behaviour is learned by the organism in the process of constant interaction with the external stimuli in the social learning environment. They rooted their theory in the principles of reinforcement and observational learning which sees modeling as involving both imitation and identification with the stimulus figures being modeled (Obi, 2008).

These theorists emphasized the importance of imitation in learning and vicarious reinforcement in situation where a person observes the action of another person (model) who is reinforced or punished for their actions. The process of learning through imitation is influenced by the nature of the reinforcement given to the model. They asserted too, that if we minutely analyze the behaviour of children, adolescents and even adults, we find that most of the behaviours are limited to imitating the behaviour of the models. They categorized models into two namely:

1. Real life model consisting of parents, siblings, teachers, friends, heroes, films, sport-stars and most successful persons in the society or in the immediate environment.
2. Symbolic models which include verbal materials, pictorial and representations (film and TV), written materials, books, magazines and works of art. They observed that it is a common experience that what children view and listen to in TV and in films, is what they try to imitate in their real life. Dressing, hairstyle, delinquency, conversational styles and all other sorts of moral and immoral acts have been imitated by our adolescents in recent years from films and TV.

They concluded that a child learns a number of activities through observation of others' behaviours from the very beginning of his or her life. The model which a child observes in his environment plays two important roles in social learning. The first is that the model's behaviours serve to elicit some responses in the observer that are already in his repertoire. This occurs when the behaviour is socially acceptable; Secondly, it also occurs when the model is performing proscribed and deviant behaviour. So based on this theory, the acquisition of a variety of new responses such as honesty, punctuality, respect for elders and for constituted authorities or on the other hand abnormal behaviours such as gossips, stealing and fighting can be learnt from the social environment (Obi, 2001).

In the S – R – theory of learning, behaviourists rely solely on observable behaviours. As a result of this, they are more comfortable explaining relatively simple learning tasks making no inferences about how learners process information.

Roles of Behaviouristic Theories in the Designing, Production and Selection of Educational Media in Teaching and Learning

- i. The acquisition of the knowledge of the behaviouristic learning theory will enable the designers, producers and the users of educational media to take into cognizance the effects of the social organization of the classroom on learning by identifying the nature of the group structure of the classroom to study through a given media. Here, the designer, producer and the teacher selecting a given media will first identify whether the media will be used for independent study, small groups or the whole class.
- ii. Since behaviourists presuppose repetition of a certain act followed with reinforcement to streamline learning (response), educational media designers and producers ensure the inclusion of attributes such as task performance and presentation of bouquets of flowers, applauses (clapping hands), written or oral praises such as ("very good", "excellent", "wrong", "too bad"), as a reinforcement to the learner's response. Such knowledge consequently enables teachers to select appropriate media that produce adequate reinforcement which propel learners into action and also those that discourage disruptive behaviours.
- iii. Educational media designers and producers with social learning behaviouristic orientation would design and produce media that encourage social engagement through small group collaborative learning. Teachers with same orientation would also ensure that reliable media is selected that would best provide social learning through the instructional delivery.
- iv. Educational media designers and producers grounded with behaviouristic theories would design and produce media that highly elicit students' interest, and hold their attention minutely throughout the learning processes. Hence, features such as favourable background musical sounds, a befitting background design of the learning environment with much attractive pictures, art works and designs, reflect in such media. Teachers here know that better studies are achieved when students' interests are aroused, hence, teachers' choice of instructional media depends on that which best appeals to the students.
- v. Since instructional designers and producers grounded in social learning behaviouristic theory are fully aware of the imitative nature of individuals serving as observers of role models to behaviour change, they respectively design and produce media that will portray and promote desirable behaviour to be emulated within a given instruction. They would consequently do away with anything that derails from it. Teachers with this orientation would end up selecting media that would appropriately not promote negative behavior, hence, a teacher selecting video instructional package for his class will ensure that instructors used in the package are not those that promote negative behaviours such as indecent dressings, obscene acts, inciting words, shaggy-haircuts and delinquent acts.
- vi. Finally, educational media designers and producers with behaviouristic orientation design and produce instructional materials with lots of drills and practice exercises because they believe that practice and exercise strengthen learning. This knowledge enables the teachers to select such instructional materials that encourage assignments and home works.

Cognitive Theory of Learning

The cognitive theorists rejected the idea that learning entails making responses under the control of stimuli. They maintained instead that learning is a purposive activity influenced by stimuli but not conditioned by them. To the cognitive psychologists, learning is perceived as an interaction between the learner and the environment or the physical world. While cognition is a gradual and developmental process, cognitive achievement is influenced by several factors such as organic maturation, past experiences, genetic inheritance and the quality of the environment (Obi, 2001).

Cognitivists presented a systematic analysis of the genesis of human intellectual development. Piaget's (the protagonist of cognitivists) major objectives were directed precisely to find out how children think and reason. The theory of human intelligence was a radical departure from the predominant stimulus-response theory of the 1930s. So far the developmental theory seems to be the most logical explanation of the processes involved in the growth of human thinking, knowledge and intelligence (Onyehalu, 1988).

The cognitivists' argument is based on the prowess that an organism tries to establish equilibrium or balance between itself and the environment in which it operates, and in trying to do this, the organism generates some relevant intelligent behaviour. These behaviours not only help the organism to achieve equilibrium but also to get adapted within the environmental milieu in which the organism operates. In doing this, the organism learns (Ezewu, 1987).

In the light of this statement, cognitivists created models of how learners process and manipulate information, instead of relying on the fact that practice strengthens the response to a stimulus. Cognitivism leads to a different way of looking at learning patterns, by creating a mental model of short-term and long-term memory. New information is stored in short memory where it is rehearsed until it is ready to be stored in long-term memory. If the information is not rehearsed, it fades from short-term memory. Learners then combine the information and skills in long-term memory to develop cognitive strategies, or skills for dealing with complex tasks; (Henich, Molenda, Russell, & Suraliudo, 2002)

The cognitivists view differently the mental processes that the individuals use in responding to their environment. Piaget (1977) theorized that the intelligence or adaptive behaviour of an organism is essentially an interplay between three psychological variables, namely; Schemata, Assimilation and Accommodation. He emphasized that a learning organism directs its intelligent behaviour through these concepts. Thus:

1. Schemata: Schemata, plural of schema, are mental structures by which individuals organize their perceived environment. Schemata are adapted or changed during mental development and learning. They are used to identify, process, and store incoming information and can be thought of as categories that individuals use to classify specific information and experiences. Schemata lead to differentiations or the ability to classify objects by their significant characteristics based on experience. Very young children learn to distinguish between mother and father, some domestic animals from their other kinds (say distinguishing ducks from chickens, sheep from goats). These cognitive structures change by the processes of assimilation and accommodation, which should be encouraged during instruction.

2. **Assimilation:** This is the cognitive process by which a learner integrates new information and experiences leading to the expansion of the existing schemata. Assimilation results from experiences. With new experiences, individual attempts to place new concepts into existing schemata, the schema expands in size but does not change its basic structure. A child for instance, who had a schema that cats possess four legs, would grow his experience to know that dogs also bear the same number of legs but grows bigger and makes sound differently from the Cat.
The learning experiences can be real life experiences. Rather than waiting for experiences to happen naturally, teachers, instructors or course designers and writers cause experiences to happen through the use of a variety of educational media and methods.
3. **Accommodation:** Accommodation is the process of modifying existing schemata or creating new ones. Since schemata change with experience, adult learners have a broader and more elaborate range of schemata than children. When dealing with a new concept or experience, the learner attempts to assimilate it into existing schemata. When it does not fit, the learner either create a new schema into which the new stimulus is placed or the existing schema be modified so that the new stimulus will fit. Both of these processes are forms of accommodation.

Schemata evolve over time in response to many learning experiences. As teachers, instructors, facilitators or lecturers, we are responsible for designing, producing or selecting educational media that best provide learning experiences which results in the creation of new schemata as well as the modification of existing ones.

Piaget asserts that these behaviours (schemata, assimilation and accommodation) follow some meaningful patterns and stages of development. Thus, intelligence develops from infancy onward through four stages; Sensory motor, preoperational, concrete operational and formal operational. Richmond (1970) summarized Piaget's analysis of development of human intelligence and said that:

The sensory motor stage lasts from zero to two years of birth when the infant has no knowledge of the existence of the world or self. His or her innate behaviour patterns are exercised in the environment and modified by the nature of things he acts upon. The child's understanding of the world does not go beyond those properties of objects and events which arise directly from his actions relating to them. He has a practical knowledge of the way things behave when he handles them but no conception of why they behave as they do. His thought is locked in his own sensory motor record, which is unique to him. His knowledge is private and not touched by the experience of others.

Pre-Operational stage: This period follows after sensory motor stage and lasts between two to seven years of birth. This stage experiences the emergence and development of language and symbolic thought. Children at this stage cannot conserve, but tend to assign life to inanimate objects and treat them as such. They also talk loudly to themselves.

Concrete operational stage: This is a period between seven to twelve years of birth when children's operations are tied to specific objects and experiences. They need concrete objects or things in front of them in order to perform mental actions. And they need to see, smell, taste,

touch and manipulate physical objects in order to obtain solutions to problems. During this period, children master skills connected with addition, subtractions, classification, serialization, relations and above all conservation. They come to know that subtraction is the opposite of addition and that a smaller quantity can normally be subtracted from a bigger one. They can classify objects according to a specific criterion, for instance, a mixture of red, black, yellow and green toys can be separated according to their colours, while rectangular, square and triangular pieces of wood can be sorted out according to their shapes. They can recognize that the amount, weight or volume of a substance remains the same despite changes in its position, shape, colour or arrangement. In other words, at concrete operational stage, children can distinguish appearance from reality. They at this stage could infer that acts and characters in a film are but fictitious. They can distinguish what things look like from what they really are. The child's reasoning becomes consistent and no longer distorted and beclouded by attention to irrelevant task orientation.

The formal operational stage: This is a period from twelve years and above. It is the final achievement in intelligent behaviour made in early adolescence. This stage is characterized by the appearance of formal or logical reasoning and flexibility in reasoning typical of adults. Children at this stage gain attention to alternatives in problem solving, and ability to discover some simple physical laws by making reasonable generalizations. Children at this stage can draw sufficient conclusions from insufficient premises through deductive and inductive reasoning; and consequently acquire the fundamental principles that underline logical thought.

From the Piagetian view point, these stages of intellectual development are hierarchical, sequential, invariant and cross-culturally valid. However, it recognizes that individuals may attain the stages either faster or slower than others depending on experience and environment to suggest that individual differences exist in people (Obi, 2001).

Roles of Cognitivists' Theories on the Designing, Production and Selection of Educational Media in Teaching and Learning

- i. The designers and producers of educational media who are fully equipped with the cognitive perspective especially Piagetian theory would be in the known that concreteness of the instructional content enhances learning and this would enable them to as much as possible to be included in the media to be designed or produced, features that concretizes the most abstract part of the instructional content. The use of unmodified real things (frogs and lizards) or modified real things (human skeleton made out of plastic materials) in biology classes would for instance equip students with concrete knowledge of human and animal anatomy. Teachers with same Piagetian orientation would also ensure appropriate selection of the media that would concretize the abstract content of the lesson to be taught.
- ii. The designers and producers of educational media who are well grounded with cognitivists' perspective would end up designing and producing instructional media that favour all categories of learners, being fully aware of the differences that exist within the individual learning capacities of learners. They are aware that although individuals pass through the same hierarchical stages in their cognitive processes, some would always be faster or slower in some certain stages. This knowledge therefore enables them to design and produce instructional media that would allow for individual self-paced learning. Teachers who are grounded with these perspectives would also select media

- that satisfy both slow and fast learners. The use of instructional video packages, text books and other printed materials would for instance, provide slow learners with the opportunity to study the prepared instructions again and again at their convenience, place and time.
- iii. Knowing the significance of past experience to the new knowledge, designers and producers of educational media design and produce instructional media that provide learning experiences requisite for the creation of new schemata or the modification of the existing one. We cannot teach the concept of airport without talking about aeroplane. Providing the pictures or short clips of aeroplane in the design and production of instructional media would simply educate the learner about it before being introduced to the concept of airports.
 - iv. The knowledge of the stages of development of individuals' intelligent behaviour enables designers and producers with cognitivists' background knowledge to design and produce instructional media that best satisfy the need of students at different levels of cognitive development, hence, the instructional media designed for children at pre-operational stage (2-7years) would differ significantly from that which is designed and produced for those at concrete operational stage.
 - v. Teachers with cognitivists' ideology which view learning as a student-centered would select instructional media that make classroom instructions participatory to the students. This would also enable the teachers discover hidden potentials of their students.

Conclusion

From the above discussions, we have learnt that media used in teaching and learning processes within or outside the classroom are said to be educational media. Their designs, production and selection for use by instructors should be done based on the perceptions of learning theories.

While behaviourists stressed external control over learners' behaviour, cognitivists stressed internal or learner control over mental processes by creating models of how learners receive, process and manipulate information having much perception of independent learning. By independent learning, cognitivists believed that teachers should individualize instructions to cater for individual differences – thus, learners focused more on using their course materials as active participants in independent learning.

The contributions made by the proponents of learning theories is so overwhelming; The difference in their view point influences how educational media are designed, produced and used. Hence, educational media designers, producers and users are readily equipped with the knowledge of how learning processes occur in individuals, what should be done to enhance it and when should it be done at a given time of cognitive and behavioural development. While some of these media are designed and produced by teachers or experts in the field, great a number of them are produced by laymen other than instructors. For greater instructional achievement on which educational media is based, where the production is done by none experts in the field, expert supervision is recommended.

Designers, producers and users of educational media should however, ensure adherence to learning theories anytime they deem it necessary to design, produce or select media for teaching learning processes.