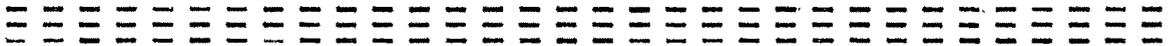


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 \*\* CHAPTER : IV \*\*  
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DEVELOPMENT OF THE INSTRUCTIONAL COMPONENTS



In chapter III is discussed in brief, the various instructional components used for this study. This chapter aims at presenting details of the procedural steps taken in the development of the components. It may be recalled here that this investigation is aimed at studying the relative effectiveness of the two media against the conventional teaching. For this purpose, a content unit had been selected and presented through the alternate media under study. It logically follows therefore, that software material for the content unit be developed and presented through the different media. The design of the study demanded that a pre pre-test, a pretest and a post-test on the unit to be developed. This chapter is presented as two sections, discussing respectively development of software material and development of tests.

I DEVELOPMENT OF SOFTWARE MATERIAL :

The first task was to select a unit, from the

history syllabus prescribed for the high schools for the purpose of developing programmed filmstrips. The proper persons to select the appropriate unit would be the teachers in the schools who were handling the subject. Usually three graduate history teachers are available in each school. A team of three history teachers was selected on the basis of their experience and they formed a panel. The panel was requested to make a selection. They analysed the syllabus and finally recommended that the unit "Buddhism and Jainism" be programmed for standard X. The following were the reasons for the choice of the unit. The government of Tamilnadu was proposing to introduce cultural history as a subject of study in the higher classes. Accordingly, the draft syllabus was prepared and circulated among the teachers to give a final shape to the higher secondary school syllabus through the incorporation of appropriate suggestions and opinions. Teachers too <sup>were</sup> was being trained for teaching the course effectively. The panel of teachers appointed for the purpose of selecting a unit for programmed filmstrips for the present study chose Buddhism and Jainism, since, according to their considered opinion, these topics of study contributed much to the development of the knowledge of the culture in India. They thought that such filmstrips would be ~~of great use~~ of great use to the teachers and pupils. Secondly, the pupils found certain areas of history rather difficult to comprehend. Units dealing with religion and

philosophy were uninteresting to them. So the teachers were of the view that interesting methods must be employed for teaching such units. The proposed method of teaching namely, through programmed filmstrip, comprising of pictures, charts and diagrams in combination with the programmed learning were expected to help them learn better. Thirdly the level of learning shown by the pupils who had been taught by the conventional methods of instruction played a prominent role in the selection of the said unit for the preparation of the programmed filmstrips. Appropriate treatment of content so as to ensure fulfilment of objectives like development of values and attitudes is often overlooked and only objectives pertaining to the cognitive domain are aimed at. This is because of the manner in which a teacher functions in the present infra structure. The teacher gets only two periods of 40 or 45 minutes duration in a week for teaching history to each class. In those two periods, he is expected to coach the pupils for the examination, cover the syllabus and do all the necessary activities prescribed by the department of education. Naturally, the teachers resort to using the lecture method of instruction which serves to attain only certain objectives like knowledge or comprehension but not those of appreciation. On the contrary, a unit like Buddhism and Jainism has much scope to develop objectives of the affective domain in

the form of receiving, responding, valuing, organising and characterisation. It may be expected that lessons which contain a series of colourful pictures and interesting events often help the pupils to appreciate the character of the person about whom they study. The panel thought that the unit Buddhism and Jainism needed such a treatment and so recommended it. Filmstrips on this topic no doubt are available for purchase. However, they are far from working as planned instructional material showing temples, monuments and the ways of worship, these filmstrips serve only as instructional aids, giving a visual dimension to the content being communicated. Thus, their use is limited and in the present set up it would be waste of time if employed in classroom instruction. What then is needed is instructional materials planned, developed and sequenced in a systematic manner to achieve set objectives. And this is what is attempted through the present study.

COURSE CONTENT :

The next step was to analyse the unit chosen into subunits and topics. This was done with a view of presenting the materials in a meaningful logical and organised manner. The following subunits were developed after referring to the textbooks and reference materials.

BUDDHISM :

SUB UNITS :

- 1. Causes for the rise of Buddhism.
- 2. The career of Buddha
- 3. The teaching of Buddha
- 4. The causes for the spread of Buddhism
- 5. The causes for its decline
- 6. The contributions of Buddhism

JAINISM :

- 1. The founders of Jainism.
- 2. Parswanatha and his techings
- 3. The causes for the rise of Jainism at the time of Mahaveera.
- 4. The career of Mahaveera
- 5. The teachings of Mahaveera
- 6. The causes for the spread of Jainism
- 7. The causes for its decline
- 8. The contributions of Jainism.

CONTENT ANALYSIS :

After dividing the unit into sub units, available facual information was gathered for each subunit. Out of

the materials gathered, relevant and important aspects were retained and tables were prepared to indicate the coverage.

For the sake of convenience each part was split into two lessons. The sub units were classified accordingly. Thus Buddhism part I was allotted the three sub units - the causes for the rise of Buddhism, the career of Buddha and the teachings of Buddha. Buddhism Part II comprised the subunits - the causes for the spread of Buddhism, the causes for its decline and the contributions of Buddhism. Similarly, Jainism was divided into two lessons, part I containing the subunits, the founders of Jainism, the career of Parswanatha, the career of Mahaveera, and the teachings of Mahaveera, and Part II contained the remaining subunits, the causes for the rise of Jainism, the causes for its spread, causes for its decline and the contributions of Jainism. Table 4.1 to 4.4 show what information is covered in each subunit.

TABLE No. 4.1

CONTENT COVERED UNDER BUDDHISM PART : I

S.No.	Sub Unit covered	Content covered
1.	The causes for the rise of Buddhism	1.1 Animal Sacrifice 1.2 Rigid caste system 1.3 Rituals in Brahmanism 1.4 The scriptures were in Sanskrit
2.	The career of Buddha	2.1 The place of his birth 2.2 His parentage 2.3 His unhappy childhood though brought up in luxury 2.4 His marriage 2.5 His reaction to the sight of human suffering 2.6 His renunciation 2.7 His failure to find happiness through penance 2.8 His enlightenment 2.9 His title 2.10 The Buddhist sangam 2.11 His love for humanity 2.12 His death
3.	The teachings of Buddha	3.1 The four fold truth (i.e.) a) Life is full of misery b) Desire is the cause of misery c) Misery can be avoided d) Desire can be avoided by following the eight fold path  3.2 The eight-fold path 3.3 He did not preach to go to the extremes 3.4 His belief in the doctrine of Karma. 3.5 His doctrine of Non-Violence 3.6 The way to attain salvation 3.7 His refusal to accept caste system 3.8 The right conduct code 3.9 His silence about God

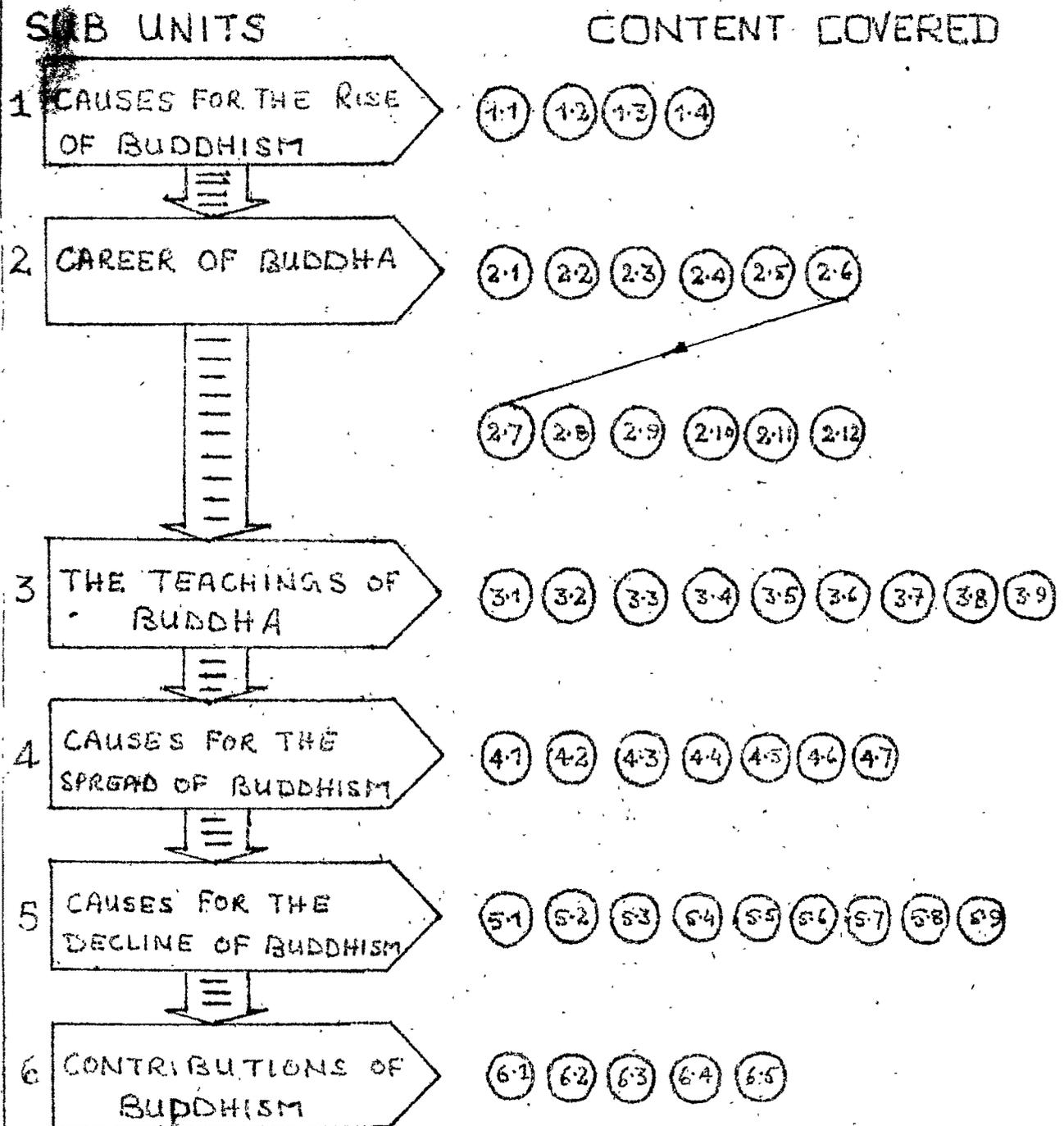
Ref to Chart : I

TABLE No. 4.2CONTENT COVERED UNDER BUDDHISM PART : II

<u>S.No.</u>	<u>Sub Unit covered</u>	<u>Content covered</u>
4.	The cause for the spread of Buddhism	4.1 The personality of Buddha 4.2 The work of the Buddhist Sangam 4.3 Royal Patronage 4.4 The missionary activities of the monks. 4.5 The work of the Buddhist Council 4.6 Buddha's refusal to accept caste system. 4.7 His preaching in Pali language
5.	The causes for its decline	5.1 Luxury in the monasteries 5.2 The split in Buddhism 5.3 The Development of the Trantric cult in Buddhism 5.4 Its acceptance of Sanskrit 5.5 Its acceptance of rituals 5.6 The loss of royal patronage in later years. 5.7 Revival of Hinduism under Sankhya 5.8 The rise of the Rajputs 5.9 Muslim invasion.
6.	The contribution of Buddhism	6.1 Architecture 6.2 Nalanda University 6.3 Ajanta paintings 6.4 Classical literature in Tamil 6.5 Our National emblem, flag and the policy of Panch Sheela

Ref to Chart : I

# CHART 1 BUDDHISM COVERED IN SIX SUB-UNITS



VIDE: TABLES 4.1 AND 4.2

TABLE No. 4.3

CONTENT COVERED UNDER JAINISM PART : I

S.No.	Sub Units covered	Content covered
1.	The founders of Jainism	1.1 Jainism founded by Adinatha 1.2 24 Thirthankaras or saints 1.3 Each Thirthankara is recognised by his special symbol.
2.	The career of Parswanatha	2.1 Parswanatha the 23rd Thirthankara 2.2 He lived in the 8th Century B.C. 2.3 He was a prince who renounced his luxury for the salvation of people 2.4 His followers were called Swatambaras 2.5 Swatambara means white-clad 2.6 Histeachings (i.e.) <ol style="list-style-type: none"> <li>1. Do not kill</li> <li>2. Do not tell lies</li> <li>3. Do not steal</li> <li>4. Do not accumulate wealth</li> </ol>
3.	The career of Mahaveera	3.1 Varthamana Mahaveera was 24th Thirthankara 3.2 His place of birth 3.3 His perentage 3.4 His marriage and renunciation 3.5 His attainment of enlightenment 3.6 His death 3.7 The place of his death
4.	The teaching of Mahaveera	4.1 The three jewels 4.2 Penance to control the senses 4.3 His rejection of animal sacrifice 4.4 His insistance on complete renunciation 4.5 His doctrine of life in every object 4.6 His faith in the doctrine of Karma 4.7 His belief in final salvation 4.8 Worship of Thirthankaras 4.9 Abolished caste system and rituals.

Ref. to Chart : II

TABLE No. 4.4.

CONTENT COVERED UNDER JAINISM PART:II

<u>S.No.</u>	<u>Sub Units covered</u>	<u>Content covered</u>
5.	Causes for the rise of Jainism	5.1 Animal sacrifice 5.2 Caste system 5.3 Rituals in Brahmanism 5.4 Religion of Parswanatha was not satisfactory 5.5 Scriptures were in Sanskrit
6.	Causes for the spread of Jainism	6.1 The royal blood of Mahaveera 6.2 Royal Patronage 6.3 The administrative ability of Mahaveera 6.4 He preached in the people's Language. 6.5 The missionary activities of the monks.
7.	Causes for its decline	7.1 The split in Jainism 7.2 Extreme penance advocated by Mahaveera 7.3 Extreme non-violence 7.4 Rivival of Hinduism by Appar 7.5 The Muslim invasion
8.	The contribution of Jainism	8.1 Cave temples 8.2 Vegetarianism 8.3 Literature 8.4 Sculpture 8.5 Detached life of people

Ref. to Chart : II



TASK ANALYSIS :

All the learning activities that the pupils had to perform while they were exposed to the programmed film-strips were listed and analysed. While doing the task analysis, the programmer had before him all the behavioural outcomes and introduced suitable activities into the programme which would facilitate the achievement of identified behavioural outcomes. (Detailed discussion appears later in this section). As mentioned in the earlier chapter, out of six objectives the first four namely Knowledge, Understanding, Application, and Skill were selected as the instructional objectives for the unit Buddhism and Jainism. Charts 1 and 2 show how the development of units, was planned.

TARGET POPULATION :

An important consideration which governed the development of instructional material for the present study was the characteristics of the target population. They were adolescents. Further, according to the concentric pattern of the syllabus organization, the target group ~~is~~<sup>was</sup> at the third cycle. At this stage, teaching should involve more of reasoning on the part of the learners. This necessitated that instructional material to be presented vividly so that the "why" of

things received adequate and appropriate attention.

ENTERING BEHAVIOUR :

Before the introduction of any new instructional material, the entering behaviour must be clearly assessed and the terminal behaviour must be identified. When the entering behaviour is known clearly; suitable learning experiences could be provided accordingly to make the learner acquire the designed learning outcomes. The pupils would surely possess some background knowledge about the subject matter taught. It could be measured by the pre-tests administered before the actual conduct of lessons. The basic requisities for learning the particular unit introduced through the programmed filmstrips are listed here under.

1. The pupils must be able to read and write Tamil as the programmes were prepared in Tamil.
2. They must be familiar with the objective type of testing as the pre and post-tests were developed in that pattern.
3. They must have the basic, knowledge of Jainism and Buddhism as reform movements of Hinduism in the 6th century B.C.
4. They must be able to do map reading.

TERMINAL BEHAVIOUR :

The terminal behaviours aimed at under each unit pertained to knowledge, understanding, application and skill. These behaviours are summarised here.

KNOWLEDGE :

1. The pupil must be able to recall the facts, terms, events, personalities and chronology specified in tables 4.1 to 4.4.
2. He must be able to express his acquisition of knowledge orally or in writing.

UNDERSTANDING :

The pupils must show their understanding of facts, terms, events, chronology and personalities as specified in tables 4.1 to 4.4 in any one of the following ways :

1. By being able to discriminate from multiple answers, the appropriate answer.
2. By comparing and contrasting the two said religions.
3. By identifying the relationship of the said religions with the present day life.

4. By giving suitable illustrations to the facts acquired.
5. By interpreting the events, trends etc.

APPLICATION :

The pupil must be able to use his acquired knowledge in new and unfamiliar situations.

1. By recalling relevant data in solving problems.
2. By analyzing the problems at hand and drawing inference from them.

SKILL :

1. The pupil must be able to mark the information given, on the map or the timeline provided, at the appropriate places.
2. The pupil must be able to prepare maps, and charts by himself.

The pre and post tests which were meant to measure the above mentioned terminal behaviours are reported in detail, later in this chapter.

FORMAT AND STYLE :

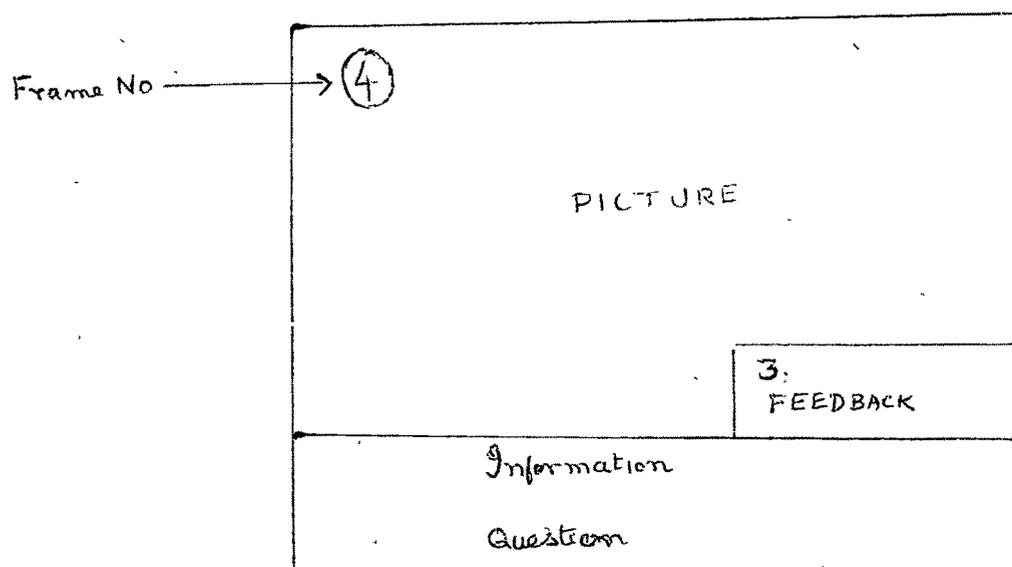
Programmed materials naturally provide scope for correction of individual errors by immediate feed back,

through discussion in clear terms. However, for the present study, since group pace was intended and maintained, the style of presentation was basically linear and the correct answer to a frame was provided in the succeeding frame which could be verified against the answers written in the record sheet by the pupil himself.

FRAME COMPONENTS :

Each frame in the programmed filmstrips consisted of five components namely ?

- a) Frame number which is found in the top left corner of the frame.
- b) Picture or chart or map to explain the information provided.
- c) The answer to the question of the previous frame, recorded in the bottom right corner of the picture.
- d) Segment of information explaining the matter contained in the picture, chart or map.
- e) Challenge in the form of a question.



The frames were referred to by their number indicated at the top left corner. The second component consisted of a picture or chart or map to explain a segment of information. The same matters were explained in written words at the bottom of the frame. The next component was a challenge in the form of a question. Immediate feedback was provided at the bottom right corner of the picture. The answer to the previous frame was recorded in each frame so that the pupil could verify it with his own answers recorded in his record sheet. (Vide appendix C and D).

#### FRAME STRUCTURE :

In this investigation the term "frame structure" has been used to mean the specific types of questions included in the frames of the programme. Usually the

linear programmes adopt the completion type of question because of the assumption that students learn better if they construct their own answers instead of choosing the right one from the given list of answers. Usually such answers are short, consisting of one or two words. In this study the pupils were not only asked to construct their responses but also to write out answers in correct order in certain forms. Different types of questions were used to provide a variety of learning situations. The following are examples of types of frames found in the programmed filmstrips.

FROM THE PROGRAMMED FILMSTRIP ON BUDDHISM PART I-TYPE  
OF THE RESPONSE REQUIRED :

Short answer type where the pupil is to complete the answer by adding a word.

EXAMPLE : 1

FRAME No. 2

TITLE : Rigid Caste System :

Picture showing the four castes and the lower caste being illustrated by the highest caste.

INFORMATION : The society was divided into four castes.

The caste system was rigid. Brahmins claimed that they alone could attain salvation and not any other caste. Other castes were looked down upon.

CHALLENGE : The social custom which did not please  
the people was the rigid .....

ANSWER : Caste system

---

After covering the first sub-unit "the causes for the rise of Buddhism the pupil is tested in the succeeding frame which is called the testing frame.

EXAMPLE : 2

FRAME No. 5 of Buddhism Part - I

Some of the following are the causes for the rise of Buddhism. Pick out the correct ones.

1. Animal sacrifice
2. Constant wars between the states
3. Magada become a powerful state
4. Caste system became very rigid
5. Rituals became more important than virtuous life
6. There were many learned men.
7. The Vedas were in Sanskrit.

---

The pupils are asked by the teacher to write out the numbers of the correct answers.

Number 1, 4, 5 and 7 are the correct answers.

EXAMPLE : 3

In certain frames understanding is developed. Understanding the motive behind certain incidents is an important aspect of history. In Buddhism Part I frame 25 such a quality is developed.

TITLE : His last act of love

PICTURE : Showing cooked pork being offered to Buddha by a hunter devotee.

INFORMATION PROVIDED : In 487 B.C. when he was 80, he went through a forest. An ignorant admirer offered him a meal of pork without knowing that Buddha was against the killing of animals. Buddha accepted the offering, as a result of which he developed dysentery and died.

CHALLENGE PROVIDED : Buddha ate the non-vegeterion food offered to him because he .....

The pupils are expected to write a sentence as the answer. The correct answer is that "he did not want to hurt the feelings of his devotee". Such frames develop the understanding of motives; which is one of the essential functions of a history lesson.

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EXAMPLE : 4DEVELOPMENT OF MAP DRAWING SKILL :

In frame No.30 of Buddhism Part, I, is presented a map showing the four important places connected with the life of Buddha. The frame reads as follows.

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EXAMPLE : 5

30 INSTRUCTION : Study the map carefully and make note of the location of places marked.

MAP : Showing the following places.

- |                 |                |
|-----------------|----------------|
| (a) Kapilavastu | (c) Sarnath    |
| (b) Bodh Gaya   | (d) Kushinagar |

CHALLENGE PROVIDED : What makes the above mentioned places important ?

The pupil from his knowledge of the subunit recalls them as the birth place, Place of attaining enlightenment, place where he died. At the same time the pupil is asked to study the locations of the places.

---

In the succeeding frame the same map is presented but the places are marked with numbers only.

31      MAP

CHALLENGE PROVIDED : In the map some places are marked and numbers are marked against them. Can you label them ?

ANSWER :

- |     |     |
|-----|-----|
| (1) | (2) |
| (3) | (4) |

The pupils were to write the names of the places against the numbers indicated.

Some times certain facts which should not be separated must be presented together. This often, would increase the size of the frame. On such occasions even though more than one point is found in a frame all the points indicated in one such frame <sup>form</sup> a configuration. Under such circumstances the fading technique is adopted.

EXAMPLE :

FRAME No. 33

TITLE :      The teachings of Buddha

The four noble truths.

1. Life is full of misery
2. The cause of misery is desire
3. Misery can be averted by killing desire
4. Desire can be killed by following the eight fold path.

CHALLENGE : Why did Buddha call life miserable ?

The answer is oldage, sickness and death. It shows the understanding of Buddhism and its principles. To the average pupil of Tamilnadu answering such a question is quite easy for, the Tamil literature is abundant with Buddhist doctrines. Old age, sickness and death are referred to in a poetic way as "Moopu, Pini, Sakkadu". The pupil is thus given a chance to correlate his knowledge of Tamil literature with what is presented as a challenge in this frame.

Again in frame 33 the key words are underlined. The pupil is made to learn these by heart, through the fading technique. In the succeeding frame they are asked to fill in the blanks :

FRAME : 34

FILL IN THE BLANKS :

1. Life is full of \_\_\_\_\_
2. The cause of misery is \_\_\_\_\_
3. Misery can be averted by \_\_\_\_\_
4. Desire can be killed by \_\_\_\_\_

In the following frame which is frame 35, the pupil is asked to recall the four fold truth.

FRAME : 35

Name the four noble truths.

Thus the gestalt principle is followed whenever possible, to give a whole picture of one whole subsection.

Since Buddhism Part-I was found to be slightly difficult for the pupils to learn, the recapitulatory frames were added at the end to recapitulate the whole lesson unit by unit.

EXTRA FRAME MATERIALS :

The material which was presented between two frames; to provide a connecting link and to make the presentation more meaningful, is referred to as extra frame material. In a lesson like history such materials are found to be necessary to develop understanding and appreciation. The teacher or the operator gave such materials whenever they were needed. The following are some of the extra frame materials offered in the programmed filmstrip Jainism Part-I.

EXAMPLE : 1

PLACE : Between frames 1 & 2

MATERIAL PRESENTED : The Jain statues are represented naked to show complete renunciation. Such monks owned nothing this world.

EXAMPLE : 2PLACE : Between frame 3 & 4

MATERIAL PRESENTED : Lotus is the symbol of holiness and is found in all Thirdankaras' statues. Find out the special symbol of Rishaba Deva. Rishaba means bull. After such extra frame materials the pupils easily identify the symbol of Rishaba Deva in frame - 4.

RESPONSE MODE : In each medium, the pupils were made to write the answer to each frame challenge on a scoring sheet meant for this purpose. Care was taken to discourage the overt verbal expression of answers since it affected the performance of the group.

FRAME SIZE :

One of the major principles of linear programming was to make the frame as small as possible. Had the subject matter been entirely new to the pupil, the principle of small steps would have been very effective. When he had some background knowledge, that knowledge, must be made full use of, in acquiring more knowledge of facts, dates etc. Under such circumstances, the frame size need not be small. When the programme was first prepared, the steps were very small. Frequent tryouts showed that

the size of each frame could be increased and so some frames were increased in size. The following is an example of an easily learnable but apparently big frame from Buddhism Part I.

FRAME : 23

TITLE : The names of Buddha

His original name was Siddhartha. His family name was Gauthama. After enlightenment he was called Buddha. Because he belonged to the sakya clan he was called Sakyamuni.

CHALLENGE : What is the meaning of the name Gauthama Buddha ?

The answer is Gauthama the enlightened one. The pupils seldom went wrong as they knew that the term Buddha meant "the enlightened one".

PROMPTS :

The principle of prompting was employed in frame writing with a view to helping the pupils arrive at the correct answers for the questions asked in the frames, with greater surety. The following is an example of a prompt in the programmed filmstrip.

JAINISM PART IFRAME NO. 32

Because of complete detachment, the Jain monks live without clothes. They are called Digambaras or Sky Clad monks.

CHALLENGE : What is meant by the term Digamabara ?

ANSWER : Sky Clad. Since prompting was done by underlining the term, arriving at the correct answer was easy for the pupils.

FRAME SEQUENCE :

For effective learning the frames had to be arranged in logical sequence. In history, the textbooks are always written in the chronological order. Though chronology is important in history, still the history teacher has to group the facts in such a way as to ensure better learning. In other words, the teachers has to adopt the psychological order. According to the logical order the lesson an Buddhism must begin with the causes for the rise Buddhism and go on to the career of Buddha. The teachings of Buddha, its rapid spread etc. are all to be found in the career of Buddha. But in the programmed filmstrips the facts are weeded out and presented in separate meaningful groups. The causes for the rise of Buddhism form one distinct group. It is followed by the

career of Buddha from his birth to his death. But his character and teachings are left out. After mastering the sub unit "the career of Buddha" the pupil passes on to the teachings of Buddha which are presented as an organized "whole" in one unit. In fact, the pupil studies about Buddha's teachings after studying about his death. Similarly in Jainism Part I the founders of Jainism forms the first sub unit, for, Jainism is an ancient religion that existed even before Mahaveera. In Jainism part II, the causes for the rise of Jainism are given. It actually means the causes for the rise of the branch of Jainism, formed by Mahaveera. Thus while organizing the subunits the matter was arranged in a psychological way. The frames were organized in order to lead the pupil from one concept to another in a smooth and effective way.

#### PREPARATION OF PICTURES :

In the early stages of the development of programmed filmstrips the information part of the programme was developed. The programmes were scrutinized by the teachers of history and based upon their suggestions, changes were made. Most of these changes were made with regard to the language, and the way of presenting facts. After scrutiny the frames were rewritten and essential charts, pictures and diagrams were prepared and added to the frames. The programme had a few and maps. They were presented to a group of B-Ed. students who viewed the programmes in

order to suggest improvement. Based upon their suggestions, modifications in the size of steps, alternation and in the pictures/modification of charts were made.

At the next stage the artist drew pencil sketches in sheets of white paper of the size 12" x 5". Three inches of space was left at the bottom for writing the information. The programmes were presented to a group of teachers trainees and their responses studied.

At this stage the programmes were only in paper and were not converted into filmstrips. For the purpose of tryout, the programmes were presented to a group of 20 Std. X pupils from a city school. They were provided with scoring sheets and the programmes were projected on the screen with the help of an epidiascope. The answers recorded by the pupils for each challenge were scrutinized at the end in order to make suitable alterations. The doubts expressed by the pupils were taken note of. Most of these doubts were about the language, for, the expression was not clear. Modifications were made in the light of major comments.

In the next try out, the pictures were completed by the artist and the script was written in clear bold letters. The programmes which were on sheets of paper were presented to another group of 20 pupils. The number was limited to 20 because of the space available in the

room, provided for screening the programmes. The pupils were expected to score correctly on 90% of the frames. When this was achieved the paper programmes were converted into programmed filmstrips. For converting them into filmstrips four 100 watts bulbs were used to provide the necessary light and a single lens reflex 35 mm. Camera was fixed on a stand to Photograph the frames. The exposure was kept constant at 1/25 of a second of f 16. The diaphragm was cut to f 16 for greater clarity while blowing the picture into huge size before the class. The negatives were developed and positive prints were taken. The positives were than bleached in pottassium - ferri-cyanide solution and were given beautiful sepia toning. They were then coloured with transparent colours by the artist. Colour photographs were not taken because of the expenses involved. (Vide appendix C & D).

THE FINAL TRYOUT :

The four programmed filmstrips developed on the Unit Buddhims and Jainism contained the minimum number of frames to master the subject matter presented. The required minimum was decided by splitting certain frames and by clubbing together certain other frames and it was the direct consequence of the previous try outs on teachers, teacher trainees, and school pupils. In the

final form, the programmed filmstrip on Buddhism I. contained 54 frames, Buddhism II 38 frames, Jainism I 44 frames and Jainism II 39 frames. All the four filmstrips were on the linear style though not on strictly Skinnerian style. The final tryout had to be conducted to determine the following :

1. The minimum time required for each programmed filmstrip.
2. To find out the error rate of the pupils in the filmstrips that had reached the final form.

To find out the above mentioned two factors a trial was conducted on another batch of 20 pupils. Each pupil was given a scoring sheet and an outline map. The frames were projected one by one on the screen and the details were explained by the teachers wherever necessary. The pupils recorded their answers in the score sheets provided. At each step the teacher asked the question "shall we proceed to the next frame"? If all the 20 pupils said yes, he proceeded to the next frame. Even if one pupil said "no" he waited. The total time taken to learn each lesson through the programmed filmstrip was thus measured. The details about each filmstrip, including the minimum time needed, are presented in table 4.5. The error rate was computed and it was found that they all passed the 90/90 criterion. The details are shown in table 4.6.

TABLE No. 4.5TABLE SHOWING THE DETAILS OF THE FILMSTRIPS

S.No.	Topic	Sub Units Covered	No.of Frames	Style	Time needed
1.	Buddhism (Part I)	1. Causes for the rise of Buddhism. 2. Career of Buddha 3. Teachings of Buddha	54	Linear	28 minutes
2.	Buddhism (Part II)	1. Causes for its spread 2. Causes for its decline 3. Its contribution	38	Linear	20 minutes
3.	Jainism (Part I)	1. The founders of Jainism 2. Parswanatha & his teachings 3. Career of Mahaveera 4. Teaching of Mahaveera	44	Linear	25 minutes
4.	(Jainism (Part II)	1. Causes for the rise of Jainism 2. Causes for its spread 3. Causes for its decline 4. Contributions	39	Linear	20 minutes

Vide Appendix "D".

TABLE No. 466

Table showing the error rate in the final try out

S.No.	Name of the lesson	Success of pupils in each frame		
		90% success Frame Number	90% success Frame Number	100% success Frame Number
1.	Buddhism Part I	23, 29, 31 33, 39, 42	6, 15, 30 38.	The remain- ning frames
2.	Buddhism Part II	28 only	7 and 29	-do-
3.	Jainism Part I	3, 18, 24 26.	1, 6, 11, 14, 28, 34.	-do-
4.	Jainism Part II	10 and 16	19 only	-do-

II DEVELOPMENT OF TESTS :

(A) DEVELOPMENT OF PRE PRETEST :

Usually, the experimental studies are conducted matched or equated groups. Matching in this study was done on the scores obtained by the pupils on an achievement test in history. This test is referred to as the pre pre-test in this study. (Appendix : A)

To construct the pre-pretest, the investigator collected the test items from the school tests which were conducted earlier. Such papers were gathered from a few schools and the questions that would cover the first two months' portion in the syllabus of Std. X were identified. The apanel of three history teachers referred to earlier, selected the test items and a test paper consisting of 40 questions was constructed. To find out its efficacy, it was administered to a group of 10 pupils of std. X. The questions which were answered correctly by at least 80% of the sample were chosen. 23 items were chosen including a map question and a short answer question. The other 21 questions were one-word answer questions of the simple recall type. The maximum marks fixed for the test was 50. This test was used as thepre pre-test in all the schools where the experiment was conducted.

(B) THE DEVELOPMENT OF PRE/POST-TESTS :

The purpose of the experiment was to measure the gain made by the pupils on knowledge, understanding, Application and skill in the four lessons taught during the experiment. The gain was measured by measuring the pupils' background knowledge of the subject before the commencement of the experiment and their knowledge of the same after the experiment. The same test was used on both occasions. The tests administered before and after the experiment <sup>are</sup> referred to as the Pre/Post-tests in this study. The same test was used to measure the delayed retention after the lapse of four weeks. Used at that stage, the test was called the delayed retention test.

There were four lessons to be taught in the unit Buddhism and Jainism. So four Pre/Post tests were developed on the following lines.

Tyler (1931) has listed steps for the construction of achievement tests. The following steps listed by him were adhered to, while constructing the pre/post tests for the four lessons. They were :

1. Formulation of the course objective
2. Defining each objective in terms of pupil behaviour

3. 3. Collection of situations in which the pupils will reveal presence or absence of each objectives.
4. Presentation of situations to the pupils.
5. Evaluation of pupils' reactions in the light of each objective.
6. Improvement of objectivity when necessary
7. Determination of the reliability of the test.

WEIGHTAGE GIVEN TO OBJECTIVES :

The guide lines for the objectives of teaching history in Tamilnadu were provided by the department of secondary education through its wing, the state Council of Educational Research and Training. Teachers were trained and guide books were distributed to the schools to improve the instruction in schools. Following the guidelines suggested by the S.C.E.R.T., (Lawrence 1969), four major objectives of teaching history which could be measured, were chosen. These were (1) Knowledge (2) Understanding (3) Applications and (4) Skill. The following were the maximum scores allotted for each objective in each test.

1. Knowledge	20 Marks
2. Understanding	10 Marks
3. Application	10 Marks
4. Skill	<u>10 Marks</u>
Total	<u>50 Marks</u>

For the four lessons four tests were developed. each test was given the same weightage for each of the four objectives ( vide Appendix : B ).

THE OBJECTIVES AND THEIR SPECIFICATIONS IN TERMS OF PUPILS BEHAVIOUR :

The four objectives mentioned earlier were divided into specifications of pupil behaviour in order to measure them through suitable test items. The following table 4.7 shows the specifications.

TABLE No. 4.7

TABLE SHOWING THE OBJECTIVES AND SPECIFICATIONS

Objective	Specification	Measurement
1. Knowledge	1. Recall	1. Simple recall test
	2. Recognition	2. Multiple choice test
2. Understanding	1. Discrimination	1. Chooses the most correct answer from the list
	2. Transforms	2. Says the same in other words.
	3. Classifies	3. Groups the knowledge acquired under proper headings
	4. Identified the under currents	4. Compares and finds out the relationship
	5. Compares and contasts	5. Compares two situations to find similarities and difference.
	6. Give examples	6. Illustrates his knowledge with examples.
3. Application	1. Solves problems using the acquired knowledge	1. A problem situation is presented
	2. Recalls rele-vent data	2. The acquired knowledge is made use of in new situations
	3. Suggests situations	3. Suggests ways of solving problems
4. Skills	1. Map making	1. Makes maps
	2. Drawing	2. Draws charts, time lines etc.

In the four lessons the above mentioned objective were measured through objective tests which are explained in detail in what follows.

DEVELOPMENT OF THE TEST ITEMS :

After determining the objectives and listing their specifications a number of test items were collected by the investigator. Brochures published by the S.C.E.R.T. (Lawrance 1969) N.I.E. (Dave 1969) and N.C.E.R.T. (Aiya 1970) were consulted and the test items prepared for the school use by the teachers were also gathered. Test papers consisting of 67 items for Buddhism I, 55 items for Buddhism - II, 56 items for Jainism I; and 58 items for Jainism II were gathered.

The collected test items were tested to find out their difficulty value. The testing was done by administering those, items to a group of 50 pupils from one of the schools in the city of Madras. In the experiment the groups were to be compared with each other, and so the norm reference type of validation was made use of. The item analysis techniques (Stodola and Stordalil 1972) was used and the difficulty value of each item was found out. Out of the whole set of questions those that were of the average difficulty value were selected for the test papers. The final test papers consisted of the following number of test items. ( vide Appendix : B)

1. Buddhism Part I - 32 items
2. Buddhism Part II - 22 items

3. Jainism P-art I - 25 items
4. Jainism Part II - 22 items

The maximum score for each test was 50 marks.

SAMPLE TEST ITEMS FOR EACH OBJECTIVES :

The test items were meant to measure the pupil's gain in the four objectives selected. The following are some of the sample items for each objective.

1. OBJECTIVE : KNOWLEDGE : Specification : Recall  
TEST PAPER : Buddhism Part I item No.1

1. What were the causes for the rise of Buddhism ?

The pupils were expected to record their answers in the blank space provided in the test paper. They were to record four reasons and four marks were allotted for this item.

The objective knowledge was given a weightage of 20 marks in each of the four test papers (vide appendix 2)

2. OBJECTIVE : UNDERSTANDING :

Understanding involves not only recalling of facts, terms etc. but also comparing, weighing and analysing them in order to find out their relevance to the situation. The following are examples of some of the test items under the objective understanding.

902

TEST BUDDHISM PART : I :

ITEM No. 11

OBJECTIVE : Understanding

SPECIFICATION: giving examples

DIRECTIONS : Put a / marks against the answer you think is correct.

Buddha never claimed to have seen that he had not seen. An example for this is :

1. He renounced his princely life
2. He did not say anything about God
3. He performed penance
4. He preached in the Pali Language.

The second choice or alternative is the correct answer. Though Buddha did all the four things stated, a proper understanding of his silence about God would make the pupil choose alternative No.2 as the correct answer.

The objective understanding was given weightage of ten marks in each of the four test papers.

3. APPLICATION :

If the pupil had understood the terms, concepts, and facts, he must be able to apply the acquired knowledge in

new situations. For that, hypothetical situations were presented and the pupils were made to react to the situations thus presented. The following is an example.

TEST : Buddhism Part II

OBJECTIVE : Application

SPECIFICATION : The pupil applies his knowledge to new situation.

DIRECTORS : As a leader of a group of Buddhists you colonise an island. You have to develop different industries for your followers. Put a ✓ against FIVE occupation you would encourage them to do.

- |                 |                       |
|-----------------|-----------------------|
| 1) Printing     | 6) P-reserving meat   |
| 2) Spinning     | 7) Photography        |
| 3) Fishing      | 8) Pearl fishing      |
| 4) Baking bread | 9) Distilling alcohol |
| 5) Hunting      | 10) Agriculture.      |

8 If the pupil understands that the cardinal doctrine of Buddhism is love for all beings he would choose the trades which involve ~~to~~ killing.

The objective application was given a weightage of ten marks in each of the four test papers.

4. SKILL :

Through the study of history skills like map making and chart making are developed. The following is an example of a test item to measure the skill of the pupils.

LESSON : Buddhism Part I

ITEM No. 32

OBJECTIVE : Skill

SPECIFICATION : Drawing a time line

Draw a time line and mark the following events.

1. Buddha's birth
2. His Marriage
3. His renunciation
4. His enlightenment
5. His death.

The skill is measured by following the chronology of events, distance between the events, and the way of presenting the time line.

In each of the test papers, the objective skill was given a weightage of 10 marks.

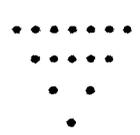
ESTABLISHING RELIABILITY OF THE TEST :

One important characteristic of a good test is its reliability. The reliability of the four tests was determined by administering them to a group of 50 pupils belonging to one section of Std. X. And the scores were tested by the split-half method. Each test was divided into two equivalent halves and the correlation was found for these two half tests. From the reliability of the half test, the self correlation of the whole test was computed by using the spearman-Brown prophecy formula. The correlation arrived at where as follows :

- Buddhism I = .6
- Buddhism II = .68
- Jainism I = .56
- Jainism II == .73

All these correlations were above .372 and so were interpreted as being reliable at .01 level according to correlation co-efficient tables.

This chapter has presented details regarding the development of instructional components and tests used for the study. Methodological details regarding the conduct of the experiment are presented in the chapter to follow.



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 \* CHAPTER : IV \*  
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