

Computer Aided Instruction:

CAI as the name suggests, stands for the type of instruction aided or carried out with the help of a computer as a machine or CAI is the type of instruction which make use of computers. CAI is the method of instruction in which there is a purposeful interaction between a learner and the computer device (having useful instructional material as software) for helping the individual learner achieve the desired instructional objectives with his own pace and abilities at his command. It is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place.

Definitions:

Bhatt and Sharma (1992): “CAI is an interaction between a students, a computer controlled display and a response entry device for the purpose of achieving educational outcomes.” Hilgard and Bower (1977): “computer-assisted instruction has now taken as so many dimensions that it can no longer be considered as a simple derivative of the teaching machine or the kind programmed learning that skinner introduced.”

Characteristics Of CAI:

1. In CAI there are two way interactions between an individual student and the computer just as happens in the tutorial system between the teacher and an individual student.

2. The computer is able to display the instructional material to the individual student.
3. The individual student takes benefit of the displayed material and responds to it. These responses are attended by the computer for deciding the future course of instruction displayed to the learner.

4. The interaction between the individual learner and the computer device helps in the realization of the set instructional objectives.

**Basic Assumptions:**

The computer assisted instruction, meant for auto-individualized instructions, rests on the following basic assumptions:

1. **Instruction for a number of learners at a time:** CAI can serve at a time thousands of learners in an individualized way. What an individual needs according to his ability and interest in a particular subject or topic, and accordingly he can get the instructional material and help him in such individualized way. Hence the first assumption of CAI lies in its capacity of providing quality and quantity auto-instruction to a sufficiently larger number of the individual learners at a time.

2. **Automatic recording of the learner’s performance:** How does an individual learner react to the presented instructional material?, what are his quarries and difficulties?, what is his performance in terms of learning outcomes? All such things can be successfully and accurately recorded by the computer device. It helps much in further planning the needed instruction to the individual learner for this proper advancement. This timely and proper auto recording is the second assumption underlying CAI.

3. **Variety in the use of methods and techniques:** CAI assumes that every learner cannot be benefitted through a single method and all the subjects or topics in a subject cannot be handled through a common method or strategies. It believes that there should be a wide variety of methods and approaches for imparting instruction in a particular subject or topic so that all the individual learners may be
able to choose a particular method or approach according to their own interest, ability, and nature of the instructional material.

**Technologies of CAI:**

CAI requires joint efforts of various persons in the matter of wise handling of men and material resources. Generally, it involves three types of techniques, namely hardware, software, and courseware.

1. **Hardware:** The computer as a machine represents the hardware. In CAI, we certainly need an appropriate computer to suit our teaching learning situations. It will require the services of an expert or technician for its maintenance and an operator.

2. **Software:** The computer cannot do anything for imparting instruction to the learners if it is not fed with the software. The programs containing instruction to the computer in a language that it can understand are called software. These programs are developed by the experts called programmers. The software used in CAI is of two kinds: application software and system software. The application software includes instruction to the computer for carrying out a total function required by the user.

3. **Courseware:** The courseware technology is the base of the instruction that is imparted to the learner by CAI. For the instructional purpose, the computer machine as hardware will need the service of the software. These programs will be prepared by a software programmer. But for its preparation he will certainly require the services of those who are experts in courseware technology who include: experts in the subject, experts in methodology and strategies of teaching the subject, experts in instructional psychology, and in audio visual aid preparation and use. What the courseware technology will prepare in terms of the instructional material and method of instruction etc. will be translated by the software technologies into software programs for being used in the computer machine. In this way these three
technologies and the persons operating them are jointly responsible for the preparation of the instructional activities conducted in CAI.

**Types or modes of CAI:**

CAI can take a variety of forms as detailed below for providing self-individualized instructions to a learner depending on the computer services availed.

1. **Informational instruction:** It helps the learner get the desired information he needs. Hence the computer can serve the role of an enquiry officer, to respond to the student’s enquiry with answers it had stored. It provides minimal interaction between the student and the computer program. The sole purpose of this type of CAI is to provide essential information for the acquirement of concepts, and skills. However the individual learner can learn a lot by adopting an enquiry or discovery approach towards self-learning through such instruction.

2. **Drill and practice:** CAI provides the learner with different types of drill and practice programs covering specific topics related to particular subject. Through these, the service of computers can be properly availed for providing practice in something already learned in some other way. It helps in the development of a variety of skills. For example, for providing practices in multiplication skill, the computer may display on the screen a simple problem like 7×8=----. The child is required to respond to typing the numeric keys of the keyboard. If the answer is wrong, the computer immediately displays WRONG and if the answer is correct, another problem for carrying out the practice is presented. These responses comes within a fraction of second, therefore the child has not to wait for the answer for feedback. On the other hand, the computer has the required Patience to wait and allow the child to go ahead with his own speed and intention of responding and move forward. The advanced programs on drill and practice select the problem of varying difficulty
levels on the basis of the student’s performance during the earlier sessions. The computer is known to have a good memory for the errors of the learners and, therefore, provides a very effective teacher in providing the students proper material for their drill and practice.

3. **Tutorial type computer assisted instruction:** In this type of CAI, the computers are engaged in actual teaching. Here they can play effectively the role of a tutor by maintaining a perfect interaction and dialogue with the individual students. The tutorial programs are prepared not only to have instruction in topics such as Newton’s laws of motion, sets and their operations, solar and lunar eclipses performance and move the students on the path of progress according to their own pace, abilities and requirements. If the students have been able to master a concept, the CAI program provides the next step of instruction, but if he is not able to achieve mastery, the program provides remedial instruction.

4. **Educational game type:** In it, the learners are provided with a variety of well-designed computer games. These games should not be confused with academic type games. Their purpose is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner. In a course of learning, these games can be used as a source of review or as a reward for some accomplishment for the learner.

5. **Simulation type of instruction:** Stimulation is used as a technique for providing training to the students. Such type of instructional activities provides powerful learning tools to them. With the carefully prepared programs, the students are made to face real or idealized situations. They have to play an active role and are required to take decisions that have consequences. For example, a simulation computer program may put the participants in the shooting range of enemies in the battlefront or in the role of a hunter in a jungle full of horror or beasts or in the role of an explorer who is looking for a
buried treasure. The stimulation in all these proves much less expensive and dangerous to have a trainee blow up something on the screen than to face real danger to make a real mistake while trained in real situations.

6. **Problem-solving type:** This type of CAI focuses on the process of finding an answer to a problem rather than the answer itself. Here, the students are provided with programs that can make them think about the ways and means of solving the problem systematically. With the concrete ways suggested in the programs, the student can divide or analyze the problem into its small constituents and are able to devise systematic procedure for its solution.

7. **Practical work oriented instruction:** CAI programs can provide valuable help in supplementing laboratory and other practical work. A student can learn so many things about the science experiments before actually performing them in his practical class by watching and following a computer program made for this purpose. Similarly he can avail the necessary skills and experiences about practical task in other fields before actually engaging in such practical activities. Thus the children will have a necessary preparation and background from computers for their better performance at the school hours.

8. **Learning affairs managing type:** In this type instructional activity, the CAI program provides valuable help in managing and supervising the learning affairs of the students. They can have a proper check over the learning activities of individual students by identifying their academic weaknesses through extensive diagnostic testing and to prescribe educational program to meet their individual needs. They can give assignments, help in selfstudy, library reading, and group work, take a test over assignment, keep progress chart and guide the teacher as well as parents to plan their children’s education.

**Merits of CAI:**
In describing undergraduate CAI in biology, chemistry, and physics McKensie (1977) cites eight advantages and four criticisms of the method. The advantages of CAI are:-

1. The immediate feedback provided by interactive terminals keeps students interacting and eager to keep trying.

2. Wiser students are obliged to participate actively. Then often remain passive in lectures.

3. The computer will wait patiently for an answer and will not express annoyance with wrong response.

4. The graphic facility is a powerful aid in enhancing intuition, especially in giving insight, into mathematical formulae.

5. Interactive graphic makes it possible to sample many more illustrations than could easily be shown in a textbook.

6. Mathematical calculations can be done as readily for realistic examples as for artificially simple case that can be solved analytically.

7. Large volume of data can be handled with accuracy and without drudgery.

**Limitations:**

1. The instruction of CAI in class room proves quite expensive and uneconomical in terms of educational returns.

2. Computer, as an electronic device, may invite significant hazards to children. There is a potential danger for the children either to damage the machine or to be damaged by it.

3. Much of the difficulty is felt on account of the unavailability or usability of the educational software. Either we don’t get any program for a particular type of instruction and teaching of a topic.

4. Serving of the hardware also poses a serious problem. If for one or the other reason the machine is failed, the expertise to operate it
again or do repair work is not easily available. Consequently, the regular instructional work on self-study of the students may receive a major setback.

5. The auto-instruction or self-study carried out in the form of CAI is basically a learner’s controlled instruction. Here, the learner is the master of the whole instructional process and thus there is a little scope for keeping restraint and check on the learner. It may lead to indiscipline, truancy, carelessness, and unnecessary wasting of time on the part of the students.

6. During long study hours, this exercise may prove quite boring, mechanical, and tiresome.

7. CAI cannot be accommodated properly in the setup of our schools comprising set time table schedules, uniform curricula and group oriented instruction. And examination system.

8. The other major limitations of CAI lies in the fact that computers are machines and no machine can ever match the human beings for effective interaction with the human beings. The emotional touch, warmth and sympathy as well as the heart link established in teacher pupil interaction are not possible in CAI.

9. CAI fails to develop language competency