THE EFFECTIVENESS OF CARTOONS IN CLASSROOM COMMUNICATION (CASE STUDY OF PRIMARY SCHOOLS IN WARRI BENDEL STATE OF NIGERIA)

BY

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DECLARATION

I hereby declare that this project has been composed by me and that it is a record of my own research work. It has not been accepted in any previous application for a higher degree. I have wholly acknowledged all information derived from materials both published and unpublished by others.

SYLVESTER ZIFEGHA EBIGBAGHA

CERTIFICATION

This thesis entitled: The Effectiveness of Cartoons in Classroom Communication - Case study of Primary Schools in Warri Bendel State of Nigeria, by SYLVESTER ZIGEGHA EBIGBAGHA meets the regulation governing the award of the degree of Master of Arts (Industrial Design) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To God Almighty for His goodness.

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Ebigbagha Zifegha Sylvester.

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ABSTRACT

Bbigbagha Sylvester Z "The Effectiveness Cartoons In Classroom Communication (case study of Primary Schools in Warri, Bendel State of Nigeria)"

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The problem of this study is to evaluate effectiveness ci the cartoon in classroom communication,

5 schools, 10 teachers and 192 pupils pa 'pated in the experiment. The experimental-control t€ :r.-nique utilizing the equated teacher method was folic. throughout the study. Teachers for both experi ntal and control groups were matched on the basis of t: qualification and years of experience in teaching . While students were equated and distributed into two groups on the basis of intelligence based on previous performance in three - recent terminal examinations.

The narrative cartoon based on the unit instruction-the digestive system, in health education was used tor the experiment. Two tests of par forms devised to measure the pupils' knowledge of the unit of instruction was administered before n immediately after the treatment. Each of thes sts was composed of eighteen items which inciudea one-word completion, multiple (four) choice, two choice true-false types.

The results indicate that the use of cartoon in classroom communication made acceptable and distinct contributions to learning. These contributions were made, however, without sacrificing the subject matter not presented specifically by the cartoon. It is also effective to pupils of high, and low performance level.

In teaching abstract concepts and subject matter like the digestive system to primary school pupils, the narrative cartoons should be used. Out-of-school cartoons dealing on the society should be employed in teaching social studies in the class-room. Cartoons should also be employed in illustra-ting books meant for formal school purposes. Finally, the Federal and state ministry of education, should employ cartoons as part of the delivery systems in diseminating information to schools.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In Nigerian society today, there are evidences of the school population explosion. Temporary structures are erected, older buildings have new wings added, also, new schools are established. This expansion will continue as a result of the increase in birthrate and decline in infant motality. Wittich and Schuller (1973) state that, with an increase in student population it will become more and more difficult for the teacher to relate to the individual student and his needs, since such students have varied backgrounds interests and aptitudes, reflecting both good and bad conditions of the Nigerian society; the teacher is less able to arrange suitable learning experiences and use appropriate communication techniques. To meet these teaching challenges, the best form of instructional materials must be developed, understood and used to the maximum.

New information is frequently developed base on findings and researches. The result is that school curricula are frequently changing to cope with the fast rate at which knowledge is increased. It is obvious that the teacher can no longer carry all facts to be taught in his head if the student must accept some responsibility

for learning so as to meet the present national needs for scientific and technological advancement and self-reliance. As it has been observed by Ogunmilade (1984), Nigeria is faced with an educational problem of great magnitude in the area of instructional media to provide quality education which the conventional method of teaching and learning perhaps cannot solve. Therefore, the need for instructional materials, that would enhance maximum learning at the shortest possible time and at a very minimum cost is obvious in order to help the teacher in his task of communicating up-to-date, useful and accurate information to learners.

It is necessary to make use of effective ways of communicating to learners the basic knowledge, skills, understanding and concepts he needs in order to assume intelligently the societal role he is expected to play. Teachers and learners live actively in an environment where information about man's activities comes from everywhere in an instant audio and visual form. Extra-curricular communication has had strong effect on the child by the time he arrives at school through his aquaintance with television, radio and cartoon-comic books particularly in the urban areas. The effect of these generated forces outside the classroom which requires a balance effect of an efficient classroom.

It has been observed that the teacher often finds himself trying to get and keep the attention of the learner. The significance of this struggle becomes clear when one realizes that the learner spends as much as four times the time spent in school under the influence of non-school oriented communication devices and messages. Most of the time the teacher finds himself relying on communication methods which perhaps cannot effectively compete with the method currently employed in the out-of-school environment, because, as stated by Wittich and Schuller (1973), out-of-school communication media are skillfully deviced to arrest the attention and interest of the individual, whether he is a child or an adult.

Inadequate educational communication results in boredom and dropouts, and results in products entering society ill prepared. Although there are many reasons for dropouts but a very important one is the impasse created when the out-of-school communication experience of the learner collides with that of the classroom (Wittich and Schuller, 1973). The importance of the youth in the society is such that he needs to acquire a full understanding of his role in the society. Great sociological problems may be expected from an ineffective use of educational communication media.

In the light of these problems, there is the need to provide an alternative means of communication that would arrest the attention and interest of the learner. But before this, there is the need to understand the communication process itself. Communication involves most often an informational or interpretative process. Messages, information or reactions travel from the sender through the communication channel (the route along which both messages and counter messages travel) to the receiver. It involves initiation, reception and feedback. The sender encodes the message and send it to the receiver who decodes the message, interprets it and the feedback goes back to the sender. This channel needs to be controlled to avoid interference for effective learning. It is only when the teacher and the learner are able to communicate clearly and without interference that valid understanding can be acquired and used in future.

Clear communication is essential for learning; therefore, it is futile to attempt to communicate without taking into account the factors that interfers with communication. Learning may be ineffective when they come up against communication barriers that originate in the classroom. Many communication barriers may lie in the channel area; some are caused by out-of-school conditions (home life, etc.) but others arise

from conditions generated in the classroom. According to Wittich and Schuller (1973), clear communication in the classroom depends on the avoidance of the following: verbalism, referent confusion, daydreaming, limited perception and physical discomfort.

Lumsdaine and May (1958) state that, research studies have shown that through the selection and appropriate use of educational communication materials, many of the problems affecting the creation of an environment for effective learning can be solved. In view of this fact, this study seek to provide a solution, that would answer the following fundamental questions:

1. Is the voice of the school being lost amid the influence of current mass communication techniques?
2. Are today's school communication methods the best that can be employed?
3. Are better educational materials and methods available through which the school may communicate more effectively with learners?

In developed countries cartoons or comics are part of an out-of-school communication that have been successfully adapted for formal school purposes (Wittich and Schuller, 1973). This has been made possible by

advances in photography and printing and they remain in effective use in publications intended for school children. Briefly, cartoons summarize and present, in an integrated combination of visuals and words, information in such a way that almost any reader's attention is arrested and held for about twelve to fifteen minutes (Wittich and Schuller, 1973). An observation of books intended for school children in Nigeria shows that the cartoon is neglected. This has been noted by Olaofe (1986), who also added that cartoons have a tremendous impact on the socio-economic and political life of a nation (Nigeria). This study, however, deals with cartoons and how effectively they can be used in the classroom environment.

1.2 Statement of the problem

The increase in student population has made it more and more difficult for the teacher to relate to the individual student and his needs since such students have varied backgrounds, interest and attitude reflecting both good and bad conditions of the Nigerian society. As a result, the teacher is less able to arrange suitable learning experiences and use appropriate communication techniques. In addition to this problem, the school curricula have to change to cope with the fast rate at which knowledge is increased as a result of

new information which emanates from research findings. To meet these challenges the best form of instructional materials must be developed, understood and used to the maximum.

A proper education of the child is a major concern today. Ways of improving the educational system and the development of a more efficient method of teaching are a prerequisite. Many children are dropouts and potential dropouts and this harms them both culturally and economically since they join the world of work ill prepared and thereby constituting a social problem. The dropout is usually the child who has failed in his general school adjustment but this cannot be attributed simply to limited mental endowment. According to Lichter et al. (1962), a comparison of graduate and dropout groups show a full range of IQ's for both groups, therefore, factors other than intelligence must certainly account for dropouts. Although there are many reasons for dropouts, a very important one is the impasse created when the out-of-school communication experience of the child collides with that of the classroom which is less effective and less interesting.

According to Fleming (1977), there have been moves to eliminate pictures from readers as a result of research findings by Samuels (1970) which showed that

pictures diverted the childs attention from the critical features of the letters to be discriminated. However, Denberg (1976-7) pointed out that pictures can function either to aid or deter the learner depending on the type of picture. In developed countries, cartoons or comics are part of an out-of-school communication media that have been successfully adapted for formal school purposes, and they remain in effective use in publications intended for school children. An observation of books intended for school children in Nigeria shows that the cartoon is neglected. Cartoons are skillfully deviced to arrest the attention and interest of the individual, whether he is a child or an adult (Wittich and Schuller, 1973). The aim of visual education is effective learning and this is supported by Hoban (1957) who states:

> Visual education is to provide materials and procedures which will increase the breath and depth of experience, so that concepts are full in their extensions and clear in their comprehensions, so that appreciation are broad and deep, so that attitudes are formed out of intellectual examinations of the total situations; and so that thinking is developed in an orderly manner.

But if the materials of instruction employed fail to accomplish this effectively, an alternative means

should be employed. There is no doubt that teachers should use instructional aids such as graphs, photographs, charts, diagrams, posters, and cartoons which are attention directing and interesting in addition to the 'chalk and talk' method of teaching in order to improve their lessons; but these are not available as it has been observed by Ogunmilade (1984), Nigeria is faced with an educational problem of great magnitude in the area of instructional media which is to provide quality education and which the conventional method of teaching and learning cannot solve.

Cartoons have had remarkable influence on the public about political, social and economic matters; they also provide a more or less sophisticated form of entertainment and thereby providing emotional release to its readers. This is possible because of two important features in cartoons: simplicity, and humour. The language in cartoon combines simplicity of expression with wittness, sarcasm and concrete images drawn from local surroundings which defy all complexities that make communication difficult. With the integration of language, visual art and creativity in cartoon production, one can communicate more effectively than he would have done using only one of the media of communication (Olaofe, 1986) and added that:

> If communication is conceptualized to include all procedures by which one mind affects the other, then the various means used by the cartoonist to send messages across are expected to have a far reaching effect on the readers. This effect can be in the form of consciousness and understanding of ones own environment, expansion and deepening of interpretation and aesthetic responses to the visual data supplied in the cartoon.

It is evident that the cartoon, though employed and still in effective use in out-of-school communication, it has been neglected in the classroom situation in Nigeria. Therefore, this study deals with the effectiveness of cartoons and its usage in the classroom environment in order to add to the varieties, liveliness, and effectiveness of classroom communication.

1.3 Objectives of the study

The main objective of this study is to evaluate the effectiveness of cartoons in classroom communication.

The specific objectives of this study are to:

(a) determine the state-of-art of cartoon in classroom communication.

(b) determine the acceptability and usage of cartoons communication in classroom interaction.

(c) evaluate the effectiveness of cartoons in classroom communication.

1.4 Justification for the study:

A review of literatures show that, the cartoon has been practised in Nigeria since the 1940s (Udechukwu, 1979), but no exhaustively formal report or literature has yet been published concerning the effectiveness of the cartoon on our educational system that is known to the researcher. Therefore, it is hoped that this study will lay a concrete experience and knowledge in cartoon and its effectiveness in our classroom environment. Thereby, serving as a meaningful guide for cartoonists, historians, illustrators and policy makers.

The cartoon is of high creative value and that same creativity is needed in their interpretation. There is the need to develop this creative ability in the learner, because, creativity is fundamental to meaning interpretation, innovation and productivity. It is one of the essential requirements for a strong technological base (Babalola, 1986).

Moreover, instructional materials and techniques often employed in our classroom are often not as lively and interesting as those employed in the out-of-school environment and this to some degree has led to boredom and dropouts in our schools. Cartoons are part of the out-of-school communication device that can be

successfully adapted for classroom use because they are interesting, humourous, simple and provides emotional release and aesthetic satisfaction. Besides, they have the capability to arouse interest and arrest attention long enough for a message or idea to be communicated. It is hoped that this study will help in determing whether it is necessary to adapt the cartoon for classroom communication in Nigeria; as it is in developed countries.

Finally, it is hoped that the fimdings of this study will be significant to further knowledge in this direction, as it may assist researchers who would want to undertake similar studies.

1.5 Scope and limitation

The cartoon is broad based. Its scope ranges from caricature, sports, editorial humour, syndicated panel or narrative cartoon, and animation. It also covers aspects as history, aesthetics, social, politics, culture, commerce and philosophy. It is therefore, necessary to delimit the scope of this study in order to obtain maximum results.

The study focused specifically on the effectiveness of cartoons in classroom communication in Warri, Bendel state of Nigeria. The form of cartoon used is the syndicated or narrative cartoon because it allows for

the presentation of ideas or concept in sequence. The classroom communication is confined to the primary schools because it is the foundation upon which the rest of the educational system is built. For easy reproduction and at a very minimum cost, the cartoon is limited to black and white. Besides, though colour is almost always preferred, researches have shown that, it does not increase learning (Coppen, 1970; Levie and Dickie, 1973). And the effect of colour is not what this study aimed at investigating.

2.2 Theory of communication.

2.3 Theory of Learning.

2.4 Development of cartoons.

2.5 Previous studies.

2.6 Summary.

2.2 Theory of communication

Everyday, interaction with people, ourselves and the environment occurs. The basis for this interaction is communication. According to Barry et al. (1965) the word communication comes from the latin verb communis, which means common. The virility of a society is based on the possibility of men living and working together for common ends. Thus without communication, cooperation is impossible. Through communication men share knowledge, information, experience, and understand, persuade, convert or control their fellow men and women.

Communication has been defined as the sharing of experience (Goyer, Tubbs and Moss, 1978). All living organisms share experience to some extent, but the human being is unique because he has the ability to create and use symbols which enable him to share experience indirectly and vicariously. According to Barnlund (1962:199), communication is the process of creating a meaning between two or more people. He further

explained:

> Two words in this sentence are critical. They are 'create' and 'meaning'. Messages may be generated from the outside but meanings are generated from within. This position parallels that of Berlo when he writes, 'communication does not consist of the transmission of meaning. Meanings are not transmitted, or transferable. Only messages are transmittable and meanings are not in the message, they are in the message users'. Communication is man's attempt to cope with his experience, his current mood, his emerging needs. For every person is a unique act of creation, involving dissimiliar materials. But it is, within broad limits, assumed to be predictable or there could be no theory of communication.

Therefore, communication may be defined as a connected series of action to share experience by sending or receiving stimuli that are meaningful in order to change behaviour. "The planning of communication is preceded, followed up and concluded by communication analysis. Which must be carried out within some frame of reference (conceptual scheme) in terms of which the communication project is

discussed" (Fuglesang, 1973:45). This is why a communication model is essential as a complementary device to fit either different purposes and or different situations.

One of the theories of communication is the mathematical theory, articulated by Shanon and Weiner (1949). This theory emphasizes the linear transmission of communication data, or content, from sender to receiver (Steinberg, 1970). This model includes seven elements: the source (the speaker); an encoder (the vocal system); a message (language and visual cues); a channel (sound wave in the air); a decoder (the listener ears'); a receiver (listener); and feedback (a visual or verbal cue that indicates whether the message has been received or correctly interpreted) Charyk and Metzger (1980) state that:

> Weaver agreed with this model when he explains that all communication was concerned with three problems: how accurately the symbol of communication could be transmitted, how precisely the symbol carried the intended meaning; and how effectively the received meaning affected conduct in the desired way. He recognized that the mathematical formulation could provide a theoretical construct within which to examine all three problems.

Steinberg (1970) states that one significant aspect of the theory is to befound in the conviction that the meaning of the message, or content, is materially affected by the accuracy or deficiency of the modus operandi of technical transmission. Noise for example, can interfere with and affect the meaning of the message. The obstrusiveness of noise, according to the mathematicians, is even more significant than semantic roadblocks to effective communication. As the message is relayed from the sender, through the transmission devices of the media and then to the receiver, it must be clear of noise or interference.

Chromsky (1957) rejected some of the mathematical assumptions of shannon and Weiner as inadequate for describing the way in which people use English grammar for example. "The difficulty with the mathematical theory of communications is that it tends to denigrate legitimate semantic implications in favour of an approach that is concerned basically with 'transmission' or pure technology "(steinberg, 1970).

The classic description of the communication process has been in terms of one variation or another of a series of basic and sequential events: who says what to whom, through what channel, under what circumstances and with what effect? (steinberg, 1970).

This basic model: who is communicating, how and with whom, why and what effect; will be adopted in this study. It attempts to identify some of the major elements that are necessary if not sufficient for communication to occur, and that are common to all communication situations (Fuglesang, 1973).

The effectiveness of communication depends on some factors such as intelligence, education, experience, age, knowledge, attitudes, beliefs, cultural background, station in life and personal needs, values, goals and interest of the message sender and receiver. What is communicated (content) and the way it is communicated (style) contribute to creating messages that are vital, dynamic and meaningful, or they can make the message dull, uninteresting and meaningless. Meaningfulness of the content and relevance to the receiver is important. The channel through which one communicates is also considered. If simple everyday words are used and fun is added from time to time, the message would look warm, friendly, interesting and helpful as it would provide a sort of emotional release rather than tension which might cause interference. To whom the communication is made is well considered in the model. The receiver is a unique individual who is different from others, his hopes, needs, desires and special set of characteristics determine his acceptance or

resistance to change of behaviour. Therefore, knowing the receiver makes for better communication. Finally, the model points at the effect of the communication. Response to questions and other feedbacks are relevant as a guide in planning future development and it helps to tell if the content has been of help to the receiver.

This sender model can be used in a variety of ways for communication. It can be used by individual communicators and by groups involved in planning and directing an information programme. It can also be used as a framework for planning programmes, a checklist in implementing programmes, a diagnostic guide, an outline in teaching communications in short courses and longer training period. It is particularly useful to communicate technical information such as the sciences, home economics, and so on, to a variety of audiences.

In the model, messages and counter messages travel through the communication channel. This channel must be kept wide open so that informational and interpretative messages can be revealed and made understandable because the communication process travels along a channel clear of any interference. Interference or noise is anything that distorts the information transmitted to the receiver or distract the receiver from receiving it. Interference destroys information. Supporting this, Cherry (1966) adds that

it sets the ultimate upper limit to the information capacity of a channel. Sometimes, a message carries little signal and much noise, this is often boring and annoying, signal-to-noise ratio is the term often used to denote the relationship between the essential information in a message and the distracting factors. A major cause of interference is the problem of role behaviour prediction. Roles are structures imposed on behaviour; the structure one imposes may not correspond to the ones othersimpose. In assessing behaviour, there is the need to use at least three approaches: (1) role prescription-statement of behaviour to be performed in a given role, (2) role descriptions-report of behaviour performed, and (3) role expectations-ideas of people about the behaviour performed. In the ideal system, prescriptions, descriptions and expectations about a given role are equivalent, if they differ radically, interference results. A basic principle of communication is that role-behaviour, prescriptions, descriptions and expectations should be closely related to one another. People should be told what they are to do, given accurate prescriptions and be led to expect what will happen before it happens.

According to Tubbs and Moss (1978), interference can be distinguished into two: (1) technical interference, and (2) semantic interference. Technical

interference are factors that cause the receiver to perceive distortions in the intended information, and the sender too may create the distortion if he has a speech impediment. Semantic interference occurs when the receiver does not attribute the same meaning to the signal that the sender does. Disagreements about meaning are so common that Cherry (1966) make distinctions between meaning to the speaker and meaning to the listener. The closer the fit between the two meanings, the more complete the communication. No two people will attribute exactly thesame meaning to any message, and supporting this, Berlo has emphasized that meanings are not in the message, they are in the message users (Barnlund, 1962).

Generally, interference can exist in the context of the communication, in the channel, in the communicator who sends the message or in the one who receives it. Some interference will always be present in human communication. However, in the classroom situation, some formidable barriers-psychological ones-originate during the interactive classroom process itself. Even the best teaching plans and procedures may be inffective when they come up against communication barriers that exist or originate in the classroom. The teacher bears the burden of achieving clarity in classroom communication, thus he must not only recognize

interference possibilities but also know the means by which a clear channel of communication may be established and maintained with efficiency. As long as messages are transmitted with clarity, unchanged or uninterrupted by interfering factors, pupil-teacher communication will proceed efficiently.

Many changes do occur as the message presented by a teacher passes to and is interpreted by the pupil. When classroom learning experiences are unnecessarily altered, they lower the general efficiency of instruction. Wittich and Schuller (1973) state that, clarity and understandability of the messages transmitted and received in a classroom depends on the avoidance of the following barriers to effective classroom communication: verbalism, referent confusion, daydreaming, limited perception, and physical discomfort.

Learners shut out psychologically unwanted noise or unattractive appeals for attention. Attention is given to interesting and desirable stimuli. Verbalism occurs when the teaching approach becomes too repetitive, 'noisy', uninteresting or unattractive. The continued use of any one kind of device results in its decreasing efficiency. It has been repeatedly demonstrated that unless learning experiences are within the learner's interest and comprehension level, little or no progress can be made towards achieving goals. Excessive

verbalism creates psychological barriers that interfere with effective classroom communication. To alleviate this problem one may vary instructional materials which use the best of the communication techniques to transmit a great deal of subject content.

In the introduction of a new concept, it is natural that, in the absence of adequate background experiences, the learner may turn to seemingly related experience for help in understanding the new concept, hoping to draw conclusions that may then apply to it. Often, however, attempts to transfer previously acquired understanding to new problems result in confusion because such needed similiar understandings are rarely available. Such impasse is called referent confusion. It is particularly likely to occur in verbal communication, for the difference in frame of reference makes it possible for two people to use thesame words and yet to arrive at completely different interpretations. Each student's unique background influences his interpretation and understanding. It is logical that the greater the abstractness and remoteness of the subject described, the less similiarity between the meaning the teacher intends and the understanding achieved by the pupil.

Another barrier to efficient classroom communication occures when the learner daydreams, that is when he turns away from the flow of classroom

communication and dwells on his own experiences and fantasies. Often they are more exciting, more interesting and thus more preoccupying than those that are identified with classroom activities. Day dreaming barrier can be lessened or solved through increasing the understandability and interest level of classroom communication by employing instructional media that would arrest the interest and attention of the pupil.

Psychologists have often pointed out that one perceives less than that which is presented or received through his vision span on sensorimotor apparatus at a given time. The limited perception act as a barrier to effective communication. Appropriate training can increase both visual and auditory learning through enlarging the span of intellectual awareness to match more closely the span of physiological perception. When proper listening and viewing techniques are made as much as part of the study situation as is consideration of content, there would be a notable increase in the amount of information that pupils can observe and understand (Wittich and Schuller, 1973).

Physical discomfort in the classroom is another barrier to classroom communication. The modern classroom should be a comfortable environment for

learning. It should be characterized by light control that permits the use of projected materials; temperature or thermal control that encourages alertness, accoustic treatment that eliminate reverberations and permits speaking and listening in comfort.

The task of the teacher to communicate is of prime importance. To attempt to communicate without taking into account the factors that interfere with efficient communication in the classroom, however, it is dangerous (Wittich and Schuller, 1973).

2.3 Theory of Learning:

Everybody brings to a communication event certain characteristic ways of responding. These responses are largely shaped by experiences. Also behaviour can be modified by new experiences.

Learning is an important aspect of human behaviour. Most aspects of human behaviour are learned except few such as the reflex: sucking, eyeblinking and so on which are attributed to instinct. Learning is defined as "any change of behaviour that is a result of experience that cause people to face later situation" (Blair et al, 1975:105). According to Gagne (1977:3) "Learning is a change in human disposition or capability which can be retained, and which is not simply ascribable to the process of growth". Learning is also defined as "a relatively permanent change in a

behavioral tendency and is the result of reinforced practice "(Kimble and Garmezy, 1963:133). There are many definitions of learning, but all have several elements in common. They all employ the notion of change. They all exclude those changes that result from innate genetic forces that produce growth. According to Blair et al. (1975: 106).

> The major point of difference center around what gets changed. To many, the process of change means linking a stimulus-response relationship that does not presently exist, or strenghtening one that does. To others the important change is in the new connections developed between internal stimuli and responses (mediators)-for example, covert kinesthetic stimuli and sub-vocal responses. Still others view the central feature of learning as the hitching together of stimuli to each other. In brief, learning theorists have not settled on a single model for viewing and studying learning. All these changes do occur, all are represented in the neural-physical make-up, and all can properly be described as learning.

According to steiner (Akolo, 1987) states that, learning is acting and deciding which results in knowing that and knowing how which encompass the quantitative, the qualitative as well as the performative. Therefore, learning may be defined as a change in behaviour as a result of experience which involves some form of activity or effort by the learner.

The process of learning has been investigated by psychologists in order to explain how learning takes place. As a result, many theories, models or prototypes have been generated. It has been analysed as a process of association; perception, reinforcement; cognitive organization; imitation and information processing. However, two basic types of learning: classical, and operant conditioning; and imitation learning will be considered; because, all our communication behaviours are learned in one of the three ways (Tubbs and Moss, 1978). According to DeCecco (1968) understanding these basic types of learning, would make it easy to observe how the conditions of learning relates to complex learning. He adds that, familiarity with basic learning gives the vocabulary needed, to analyze complex learning, in terms of the conditions and components the communicator can manipulate.

DeCecco (1968) states that, there are five basic external conditions of learning: Contiguity, practice, reinforcement, generalization, and discrimination. These conditions are important in the various learning types. Contiguity is defined as the almost simultaneous occurence of the stimulus and response. Guthrie (DeCecco, 1968) holds that the only necessary condition for learning is

contiguity. The importance of contiguity is emphasized when DeCecco (1968:249) states:

> Contiguity is an important condition in most learning. Classical conditioning involves contiguity of the conditioned and unconditioned stimulus. Operant conditioning involves contiguity of the response and the reinforcing stimulus. Skill learning involves contiguity in the occurence of the various links in the motor chain. Concept learning involves contiguity in the presentation of examples and non examples. Principle learning involves contiguity in the recall of the component concepts. Finally, problem solving involves contiguity in the recall of the component principles.

Practice, the second condition, is defined as a repitition of a response in the presence of stimulus. Very little is learned from a first response to a particular stimulus and there must be a repeat stimulus-response associations to retain them (DeCecco, 1968). However, with current educational emphasis on cognition and meaningful learning, repitition as learning condition is becoming less popular. Another important condition for learning is reinforcement. It is defined as a reward for giving the desired response. It may be before or after a response is made. In a given situation, the organism will tend to repeat responses for which it is reinforced and discontinue responses for which it is not reinforced positively (DeCecco, 1968). Another external condition for learning is generalization, which occurs when the

response made to a new stimulus is one previously made to another stimulus. Since no two stimuli are identical, generalization has an important function in determining behaviour. The fifth condition of learning is discrimination. In this, the individual makes different responses to two or more stimuli. Both generalization and discrimination are perhaps better defined as phenomena than as condition of learning (DeCecco, 1968).

Classical conditioning is one of the basic types of learning. The external conditions of learning necessary for this type of learning are: (1) contiguity, and (2) practice. These conditions are observed and measured by Pavlov. In Pavlov's experiment, a hungry dog was shown a light just before it received food. The food, an unconditioned stimulus, always produce a salivating response in the dog. After the two stimuli, food and light had been paired (Contiguous) a number of times (practice), the dog salivated whenever it saw the light-even if it received no food. Such a response is said to be conditioned. "These responses are of limited usefulness because they are not adaptive-that is, they do not produce changes in the environment. The dag will not always receive food if it salivates when it sees light" (Tubbs and Moss, 1978:48). They state that, although many communication behaviours are conditioned, primary

concern is with those that can produce change. A good part of the learning that does produce environmental change is instrumental learning or operant conditioning.

The necessary entering behaviour for operant conditioning is the availability of the organism to perform a particular responses. A pigeon must be able to peck, a rat to press a bar or lever, a human being to smile or scratch his head. These responses are called operants because they operate on the environment. When the pigeon peck a disc, the rat presses a lever, the state of the environment has been changed by the responses or operants. The principles underlying operant condition can best be explained by describing skinner's experiment. In the experiment, a hungry pigeon aimlessly peck around a box scouting for food. In time it pecks at a window in the box that happens to be illuminated and it is immediately given a pellet of food. The successive provision of food after peqking the right spot is the reinforcement. After a number of such reinforcements, the pigeon learns that it is possible to get food by pecking at the window when it is lighted. This behaviour is instrumental in getting the reward. Three external conditions of learning must be provided in operant conditioning: reinforcement, contiguity and practice. Incidentally, the reward need not be a positive stimulus. It can be a removal of some unpleasant

stimulus; for example, the pigeon can learn to peck at the window in order to avoid electric shock.

The elimination of a response by withholding reinforcement (extinction) can modify communication behaviour just as much as a positive reward will strenghten a desired response. Applications of instrumental learning to the complexities of communication is clearer when the nature of reinforcers is considered. Reinforcers can be used to correct or promote a behaviour. If it promotes a behaviour it is a positive reinforcer and if it discourages a behaviour it is a negative reinforcer. The reinforcement of a given behaviour increases the possibility that the behaviour will occur again. According to Tubbs and Moss (1978:50)

> In a busy competitive law firm, one young lawyer found that the way to get what she wanted-whether it was a larger office, a raise, or more secretarial help-was to make demand very insistently 'well' she was found of saying 'it's true. The squeaky wheel gets the most grease. As she moved on the other jobs this became her style. She was quite vocal in expressing her dissatisfactions, and professionally she always seem to get what she wanted.

Once she acquired this new response, she began to generalize it-to apply it to situations that were similiar but not identical to those in which she learned it. Since no two situations are similar, generalization has an important function to play in communication behaviour

(Tubbs and Moss, 1978). They add that, the insistent lawyer may find that her sharp, assertive style at office does not work at home when she has to cope with her teenage daughters. The principle involve here is discrimination; learning that a behaviour has different consequences in different situations. To some degree all social learning depends on our ability to discriminate and react selectively.

In operant conditioning, all the external conditions of learning are available: contiguity, practice, reinforcement, generalization and discrimination. Skinner and his followers believe that virtually all human behaviour can be accounted for by the principles of instrumental learning (Tubbs and Moss, 1978). But Bandura and Walters (1963) emphasize that new responses are also learned through modeling or imitation. It is not always necessary to perform behaviour and be rewarded, many new responses can be learned by observing them in others. In line with this view, Maccoby (1959) states that, children observation of social role plays an important part in socialization. Moreover, a wide range of behaviour has been experimentally demostrated to be susceptible to modeling influences including aggression, altruism, problem solving, moral judgement, self rewarding behaviour and so on (Bandura and Walters, 1963; Flanders, 1968; Hartup and Coates, 1969). Learning from

observation of models and its later performance is a function of attentional, retentional, motoric and motivational processes, all of which may be affected by various factors in the modeling stimuli, the observation and performance context, and by individual capacities (Roberts, 1973). When others are observed being reinforced for a given behaviour, it is more likely, that behaviour will be imitated by some others- this concept is called vicarious reinforcement. For example, students who observe others communicate successfully are more likely to try these communication behaviours themselves. According to Roberts (1973), there is age related difference in observation learning and performance; an understanding of this possibility of age related difference should aid understanding of children's communication behaviour particularly what various children might learn from the media. Therefore a change of behaviour is acquired not only through contiguity, practice, reinforcement, but also through modeling and vicarious reinforcement.

At this point it would be necessary to consider the elements in a situation that are essential for learning. Gagne (DeCecco, 1968) states that, three elements together constitute the learning event: the learner, the stimulus or stimulus situation, and the response. DeCecco (1968) described these terms in specificity. A learner consists of sense organs, a

central nervous system and muscles. His previous learning is his entering behaviour, or his internal conditions of learning. A stimulus is an event in the environment; a stimulus situation is several events in the environment. A response is simply a part of our behaviour. He further adds that one of the easiest ways to depict learning is as follows: when a stimulus is first presented, there is no response. When it is presented the next time there is a response. This response indicate a change in the performance of these learners from the time before they were in the stimulus situation to the time after they were in the situation. From this change in performance, we infer the occurence of learning. "By taking the learning event into account we can plan instruction so that one can foresee which stimuli will result in the student's making which responses" (DeCecco, 1968:247).

2.4 Development of Cartoons

According to Steinberg (1970:102):

> Cartoons, in one form or another, literally are as old as man's first efforts to communicate by non-verbal symbols. Although there is a world of difference between early cave drawings and pictographs and contemporary comics, there is nevertheless a common communicative root in this form of popular art. There is also a considerable difference, indeed some would say a disparity, between the drawings of many of the world's greatest artists and the popular cartoons of today. But here too there is an inevitable generic anology. Contemporary cartoon does not, for the most part, aspire to very high aesthetic or social heights. It must be emphasized, however, that, despite the commonly ascepted version of the comic strip as humour, the

Horn (1980) states that, McCutcheon's view agrees with many cartoonists but it ignores the origin of cartoon in art history and fails to see cartoon as a work of art. Therefore, cartoon may be defined as any drawing that makes a complete sense, thought or idea, that embodies freedom of expression and not tied to the constraints of literalism and slavish representation (Horn, 1980).

The art of cartoon is broad. It involves caricature, editorial humour, animation and syndicated panels (comic strip) and sport. It covers a wide area of interest ranging from history, aesthetics, socio-politics, culture, commerce and philosophy.

The cartoon is a phase transition from caricature as a result of the universal acceptance of prints (Horn, 1980). Caricature is defined as the art of following nature's disfigurement in an attempt to arrive at a perfect deformity or ugliness, for the sake of creating fun. The development of modern caricature is attributed to two brothers: Agostino and Annibale Carricci in the 16th century in Italy, from where it spread to other parts of the world. It would be erroneous to see African 'traditional' sculpture as caricature because of the emphasis of the head in the artwork. This emphasis goes beyond poking fun, it is philosophical, made to emphasize the important function played by the exaggerated part. For example, the breast

in female figure is given emphasis to indicate fertility.

William Hogart (Horn, 1980) was the first cartoonist to draw humorous scenses without human deformities, first editorial cartoonist, and the forerunner of narrative cartoons (comic strips). In the course of the 18th century, the cartoon found a function as well as form. It has functioned as a means of social protest and political persuasion. Horn (1980) adds that, by linking the resources of the tradition and the immediacy of popular illustration, cartoonist "struck a responsive chord with even the least sophisticated audience", thus making communication more effective and the desired behaviour easier to achieve.

The potency of cartoon lies in its ability to make a point sharply and quickly without the semantic ambiguities inherent in the written word; as result, it has been directed mostly to social protest and promotion of social change. Cartoon summarizes creatively thought provoking laughter and influences the public in their reaction to nation-wide issues. Editorial cartoonists can be divided into two: the dialogues, who are generally more persuasive; and agnostics, who are usually funnier and more often provide accurate information (Horn, 1980) and added that, political or editorial cartooning are less concerned with ultimates and are more narrowly focused

on topical issues with its jibes at those at the helm of affairs. The history of editorial cartoon in Nigeria is traced to the 1940s (Udechukwu, 1979) added that, Lasekan was the first cartoonist. While working with the West African Pilot, as an editorial cartoonist, he protested against the British colonial administration in cartoons. Udechukwu (1979) noted that, the role of cartoon in facilitating the achievement of Nigeria independence was immense.

Another development is the humour or gag cartoons which originated in the late 19th century (Horn, 1980). They are usually funny but with some social, political, and moral point. The main aim is to amuse. In the humour cartoon, there is a resurgence of caricature, a technique that was neglected by the socially conscious cartoonists of the 19th century. At a time, the taboo and prohibition of governments and editors alike restricted the freedom of humour cartoonists; but now, there is no subject they cannot deal with (Horn, 1980). There had always been cartoons addressed to a single issue and there were also group of cartoons centering on universal themes-women, fashion and money that are deemed necessary. Gag cartoons are sequentially issued over a period of time either as separate plates or in successive magazine numbers. Many cartoonists use a multi-panel comic strip layout to extend their point while the humour strip

artist sometimes condenses his strip into one cartoon panel. Cartoon in sequence are as old as cartoon itself. In the second half of the 19th century, cartoons were organized into progressively more complex sequence of drawing, which became an independent art, comic, in the 20th century (Horn, 1980). Comic or narrative cartoon is highly influential or effective for learning because ideas that relates to one and another are presented in sequence. Steinberg (1970: 104) states that:

> the cartoon narrative can be divided into two entitities-the newspaper comics and the pulp-type adventure comic books. A division which is most significant, because of the differences in quality and substance. The newspaper comics are usually innocuous. The pulp-type adventure comic books, read by millions of young children and adolescents are far from naive. They have been the center of periodic storms of controversy over both their form and content and at least one distinguished psychiatrist, Wertham (1954) believes that there should be a law banning them from publication as inherently indecent and dangerous to the youth who devour them so steadily.

The news paper comic and the pulp-type comic books, however, widely they vary in structure and content, are examples of graphic communicative arts. The news paper comics are intended for family consumption. The pulp-type comics, whatever their effects may be, are certainly designed to titillate and are concerned mainly with sex, sadism, crime, horror and violence.

Examples of these pulp-type comics are Ikebe Super, Lolly, Fantasy, Killers and Superstory to mention a few. There is an in-between, hybrid kind of cartoon narrative which has also aroused considerable controversy. This is the cartoon book designed to make palatable, by drawing and narrative text, the great classics (Steinberg, 1970), and added that, those who published these books, based on Shakespear's 'Julius Caeser' and other masterpieces, claim they have educational significance. Futhermore, that their critics believe them to be a desecration of great literature and a cultural catastrophe, with equally abominable text and cartoons.

However, in developed countries, there was much concern among educators and parents about the effect of undesirable comics emphasizing violence and even sadism on children and their reading habits. But, though there was general agreement that the influence of comic books was extensive. The many research studies done to pinpoint the nature of the influence did not reach any concensus. Some reported positive effects on children, others reported negative ones (Wittich and Schuller, 1973). According to Witty and Sizemore (1954), there was no valid basis for either strongly opposing or stoutly defending the comic medium. Whatever else they have done, it was evident that the comic books stimulate the reading habits of young

people far more than any single device. Thorndike (1941) states that, the child who read one comic book per month, read about twice as many words per year as his reading books contained and that both the amount and the character of the vocabulary provided valuable practice for the young reader.

The decade around the dawn of the 20th century, witnessed an extraordinary surge in the number quality and popularity of humour magazines and cartoons generally (Horn, 1980). There were literally hundreds of cartoon publications that flourished all over the world and reached unheard of height of success. Nigeria witnessed this upsurge in the 1970s and 80s with the rise of magazines such as Ikebe super, Lolly, Lagos fun, Fantasy, Killers and superstory. The state of humour magazines today is uncertain, but it is safe to assume that, it has beenable to weather all the calamities of the 20th century and will survive no matter what happen next (Horn, 1980). Humour cartoons make communication more effective and lively when employed to situations or subjects that are thought to be serious (Fuglesang, 1973).

The most recent form of development in cartoon is the animated cartoon. It derives not only etymologically but also artistically, historically, and conceptually from the cartoon and comic strip.

Long ago man has tried to animate images and the first efforts resulted in the chinese shadow theatre, early flip books and the magic lanterns of the 17th and 18th century. In 1834, W. Horner invented the Zoetrope, a revolving drum with slits allowing a spectator to look at moving images within the device. Joseph Plateau invention of 1832, the phenakistiscope, was regarded as the first successful attempt on geniune animation. In 1892 Emile Reynaud moved one step forward by inventing the Praxinoscope, but could not keep pace with the rapid development of movie camera. J.S. Blackton, a cartoonist and film maker married the cartoon and the movie camera with the making of the first cartoon film 'Humorous phases of funny faces', with this, he earned the title 'the father of modern animation' (Horn, 1980).

The early cartoons were silent and dialogue was conveyed by the use of word ballon, a device borrowed from the comic strip which was gradually abandoned in favour of inter titles borrowed from the movies. Sound was introduced in 1928 into cartoons when the cartoonist, Walt Disney produced the first cartoon with a synchronized sound track 'steamboat Willie' the first Mickey Mouse cartoon; it added dialogue, music, sound effects and characterization and punctuation to the visual movements. Animation feature is another

development in animated cartoons. Generally, animation feature is defined as a 60 minutes or more in duration. It first developed in Argentina as early as 1917. It differs from the cartoon shot not only in terms of lenght, increase production, cost and expanded manpower but also in aesthetic terms. It requires greater integration of the parts with the whole and therefore a sharper definition of characters, a more consistent storyline and a heavy reliance on cinematic techniques.

Animation is a recent cartoon art practised in Nigeria. As Rishante (notes) started in 1979 at a national workshop in animation at Jos, organized by the Nigerian Television Authority. He added that, two years preceding this period, two swiss couples had demostrated on a small scale in Jos, the animated cartoon. Furthermore, he stated that the first animated cartoon, developed and produced in Nigeria is titled 'stone'. But, Akolo (note) also that, in the early 1950s, there had been animated cartoons shown in the cinema hall, and Nigerians took part in developing these cartoons. As an example, he pointed to the advert of Barclays Bank and Sami Akpabot, provided the music and sound track. It is probable that the processing is done abroad. However, it is safe to state that a complete production and

development of animated cartoon started in Nigeria in the late 1970s and early 80s. Animated cartoon is now widely accepted as a legitimate art form. It has been gaining a wider viewing public and its boundries have been extended wider and wider with the discovery of new applications-the latest being the computer (Horn, 1980).

Cartoon is a valuable tool for educators (Horn, 1980). The ability of cartoon to arouse, direct attention and illustrate fact beautifully, makes it very important for clear communication and learning (Kinder, 1959; Allen, 1975). Wood and Sterner (Lumsdaine and May, 1958) found that children with very few exceptions found cartoons interesting and thus arouse students intellectual curiosity and imagination. There is the need to develop this imaginative and creative ability in the learner for the benefit of our present society. Creativity is one of the essential requirements for a strong technological base. Most individuals have the potentials to be creative, however, not everyone's creativeness has been stirred (Babalola, 1986), and went further to state that creativity is essential for social progress, and the development of individuals, the family and the members in it. It also augurs well for the development of our nation, which is at least a major factor in total education.

The integration of language, visual art, and creativity in the production oi cartoon has enabled the artist to communicate more effectively than he would have done using only one of the media of communication (Olaofe, 1986), and further stated that, the creative power of the cartoons lies not only in the ability to gather together a collection of visual data or records of events, but in the ability to convey the desired message in a simple, yet piognant manner, without allowing the rules of grammar, stylistic appropriations and semantic exactness to rob them the meaning of the message. In line with this view, McCutcheon (Horn, 1980) state that, in the cartoon, the idea alone is the essential requirement whether it is meant to inform, reform or to amuse, and presupposes the ability to say things trenchantly, humorously or caustically in terms of lines. Humour, simplicity and directness which are characteristics of a cartoon results in economy of details in terms of lines. No wonder Barry et al. (1965) state that, the cartoon is perhaps the most economical code that artists have ever devised. They went further to state that, the modern cartoon is particularly interesting because of the extraordinarily large amount of information that can be suggested by a very simple drawing; in fact, the viewer's share in the process

of communication is greater with cartoons than with any other visual art. For a pictorial representation to be useful to learners, there should be economy of details to present the idea purported (Coppen, 1970).

According to Olaofe (1986), the use of cartoon has now become a valuable way information is conveyed in any society. It is also the way actions and reactions of people are subjected to critical evaluation. More than all these, cartoons offer readers emotional relexation and aesthetic satisfaction. Cartoons are one of the major forms of graphic communication; they have the power to capture attention and influence attitudes and behaviour (Brown et al. 1973). In line with this, Allen (1973) states that, cartoons should be employed in the classroom communication system, because its influence is immense. It is regarded as the most influential graphic art form of the 20th century (Horn, 1980).

2.5 Previous studies

The development of cartoon and its qualities suggest many possibilities concerning its use as an aid in classroom instruction. Since the researcher could not lay hands on previous studies in cartoon for classroom purposes, similiar studies measuring the effectiveness of sound pictures as teaching aids

in the classroom were considered. This involved a summary and critical evaluation of the early educational sound picture experimentation.

The first experiment with educational talking pictures was probably the one conducted in Middlesex Country England (Arnspiger, 1972). The objective of this study was to discover the place which sound film might ultimately occupy in schools. This involved some comparison of the effectiveness of both sound and silent films. The experimenters investigated the use of films as teaching medium as well as a means of arousing interest on the part of the pupils. Particular emphasis was given to the task of ascertaining whether or not sound films open up new channels for the presentation of ideas to the backward child.

Classified according to subjects the films used were: geography, six; natural science, four; and films of general interest dealing with outstanding events and personalities of modern life, six. All films had been produced for adult entertainment, so their usefulness as educational tools was in some respect limited.

Fifteen schools cooperated in the experiment. More than 3,500 pupils and 180 teachers participated. All classes, each having fewer than fifty pupils, were shown the films, some once and some twice.

The number of presentation was left to each teacher discretion. Each class was divided into two sections, one receiving a preparatory lesson and the other have non before the film was shown. The same test situation was set up for a recapitulatory lesson. Essay examination were sent to all schools and each teacher scored her own pupils' tests. Pupils were tested not only immediately after the conclusion of the picture study but also after a lapse of a number of days.

Questionnaires were sent to all the teachers to obtain their comments on the result of the films as these were revealed in the reactions of the pupils and in their own impression of the pictures. The answers to the questionnaires indicated that the teachers were generally agreed that this new medium of instruction stimulated the pupils to greater activity. The teachers also agreed that this medium aided perceptibly in learning. Most of the teachers preferred the sound film to the silent film for educational purposes. The teachers of backward pupils were particularly enthusiastic in their praise of the sound film.

The test results, however, are subject to criticism. Each teacher scored his own examinations which, of necessity, resulted in errors due to subjective judgement. No control group was used nor

were initial tests given prior to the experiment to determine what or how much information was possessed by the pupils concerning the subjects.

Another study is the fox film experiment as reported by Arnspiger (1972). The main aim of this study was to test the value of educational talking pictures. Five of the fox films were used in the experiment. A test of fifty questions (forty true-false and ten multiple-choice)was constructed for each picture.

The experimentation extended over a period of four days. On the first day all the tests were given to the children. On the second day two films were shown and the appropriate two tests repeated. On the third day two more films were shown and the corresponding tests repeated. On the fourth day one film and its test were given.

The average gain per pupil on all five tests was 17.7 points and since there were fifty questions in each test, the experimenters concluded that this represented a 35 percent gain due to the effect of the educational sound pictures.

This experiment indicated a definite contribution made by sound pictures when used as a means of classroom instruction. The extend of this contribution is

questionable, however, since no control group was used as a basis for comparison. Eighty per cent of the test questions were of the true-false type. These questions were repeated from one to three days after the initial tests were administered not insuring against the element of test teaching. The intelligence and social background of the pupils participating in this experiment were undoubtedly considerably above average, because of the manner in which the pupils participating in the experiment were selected.

Clark (Arnspiger, 1972) studied the relative effectiveness of sound pictures, silent motion pictures, and classroom lecture demonstrations. Thirteen films were used in the investigation, seven in the field of biological science and six in the field of physical science. The biological science films were produced primarily for theoretical purpose and adult entertainment; the physical science films for general use-cultural and educational. None of them was produced to fit into any specific course of study or according to any definite classroom procedure. Their values, then, for experimental purpose in a classroom situation were some what limited. Of the biological science films, three originally were silent films converted to sound films by superimposing a popular lecture. The speech and

the silent titles were not identical, however, the speech being somewhat more pertinent and complete. Both editions-sound and silent-were available and were used in comparing effectiveness of sound and silent pictures in a classroom situation. It is apparent that the silent pictures used in this phase of the experiment were not completely comparable with the sound pictures.

The group of students was divided into experimental groups and control groups equated on the basis of an intelligence and a vocabulary test. Each of the four regular class instructors taught both experimental and control groups during the entire experiment. No additional teaching, apart from the film material or the "identical" classroom lectures, took place.

Two types of measuring devices were employed. One consisted of a battery written tests; the other was a photographic record of the classes made immediately after each of a series of distracting auditory or visual stimuli. The written tests were designed to measure three phases of the problem investigated: concrete knowledge or information, ability to think more accurately and to reason more soundly, and interest in the topic studied, films were compared with lecture demonstrations set up in imitation of the film material. A valid investigation of the

comparative effects of sound and silent films would utilize completely comparable sound and silent pictures, their effect being measured by a battery of highly reliable and valid tests.

The following are the conclusions drawn by clark:

- Educational sound films of the type in which the sound is a vital and realistic part of the pictures are as effective as identical lecture demonstrations in conveying specific information to mature students.

- Silent films similar to those used in this investigation appear to be less effective for developing specific knowledge than identical classroom demonstrations.

- The sound and silent films in the field of physical science are as effective as their corresponding lecture demonstrations in the development of ability to think clearly and to reason more soundly.

- In maintaining interests already possessed by the students, as expressed by them on an interest test, these sound films and the silent films appear to be about equally effective but have a slight advantage over the lecture demonstrations.

- In stimulating new interests, the sound films, silent films, and lecture demonstrations used are about equally effective with a small advantage indicated in favour of the sound films.
- A measure of sustained attention on the part of the students indicated that the sound films in the field of the physical sciences are more effective than the silent films and demonstrations used.
- When sound films of the lecture type are compared with identical silent films, the sound films are less effective than the silent films in conveying specific information.

The sound and silent films used in the experiment were not completely comparable. The sound versions of the three films were not identical with the silent version. The limited number of questions measuring these two media of instruction tested only the subject matter common to the two kinds of films. The investigator found the difference in average scores between the two groups to be but 0.5, which difference is not statistically certain as favouring either group.

The comparison made between the two sound pictures was invalid because the picture material was different for each of the four films and because a different set

of test questions was used to measure each group.

According to Webb and Campbell (in Pool et al. 1973:938):

> Experimentation is the primary methodology for testing about the effectiveness of communication. Sometimes it is possible to conduct elegant controlled experiments, other times, quasi-experiments are possible, even though true experiments are not. On still other occassions, correlational analysis without experimental control is all that can be accomplished. In all cases where the effect of communication are of interest, the control experiment is the standard against which other research methods are judged.

In virtually all the studies, measures of teaching effectiveness were based on gains in student achievement. Such gains were computed from standardized achievement test scores as either posttest minus pretest mean, or observed posttest mean minus posttest mean predicted from pretest.

2.6 Summary:

The review of related literature shows that, to use cartoons effectively for instruction in the classroom, requires as much or more understanding of the process of communication, and the process of learning as it does of the medium itself.

Communication may be defined as a connected series of action to share experience by sending or receiving stimuli that are meaningful in order to change

behaviour (Barnlund, 1962; Barry et al., 1965; and Tubbs and Moss, 1978), Fuglesang (1973) states that, a communication model is essential when planning communication. Steinberg (1970) described a basic model of communication in terms of who is communicating, through what medium, with whom and what effect. This sender model is adopted in this study because it attempts to identify some of the major elements that are necessary if not sufficient for communication to occur, and are common to all communication situation (Fuglesang, 1973).

It is futile to attempt to communicate without taking into account factors that interfere with communication. Learning may be ineffective when they come up against communication barriers that originate in the classroom, such as: Verbalism, referent confusion, daydreaming, limited perception, and physical discomfort (Wiitich and Schuller, 1973). Generally, interference destroys information.

Learning may be defined as a change in behaviour as a result of experience which involves some form of activity or effort by the learner (Kimble and Garmezy, 1963; Gagne, 1970; Blair et al, 1973; and Akolo, 1987). Psychologists have analyzed learning as a process of association, perception, reinforcement, cognitive organization, imitation and information

processing. Tubbs and Moss (1978) state that, all our communication behaviours is learned in one of the three ways: (1) classical conditioning, (2) Instrumental learning, and (3) Imitation. Skinner (Tubbs and Moss, 1978) believes that, all human behaviour can be accounted for by instrumental learning. But Maccoby (1959), Bandura and Walters (1963), Flanders (1968), Hartup and Coates (1970) and Roberts (1973) emphasize that new responses are also learned through imitation.

DeCecco (1968) states that, there are five basic external conditions for learning: (1) contiguity, (2) practice, (3) reinforcement, (4) generalization, and (5) discrimination.

Three elements in a situation are essential for learning: (1) the learner, (2) the stimulus or stimulus situation, and (3) the response. These three elements constitute the learning event. By taking into account the learning event, we can plan instruction so that one can foresee which stimuli will result in the student making which response (DeCecco, 1968).

Cartoons in one form or the other literally are as old as man's first efforts to communicate by non-verbal symbols (Steinberg, 1970; Wittich and Schuller, 1973). Today the use of cartoon for fun and information is not strange. The cartoon is not always

simple and popular fun, it provides an insightful and frequently unerringly accurate portrait of the political and social mores of the time (Barry et al, 1965; Steinberg, 1970).

Horn (1980) defined the cartoon as any drawing that makes a complete sense, idea, or thought, that embodies freedom of expression and not tied to the constraints of literalism and slavish representation. It involves caricature, editorial humour, animation, syndicated panel (comic strip) and sport. Cartoon is a phase transition from caricature (Horn, 1980). He traced the development of modern caricature to Agostino and Annibale Carricci in the 16th century Italy. Hogart was regarded as the first modern cartoonist, and the forerunner of narrative cartoons (comic strips). The cartoon found a function as well as a form in the 18th century. It functioned as a means of social protest and political persuation. Udechukwu (1979) traced the history of editorial cartoon in Nigeria to the early 1940s with Lasekan as the first cartoonist.

The humour or gag cartoon originated in the late 19th century (Horn, 1980). In the second half of the 19th century, cartoons were organized into progressively more complex sequence of drawing, which became an independent art, comic, in the 20th century. The decade

around the dawn of the 20th century, witnessed an extraordinary surge in the number, quality, and popularity of humour magazines and cartoons generally (Horn, 1980). Nigeria witnessed this upsurge in the 1970s and 80s with the rise of magazines such as Ikebe Super, Lolly, Lagos Fun, Fantacy, Killers and Superstory. The state of humour cartoons today is uncertain, but it is safe to assume that it has been able to weather all the calamities of the 20th century and will survive no matter what happen next (Horn, 1980).

The most recent development in cartoon is animation. Long ago man has tried to animate images and the first efforts resulted in the Chinese shadow theatre, early flip books, and the magic lantern of the 17th and 18th centuries. Horn (1980) traced the origin of modern animation to Blackton, in the 20th century. Early cartoons were silent and dialogue was conveyed with the use of word ballon which was later abandoned in favour of intertitles. Sound was introduced to cartoon by Walt Disney in 1928. Rishante (notes) that professional animation started in Nigeria in 1979. But Akolo (notes) that the animated cartoon had been shown in cinema theatres in the early 1950s and Nigerians participated in their production; it is possible that these cartoons were developed and processed abroad. However, it is safe

to state that, a complete production and development of animated cartoons in Nigeria, started in the late 1970s and early 1980s.

Measures of teaching effectiveness are based on gains in students achievements. Such gains were computed from standardized achievement test scores as posttest minus pretest. The experimental method of research is the primary methodology for testing effectiveness of communication (Webb and Campbell, in Pool et al, 1973).

CHAPTER THREE

3. RESEARCH DESIGN

3.1 Introduction:

The specific purpose of this chapter is to present the methods and procedures that were used in the collection of the data for this study. The following areas are discussed: selection of the sample for the study, description of the instrument, research procedure, pilot study, and the statistical analysis of the data.

3.2 Description of Research Design

The experimental research approach characterized primarily by control and manipulation was used. The pretest-posttest and control-experimental design was employed in order to achieve the objectives of this study.

The main objective of this study is to evaluate the effectiveness of cartoon in classroom communication. The specific objectives are to:

(a) determine the state-of-art of cartoons in classroom communication.

(b) determine the acceptability and usage of cartoon in classroom communication.

(c) evaluate the effectiveness of cartoon in classroom communication.

B and C above would be examined through the use

of standardized achievement test based on a unit of instruction.

3.3 Sample of the study

The sample of this study, consist of primary school pupils in class five. This grade of pupils were used because, the instrument employed in this study involved pictorial representation in sequence. Vernon; Zazzo (Coppen, 1970) state that, the child could only understand sequence in pictorial representation at about the age of eleven. By the National policy on Education (1985), the child is expected to be in primary five at this age.

A systematic sampling technique was employed. The every fifth name in the register of a class wereselected for the experiment. Eight pupils were taken in each class, representing twenty percent of the target population. In all, one hundred and ninety-two pupils participated in the experiment. Two teachers in each of the five schools were selected for the experiment, they are of equal and required experience in teaching primary five pupils and ten teachers participated in the experiment. Five public schools were randomly selected in Warri, Bendel state. Warri, was chosen for the experiment because it offered opportunites (1) to obtain a heterogeneous population, and (2) to match teachers more accurately

on the basis of teaching experience. Primary schools were used for the experiment because the rest of the education is built upon it. It is the key to the success or failure of the whole education system. Private schools are not selected because they are still very young and since they are more costly, the majority, take their children to the public schools. Since these schools are large and operate both the morning and afternoon session, it is assumed that they form adequate representation of the target population sampled. The five primary schools selected are Torufa, Omatsola, Mowoe Cavegina and Alders Town (Hereafter these schools are designated by the capital letters A, B, C, D and E but not in the order given above.

3.4 Description of the Instrument

The unit of instruction-the digestive system, used in this study included those important elements of subject matter which, it was felt, were particularly well adapted to presentation through the medium of the syndicated or narrative cartoon. Other criteria which guided the selection and manner of presentation through the medium are (1) the digestive system is the first topic involving internal functions and a series of connected action in primary five scheme of work as stated in the syllabus of the 6-3-3-4 system; (2) It possesses some high level of abstractions and

seriousness. Subject matter which are abstract and taught to be serious should be 'sugar coated' so that it would serve as an entertainment without loosing its content (Fuglesang, 1973), (3) Fonseca and Kearl (Coppen, 1970) state that, subject matters involving a series of action should be depicted in connected series of illustration in order for clear communication and effective learning to occur, and (4) the subject content is an important one at all levels of education which the child needs to grasp in order to serve as a base for understanding it at a higher level of education.

Tests were constructed from the unit of instruction. The content of the unit of instruction was taken from Bondi et al. (1977) and compared with three other biology authorities: Kimball (1968), Hall (1970), Godman and Gutteridge (1979) in order to ascertain the correctness of the content. It was then taken to experts: teachers of Health education in staff school, Ahmadu Bello University, Zaria, with a minimum of six years experience in teaching primary five pupils in order to be moderated to the level of the sample. The content was moderated and test items drawn by five of these experts from the moderated version, suitable to the target sample.

The tests were designed to measure, (1) concrete knowledge or information, and (2) ability to think

more accurately and to reason more soundly. The test items and the moderated content were taken to three other primary schools in Zaria; Barau Dikko LEA, Laiminu LEA, and Ahmadu LEA, where experts in these schools assessed the test items and content, and confirmed their suitability for the sample. Based on this moderated version of the unit of instruction, the researcher prepared a syndicated or narrative cartoon that was exposed to the experimental group. The cartoon was ascertained suitable for the target sample by five experts-senior lecturers, two in the faculty of Education and three in the department of Industrial Design, Ahmadu Bello University, Zaria. Words and visuals were integrated in the narrative cartoon; as shown in plates I, II, III and IV.

Tests of the following types were constructed: (1) A phrase or one word completion-these tests requires the insertion of a phrase or one word to complete statements regarding the items of the subject matter, (2) Multiple choice-this type of test requires the checking of one of the four responses which correctly completed a given statement, (3) Two choice-this type of test was thesame form as the multiple choice except that there were two responses instead of four from which to choose, and (4) True-false-this type of test was used to measure concepts which could

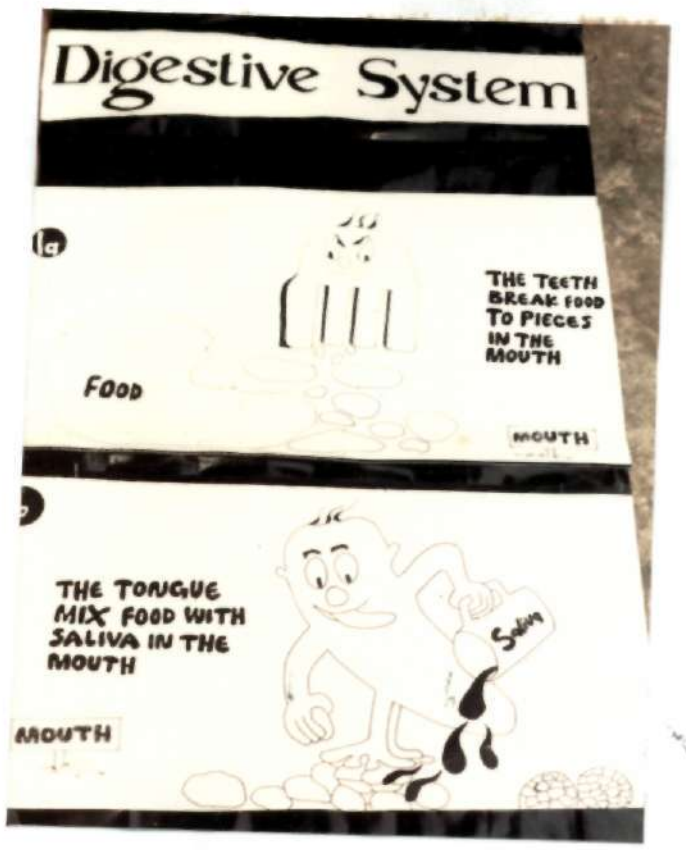


Plate I: Digestion in the mouth.



Plate II: Food moves through the throat to the stomach.

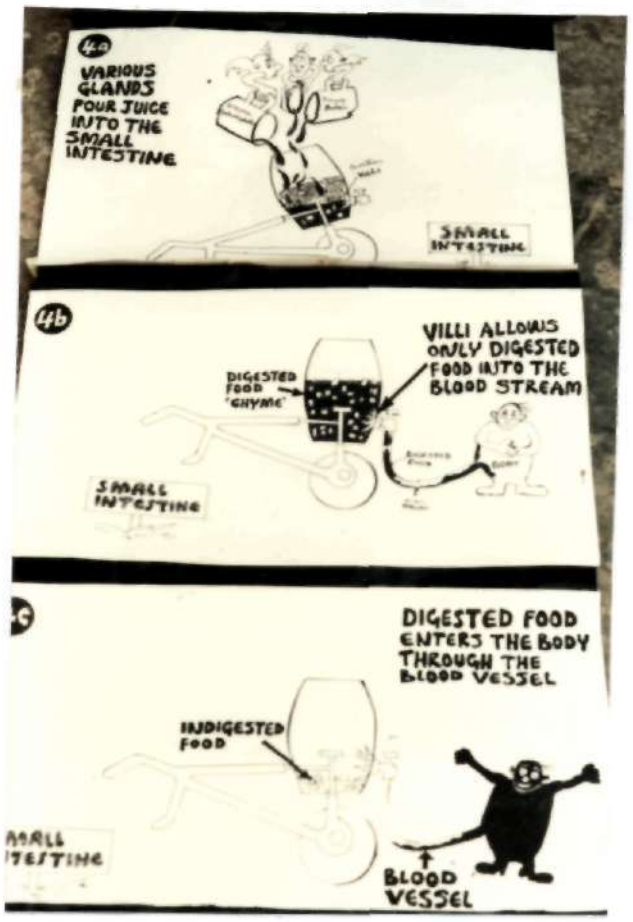


Plate III: Digestion in the small intestine.

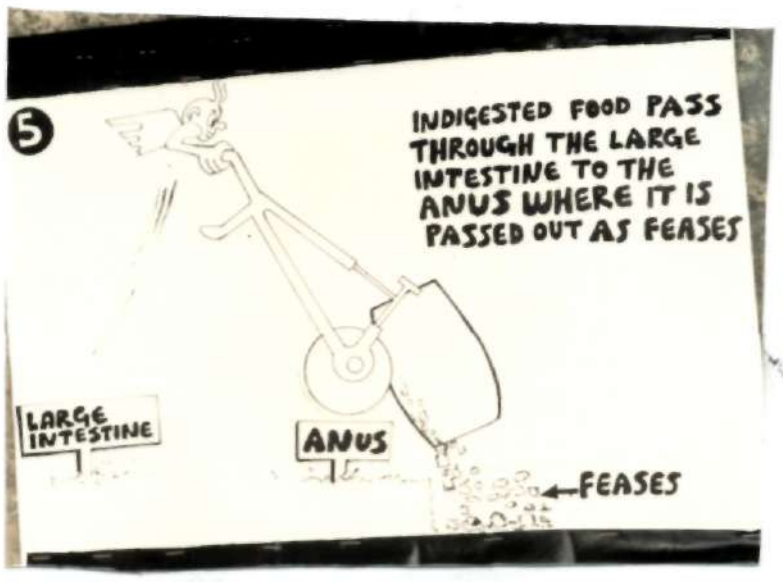


Plate IV: Indigested food passes out through the anus as feaces.

not be measured easily by one of the other three type of tests. The weighting assigned to the various types of test items is as follows: True-false, 1; Two choice, 1; Multiple choice, 2; and a phrase or one word completion, 3.

Two tests utilizing the parallel form technique was used as pretest and posttest, in order to determine the entry behaviour or amount of information about the subject, and the knowledge gained after the treatment respectively. 30 marks was allocated to each of the test. It has 18 items to be answered in 20 minutes. 3 one word completion test type, 4 two choice test type, 6 multiple choice test type, and 5 true or false test type, in addition to information such as school, age, and name.

3.5 Research Procedure:

An official letter of introduction obtained from the department of Industrial Design was presented to the heads of schools. The letter explained the aim of the study, sought permission and cooperation of each of them to carry out the experiment.

The experimental procedures extended over a period of four days in each school. On the first day, the letter of introduction from the department was given to the headmasters or headmistress of the school. Record of the qualifications and years of

experience of teachers were collected confidentially from the headmaster or headmistress in order to equate teachers. Two teachers were selected with equal qualifications and about the same years of experience in teaching primary five pupils for experimental, and control group. The minimum qualification of teachers that participated in the experiment was a Teacher's Grade Two certificate and a minimum of five years experience in teaching primary five pupils. The teachers cooperated.

On the second day, instructions regarding teaching procedures and time allotment were given to the head of the school and the teachers involved. Copies of the instructional material (text) was provided to the teachers of both experimental and control group. In addition to the text, the cartoon was given to the teacher of the experimental group. The instructional procedures and time allotments was intended to furnish the basis for uniformity in teaching and supervision throughout the experiment. It included the teaching plan and the instructional text.

Every fifth name in the register of pupils in primary five was selected for the experiment. The records of their age and previous performance on the recent past three terminal examinations were collected. Based on these records, the pupil were

matched and distributed into two groups: experimental and control. Tables 3.1 and 3.2 shows the age and previous performance of the pupils respectively. The tables indicate that, the age and previous performance of pupils in all schools corresponded closely and the differences are negligible. The previous performances of pupils

TABLE 3.1: MEAN AGE OF PUPILS OF EXPERIMENTAL AND CONTROL GROUPS (IN MONTHS).

	A		B		C		D		E	
	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
No of cases	16	16	16	16	20	20	20	20	24	24
Mean	128.9	128.7	129.1	129.5	130.7	130.4	129.8	129.4	130.9	130.1
Standard Deviation	3.4	3.6	5.1	5.2	2.7	2.9	2.7	2.8	2.5	2.2

TABLE 3.2: MEAN OF PREVIOUS PERFORMANCE ON RECENT THREE TERMINAL EXAMINATIONS.

	A		B		C		D		E	
	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
No of cases	16	16	16	16	20	20	20	20	24	24
Mean	10.5	10.6	11.7	11.8	10.7	10.9	11.8	11.4	9.5	9.9
Standard Deviation	2.4	2.2	2.4	2.6	2.7	3.1	2.9	2.8	3.4	3.6

in the recent three terminal examinations serve as a basis for matching pupils according to their mental ability. The performances are categorized into five grades: A, B, C, D and E. The grading was based on position of pupils in the class following their performance in the examination which was reflected in their report cards as follows: first to fifth, A; sixth to fifteenth, B; sixteenth to twenty fifth, C; twenty sixth to thirty fifth, D; and thirty sixth to fourtieth, E. The weighting assigned to these performances are as follows: A, 5; B, 4; C, 3; D, 2; and E, 1. 10 points and above is regarded as high performers and below 7 points as low performers.

The list of the experimental and control group were compiled after matching and were given to the respective teachers involved in the experiment on the third day. And schedules were made as complete as possible to provide for uniform periods of time elapsing between teaching periods.

On the fourth day, the treatment was administered to both experimental and control group under normal classroom conditions. The teacher of the control group was free to use any instructional devices available with the exception of cartoon, while, the teacher of the experimental group used cartoon in addition.

The first three periods of the morning session was used. The treatment was administered within the normal class period of thirty five minutes. Before the treatment, a twenty minutes pretest was administered to both groups in order to determine the entry behaviour or their state-of-knowledge of the pupils about the subject matter. No teacher of either groups were allowed to learn about the nature of the test items before the administration of the test. Also immediately after the treatment, a posttest of twenty minutes, and of parallel form with that of the pretest was administered and collected. The experiment, in all the schools lasted twenty working days.

All scoring was done by means of objective keys which were constructed before the beginning of the experiment. It was possible to score objectively and yet give partial credit to some responses made by pupils in the case of a phrase or one word completion.

3.6 Pilot Study

A pilot study was carried out in staff school, Ahmadu Bello University, Zaria. Twenty pupils and two teachers participated in the experiment. The pupil in primary five, were distributed into two groups: experimental and control, of ten pupils each.

The teachers were provided with copies of the teaching procedures and time allotment. The teaching plan and the instructional text was given to both teachers of the two groups; in addition, the cartoon was given to the teacher of the experimental group a day before the treatment was administered. The treatment was administered within the normal double period of seventy minutes. A twenty minutes test was administered immediately before and after the treatment.

The purpose of the pilot study was to determine if there are test items that need to be reframed. No major changes were made.

3.7 Statistical Design:

The following statistical techniques were employed in treating the data. The means or average of the experimental group scores were compared with the means of the control group scores.

The reliability of the means was determined by computing the standard deviation of the means. Difference between means may not be statistically significant, therefore, the t-ratio of the difference between the experimental groups and control groups was computed. At-value of two (2.0) or more indicates that, the level of probability of the difference occuring by chance is 0.05. This indicates that, there is practical certainty that a true difference in the same direction

exists.

The superiority of one group over the other was computed by dividing the difference between the means of the two groups by the mean of the inferior group, and expressing this relation in terms of percent (percent superiority).

CHAPTER FOUR

ANALYSIS OF DATA

4.1 Introduction

The main objective of this study is to evaluate the effectiveness of the cartoon in classroom communication.

This chapter deals with the analysis of data collected from the tests conducted among primary five pupils in five primary schools in Warri, Bendel state of Nigeria. The standardized test items were constructed to measure the cognitive domain or the understanding of concrete information of the subject matter and the ability of pupils to think more accurately and to reason more soundly.

4.2 Treatment of Data

The following statistical techniques were employed in treating the data. The mean gains obtained from the posttest mean score minus the pretest mean score of the experimental and control groups were compared. The reliability of the means was determined by computing the standard deviation of the means.

Difference between means may not be statistically significant or may be by chance. In order to determine whether these differences in mean are statistically

significant, the T-test was employed. The T-ratio or T-value of the difference between the posttest and the pretest of the experimental and control groups were computed and compared. If the t-value is two (2.0) or more, it indicates that the level of probability of the difference occuring by chance is less or equal to 0.05, and this implies that there is a significant difference.

The superiority of one group over the other was computed by dividing the difference between the mean gain of the two groups by the mean gain of the inferior group and expressing this relation in terms of percent (percent superiority).

4.3 Gains on the instructional content:

Table 4.1 shows the result of the pretest and the posttest scores of both experimental and control groups. The table indicates that, the entry behaviour of the pupils as reflected in the result of the pretest, corresponded very closely and the difference between experimental and control groups in all the schools are negligible: 15.6, 15.4; 13.0, 13.8; 12.0, 12.0; 14.8, 14.6; and 11.8, 11.5; and 13.4, 13.4 for the combine school.

TABLE 4.1: COMPARISON OF TEST SCORES MADE BY EXPERIMENTAL AND CONTROL GROUPS.

	A		B		C		D		E		Combine	
	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
No of cases	16	16	16	16	20	20	20	20	24	24	96	96
Pretest	15.6	15.4	13.0	13.8	12.0	12.0	14.8	14.6	11.8	11.5	13.4	13.4
Standard Deviation	7.0	4.0	5.7	6.2	3.2	3.2	3.3	3.0	4.0	3.5	4.6	3.9
Posttest	23.9	19.3	18.9	17.5	18.2	16.8	18.6	18.3	20.3	14.5	19.9	17.2
Standard Deviation	4.4	4.7	6.8	4.7	2.8	5.8	5.1	4.9	5.2	4.3	4.8	4.8
Mean gain	8.5	3.9	5.9	3.7	6.2	4.8	3.8	3.7	8.5	3.0	6.5	3.8
T-value	3.6	2.4	2.5	1.8	6.1	2.6	2.7	2.7	4.8	2.5	7.8	5.2
% Superiority	113		64		29		14		183		78	

Table 4.2 shows the highest and low performance mean scores of both experimental and control group, in order to determine whether the highs and the lows benefited from the treatment. For every school except school B and E, the mean gain of the lows and the highs in the experimental groups are equal: 8, 8; 6, 6; and 5, 5. In B and E, the mean gains favour the lows of the experimental group: 5, 7; and 7, 9; and 6, 7 in the combine. This tends to suggest that the lows benefited more than the highs of the experimental groups with the treatment. This is in line with the view of salomon (1972b), Allen (1973).

The result also shows that, for all the schools except school E, where the gains of the highs and lows are equal: 3, 3; in the control group, the highs benefited remarkably more than the lows: 5, 3; 5, 3; 8, 2; and 5, 1; and 6, 2, in the combine.

Comparing the mean gains of the highs of experimental and control groups, the result indicates that, for every school except for school C, where the highs of the control have higher mean gain; 6, 8; the highs gain of the experimental groups are equal or higher than those of the control groups : 8, 5; 5, 5; 5, 5; and 7, 3; and 6, 6; in the combine schools. This suggests that the highs benefited from both the treatment in the experimental and control groups.

TABLE 4.2: COMPARISON OF GAINS MADE BY HIGH AND LOW PERFORMANCE LEVEL. COMPARISON OF

	A				B				C				D				E				Combine			
	Exp.		Cont.		Exp.		Cont.		Exp.		Cont.		Exp.		Cont.		Exp.		Cont.		Exp.		Cont.	
No of cases	10	4	10	3	13	2	11	2	12	5	12	5	14	4	15	2	12	9	13	8	61	24	61	20
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
Pretest	21	11	21	9	18	8	18	10	15	9	16	8	18	10	18	12	16	8	16	8	18	9	17	10
Posttest	29	19	24	14	23	15	23	13	21	15	24	10	23	15	23	13	23	17	19	11	24	16	23	12
Difference	8	8	3	5	5	7	5	3	6	6	8	2	5	5	5	1	7	9	3	3	6	7	6	2

Table 4.3 shows the comparative gains in the experimental and control groups in all the schools on the cartoon unit items. The data indicate that, the differences in mean gains of every school in the cartoon unit items were greater for the experimental groups than for the control groups with the exception of school D : 5.3, 3.4; 5.2, 3.5; 3.8, 3.0; 5.5, 2.6 and 4.3, 2.9 in the combine. In school D where the control group scored higher; 2.0, 2.1, This is graphically shown in Appendix G.

The percent of superiority of the experimental over control groups except in school D, ranged from 27 to 112 percent. This superiority are statistically significant with the t-value ranging from 3.1 to 7.4.

In the preceding discussion it has been shown that, there was a marked superiority of the experimental over the control groups in mean gains as measured by those items presented both by the cartoon and by the unit of instruction. It is also important to determine whether a superiority in mean gains exists in favour of the control groups on the items included only in the unit of instruction. The test items which were not answered either directly or indirectly by the cartoon (hereafter designated, non-cartoon items).

Table 4.4 shows that for every school, the differences in mean gains on non cartoon-unit items were greater for the experimental groups than for the control groups: 3.0, 0.5; 0.7, 0.2; 2.4, 1.8; 1.8, 1.6; 3.0, 0.4; and 2.2, 0.9 for the combine. This is graphically shown in Appendix G. The greatest mean difference exist in school E and the least in school D. The mean difference in schools A, C and E are statistically significant in favour of the experimental groups over the control groups. The combine school result indicates 144 percent superiority of the experimental group over the control in this type of test items; and this difference is statistically significant with the t-valve, 6.1. It seems evident, therefore, that the gains made by the experimental groups, on those items presented both by the cartoon and by the unit of instruction, were not made at the expense of the learning of those elements of subject matter which were presented only by the unit of instruction.

4.5 Summary:

The results presented in this chapter indicate that the cartoon used in the experiment made distinct contributions to learning. The differences in gains for the combine schools were greater for the experimental than for the control groups in the case of all the

TABLE 4.4: GAINS MADE BY EXPERIMENTAL AND CONTROL GROUPS ON NON CARTOON ITEMS.

	A		B		C		D		E		Combine	
	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
No of cases	16	16	16	16	20	20	20	20	24	24	96	96
Pretest	6.8	8.1	6.8	5.3	7.4	6.5	6.9	7.8	6.3	4.2	6.8	6.3
Standard Deviation	3.3	2.5	3.0	3.1	1.7	1.5	1.9	1.9	3.3	1.6	2.6	2.1
Posttest	9.8	8.6	7.5	5.5	9.8	8.3	8.7	9.4	9.3	4.6	9.0	7.2
Standard Deviation	1.6	2.3	3.2	1.7	1.8	1.7	1.7	2.0	3.1	2.2	2.7	2.0
Mean gain	3.0	0.5	0.7	0.2	2.4	1.8	1.8	1.5	3.0	0.4	2.2	0.9
T-valve	2.6	0.86	0.97	0.91	5.8	3.3	3.6	2.8	3.3	0.73	6.1	3.5
% Superiority	500		25		33		13		675		144	

individual schools except school D: 3.8, 3.7; the t-value indicates that differences favouring the experimental groups were statistically significant, the t-value ranges from 2.4 to 6.1; and 7.8 in the combined schools.

The study of the results of the test items, the answer to which were presented both by the cartoons and by the unit of instruction, and which are termed cartoon-unit items in this study, indicates the specific contribution to learning made by the cartoon. The percents of superiority of the experimental groups over the control groups for all schools combined on these cartoon-unit items ranged from 27 to 112 percent.

It would seem that the specific contribution to learning of the cartoon was determined by the amount of subject matter presented by the cartoon which the classroom teacher did not present as effectively by the use of other methods of subject matter presentation.

The experimental groups achieved practically as much as the control groups in the subject matter which was presented in the unit of instruction and not in the cartoon. In schools A, C, and E, the experimental groups achieved significantly more than the control groups in these subject matter. It would seem then that the gains of the experimental over the control

groups throughout the experiment were made without sacrificing the learning of subject matter not presented specifically by the cartoon. A summary of the result considering the combined school is graphically illustrated in Appendix G.

CHAPTER FIVE

SUMMARY, MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

In this chapter, a summary of the procedures, major findings of the study, conclusions and recommendations will be considered.

5.2 Statement of the problem

The problem of this study is to evaluate the effectiveness of the cartoon in classroom communication. The specific objectives are to: (1) determine the state-of-art of the cartoon in the classroom, (2) determine the acceptability and usage of cartoon communication in the classroom, and (3) evaluate the effectiveness of cartoons in classroom communication.

5.3 Research Procedures

The cartoon used in the experiment were based on unit of instruction moderated by experts trained in the field of teaching primary school pupils, with due consideration of modern educational theories and practices. The unit of instruction: the digestive system, served as the course of study for the experimentation. It was studied under health education in class five.

5 primary schools, 10 teachers and 192 pupils participated in the experiment. The primary schools randomly selected in Warri were: Torufa, Omatsola, Mowoe, Alders Town, and Caveginia.

The experimental-control technique, utilizing the equated teacher method was followed throughout the experiment. The pupils of the control group were taught by the ordinary classroom method without the aid of the cartoon. The pupil of the experimental group, however, were presented with several narrative cartoons during the course of instruction. Teachers of both groups received unit of instruction upon which the cartoon were based, which served as the course of study.

Teachers were equated on the basis of their qualifications and years of experience. The pupils' intelligence were equated on the basis of their previous performance in three recent terminal examinations. The differences in the intelligence of pupils and the results of the pretest indicates that, the intelligence of pupils in all the schools were well matched.

Objective tests devised to measure the pupils' knowledge concerning the unit of instruction was administered before the treatment. This was composed of eighteen items which included one-word completion, multiple (four) choice, two choice, and true-false

types. The result indicate that, in every school, the difference in mean made by both experimental and control groups are negligible, this seem to suggest that the entry behaviour of pupils were approximately equal. A parallel test was administered immediately after the treatment.

The class teaching on the unit of instruction began on the fourth day, in each school, after teachers and pupils have been matched. The unit was taught within a double period of 70 minutes. Both experimental, and control groups received a 30 minute instruction, before and after which a 20 minute test was administered. The teachers of the control groups were allowed to use any teaching device except cartoons within the time limits set. No teacher was allowed to see any of the test items and no teacher of the control group was allowed to see the cartoon during the experimental period.

5.4 Major findings:

1. The state-of-the-art of cartoon in classroom communication:

The development and use of cartoon in Nigeria has reached an advance stage as in the developed countries. Various techniques and types of cartoon: editorial humour, Gag, comics, caricature, and animation (except computer animation) are well developed and effectively

employed in the out-of-school communication system. But unlike the developed countries, the cartoon is yet to be applied to classroom communication; particularly books intended for formal school purposes.

2. The usage and acceptability of cartoon in classroom communication:

The results indicate that, the use of cartoon in the experiment produced acceptable and distinct contribution to learning. The differences in gains for the combined schools were greater for the experimental than for the control groups in the case of every school except school D: 3.8, 3.7. The t-value indicates that, differences favouring the experimental groups were statistically significant and it ranged from 2.4 to 6.1; and 7.8 in the combined schools. The result indicates that the pupil responded favourably to the use of cartoon as a teaching aid in the classroom.

3. Evaluating the effectiveness of cartoon in classroom interaction:

The results of the test items, the answer to which were presented both by the cartoon and by the unit of instruction, and which are termed cartoon-unit items in this study, indicates the specific contribution to learning made by the cartoon. The percent of superiority of the experimental groups over the control groups for all schools combined ranged from 27 to 112 percent.

It would seem that the specific contribution to learning of the cartoon was determined by the amount of subject matter presented by the cartoon which the classroom teacher did not present as effectively by the use of other methods of subject matter presentation.

The experimental group achieved practically as much as the control groups in the subject matter which was presented in the unit of instruction and not in the cartoon. In school A, C, and E, the experimental groups achieved significantly more than the control groups in these subject matter. It would seem then that the gains of the experimental over the control groups throughout the experiment were made without sacrificing the learning of the subject matter not presented specifically by the cartoon.

From the results, the cartoon as a teaching aid, is effective and economical. Effective from the standpoint of clarifying concepts, and economical in terms of energy required of pupils, teachers or both, to accomplish desired objectives.

5.5 Conclusions

The development of the cartoon in Nigeria indicate that, the cartoon has been effectively employed in the out-of-school environment, but

neglected for formal school purposes. And one of its function is to inform or instruct. The qualities of cartoon: simplicity, directness, creativity and humour, suggest many possibilities concerning its use as an aid in classroom instruction. Hence, the main objective of this study was to evaluate the effectiveness of cartoon in classroom communication. The modern cartoon is particularly interesting because of the extraordinarily large amount of information that can be suggested by a very simple drawing (Barry et al, 1965). It conveyed the desired message in a simple, yet piognant manner without allowing the rules of grammar, stylistic appropriations and semantic exactness to rob or distort the meaning of the desired message. The cartoon directs attention to the main idea; the idea alone is the essential requirement in the cartoon whether it is meant to inform, reform or to amuse, and it presupposes the ability to say things trenchantly, humorously and caustically in terms of line. Creativity is involved in the production of a cartoon: unimpressive ideas are made impressive, and abstract concepts are rendered concrete for the purpose of clear communication. This stimulate the imagination and creative ability of the learner, which are essential to the development of the individual and the society. The humour in

cartoons provide emotional and aesthetic satisfaction which are conducive for effective communication and learning to occur.

With reference to the usage and acceptability of the cartoon in classroom situation, the finding showed that, the use of cartoon to teach abstract concepts and subject matter involving a connected series of action or function, such as the digestive system, in the primary school, made acceptable and distinct contributions to learning.

Brown et al. (1973) state that, the cartoon have the power to capture attention and change behaviour and attitudes. The change of behaviour as a result of the sharing of meaningful visual/verbal stimuli is the aim of communication. And when behaviour is changed as a result of experience which involve some form of effort by the learner, effective learning could be said to have occured. In other words, cartoons have the ability to effect effective communication and learning. The result indicate that, the cartoon is effective, and economical in classroom instruction. Effective from the standpoint of clarifying concepts and economical in terms of energy required of pupils, teachers or both to accomplish desired goals. The result also showed that, the marked contributions made to learning by

the cartoon, were achieved without the loss of learning other elements of subject matter not included in the cartoon. This seems to suggest that, the cartoon did not distract attention from the subject matter not presented in the cartoon. It also benefited pupils of high, and low performance level.

The ability of the cartoon to arouse, attract and direct attention, beautifully illustrate facts that are unnoticed, and capable of changing behaviour makes the cartoon a valuable tool for educators. Olaofe (1986) states that, the integration of language, visual art and creativity in the production of the cartoon enable one to communicate more effectively than he would have done using only one of the media of communication. In line with this thought, Allen (1973) suggests that, the cartoon should be employed in the classroom communication system because its influence on behaviour is immense.

5.6 Recommendations

Based on the findings and conclusions of this study, it is necessary that the following recommendations are made:

(1) In teaching abstract concepts and topics involving series of actions and functions that are often taught to be difficult and

boring to the child, the narrative cartoon should be used. It depicts each stage or major functions in a connected series of close sequence cartoon. It also add fun to information thereby easying tension that might cause communication barrier to effective learning. The simplicity and humour inherent in the cartoon facilitate understanding of complex topics and concepts. And add liveliness to classroom communication.

(2) Since cartoons are effective in classroom communication, the out-of-school communication cartoons, depicting the socio-political life of the nation should be employed in teaching social studies in the classroom environment. These cartoons are skillfully deviced to arouse and hold the attention and interest of the child until such a time that the ideas in the cartoon are grasped.

(3) Publishers, illustrators-cartoonists, educators, policy makers and all involved in developing instructional materials for the child should employ the educational cartoon in illustrating books meant for formal school purposes.

(4) In passing information to children in the primary school about complex, and abstract ideas, or actions in sequence, the federal and state ministry of education should employ cartoons as part of the delivery system.

5.6.1 Recommendation for Further Research

The present study indicates the effectiveness of the cartoon as an aid to the teaching of cartain unit of instruction in health education in the primary school. This demostration of effectiveness within this rather narrow range of instruction suggests many possibilities for fruitful research, the results of which should be of great importance to the whole field of education. Some of these areas of research which seem promising are as follows:

(1) The investigation of the effectiveness of cartoon in teaching very large groups should be made. This would involve a study of the types and amounts of subject materials of the curriculum which can be presented to many groups brought together at one time. It is possible that certain portions of many courses may be presented by the cartoon thus relieving the teacher of much instruction which can be administered in a

routine manner so that his time may be more profitably spent in administering to the individual needs of learners.

(2) Studies in utilization and adaptability of the cartoon in supplementing typical forms and methods of teaching should be made. Wherein do certain forms of school organizations and specific types of teaching method fail to meet the requirements of sound educational practice. How might the cartoon be made to provide instructional materials which will overcome certain of these shortcomings of typical forms and method? What are the optimum procedures to be followed in administering on the various levels of education?

(3) The opportunities for the use of the educational cartoon in adult education should be thoroughly studied. Special attention should be given to the effectiveness of the cartoon when utilized to supplement other types of teaching and when used alone to present the complete instructional unit.

These problems for research will depend for their solution upon the coordination and integration of the work of the philosopher, the sociologist, the

psychologist, the subject matter specialist, the educational administrator, and the expert cartoonist. It will be through this coordination of effort that the educational cartoon will assume its proper position of usefulness in the field of education.

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APPENDIX A: LETTER OF INTRODUCTION:

DEPARTMENT OF INDUSTRIAL DESIGN
AHMADU BELLO UNIVERSITY, ZARIA
Telephone 51231-2 Telegram Umbello

Vice Chancellor Professor A N Mohammed B Sc.
D. P. A. & E (London) Ph. D (ABU) F. N. S. P.
Head of Dept S A ADELTORO, B A M A (ABU) Ph. D (Texas)

Your Ref.....

Our Ref. F.ID.33/89

18th May 1989

TO WHOM IT MAY CONCERN

The bearer, Mr. Sylvester Ibigbagha is a Masters Student in this Department. He is currently engaged in field work for his Masters Thesis which deals with the determination of the most effective techniques for illustrating children's books. Kindly give him your cooperation to assist him conduct the study which we consider very important to education in Nigeria.

Sincerely yours

Dr. J.S. Rishante
Coordinator, Postgraduate Programme

DEPT. OF INDUSTRIAL DESIGN
19 MAY 1989
A.B.U. ZARIA

APPENDIX B: THE UNIT OF INSTRUCTION

AN OVERVIEW

When we have not eaten for sometime we feel hungry. Hunger reminds us we should eat food. The body needs food for energy, in order to function. The food we eat have to undergo a chemical process before it can be used by the body. This process is called digestion. Digestion is the process by which food is breaking down into particules for the use of the body.

Food enters the body through the mouth with the teeth breaking it up into tiny pieces. While the food is being chewed, the tongue moves it about thereby helping to mix it with saliva so that it can be swallowed. It then passes through the Oesophagus (throat) to the stomach. Food remain's in the stomach for sometime where it is mixed with some enzymes. After it leaves the stomach, the food is pushed into the Duodenum where it mix with more enzymes. The food is then pushed into the small intestine.

The small intestine is the main centre of digestion in the body. Various glands pour juices into the small intestines. Intestinal juices given of by the glands in the walls of the small intestine itself, Bile from the Liver and Pancreatic juice from the pancrease, as well as certain salts in bile complete the process of

breaking down carbonhydrate, protein and simple substances. The food in the small intestine is at its most liquid state called chyme. In the lower part of the small intestine, digested food begins to enter the blood stream by absorption. To facilitate absorption, the lining of the intenstine have inward pointing projections called villi. Each villus is well supplied with blood vessels and it is by means of these, that most of the product of digestion are absorbed. The villi will not allow indigested food to pass into the blood stream. There are about five million villi in the small intestine.

The indigestable part of the food goes into the large intestine and it is passed out through the anus as faeces.

NOTE OF LESSON ON HEALTH EDUCATION

Time : 70 minutes (double period) (20 minutes each for pre and posttest).

Topic : The digestion of food.

Apparatus: (for experimental group only) a drawn series of cartoon of the digestive system.

Previous knowledge: The children have known the three classes of food - carbonhydrate, protein and fat. Yam or garri, meat or fish and oil as example respectively.

Behavioural Objectives: By the end of the lesson, the pupils will be able to:

(a) define the term digestion.

(b) describe the digestive system.

(c) mention the organs and their functions.

(d) identify the functions of enzymes.

Introduction: Teacher will ask the pupil to mention the three classes of food. Teacher will ask them what happens when they are hungry? Why they eat food? Individual pupil will give his/her answer and teacher may explain better where necessary.

Presentation - Step I: We eat food everyday, what happens to the food we eat? The body uses it. Can we describe how we take food (teacher will listen to the children's ideas).

Step II: Teacher explains to the pupils that when we eat food, it is broken down into dissoveable compounds (soluble) known as particles. The smallest particles pass through the walls of the small intestine and enters the blood stream.

Step III: Teacher explain's that before the food can be used in the body, it has to undergo a chemical process in the body. This process is called digestion. Teacher now gives the meaning of digestion as the

process of breaking down food particles for the use of the body.

Step IV: The teacher will explain to the pupils the chemical process which is mainly by enzymes. Teacher will treat enzymes, their sources and functions.

Step V: With the help of cartoons (for experimental group only) the teacher will illustrate the process of digestion and the organs e.g. mouth, throat stomach, small and large intestine and the anus. Teacher then summarize the process of the digestive system.

Pupils activities: Children will be allowed to ask questions. Evaluation: Test items to be given to students.

APPENDIX C.1: HEALTH EDUCATION (DIGESTIVE SYSTEM)
TEST (POSTTEST) 20 Minutes

Name: ..... Date: .....

School: .....

Age: .....

ANSWER ALL QUESTIONS 9 Marks

Fill the blank space by placing one word in each of the Space:

1. Digestion of food starts in the .....
2. The main centre of digestion is .....
3. The indigestable food passes out of the body through the .....

Choose and fill the number of the Correct answer in the dotted line at the right: 4 marks

4. The body needs food for ..... (a) Energy (b) rest
5. The food in the small intestine is ..... (a) Solid (b) liquid
6. Each villus is well supplied with ..... (a) water (b) blood
7. Digested food enters the blood stream by ..... (a) excretion
   (b) absorption

Circle the Correct answer 12 marks

8. Digestion means .....
   (a) sending out the unwanted food.....
   (b) swallowing food
   (c) breaking food into smaller forms
   (d) all of the above

9. The indigestable food goes into the:

   (a) Large intestine

   (b) Stomach

   (c) Throat

   (d) Mouth

10. The tongue mixed food with saliva in the:

   (a) Stomach

   (b) Mouth

   (c) Small intestine

   (d) All of the above

11. About how many villi do we have in the small intestine:

   (a) Two million

   (b) Five million

   (c) Three million

   (d) One million

12. Which of these is not in the digestive system

   (a) Stomach

   (b) Head

   (c) Small intestine

   (d) Mouth

13. What break food to pieces in the mouth?

   (a) Tongue

   (b) Saliva

   (c) Teeth

   (d) None of the above

If you think the statement is true Circle T;
If you think the statement is false cirle F 5 marks

14. The food we eat remain in the stomach as it is without any change: T F

15. The most liquid state of food in the small intestine is called chyme: T F

16. Carbonhydrate, protein and fat are broken into simple substance: T F

17. Various glands pour juices into the small intestine T F

18. Villi allow digested food into the blood T F

APPENDIX C.2: HEALTH EDUCATION (DIGESTIVE SYSTEM)

TEST (PRETEST) 30 Minutes

20 Minutes

Name: ..... Date: .....

School: .....

Age: .....

ANSWER ALL QUESTIONS 9 Marks

Fill the blank space by placing one word in each of the Space:

1. In the mouth what mixed food with saliva .....
2. Before the food gets to the stomach it passes through the .....
3. The anus is where indigestable food passes .....

Choose and fill the number of the correct answer in the dotted line at the right: 4 Marks

4. We eat food to ..... (a) sleep (b) work
5. The food we eat is most liquid in the ..... (a) small intestine (b) large intestine
6. Blood is well supplied to each ..... (a) Villus (b) Digested food
7. Food enters the blood by (a) absorption (b) Evaporation

Circle the correct answer 12 marks

8. The breaking of food into smaller form is called

(a) Hespitation (b) Nutrition

(c) Digestion (d) All of the above

9. Which of this is in the digestive system?

(a) Head (c) Stomach

(b) Leg (d) Nose

10. About five million villi are in the:

(a) Large intestine (c) Small intestine

(b) Stomach (d) None of the above.

11. The food is mixed with saliva in the

(a) Mouth (c) Small intestine

(b) Stomach (d) All of the above

12. What break food to pieces in the mouth

(a) Tongue (c) Saliva

(b) Teeth (d) All of the above

13. The food that is not digested goes into the:

(a) Small intestine (c) Large intestine

(b) Stomach (d) All of the above

<u>If you think the statement below is true cicle T</u>

<u>If you think the statement is false circle F</u>

<u>5 marks</u>

14. Carbonhydrates, protein and fat are broken into simple substances: <u>T</u> <u>F</u>

15. The large intestine receives juice from various glands: <u>T</u> <u>F</u>

16. The food we eat does not change in the stomach <u>T</u> <u>F</u>

17. Villi is in the stomach <u>T</u> <u>F</u>

18. The most liquide state of food in the small

APPENDIX D: TABLES SHOWING THE AGE OF PUPILS IN MONTHS.

Table 1

School A		School B	
Exp. group	Cont. group	Exp. group	Cont. group
127	135	120	123
129	133	123	133
133	123	126	135
125	124	121	121
123	125	136	131
135	128	134	123
133	134	132	133
132	129	133	137
128	132	126	129
129	128	126	131
123	130	129	130
130	130	124	125
125	123	133	120
133	126	136	132
127	129	133	134
131	131	133	135
Mean = 128.9	Mean = 128	Mean = 129	Mean = 129.5
SD = 3.47	SD = 3.67	SD = 5.15	SD = 5.26

Table 2:

School C		School D		School E	
Exp.	Cont.	Exp.	Cont.	Exp.	Cont.
128	129	126	130	133	133
131	126	128	129	126	124
125	128	132	127	127	133
134	134	132	130	132	131
133	134	133	122	132	133
132	133	129	129	125	133
134	133	128	133	127	127
135	133	127	130	130	130
133	135	134	132	134	129
133	126	132	130	133	128
131	125	132	132	133	131
133	127	128	127	129	132
129	130	127	130	131	128
127	131	129	129	128	130
128	132	130	128	133	131
132	128	131	125	134	127
132	134	123	127	134	131
128	130	131	133	132	131
129	132	132	132	131	131
128	128	132	134	132	132
				133	130
				131	133
				130	131
				132	131
Mean=	130.7	130.4	129.8	129.4	130.9	130.4
SD =	2.72	2.99	2.72	2.88	2.58	2.27

APPENDIX E: TABLES SHOWING PREVIOUS PERFORMANCE OF PUPILS.

Table 1:

School A

Control Group				Experimental Group			
First	Second	Third	Total	First	Second	Third	Total
4	2	3	15	23	18	13	10
6	11	4	13	3	5	2	15
1	1	1	15	1	3	1	15
23	30	14	9	30	28	36	5
7	9	12	12	13	10	6	12
6	10	17	11	18	11	24	10
24	13	34	9	19	22	19	9
8	6	15	12	40	38	34	4
14	33	18	9	31	27	21	7
9	16	5	12	25	13	4	12
10	17	10	12	11	9	9	12
32	30	28	6	4	4	7	14
29	25	26	7	3	5	2	15
2	2	3	15	30	33	27	6
35	37	40	4	18	23	16	9
20	22	13	10	16	8	5	13
Total = 171				Total = 168			
Mean = 10.6				Mean = 10.5			
SD = 2.29				SD = 2.44			

Table 2:

School B

Control Group				Experimental Group			
First	Second	Third	Total	First	Second	Third	Total
2	3	4	15	3	6	4	14
7	6	9	12	13	20	13	11
13	23	19	10	8	25	16	10
21	22	31	8	20	26	14	9
8	2	4	14	1	2	1	15
16	13	11	11	18	7	4	12
4	5	1	15	5	3	2	15
1	1	2	15	4	5	3	15
23	31	19	8	25	27	21	8
3	2	2	15	2	1	5	15
5	4	3	15	2	4	3	15
6	7	5	13	10	5	12	13
9	14	18	11	5	15	7	13
10	24	25	9	23	27	19	8
32	12	21	9	7	4	6	13
18	33	14	9	11	9	10	12
Total - 189				Total - 188			
Mean - 11.81				Mean - 11.75			
SD - 2.68				SD - 2.46			

Table 3: School C

Control Group				Experimental Group			
First	Second	Third	Total	First	Second	Third	Total
4	5	6	14	19	12	15	13
31	40	37	4	3	4	5	15
24	19	20	9	31	35	32	6
3	9	7	13	19	7	9	11
2	2	3	15	11	10	12	12
1	1	1	15	5	8	2	14
17	33	14	9	14	13	14	12
6	7	9	12	23	21	29	8
5	3	4	15	1	6	2	14
30	29	22	7	9	6	7	12
7	6	5	13	29	29	27	6
9	8	2	13	22	28	30	7
18	11	8	11	17	25	22	9
15	10	10	12	16	15	22	10
12	12	11	12	7	8	8	12
11	13	12	12	4	3	3	15
23	25	26	8	28	29	24	7
21	29	28	7	10	11	1	13
27	27	30	6	26	20	24	9
24	18	24	9	18	16	20	9
Total = 218				Total = 214			
Mean = 10.9				Mean = 10.7			
SD = 3.16				SD = 2.70			

Table 4: School D

Control Group				Experimental Group			
First	Second	Third	Total	First	Second	Third	Total
2	3	4	15	1	3	3	15
21	19	24	9	20	18	25	9
7	1	3	14	6	2	4	14
6	5	5	14	7	5	5	14
31	29	33	6	9	11	8	12
4	4	1	15	8	10	7	12
9	11	10	12	2	1	2	15
12	7	6	12	14	13	15	12
19	13	17	10	10	9	11	12
5	9	2	14	33	31	34	6
15	15	14	12	18	16	12	11
33	31	34	6	31	34	33	6
1	2	2	15	18	12	14	11
18	14	12	11	17	18	20	9
16	16	16	9	4	7	6	11
8	9	7	12	19	13	17	10
3	5	7	14	12	6	9	12
17	15	11	11	24	26	28	7
25	22	22	9	31	33	29	6
9	10	9	12	3	4	5	15
Total = 229				Total = 236			
Mean = 11.48				Mean = 11.80			
SD = 2.8				SD = 2.9			

Table 5:

School E

Control Group				Experimental Group			
First	Second	Third	Total	First	Second	Third	Total
14	34	17	9	18	24	12	10
3	2	5	15	12	10	9	11
14	4	12	13	13	25	26	9
36	40	31	4	24	29	29	7
4	5	6	14	27	29	25	7
18	25	20	9	5	6	7	13
5	10	12	10	28	30	31	6
30	27	27	6	19	14	22	9
16	9	5	12	1	1	1	15
1	3	1	15	4	5	16	13
13	16	11	11	3	2	4	15
17	8	18	10	33	31	32	6
39	37	40	4	4	7	4	14
4	4	8	14	18	12	14	11
14	18	15	11	20	24	25	9
33	27	30	6	40	28	31	5
21	22	32	8	30	27	33	8
32	28	31	7	1	6	2	14
5	2	2	15	36	38	40	4
34	21	28	7	37	36	39	4
24	40	39	5	8	9	9	12
9	5	16	12	7	8	8	12
2	1	2	15	29	30	27	6
30	30	29	6	21	22	13	10
Total = 238				Total = 230			
Mean = 9.91				Mean = 9.58			
SD = 3.64				SD = 3.42			

APPENDIX F: TABLES SHOWING RAW SCORES OF PUPILS ON TEST ITEMS

Table 1

School A				School B			
Exp.		Cont.		Exp.		Cont.	
Pre	Post	Pre	Post	Pre	Post	Pre	Post
14	29	5	14	14	18	15	17
18	25	17	20	17	21	2	16
28	29	16	23	26	30	8	[illegible]
11	16	17	23	24	27	11	9
13	17	14	17	15	28	16	15
5	19	15	25	9	16	18	17
3	27	15	25	7	10	10	10
23	22	18	15	8	10	25	24
26	27	17	26	9	22	22	24
23	30	9	12	8	10	13	18
14	25	14	17	4	18	22	24
13	30	23	24	15	27	19	23
7	21	17	24	11	11	3	11
16	21	20	27	16	22	13	19
15	21	12	16	11	11	14	19
21	24	18	21	14	22	11	21

Table 2

School C				School D			
Exp.		Cont.		Exp.		Cont.	
Pre	Post	Pre	Post	Pre	Post	Pre	Post
17	14	12	15	14	19	20	21
17	19	17	27	12	14	9	12
13	19	16	18	15	23	20	21
10	20	16	15	15	16	9	13
9	20	9	15	12	15	15	20
9	21	8	12	11	16	16	15
12	21	9	9	12	16	16	14
13	22	7	11	18	21	16	17
14	19	12	27	15	18	15	16
12	14	16	28	19	17	14	13
15	23	10	12	9	16	11	19
5	16	8	12	19	17	12	22
12	15	17	14	12	15	14	28
11	20	17	19	17	27	17	11
12	16	13	9	16	28	18	27
18	21	10	20	19	15	17	21
15	18	9	20	8	12	12	22
9	13	9	11	19	29	9	13
9	16	12	21	17	11	18	25
9	17	13	22	17	27	14	16

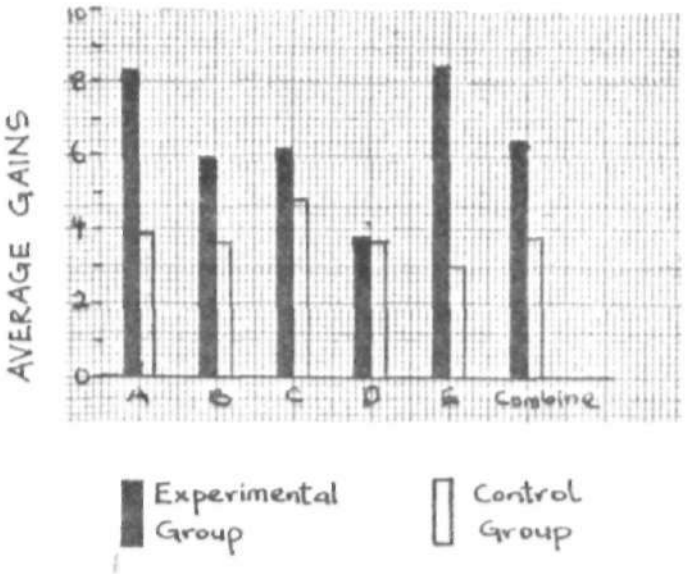
Table 3

School E			
Exp.		Cont.	
Pre	Post	Pre	Post
4	28	17	21
11	18	10	16
7	14	6	11
13	15	11	16
10	12	9	14
6	24	16	23
16	18	9	12
13	25	12	17
10	15	8	13
11	14	18	21
13	29	18	17
9	25	12	12
21	27	4	12
9	16	9	14
18	25	13	12
11	19	12	16
16	19	9	11
6	26	10	13
16	29	14	10
12	22	14	10
10	16	9	3
12	19	15	18
17	17	11	17
14	16	11	21

APPENDIX G

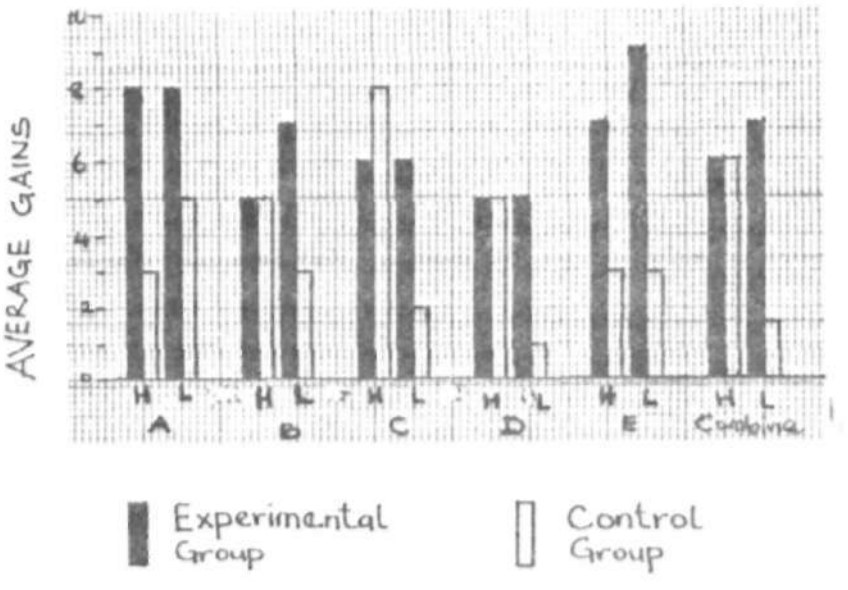
Graphical Representation of Data

a



Comparison of mean gains made by experimental and control groups.

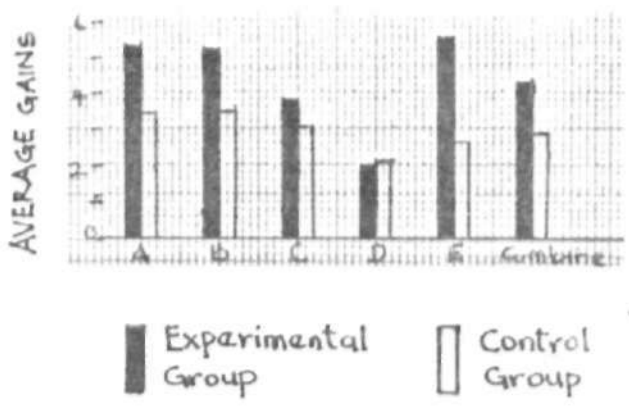
b



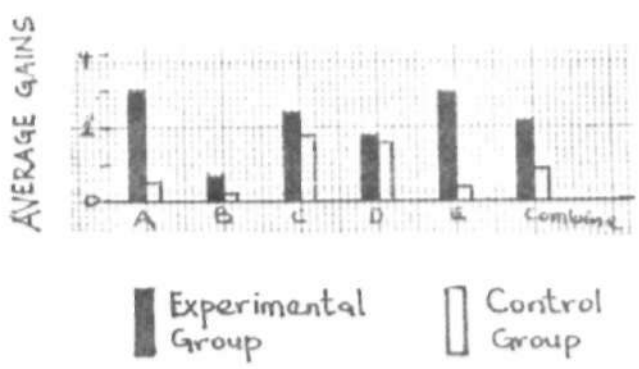
Comparison of gains made by high and low performance level.

APPENDIX G

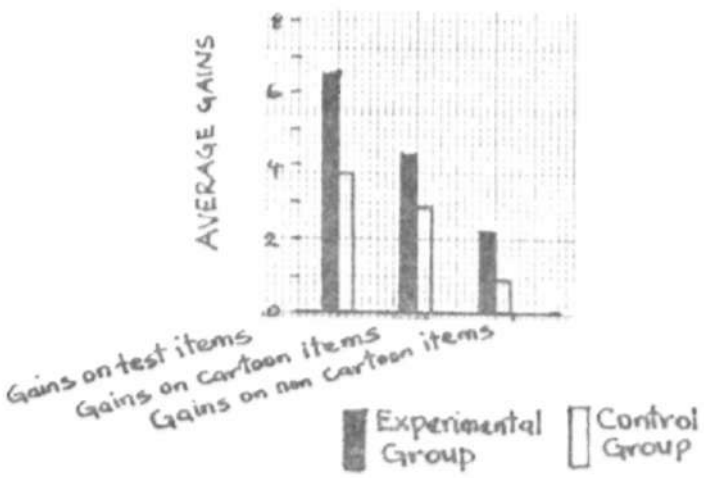
Graphical Representation of Data



Gains on Cartoon- unit items



Gains on non cartoon items



Comparison of gains made by Experimental and Control group in the combined school.