DIFFERENT TYPES OF INSTRUCTIONAL MATERIAL

(CLASSIFICATION)

There are many different types of visual aids. The following advice will help you make the most of those most commonly used.

PowerPoint (or equivalent)

Microsoft PowerPoint is probably now the most commonly used form of visual aid. Used well, it can really help you in your presentation; used badly, however, it can have the opposite effect. The general principles are:

Do	Don't
use a big enough font (minimum 20pt)	make it so small you can't read it
keep the background simple	use a fussy background image
use animations *when appropriate*	but don't over-do the animation - it gets distracting
make things visual	use endless slides of bulleted lists that all look the same

Overhead projector slides/transparencies

Overhead projector slides/transparencies are displayed on the overhead projector (OHP) - a very useful tool found in most lecture and seminar rooms. The OHP projects and enlarges your slides onto a screen or wall without requiring the lights to be dimmed. You can produce your slides in three ways:

- pre-prepared slides : these can be words or images either hand written/drawn or produced on a computer;
- spontaneously produced slides: these can be written as you speak to illustrate your points or to record comments from the audience;
- a mixture of each: try adding to pre-prepared slides when making your presentation to show movement, highlight change or signal detailed interrelationships.

Make sure that the text on your slides is large enough to be read from the back of the room. A useful rule of thumb is to use 18 point text if you are producing slides with text on a computer. This should also help reduce the amount of information on each slide. Avoid giving your audience too much text or overly complicated diagrams to read as this limits their ability to listen. Try to avoid lists of abstract words as these can be misleading or uninformative.

White or black board

White or black boards can be very useful to help explain the sequence of ideas or routines, particularly in the sciences. Use them to clarify your title or to record your key points as you introduce your presentation (this will give you a fixed list to help you recap as you go along). Rather than expecting the audience to follow your spoken description of an experiment or process, write each stage on the board, including any complex terminology or precise references to help your audience

take accurate notes. However, once you have written something on the board you will either have to leave it there or rub it off - both can be distracting to your audience. Check to make sure your audience has taken down a reference before rubbing it off - there is nothing more frustrating than not being given enough time! Avoid leaving out of date material from an earlier point of your presentation on the board as this might confuse your audience. If you do need to write 'live', check that your audience can read your writing.

Paper handouts

Handouts are incredibly useful. Use a handout if your information is too detailed to fit on a slide or if you want your audience to have a full record of your findings. Consider the merits of passing round your handouts at the beginning, middle and end of a presentation. Given too early and they may prove a distraction. Given too late and your audience may have taken too many unnecessary notes. Given out in the middle and your audience will inevitably read rather than listen. One powerful way of avoiding these pitfalls is to give out incomplete handouts at key stages during your presentation. You can then highlight the missing details vocally, encouraging your audience to fill in the gaps.

Flip chart

A flip chart is a large pad of paper on a stand. It is a very useful and flexible way of recording information during your presentation - you can even use pre-prepared sheets for key points. Record information as you go along, keeping one main idea to each sheet. Flip back through the pad to help you recap your main points. Use the turning of a page to show progression from point to point. Remember to make your writing clear and readable and your diagrams as simple as possible.

Video (DVD or VHS)

Video gives you a chance to show stimulating visual information. Use video to bring movement, pictures and sound into your presentation. Always make sure that the clip is directly relevant to your content. Tell your audience what to look for. Avoid showing any more film than you need.

Artefacts or props

Sometimes it can be very useful to use artefacts or props when making a presentation (think of the safety routine on an aeroplane when the steward shows you how to use the safety equipment). If you bring an artefact with you, make sure that the object can be seen and be prepared to pass it round a small group or move to different areas of a large room to help your audience view it in detail. Remember that this will take time and that when an audience is immersed in looking at an object, they will find it hard to listen to your talk. Conceal large props until you need them; they might distract your audience's attention.

IMPORTANCE OF INSTRUCTIONAL MATERIAL

1. To challenge the attention of the pupils:
The teacher who uses devices can usually maintain the full attention of the class. This is generally true in the lower grades. Devices should never be used by the teacher as mere attractions. Exposure to visual or audio-visual material and nothing more is not educative.

2. To stimulate the imagination and develop the mental imagery of the pupils:
Devices stimulate the imagination, of the pupils. Mental imagery can be used as a vehicle of thought and as a means of clarifying ideas.

3. To facilitate the understanding of the pupils:

The most widely accepted use of devices, whether visual or audio-visual, is its use in aiding understanding. Learning can be sped up by using models, movies, filmstrips, and pictorial material to supplement textbooks. Material devices give significance and colour to the idea presented by the teacher. Abstract ideas can be made concrete in the minds of the pupils by the use of devices. Diagrams and graphs, for example, are very useful in developing understanding in social studies and in mathematics. The graph is a good device in representing mathematical facts.

4. To provide incentive for action:

The use of devices, such as pictures and objects, arouses emotion and incites the individual to action. The teacher must select the right kind of &vice to excite the pupils to worthwhile intellectual activity. Asking the pupils to collect pictures representing water, air, land transportation wilt stimulates them to action.

5. To develop the ability to listen:

The ability to listen can be developed best through the use of audio-visual materials. It is also the responsibility of the school, to provide training for our pupils to be good listeners. Training in the art of listening is one of the aims of audio-visual education.

PRINCIPLES OF SELECTION AND USE OF VARIOUS INSTRUCTIONAL AIDS SUCH AS CHALK BOARD, CHARTS, MODELS AND ANIMATIONS

CHALK BOARD:

- It is the most commonly used av aid.
- It is also known as black board.
- It gives motivation and gives instruction concrete and understandable.

TYPES OF CHALK BOARD:
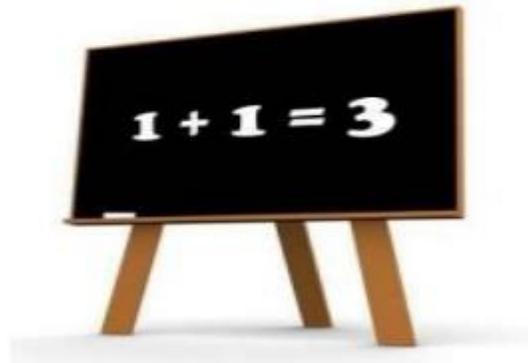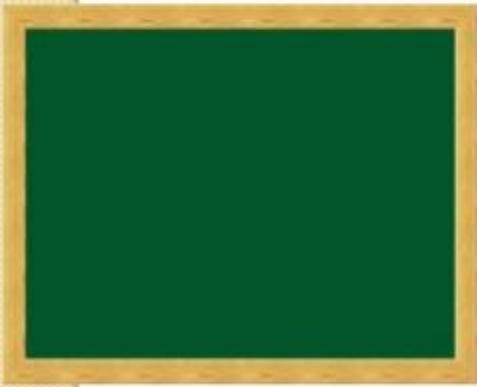
- Fixed
- Portable
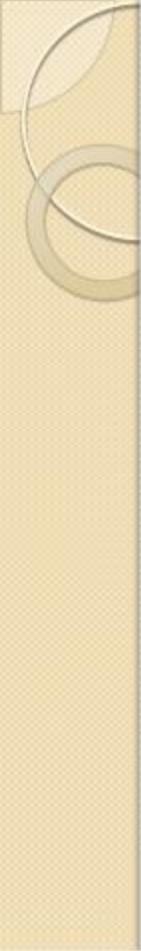
SKILLS INVOLVED IN EFFECTIVE USE OF CHALK BOARD:

- Don't write everything on chalkboard.
- The 'STANCE' it has been observed that most convenient place to stand is towards the (L) side of the chalkboard, as this allows you to turn from the chalkboard to the class.
- Take half stick of chalk and hold the chalk between the thumb and forefinger.
- Write in sequence as head line and sub line.
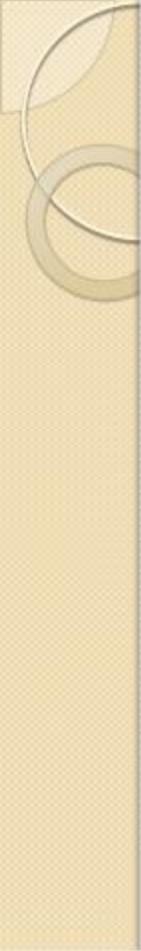
Contd..

- There should be equal gap in between the words. Size of each letter should be equal and broad.
- Gaps between each word should be uniform.
- The margin space for the top and bottom of the board should be equal.
- Use more pressure for strong line
- Try to keep 2/3rd part of the board when drawing.
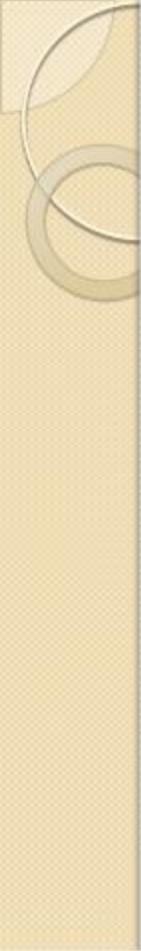
Contd..

- Never use fingers in place of duster.
- Use duster from top to bottom and again from top to bottom by lifting rather by rubbing to avoid dust allergy.
- Write in straight rows starting at the top corner.
- Avoid abbreviation
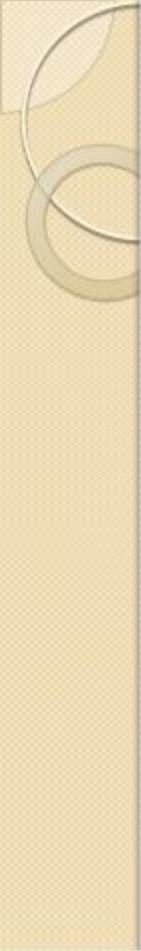
Contd..

- Face the group after writing and continue the discussion.
- Extreme lower corners should not be used.
- Use coloured chalks
- Do not stand in front of the board, stand at one side.
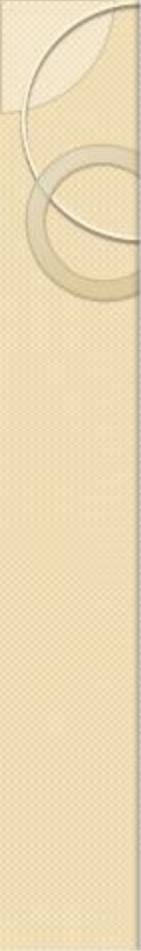
Charts:

DEFINITION:

It defined as combination of graphic and pictorial material designed for the orderly and logical visualizing of relationships between key facts and ideas.
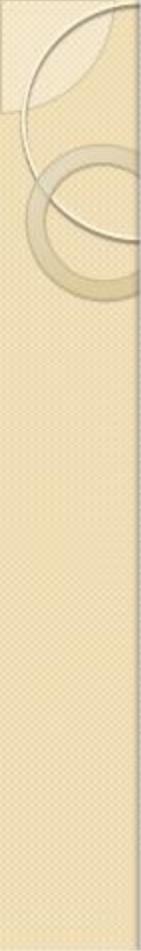
PREPARATION OF CHARTS:

Materials required:

- Prepare charts are sheets of thick white or light coloured paper.
- Fibre tipped round point and Chisel – Point colour Markers.
- Drawing aids
- Adhesives
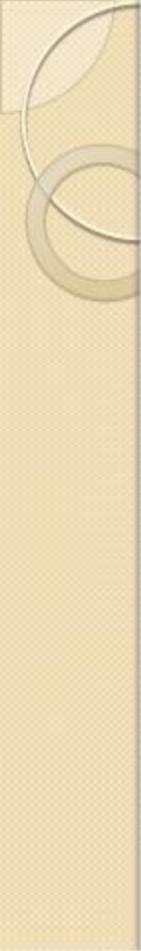
Before making a chart:

- One should plan the content in terms of the objectives and decide the layout.
- The layout should be 'balanced' and should use the space effectively.

# Principles:

- The size of the chart, the size of the letters and the contrast of the display materials should be such that it is readable by the farthest viewer.

- Standard chart paper in sizes 90x60cm and 70x55cm is suitable for most purposes.

Contd..

- The size of letters for the Captions, labels and keywords written on a chart should be between 2 and 3mm.

- The thickness of the lines should be between 2 and 3mm.

- Light coloured chart paper should be used eg. Yellow, light green and white are better suited for dark coloured pens. Eg. black, blue, red and orange.
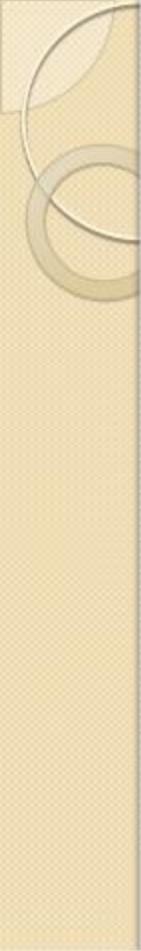
Contd..

- Simple hand-drawn charts with non-decorative lettering are more effective than elaborately drawn.

- One chart should convey just one idea or one principle.

- Charts crowded with information are less effective.

MODELS:

Models are three dimensional recognizable limitations of an object with increase, decrease or exact size. They are replies of objects, eg. Models of eye, ear or other organs of human body.
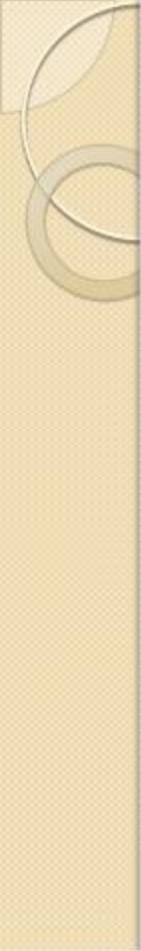
PREPARATION OF MODELS:

- Identification of purpose of model
- Being knowledgeable about the model
- Collection of materials to be used
- Proper planning to prepare the model
- Drawing the model with exact measurement
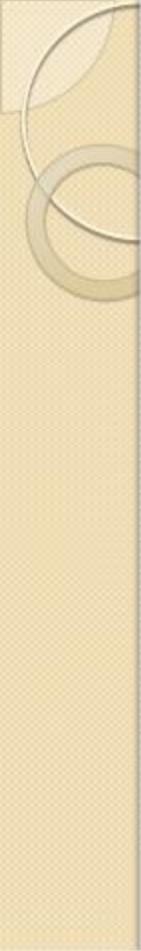
CONTD..

- Preparing the model with exact measurement
- Preparing the model as much as real and attractive
- Pretesting the model to check it.
- Mounting and labeling the model.

PRINCIPLES USED IN EACH AREA:
1. Principles of Selection:

- They should suit the age level, grade level, and other characteristics of the learners.
- It should be interesting and motivating.
- They should be the true representatives of the real things.
- They should have in the realization of desired learning objectives.

2.Principles of preparation:

- As for as possible locally available material should be used.
- The teachers should receive some training in the preparation of aids.
- The teachers themselves should prepare some of the aids.
- Students may be associated in the preparation of aids.

3. Principles of Handling:

- Arrangement of keeping aids safely and also to facilitate their lending to the teachers for use.

4. Principles of Presentation:

- Teachers should carefully visualize the use of teaching aids before their actual presentation.
- They should fully familiar themselves with the use and manipulation of the aids.
- Adequate care should be taken to handle an aid in such a way as no damage is done it.
- The aid should be displayed properly so that all the students are able to see it, observe it and derive maximum benefit out of it.
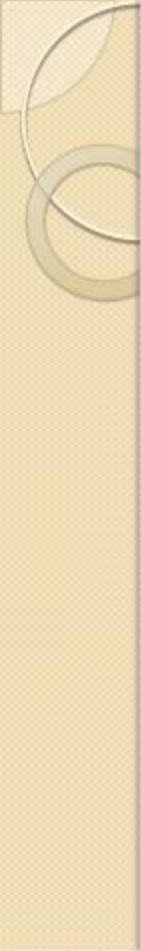
5. Principle of Response:

- Teachers guide the students to respond activity to the AV stimuli.

6. Principle of Evaluation:

- Continuous evaluation is necessary.

What is e-learning?

When it comes to education, the model has been pretty straight forward - up until the early '00s education was in a classroom of students with a teacher who led the process. Physical presence was a no-brainer, and any other type of learning was questionable at best. Then the computer evolution happened and it radically changed the learning landscape. In essence, e-learning is a computer based educational tool or system that enables you to learn anywhere and at any time. Today e-learning is mostly delivered though the internet, although in the past it was delivered using a blend of computer-based methods like CD-ROM. Technology has advanced so much that the geographical gap is bridged with the use of tools that make you feel as 6 if you are inside the classroom. E-learning offers the ability to share material in all kinds of formats such as videos, slideshows, word documents and PDFs. Conducting webinars (live online classes) and communicating with professors via chat and message forums is also an option available to users. There is a plethora of different e-learning systems (otherwise known as Learning Management Systems, or LMSs for short) and methods, which allow for courses to be delivered. With the right tool various processes can be automated such as the marking of tests or the creation of engaging content. E-learning provides the learners with the ability to fit learning around their lifestyles, effectively allowing even the busiest person to further a career and gain new qualifications. Some of the most important developments in education have happened since the launch of the internet. These days learners are well versed in the use of smartphones, text messaging and using the internet so participating in and running an online course has become a simple affair. Message boards, social media and various other means of online communication allow learners to keep 7 in touch and discuss course related matters, whilst providing for a sense of

community. In the fast-paced world of e-learning the available technologies to make a course exciting are always changing, and course content can and should be updated quickly to give students the very latest information. This is especially important if the elearning training is being given to employees in a sector where keeping up-to-date on industry developments is of the utmost importance. This is one of the reasons why many businesses are now offering training via elearning - other reasons includes low costs and the ability for employees to study in their own time and place. Overall, traditional learning is expensive, takes a long time and the results can vary. E-learning offers an alternative that is faster, cheaper and potentially better.

The benefits and drawbacks of online learning Whether you're a high-school teacher looking to engage your students in a more interactive way, or a corporate trainer hired by a large company to design training 12 curricula, e-learning packs a punch when it comes to benefits that make the creation and delivery processes easier and hassle-free. Important benefits are outlined below: No Boundaries, No Restrictions Along with locational restrictions, time is one of the issues that learners and teachers both have to face in learning. In the case of face-to-face learning, the location limits attendance to a group of learners who have the ability to participate in the area, and in the case of time, it limits the crowd to those who can attend at a specific time. E-learning, on the other hand, facilitates learning without having to organize when and where everyone who is interested in a course can be present. More Fun Designing a course in a way that makes it interactive and fun through the use of multimedia or the more recently

developed methods of gamification (further discussed in later chapters) enhances not only your engagement factor, but also the relative lifetime of the course material in question. Cost Effective 13 This is directed to both learners and teachers, but there is a good chance that whatever your role you had to pay exorbitant amounts of money at some point to acquire updated versions of textbooks for school or college. While textbooks often become obsolete after a certain period of time, the need to constantly acquire new editions is not present in e-learning. It Just Fits! As companies and organizations adopt technologies to improve the efficiency of day-to-day operations, the use of the internet becomes a necessity. As multinational corporations expand across the globe, the chances of working with people from other countries increases, and training all those parties together is an issue that elearning successfully addresses. Let's blend all of that together and apply it in a real-life scenario: In an effort to enhance the credibility of course material, oftentimes a professor will summon a field specialist to give a lecture relevant to the topic at hand. In the traditional model of education, the professor would have to extend an invitation to said expert, and incur the costs of his flight, stay and training. 14 With e-learning: With e-learning the professor has the ability to host a guest lecture without having to spend much money. It can be done virtually, with cameras for both the lecturer and the students, and with the use of microphones to facilitate the same level of interaction that would be possible if the lecturer were physically present in the room. The added benefit comes in when we are able to replay the lecture and gain even more out of it. Students that missed out can view the recording, or students that attended can watch it again to further their understanding.

Nichols outline ten e-learning concepts in teaching and learning process
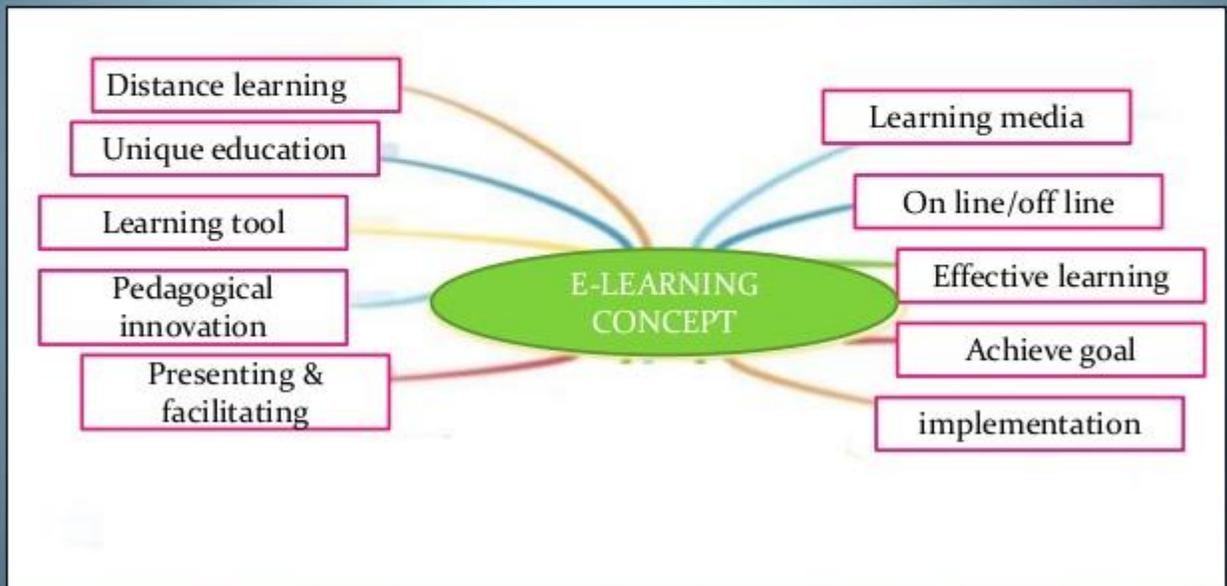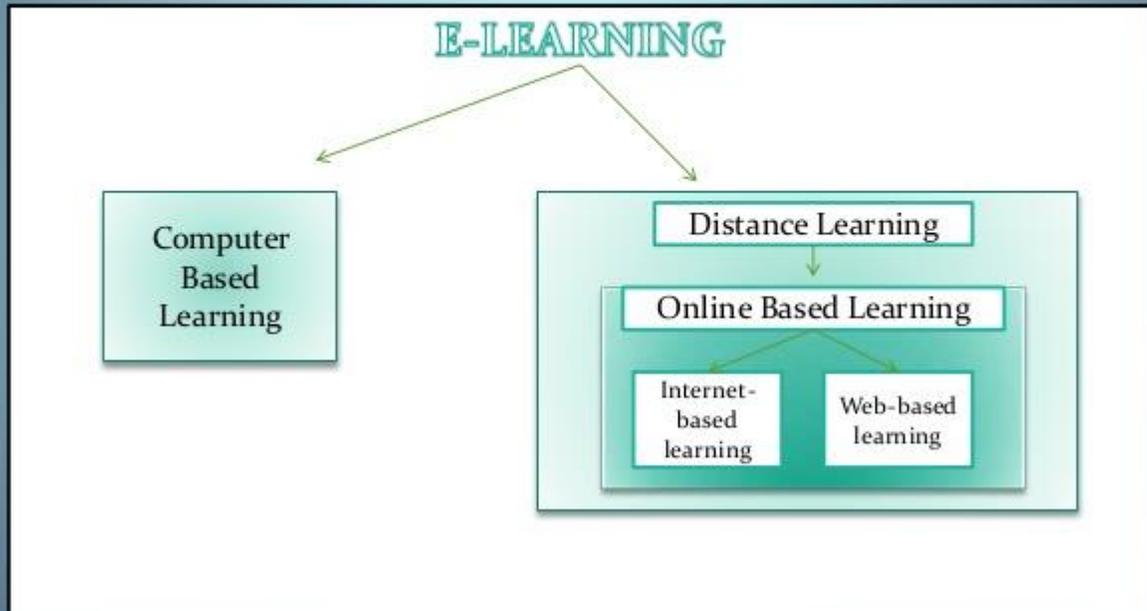
COMUNICATION

Different ways

Within communication we distinguish different directions/ways to communicate:

- one to one
- one to many
- many to one
- many to many

E-LEARNING PURPOSE

➢ To increase spare energy from student on material that learned.

➢ Increase active participation from them.

➢ Increase independent learn skills, and

➢ Increase learning material quality.

The implementations of e-learning:

- Website or webpage;
- Links;
- Chat client;
- Quizzes;
- Database management;
- Record system and logs.

E-learning as a Process
The changes of paradigm in education

Teacher-centered instruction	Student-centered instruction
Single-sense stimulation	Multisensory stimulation
Single-path progression	Multipath progression
Single media	Multimedia
Isolated work	Collaborate work
Information delivery	Information exchange
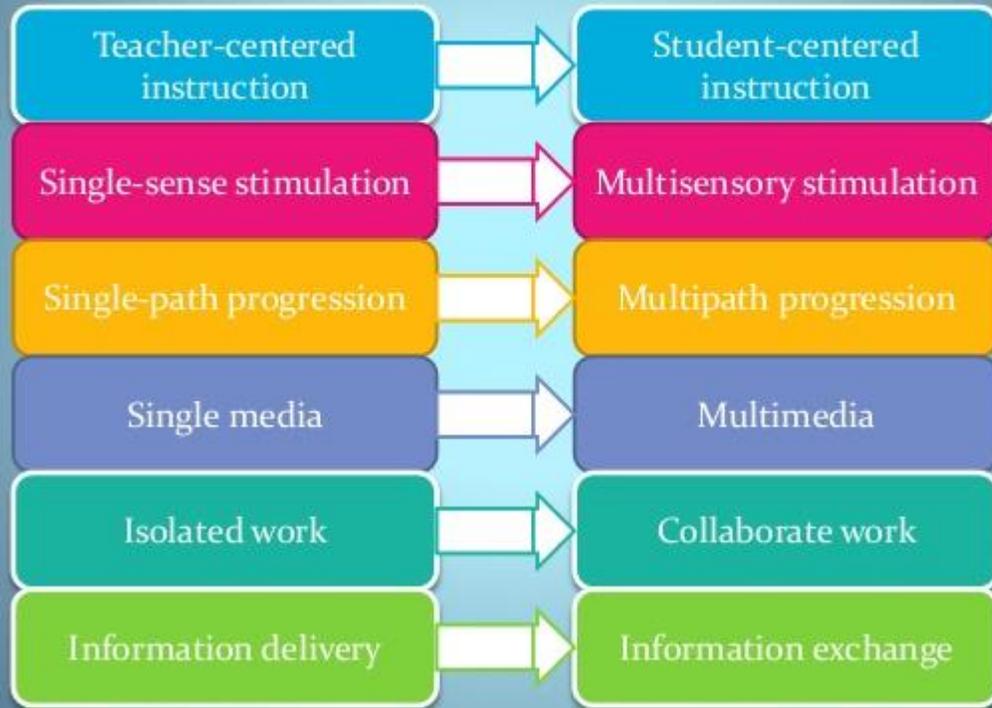
Electronic book

An **electronic book** (or **e-book**) is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. Although sometimes defined as "an electronic version of a printed book", some e-books exist without a printed equivalent. Commercially produced and sold e-books are usually intended to be read on dedicated e-reader devices. However, almost any sophisticated computer device that features a controllable viewing screen can also be used to read e-books, including desktop computers, laptops, tablets and smartphones.

In the 2000s, there was a trend of print and e-book sales moving to the Internet, where readers buy traditional paper books and e-books on websites using e-commerce systems. With print books, readers are increasingly browsing through images of the covers of books on publisher or bookstore websites and selecting and ordering titles online; the paper books are then delivered to the reader by mail or another delivery service. With e-books, users can browse through titles online, and then when they select and order titles, the e-book can be sent to them online or the user can download the e-book. At the start of 2012 in the U.S., more e-books were published online than were distributed in hardcove.

Electronic journal

Electronic journals, also known as **ejournals**, **e-journals**, and **electronic serials**, are scholarly journals or intellectual magazines that can be accessed via electronic transmission. Some journals are 'born digital' in that they are solely published on the web and in a digital format, but most electronic journals originated as print journals, which subsequently evolved to have an electronic version, while still maintaining a print component. As academic research habits have changed in line with the growth of the internet, the e-journal has come to dominate the journals world.

An e-journal closely resembles a print journal in structure: there is a table of contents which lists the articles, and many electronic journals still use a volume/issue model, although some titles now publish on a continuous basis. Online journal articles are a specialized form of electronic document: they have the purpose of providing material for academic research and study, and they are formatted approximately like journal articles in traditional printed journals. Often a

journal article will be available for download in two formats - as a PDF and in HTML format, although other electronic file types are often supported for supplementary material. Articles are indexed in bibliographic databases, as well as by search engines. E-journals allow new types on content to be included in journals, for example video material, or the data sets on which research has been based.

With the growth and development of the internet, there has been a growth in the number of new journals, especially in those that exist as digital publications only. A subset of these journals exist as Open Access titles, meaning that they are free to access for all, and have Creative Commons licences which permit the reproduction of content in different ways. High quality open access journals are listed in Directory of Open Access Journals. Most however continue to exist as subscription journals, for which libraries, organisations and individuals purchase access.

MOOC PLATFORMS FOR SCIENCE EDUCATION

A **massive open online course** (**MOOC**) is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive user forums to support community interactions among students, professors, and teaching assistants (TAs). MOOCs are a recent and widely researched development in distance education which were first introduced in 2006 and emerged as a popular mode of learning in 2012.

Early MOOCs often emphasized open-access features, such as open licensing of content, structure and learning goals, to promote the reuse and remixing of resources. Some later MOOCs use closed licenses for their course materials while maintaining free access for students
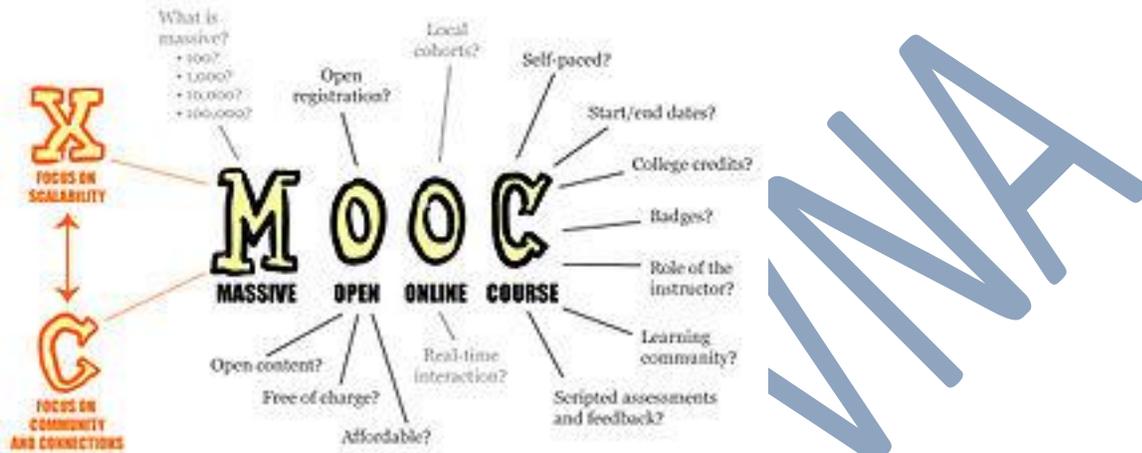
CBCS: CONCEPT, NEED AND SIGNIFICANCE

What is Choice Based Credit System?

University Grants Commission has come up with the Choice Based Credit System (CBCS) programme in which the students have a choice to choose from the prescribed courses, which are referred as core, elective or minor or soft skill courses and they can learn at their own pace and the entire assessment is graded-based on a credit system. The basic idea is to look into the needs of the students so as to keep up-to-date with development of higher education in India and abroad. CBCS aims to redefine the curriculum keeping pace with the liberalisation and globalisation

in education. CBCS allows students an easy mode of mobility to various educational institutions spread across the world along with the facility of transfer of credits earned by students.

Features of CBCS

• This is a uniform CBCS for all central and state and other recognised universities.

• There are three main courses: Core, Elective and Foundation.

• There are also non-credit courses available which will be assessed as 'Satisfactory' or "Unsatisfactory'. This is not included in the computation of SGPA/CGPA.

• All the three main courses will be evaluated and accessed to provide for an effective and balanced result.

How does it work?

It has the following basic elements:

• **Semesters:** The assessment is done semester wise. A student progresses on the basis of the courses taken rather than time like three years for science, arts, commerce or four years for engineering etc. Each semester will have 15–18 weeks of academic work which is equal to 90 teaching days. There is flexibility in creating the curriculum and assigning credits based on the course content and hours of teaching.

• **Credit system:** Each course is assigned a certain credit. When the student passes that course, he earns the credits which are based on that course. If a student passes a single course in a

semester, he does not have to repeat that course later. The students can earn credits according to his pace.

• **Credit transfer:** If for some reasons, he cannot cope with the study load or if he falls sick, he has the freedom to study fewer courses and earn fewer credits and he can compensate this in the next semester.

• **Comprehensive continuous assessment:**There is a continuous evaluation of the student not only by the teachers but also by the student himself.

• **Grading:** UGC has introduced a 10-point grading system as follows:

o O (Outstanding): 10

o A+ (Excellent): 9

o A (Very Good): 8

o B+ (Good): 7

o B (Above Average): 6

o C (Average): 5

o P (Pass): 4

o F (Fail): 0

o Ab (Absent): 0

How is the credit counted?

One credit per semester is equal to one hour of teaching, which includes both lecture (L) or tutorial (T) or two hours of practical work/field work (P) per week. A study course can have only L component or only T or P component or combination of any two

or all the three components. The total credits earned by a student for each semester is L+T+P.

In compliance with the global grading system

All the major higher education institutions across the world are implementing a system of credits. For instance, we have the European Credit Transfer System (ECTS) in Europe's universities, the 'National Qualifications Framework' in Australia. There is the Pan-Canadian Protocol on the Transferability of University Credits. In the UK, we have the Credit Accumulation and Transfer System (CATS). Even the systems operating in the US, Japan, etc. are based on credit system.

Advantages of Choice Based Credit System

• The CBCS offers a 'cafeteria' approach in which the students can choose courses of their own choice.

• The credit system allows a student to study what he prefers in his own sequence as per his interests.

• They can learn at their own pace.

• They can opt for additional courses and can achieve more than the required credits.

• They can also opt for an interdisciplinary approach to learning.

• Inter college/university migration within the country and outside becomes easy with the transfer of Credits. This means that it will be easier for foreign universities to come and offer courses in India.

• Can opt for one part of the course in one institute and the other

part in another institute. This will help in making a clear choice between good and bad colleges/ institutes.

• The students have more scope to enhance their skills and more scope of taking up projects and assignments, vocational training, including entrepreneurship.

• The system improves the job opportunities of students.

• The system will help in enabling potential employers assess the performance of students on a scientific scale.

Disadvantages of CBCS

• Not very easy to estimate the exact marks.

• Teachers' workload may fluctuate.

• Needs proper and good infrastructure for a universal spread of education.

Conclusion: It is too early to say whether CBCS will be successful or not. The UGC has always initiated measures to bring efficiency and excellence in the Higher Education System of India. The basic motive is to expand academic quality in all aspects, right from the curriculum to the learning-teaching process to examination and evaluation systems. However, so far multiple methods are followed by different universities across the country towards examination, evaluation and grading system. Considering this diversity, the implementation of the choice based credit system seems to be a good system in assessing the overall performance of a student in a universal way of a single grading syst

PROMOTION AND INNOVATION IN SCIENCE EDUCATION: MEANING, IMPORTANCE AND INITIATIVES (SUCH AS KVPY, IISERS, HBCSE, SCIENCE OLYMPIADS).

KVPY

Kishore Vaigyanik Protsahan Yojana (KVPY) is a program started by the Department of Science and Technology (DST), Government of India to encourage students of Basic Sciences, Engineering and Medicine to take up research careers in these areas. The aim of the program is to identify, assist and encourage talented students with aptitude for research and growth in the country.

The Department of Science and Technology – the root agency of the Government has entrusted the overall responsibility for organizing the scheme to the Indian Institute of Science (IISc), Bangalore and set up a National Advisory Committee (NAC) for overseeing its implementation and a National Scientific Committee (NSC) look after both the administrative and academic aspects of the KVPY Program.

The selection of students from those studying in +1, +2, any U.G. Program in Science / Medicine and also Engineering students having aptitude for scientific research, are carried out by IISc (Bangalore), IIT-Bombay (Mumbai), and ICMR (New Delhi), respectively, in association with two Zonal Centers one at (IISER), Kolkata and another at Mumbai (HBCSE, TIFR). Generous scholarship and Contingency grant are provided (up to the pre-Ph.D. level) to the selected students.

Fellowship

The advertisement for the KVPY Fellowship appears in all the national dailies normally on the Technology Day the May 11 and Second Sunday of July every year.

These Fellowships are only for Indian Nationals studying in India. Selection procedures are different for SP (Basic Sciences) and SP (Medicine). All of them, however, include an interview for final selection.

Syllabus

There is no prescribed syllabus for the written test. The written test aims to test the understanding and analytical ability of the student than his/her factual knowledge. However, students are tested for the syllabus up to class XII.

Awards and Recognitions

The Department of Science and Technology, Government of India, offers attractive fellowships (Rs. 4000 to Rs. 7000 per month) and contingency grants (Four months fellowship per year) for students studying in Basic Sciences, Engineering and Medicine. Selection to the program takes into account academic excellence and demonstrated interest in pursuing a research career.

Eligibility

Eligibility details for class-X pass Students are as follows –

Basic Sciences – (SA/SX/SB):

- **Stream SA: Students enrolled in the XI Standard** (Science Subjects) during the academic year 2012-2013 and have secured a minimum of 80%

(70% for SC/ST) marks in aggregate in MATHEMATICS and SCIENCE subjects in the X Standard Board Examination. Students promoted through both the Summative Assessments-II conducted by the school and conducted by the Board are eligible to apply, if they satisfy eligibility criteria. If the candidates have obtained a letter grade in the qualified examination, they are requested to convert it into an appropriate % and fill-up the application form. {The students under the mentorship list will not be eligible for any fellowship. Their fellowship will be activated when these students enroll in an undergraduate course in Basic Sciences (B.Sc./B.S./Int.M.Sc./M.S.) after their XII Standard/(+2).}

- **Stream SX: Applicable for the Students enrolled in XII Standard/ (+2) (Science subjects).**

- **Stream SB: Applicable for the Students enrolled in the 1st year of B. Sc./ B.S./Int. M.Sc./M.S.**

Selection Procedure

Aptitude Test: After scrutiny of application forms and based on the performance in the Board Examination(s), all the eligible candidates from Streams SA, SX and SB have to appear for a written aptitude test (conducted both in Hindi and English). The test will be conducted at different centers across the country on 4th November 2012. The details of the venue of the aptitude tests and their seat number will be put on the KVPY website in first week of October 2012.

Interview: Candidates will be called for the interview based on the performance in the aptitude test, which is the final stage of the selection procedure.

Admit Card:

1. Students who have applied online may download the admit card for the aptitude test from the website from the second week of October 2012.

2. Students, who have applied with a hard copy, admit card will be sent by speed post.

Exam Pattern:

1. The question paper in SA Stream will be both multiple choice objective and descriptive types.

2. In the objective type, 4 choices for the correct answer will be provided and the choice for the correct answer has to be made.

3. In the descriptive type solution to a problem, formula for a sum, etc., has to be worked out and written.

4. There is no negative marking.

HBCSE Olympiad

Homi Bhabha Centre for Science Education (HBCSE) is a National Centre of the Tata Institute of Fundamental Research (TIFR), Mumbai. The broad goals of the Centre are to promote equity and excellence in science and mathematics education from primary school to undergraduate college level, and encourage the growth of scientific literacy in the country.

Activities

To these ends it carries out a wide spectrum of inter-related activities, which may be viewed under three broad categories:

- Research and Development
- Teacher Education and Science Popularisation
- Olympiads, NIUS and other Students' Nurture Programmes.

HBCSE is the premier institution in the country for research and development in science, technology and mathematics education. It is India's nodal centre for Olympiad programmes in mathematics, physics, chemistry, biology, astronomy and junior science.

Graduate School

HBCSE (TIFR) runs a Graduate School in Science Education. Students admitted to HBCSE Graduate School work towards the Ph.D. degree of the Tata Institute of Fundamental Research (TIFR) which is a Deemed University.