

Thinking of Programmed Instructional Design: Need of Today's Learner

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Abstract: This article stresses on adopting appropriate instructional design for providing learner, experiences and organizing teacher pupil activities which is crucial for effective use of curricular content and achievement of curricular objectives. In India programmed instruction is still in its infancy, as regards its classroom use is almost nil. While designing with curricular organization, the curriculum designer should treat teaching learning strategies as an essential component of curricular cycle and while transacting the curriculum, the curriculum practitioner should be consistently conscious about careful selection of appropriate programmed instructional design. It would be imperative that, in spite of the mastery over the content on the part of the teacher, he/she should be appropriately oriented with regard to the importance and various types of instructional design and the principles that should govern their selection and administration. Programmed instruction is a systematic, step by step, self instructional programme aimed to ensure the learning of the stated behavior. It is thought as the way of "growing" or improving instruction. It places the learner at the centre where he himself constructs knowledge rather than passively absorbing it. An individual's knowledge is a function of ones prior experiences, mental structures, and beliefs that are used to interpret objects and events. In some classrooms, the predominant training model is direct instruction which is called instructivism or objectivism(based on information processing theory).The trainers central role is to transmit knowledge to learners and learners role is to absorb information(reception and compliances).the learning experiences in programmed instruction is self corrective. This instruction is an application of the principles of behavior sciences and technology in the field of education. The National Council of Educational Research and Training has done some work, yet the application of Programmed instruction has not shown appreciable impact on our classroom teaching.

Key Words: Branched programme, frames, linear programme, mathematics programme, programmed instruction.

I. Introduction

However, in today's real- world context, the work environment is becoming a learning Environment (learning organization).Learners will not make use of concepts and ideas unless they use them through some type of process, that is, learners master only those activities they actually practice. Both constructivism and instructivism are required as learners need to be able to solve complex problems and be able to understand the reasons or methods they use to reach their conclusions. As a field, instructional design is historically and traditionally rooted in cognitive and behavioral psychology, though recently constructivism (learning theory) has influenced thinking in the field. Behaviorists place "an emphasis on producing observable and measurable outcomes in students" (Ertmer & Newby, 1993). They believe that learning occurs when learners show the correct response to a certain stimulus (Smith & Ragan, 1999). The current instructional design application of behavioral objectives is reminiscent of these behaviorist views. However, most current instructional designers writing objectives based on action do not share the behaviorists' disinterest in the cognitive processes that also take place. Rather, they write objectives with an attempt to extract "best evidence" of the cognitive processes that cannot be directly observed. Programmed instruction owes its origin to the psychology of learning .The psychologist bearing direct relevance to programming is E.L.Thorndike(1874-1949).Other important psychologist who made significant contribution in the field are: Sidney.L .Pressy, Robert .M. Gagne, Robert Mager and B.F.Skinner. "GITA" is the first example of programmed learning.

II. Teaching Instruction and Programme Instruction

Teaching is a broad term and instruction is a purposeful, orderly, controlled sequencing of experience to reach a specified goal. Programmed instruction is a sub-head under instruction and represents a more rigorous attempt to develop a mastery over specialized goals to secure "insured learning".

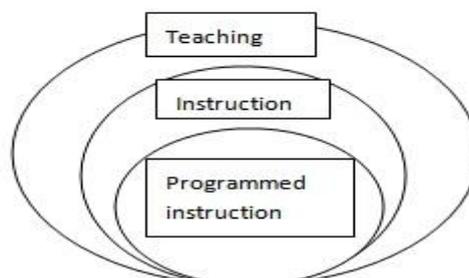
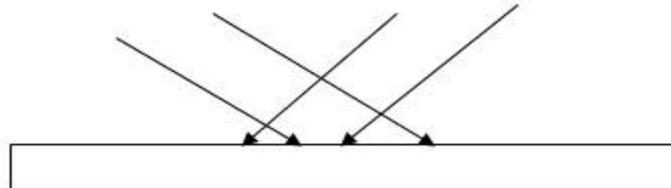


Fig. Teaching, Instruction and Programmed Instruction

III. Programmed Instruction

Programmed instruction or programmed learning is one of the important innovations in the teaching learning process. It is carefully specified, systematically planned, empirically established, skillfully arranged and effectively controlled self instructional technique for providing individualized instruction or learning experiences to the learner. The subject matter or learning experiences is sequenced into small segments. In order to help the learner to give assistance primes and prompts are provided in the introductory frames. Prompts are classified into two types: formal prompt and thematic prompt.

Formal prompt-one of the optical phenomena which can be studied by using rays of light is reflection. Rays of light bounce on certain surfaces



The phenomenon that you see in the figure is called re-----.

Response: reflection.

Thematic prompt -depends on the general properties of the prompting stimulus. It provides a hint.

The ray that is incident on a reflecting surface is called incident ray. The ray which is reflected by the mirror is called-----ray.

Response: reflected

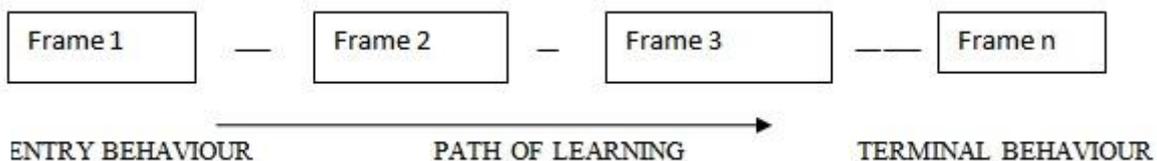
As a result of experimental studies and research there are different types of programmed instructions-

- Linear, Branched and Mathematics Programming- Represents actual basic formats in teaching.
- Rule system of Programming-deductive and inductive approach in teaching. Here a perfect rule works as a stimulus for evoking the responses. This system is just the extension of linear or branched programming.
- Computer assisted instruction and learner controlled instruction-ways and means of providing instruction.

The idea of Programmed instruction is “if a miracle of mechanical ingenuity, a book can be so arranged that only to him who had done what was directed on page one and page two would become visible and so on, that requires personal instruction then the miracle later on becomes reality.” It has exercised a revolutionary impact on teaching learning process. It is the innovative step in direction towards automation and individualized instruction. It may be treated as “software approach” for instructional technology.

3.1 Linear/Extrinsic Programming

B.F.Skinner is the originator, Single track or straight line programme, content is broken into sequence of steps which remain unchanged and presented in a series of small steps (frames), learner respond actively to each frame and immediate reinforcement is given, the programmer sitting at a distant place controls externally the learner’s responses and the learner constructs the response, simple linear machine design, 5% rate of error and helpful in the modification of the behavior of the learner. It depends on the principle of- small steps, active responding, minimum errors, self pacing and knowledge of results.

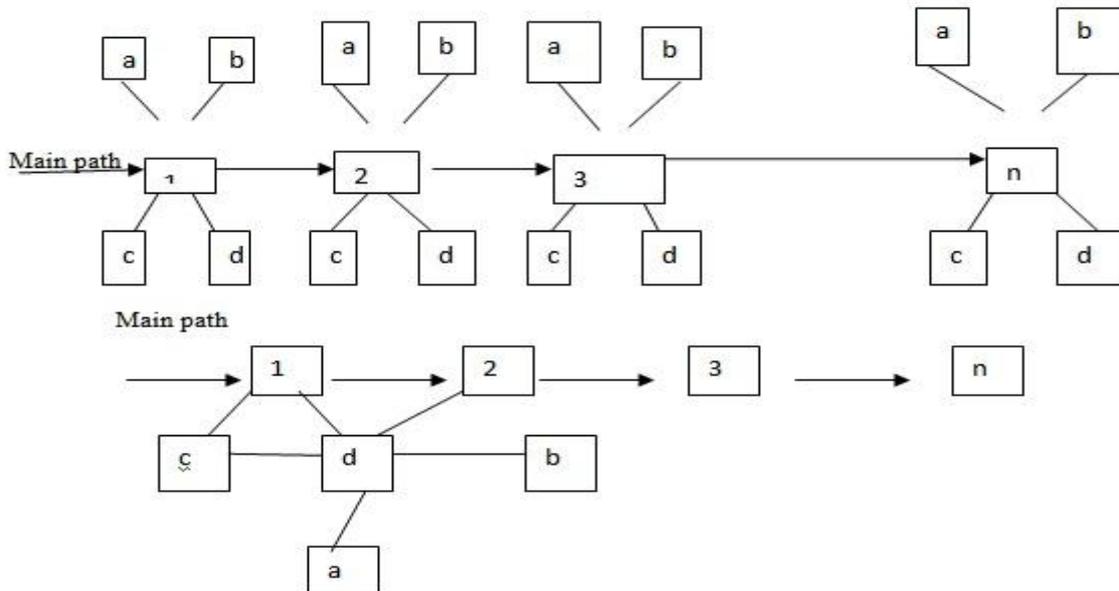


Example of linear programming: The angle having 90 degree is called----- angle. (Acute, obtuse, right, straight angle) Response: right angle

3.2 Branching/Intrinsic Programming

Norman.A.Crowder is the originator, Frame is relatively bigger in size compared to linear programming, it contains two or three related ideas or related sequences, learner has to arrive at the answer by setting the relationship between one idea and the other and by filling up the gaps not fully covered in the frame, it contains multiple choice items where the learner selects the response, it is applicable where the information of broader concepts is to be given and remedial solution

to the difficulties of the learner and rate of error varies according to the programme which is usually 20%, it employs three principles: principles of exposition, diagnosis and remediation, student's learn better if the whole content is exposed, student's errors help in diagnosis and doesn't necessarily hinder learning, student's learn better if the remediation is provided side by side. Frame package is large, may be paragraph or page in frame. Frame structure consists of three aspects- exposition, diagnosis and remediation.



Example: Branched program me in Simple Arithmetic

PAGE1

In a multiplication the two numbers that are multiplied together may be called the “factors” and the result is called the product. Thus in $2 \times 3 = 6$, the numbers 2 and 3 are called factors and the number 6 is called the product. Below you will find a question. Pick what you think as the right answer to the question and go to the page number given against the answer.

The question is: what is the result (product) if 3 is used as a factor twice in a multiplication?

Answer: 6-turn to page 3

Answer: 9-turn to page 5

If you do not understand turn to page 7

PAGE 5

Your answer on page 1 was 9. You are correct. If we use as a factor twice, in a multiplication, we get $3 \times 3 = 9$ as a result. Now, what result would we get if we used the number 2 as a factor three times?

Answer 6-turn to page 4

Answer 8-turn to page 10

PAGE 3

Your answer on page 1 was 6. you seem to have merely used 2 & 3 factors in a multiplication. The problem was to use the number 3 as a factor twice. In other words, we want the result of the multiplication $3 \times 3 = ?$ Now return to page 1 and try again.

PAGE 7

Your answer to page 1 was “I don't understand.” We are asking you what product you get from a multiplication in which you use the number 3 as a factor twice: in other words what is the result of the multiplication in which the numbers that are multiplied together are both 3's? i.e., what is the product of 3×3 ?

Now return to page 1 and choose the right answer, and so on.

Continued

3.3 Mathetics Programming

Thomas.P.Gilbert is the originator; it is the systematic application of reinforcement theory to the analysis and construction of complex behavior repertoires usually known as subject-matter mastery, knowledge and skills. Mathetics if applied diligently produces material that exceeds the efficiency of lessons produced by any known method. It involves task

analysis which may be stated as---description of the task which the learner has to learn, isolation of the required behavior, identification of the conditions under which the behavior occurs and determination and generalization of a criterion of acceptable performance. It involves three principles: Principle of chain, discrimination and generalizations. The prescription helps in learning, mastery steps can be placed anywhere in chain of learning. Reverse-contiguity is helpful for the mastery of the content and completion of task provides motivation to the students. Learning packages are developed in small steps. It provides three types of frames.

Example: Programme- To find the square of 26

Demonstration frame 1. Multiply the first digit 2 by the next higher consecutive number.
2. Write 76 to the right of the result
3. The square of 26 is 676.

Programme - To find the square of 21

Teaching frame 1. multiply 2 by 2.
2. Write 41 to the right of 4.
3. The square of 21 is 441.

Testing frame Programme- what is the square of 25? -----

IV. Specific Skills Needed For the Construction of Programme

- 4.1 Skills needed for the planning stage: skill in writing behavioral objectives, skill in defining entry behavior, skill in content analysis, skill in preparing a criterion test.
- 4.2 Skills needed at writing stage: skill in differentiating the functional and structural ingredients of frames, skill of using primes and prompts skill in ordering and arranging frames in a proper sequence.
- 4.3 Skills needed at revision, editing and testing: linguistic skill, editing skill, skill in individual testing which requires establishing a rapport, skill in obtaining evidence about the worthiness of the programme.

Illustrative Programme: Silent features of the Constitution of India.

In this programme you will find paragraphs which are called frames. Study each frame carefully and write down what is required. Answers are given at the end, after stating the answers, check them, if your answer is wrong or you don't understand anything, you can again go back to the frame. This is not a test but instead it is called as a self- study programme.

Frame 1-The Constituent Assembly of India was set up under the provisions of the Cabinet Mission Plan to frame the Constitution of India which was formally adopted on 26th November, 1949 and came into force on 26th January 1950. It took nearly three years to complete the work.

- What was the work assigned to Constituent Assembly?
- Under whose provision was it formed?
- When did our Constitution come into force?
- When was it adopted?
- How much time did Constituent Assembly take to complete its work?

Frame 2- The Preamble of the Constitution has a great significance but is not a part of the Constitution. The Constitution was framed by the people of India through their representatives. It stresses the fact that the reign of the law lies with the people of India.

- Is the preamble a part of the constitution?
- By who was the constitution framed?
- In whose hands does the reign of law of India lie?

Frame 3- The Preamble of our Constitution is as under: We the people of India having solemnly resolved to constitute India into a Sovereign Socialistic Secular Democratic Republic and to secure to all citizens: Justice, Social, economic and political; Liberty of thought, expression, belief, faith and worship; Equality of status and of opportunity; and to promote them all; Fraternity assuring the dignity of the individual and the unity and integrity of the Nation.

- Who has given the Constitution of India?
- What kind of justice has been ensured by the Preamble?
- What type of Republic is to be constituted?
- What kind of equality has been given to its citizen?

FRAME 4- People themselves adopted and enacted the Constitution. Thus, the representatives of the people frame the laws of the country and they have the power to change or amend the Constitution.

- Who frame the laws of the country?
- Who has the power to amend the constitution?

Answers:

Frame1- To frame the Constitution of India Provision of the Cabinet Mission Plan, 26th January 1950, 26th November 1949, Nearly 3 years.

Frame 2- No, People of India through their Representatives, People of India.

Frame 3- people of India, Social Economic and Political, Sovereign Socialism Secular Democratic, Equality of status.

Frame4- Representatives of the people, Representatives of the people.

V. Impact of Programmed Learning

Tutorial experiences are provided for individual learners on large scale, control on homework and study enable the learner to catch up the loss of absence from school, technological solution to the problem of individual difference, eliminates the teacher variable in the research, immediate scoring promotes the learning process, classroom efficiency may increase about 30%, difficulties of the students can easily be diagnosed and there can be great increase in interest and improvement in learning.

VI. Conclusion

I especially favor the idea of using an objective approach to provide the learner with an "anchor" before they set sail on the open seas of knowledge. A basic understanding of the material in question provides the learner with a guiding compass for further travel. Another consideration is the distinction between "training" and "education". In today's competitive world, Programmed instruction may be required to establish and meet the objectives. On the other hand, the designer may be challenged to provide material that fosters an individual to find divergent approaches to problem solving. Whichever situation the instructional design finds themselves in, they will require a thorough understanding of learning theories to enable them to provide the appropriate learning environment.

Finally, the idea of individualized self instructional prompted by programmed instruction approach has reached its climax by the introduction of computer assisted instruction. The technique of programmed instruction is becoming more and more technical and empirical by using the systematic and objective principles of mathematics, applied sciences and engineering. Basically originating from the psychology of learning and instruction, it has now been developed as one of the important aspects of instructional technology. Programmed instruction may prove a big helping hand in all the tasks and aspects of education. With intelligent application of learning theory strategies and technology, the modern designer will find solutions to the learning requirements of the 21st century.

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