

## **Chapter 2 – CAI METHODOLOGIES**

Knowledge of different CAI methodologies help teacher/course ware designer to choose appropriate methodology for a given application. Since CAI can be used with different levels of children and to teach different subjects, it is necessary to know about these methodologies. Different prominent CAI methodologies could be referred as follows [59] :

1. Drill and Practice
2. Tutorial
3. Simulation
4. Exploratory/Games

### **1. Drill and Practice.**

Some of the examples in this category include counting arithmetic, displaying a set of questions, accepting answers and repeating the process on same set for next run.

#### **1.1 Purpose of Drill and practice:**

To provide practice on skills and knowledge to help learners (students) remember and use what they have been taught.

#### **1.2 Methodology :**

##### **a. Linear.**

Progresses straight without branching to provide explanations.

##### **b. Repetitious.**

Same process is repeatedly used for improving the performance of slow learners.

c. Format.

Computer presents an exercise, child types in response and computer informs if answer is correct. Alternatively after interactions on a set of questions (batch wise), system informs about correct and incorrect answers.

1.3. Strengths :

- a. They build skills necessary at the pace of the student. There is good feedback to ensure on the most wanted confirmation on what learner knows.
- b. Highly interactive and hence helps learner in total participation.
- c. Easy for students and teachers because clarity flows and correct responses are ensured.

1.4 Limitations :

- a. The whole exercise may be boring if it is not constructed properly.
- b. It is meant for addressing, on improving lowerlevel skills and not on any creative approach.
- c. More computing facilities are required for individualisation.

2. Tutorial.

In the field of education, Pundits talk about SOCRATIC THINKING APPROACH. This refers to the following:

Teacher directs child's own discovery through a carefully sequenced series of leading questions in order to explain a topic. Thus we may say that better tutorial programs use a

Socratic thinking approach to teaching.

Tutorial attempts to teach a child about some subject matter in much the same way as a parent or a teacher would do while interacting with a child.

2.1 Purpose of tutorials :

To teach the student about a particular topic.

2.2 Methodology :

a. Linearly progresses with various amounts of branching.

b. Progresses through a series of lessons.

c. Format: SOCRATIC DIALOGUE

It involves presentation of information, questioning, feedback on the child's response branching to explanations or review.

2.3 Strengths :

a. Child's active involvement and understanding of knowledge.

b. Ensures total participation.

c. More interactive.

2.4 Limitations :

a. System is usually stored with limited "intelligence" in comparison with a teacher.

b. Tutorials require extensive field testing.

c. More computer facilities and more time required for conducting tutorials.

### 3. Simulation.

Children who play house are simulating adult roles and activities. They learn a lot while pretending. Simulations are models. In a computer based titration experiment, student gets the complete grip on the purpose of the experiment, various stages of the experiment. There should not be any confusion between a simulation on computer and video recorded tape. Video tape does not ensure the participation of the person who is viewing.

#### 3.1 Purpose of simulation :

- a. To promote problem solving, develop an intuition about a particular situation.
- b. To facilitate the acquisition of skills and knowledge.
- c. To motivate interest in the subject.

#### 3.2 Methodology :

- a. Displaying models.
- b. Processing models with different sets of input on different processing choices.
- c. Format

Presents models.

Accepting necessary input.

Presents the step by step process changing the model. Allows repetition of the model processing with different sets of input.

#### 3.3 Strengths :

- a. Simulation allows interactions with events that would otherwise be inaccessible due to high

costs, danger or time constraints.

- b. Simulation is highly interactive and motivating.
- c. Almost realistic and students feel the real thrill in learning.

#### 3.4 Limitations :

- a. Simulation may not ensure the correctness on student's responses.
- b. It is relatively more difficult to implement effectively.
- c. Simulation is a model and doesn't ensure physical action.
- d. All teachers can not create their own simulations without the understanding of programming and simulation.

#### 4. Games.

Most of the games help us, in learning skills indirectly. In fact the concepts are intrinsic in structure. For example TIC-TAC-TOE teaches the child plotting skills and the concepts of grid etc.

##### 4.1 Purpose of games :

- a. To develop creativity, divergent thinking and problem solving.
- b. Facilitate the acquisition of skills and knowledge.
- c. Games motivate interest in learning.

#### 4.2 Methodology :

- a. Approach is nonlinear.
- b. Exploratory and discovery oriented.
- c. Format

Provide a set of tools or a miniature world that children use for explorations and for productive playing.

#### 4.3 Strengths:

- a. Utilizes and develops convergent and divergent abilities.
- b. Promotes social interaction and true discovery learning. Can be used repeatedly.

#### 4.4 Limitations :

- a. In most of the cases, goals and objectives are not always clear.
- b. Games do not ensure correct responses.
- c. Teachers cannot easily create their own programs.



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