MAINTENANCE OF STUDIO AND DEVELOPMENT OF E-CONTENT

REPORT

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BACKGROUND AND THE GENESIS OF ESTABLISHMENT OF STUDIO IN THE INSTITUTE

Genesis

Studio of the Institute was established in the year 2016. Its chief aim is to promote Educational Technology, especially, mass media singly or in combinations (multimedia packages) to extend educational opportunities and improve quality of educational processes at the school level.

As a part of the Institute, major functions of the Studio are based on Research and Development, Training, Extension and Dissemination functions are as given below:

a. To design, develop, try out and disseminate alternative learning systems to achieve the national goal of universalisation of elementary and secondary education.

b. To address various educational problems at micro, meso and macro levels.

The areas of activities of the studio are based on Research and Development, Training, Extension and Dissemination functions are as given below:

- To design and produce media software materials viz., television/radio (for both broadcast as well as non-broadcast use) graphics and other programmes for strengthening the transaction of curricular and co-curricular activities at the school level.
- To create competencies in development and use of educational software materials mentioned above through training in areas such as script development, media production, media communication, media research, technical operations, setting up studios, repair and maintenance of equipment.
- To develop plans for the use of Information and Communication Technologies (ICTs) in education.
- To train the faculty of Institutes of Advanced Study in Education/Colleges of Teacher Education and District Institutes of Education and Training in the use of Educational Technology in their teacher education programmes.
- To undertake research, evaluation and monitoring of the systems, programmes and materials with a view to improving the materials and increasing their effectiveness.
- To document and disseminate information, materials and media programmes for better utilization and to function as a clearinghouse/agency in the field of Educational Technology.

Major Functions of Studio

- Design, develop and disseminate alternative learning systems
- Development of e-content
- Promote Educational Technology
- Train Personnel in Educational Technology
- Provide Consultancy and media support to other constituents of NCERT
- Recording of day-today activities of the Institute

The world has experienced the horror of COVID-19 Pandemic in 2020 and still continuing it with the new dangerous strain of virus after mutations. It affected all the sectors of society. Education, one of the vital sector of social infrastructure, was affected badly in this Pandemic period. Thanks to the ICT technicians and the prompt actions taken by the Indian government to vitalize the entire education system with the digital resources. In fact, the digital resources came as a savior for the future generations to continue their education although not face-to-face (F2F) but on-line. Corers of learners all over the country are now learning, digitally, on-line. Digital resources have been proved to benefit students, teachers and teacher educators in various ways. As per the vision of NCF-2005, learning through visualisation can be achieved as these e-resources helps students in visualising the concepts. NEP-2020 strongly recommended to introduce digital learning and digital resources at all levels of education after realizing its importance. Similarly, it also assists teachers to improve the teaching methodology and provide a better learning environment for students to construct their own knowledge. The main challenge lies in the availability of these e-resources customized to the need of the teacher and student. Keeping this in mind, National Repository of Open Educational Resources (NROER), DIKSHA Portal, PM-evidya programmeand several other programmes have been launched to provide free access to e-resources to every stakeholder of education system. This gives rise to the need for developing appropriate and effective e-resources keeping the local context in mind.

RIE has established studio set-up, in addition to the Studios available at Central Institute of Educational Technology (CIET). Faculties and students can be effectively involved in the programmes organized by the studio and they can develop e-resources by utilizing the facilities available. The participation of students will also enable them to develop skill sets which will save them in their teaching careers. These studios can also be a resource point for the states to produce e-resources.

Objectives

- To produce audio, video and digital resources/contents for school education and teacher education
- To digitize existing print and non-print resources related to the school curriculum and teacher education curriculum
- To deploy digital resources on NROER
- To develop online course materials
- To develop e-content material in different subjects for different classes related to school education
- To provide training to the teachers and teacher educators KRPs on E-content Development

The studio personnel appointed for the purpose would manage the day-to-day operations and maintenance of the equipment and facilities. The E-content/Materials will be developed in the studio. Resource Persons/Presenter/Script writer/Artists will be invited to develop/assist in the development of the materials. The metadata of the resources will be developed and the resources deployed on NROER. E- Resources will be developed in regional language in consultation with state teams. The video conferencing network will be used for organizing public lectures disseminated across various RIE synchronously.

PERSONNEL ENGAGED IN THE STUDIO

1. SEIKH AKRAM	**: CAMERAMAN**
2. SHRI ANKUSH SAHU	**: CAMERAMAN-CUM-EDITOR**
3. SHRI SUSHIL SHARMA NEUPANE	**: VIDEO EDITOR**

RESOURCE PERSON/EXPERTS

1. SHRI ASHISH BHAWALKAR	**: REVIEWER**
2. SHRI MAYANK SHARMA	**: PRODUCER/DIRECTOR/SCRIPT WIRITER/ VOICE-OVER**
3. SHIEKH AKRAM	**: CAMERAMAN-CUM- EDITOR**
4. MOHD. ARSHAN	**: SCRIPT WRITER/ PRESENTER/ VOICE-OVER/ RESEARCHER**
5. SAROJ MAHAPTRA	**: SOUND ENGINEER AND EDITOR**
6. SHRI VARUN MUDGAL	**: SCRIPT WRITER/PRESENTER/VOICE-OVER**

ICT AND EDUCATION

INTRODUCTION

Contemporary societies are increasingly based on information and knowledge, and the ubiquity of technologies. Consequently, societies need to put in place mechanisms to:

— build workforces that have information and communications technology (ICT) skills and are reflective, creative and adept at problem-solving in order to generate knowledge;

— enable people to be knowledgeable and resourceful so they are able to make informed choices, manage their lives effectively and realize their potential;

— encourage all members of society – irrespective of gender, language, age, background, location and differing abilities – to participate fully in society and influence the decisions that affect their lives; and

— foster cross-cultural understanding, tolerance and the peaceful resolution of conflict.

The attainment of these social and economic goals is a key focus of education systems worldwide. Teachers need to be equipped to guide the next generation to embrace and be able to achieve these goals.

The 2030 Agenda for Sustainable Development, adopted by the UN General Assembly, underscores a prevalent global shift towards the building of inclusive Knowledge Societies based on human rights, the achievement of gender equality and empowerment. ICTs are critical for progress towards the achievement of all 17 Sustainable Development Goals (SDGs). Namely, ICT related targets are addressed in: Quality education (Goal 4), Gender equality (Goal 5), Infrastructure (Goal 9), Reduced inequalities within and across countries (Goal 10), Peace, justice and strong institutions (Goal 16) and Partnerships for the goals (Goal 17).

Technology has a significant role to play in the achievement of the SDGs. UNESCO, in partnership with industry leaders and global subject experts, has created an international Framework that sets out the competencies required to teach effectively with ICT: the UNESCO ICT Competency Framework for Teachers (ICT CFT).

There have been three ICT CFT versions: 2008, 2011 and 2018. Each version has reflected the prevailing thinking on the relationship between technology and education, with suggestions on how to achieve competencies using popular technologies of the time. From the outset, it was envisaged that the ICT CFT would be dynamic and revisited regularly to ensure relevance.

The ICT CFT Version 3 takes into account the Agenda 2030 for Sustainable Development, and is designed to preserve those competencies that remain relevant and to frame them within the current advances in technologies and the changing demands of life and work. For example, open educational resources (OER) are now numerous and beneficial and have therefore been included; furthermore, inclusive education is also addressed in the ICT CFT Version 3, in line with the key SDG principle of "*leaving no one behind*".

The ICT CFT Version 3 is intended to inform teacher-training policies and programmes to strengthen the use of ICT in Education. Its target audience is teacher-training personnel, educational experts, policy-makers, teacher support personnel and other professional

development providers. The ICT CFT assumes a working knowledge of the benefits of ICT in Education, and encourages contextualization and adaptation of teacher professional development as relevant.

This version of the ICT CFT emphasizes that teachers, in addition to having ICT competencies and the ability to develop these in their students, must be able to use ICT to help students become collaborative, problem-solving, creative learners and innovative and engaged members of society.

UNESCO ICT Competency Framework for Teachers

For this purpose, teachers' professional development should be understood as a lifelong learning process, rather than a one-off event. It is advised that the ICT CFT be integrated into the three phases of teacher professional development:

— pre-service - focusing on initial preparation on pedagogy, subject matter knowledge, management skills and use of various teaching tools including digital tools and resources;

— in-service - including structured face-to-face and distance training opportunities building upon pre-service programmes and directly relevant to teaching needs in classrooms and beyond; and,

— On-going formal and informal pedagogical and technical support, enabled by ICTs, for teachers' innovative use of ICT to address daily needs and to facilitate students' higher-order learning.

The ICT CFT Version 3

The ICT CFT consists of 18 competencies organized according to the six aspects of teachers' professional practice, over three levels of teachers' pedagogical use of ICT. The underlying idea is that teachers who have competencies to use ICT in their professional practice will deliver quality education and ultimately be able to effectively guide the development of students' ICT competencies.

The six aspects of a teacher's professional practice addressed are:

1. Understanding ICT in Education Policy;
2. Curriculum and Assessment;
3. Pedagogy;
4. Application of Digital Skills;
5. Organization and Administration; and
6. Teacher Professional Learning.

The ICT CFT is organized over three successive stages or levels of a teacher's development in making pedagogical use of ICT.

The first level is **Knowledge Acquisition,**1 where teachers acquire knowledge about using technology and basic ICT competencies. The Knowledge Acquisition level demands that teachers be aware of the potential benefits of ICT in the classroom and within national policies

and priorities be able to manage and organize the school's ICT investments and use technology to embark on lifelong learning and further professional development.

Teachers who have mastered the competencies in the Knowledge Acquisition level can:

1. articulate how their classroom practices correspond to and support institutional and/or national policy;
2. analyse curriculum standards and identify how ICT can be used pedagogically to support attainment of the standards;
3. make appropriate ICT choices to support specific teaching and learning methodologies;
4. identify the functions of hardware components and common productivity software applications, and be able to use them; In the 2011 ICT CFT, this level was termed 'Technology Literacy'.
5. organize the physical environment to ensure technology supports different learning methodologies in an inclusive manner; and
6. use ICT to support their own professional development.

The second level is **Knowledge Deepening**, where teachers acquire ICT competencies that enable them to facilitate learning environments that are student-centred, collaborative and cooperative in nature. Teachers are also able to link policy directives with real action in the classroom, have the capacity to build technology plans
to maintain the school ICT assets, and forecast future needs. In addition, teachers can study further by linking to national and global teacher networks.

Teachers who have mastered the competencies in the Knowledge Deepening level can:

1. design, modify and implement classroom practices that support institutional and/or national policies, international commitments (e.g. UN Conventions), and social priorities;
2. integrate ICT across subject content, teaching and assessment processes, and grade levels, and create a conducive ICT-enhanced learning environment where students, supported by ICT, demonstrate mastery of curriculum standards;
3. design ICT-supported project-based learning activities and use ICT to facilitate students to create, implement and monitor project plans, and solve complex problems;
4. blend varied digital tools and resources to create an integrated digital learning environment to support students' higher-order thinking and problem-solving skills;
5. use digital tools flexibly to facilitate collaborative learning, manage students and other learning partners, and administer the learning process; and
6. use technology to interact with professional networks to support their own professional development.

The third level is **Knowledge Creation**, where teachers acquire competencies that encourage them to model good practice, and set up learning environments that encourage students to create the kind of new knowledge required for more harmonious, fulfilling and prosperous societies.

Teachers who have mastered the competencies in the Knowledge Creation level can:

1. critique institutional and national education policies alike, suggest revisions, design improvements and speculate on the impact of these changes;
2. determine how best to incorporate student-centred and collaborative learning to ensure mastery of multidisciplinary curriculum standards;
3. while determining learning parameters, encourage student self-management in student-centred and collaborative learning;
4. design knowledge communities and use digital tools to support pervasive learning;
5. play a leadership role in devising a technology strategy for their school to turn it into a learning organization; and
6. continually develop, experiment, coach, innovate, and share best practice to determine how the school can best be served by technology.

Recent decades have witnessed the development and pervasive implementation of computer and other information technologies throughout societies around the world. The use of information technologies is now embedded in societies and in schooling.

Information technologies provide the tools for creating, collecting, storing, and using knowledge as well as for communication and collaboration (Kozma, 2003a). The development of these technologies has changed not only the environment in which students develop skills for life but also the basis of many occupations and the ways in which various social transactions take place. Knowing about, understanding, and using information technologies has thus become an important component of life in modern society.

Today, many education systems assess these skills as part of their monitoring of student achievement. Since the late 1980s, this area of education has been a feature of IEA's international comparative research agenda. IEA's Computers in Education Study (COMPED), conducted in two stages in 1989 and 1992 (Pelgrum, Reinen, & Plomp, 1993), focused on computer availability and use in schools. It also estimated the impact of school-based computer use on student achievement.

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E-CONTENT AND OPEN EDUCATIONAL RESOURCES

INTRODUCTION

Today the entire world is moving speedily towards digitization and we have to learn new things using new technologies. The evolution of computers, especially, the internet has affected all spheres of our life. Ten to fifteen years back, we used to spend our time in the library for information in books, magazines and journals. Now a days, we search for the information in the web sites. Access to information has become very easy because of information sharing on World Wide Web (www). Quality of teaching and students' learning are determined by the teachers who teach them. Well trained teachers with required knowledge, skills and commitment can develop scientific and critical thinking, promote tolerance, and develop cultural and social values in them. Innovative technologies will make it possible to achieve these by providing new ways to teachers. But, these new technologies are placing more demands on teachers to learn how to use them in their teaching and learning processes. This great transformation is posing challenges to teachers and teacher educators in using technologies in creative and productive ways. Hence, we as teachers have to meet these new challenges by continuously acquiring new knowledge and skills to discharge our duties, effectively. ICT can offer tremendous opportunities for capturing, storing, disseminating and communicating a wide variety of information. Because of rapid expansion of knowledge and availability of variety of ICT has made knowledge, inclusion and integration of ICT in teaching and learning inevitable for us now. Moreover, ICT can promote international collaboration and networking in education and provide more flexible and effective ways for professional development. It can also help in pre-service and in-service teacher training programs.

Wide varieties of digital materials which are of educational significance are available online. Some of the quality materials which are available free of cost or with minimum restrictions can be used, reused and modified by teachers and students for their teaching and learning. As textbooks are too expensive, the students are switching from textbooks to digital course materials. These materials provide both teachers and students a greater interactivity and social collaboration. One of the materials which can be designed and developed used, reused and distributed is e-content.

E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed E-content.

It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers. It has a significant implications for open and distance learning institutions.

Electronic content (E-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. According to Oxford dictionary 'E-content is the digital text and images designed to display on web pages'. According to Saxena Anurag(2011) 'E-content is basically a package that satisfies the conditions like minimization of distance, cost effectiveness, user friendliness and adaptability to local conditions'.

Well developed E-content can be delivered many times to different learners. Individual course components i.e. units, lessons and media elements such as graphics and animations can be reused in different contexts.

Designing and Development of E-content

The purpose of E-content development is to create an information rich society. Everyone in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated E-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

E-content design, development and approach will depend upon the nature of the content and the learners. It will also depend on the quality and complexity the learning you wish to create. Various instructional design models are available according to our requirements. Most of the models involve the process of analyzing the learner needs and goals of the instructional material development, development of a delivery system and content, pilot study of the material developed, implementation, evaluating, refining the materials etc. In designing and development of E-content we have to adopt one of the instructional design models based on our requirements. Before understanding the designing and development of E-content it is essential to understand the meaning of instructional design. According to Wikipedia 'instructional design is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process broadly consists of determining the current status of learner understanding, defining the end goal of the instructional material and creating some 'intervention' to assist the transition. This systematic approach provides a step by step process for the analysis of the learners' needs, the design and development of the material'. Most common and popular model used for creating instructional materials is the ADDIE model. This abbreviation stands for the five phases involved in the model. They are analyze, design, develop, implement and evaluate. This model is initially developed by Florida State University to explain the processes involved in the formulation of an Instructional Systems Development (ISD) program for military inter-service training. ISD was meant for training individuals to do a particular job. This can also be applied to any inter-service curriculum development activity.

Originally the model contained several steps under its five original phases (analyze, design, develop, implement and evaluate). Over the years the steps were revised and finally the model itself became more dynamic and interactive.

Now let us try to understand the five phases of **ADDIE model**.

Analysis: It is the first phase of this model meant for examining the suitability of the E-content to be developed. It is related to analyzing the learning needs, context, learner, task and content. Analyzing the learning needs is identifying the needs from the perspective of different learners, teachers, subject experts, practitioner, policy makers etc. Needs are to be clearly stated. Contextual analysis is collecting data related to the context of learning such as learning environment. Whether the E-content developed is for the individual or group, formal or informal, facilitated or self-learning etc. Learner analysis is collecting data related to learners' academic levels and attributes such as skills, motivation, visual literacy, language competency, learning styles, etc. That is nothing but preparing the learner profile. It helps to know about the learner. Task analysis is stating the purposes of developing the E-content.

Deciding whether that is developed for educating, training, creating awareness, developing skills etc. Content analysis is nothing but preparing a content outline. Good content comprehension is required before designing and developing content. It includes verifying the content with respect to cognitive appropriateness, factual accuracy, completeness etc. It also includes classifying the content into facts, concepts, principles, processes and procedures.

Design: It is concerned with defining the learning objectives, structuring the content logically, specifying the instructional and evaluation strategies, and preparing for visual and technical design. Learning objectives are to be defined in clear, realistic and measurable terms. Learning objectives are the statements that describe what the learner will be able to do at the end of the course or program. Learning objectives should specify performance and communicate their purposes. Prepare a detailed content outline in which content is thoroughly analyzed and logically organized. Content is to be structured logically following simple to complex, known to unknown, concrete to abstract, general to specific etc. Instructional strategies are to be stated clearly. Depending on the learning style and nature of the content we have to decide the appropriate instructional strategy. Appropriate media mix that is combination of audio, video, graphics, animation; simulation, etc is to be decided. Learner evaluation strategies such as practice, computer marked or tutor marked assessments, pre-test, post-test, remedial tests etc are to be specified. We have to decide about the formative and summative assessments. Before developing the content for the selected course review the proposed learning objectives. Make sure that content, assessment tests and exercises match the objectives stated. Provide the information and knowledge required to meet the learning objectives.

Development: It is related to the creation of story board. Story board is nothing but scripting the entire course content. The term 'story board' is taken from film production. In a movie it indicates the visual representation of the various scenes. In E-content development the story board describes step by step script of the final outcome of the E-content i.e. story board is created to provide a blue print of the course with each and every detail along with the content

notes. The story board is created based on the objectives and instructional strategies. Here, the developers create and assemble the content assets and learning objects. Programming and integration of all media elements into a cohesive multimedia package are the part of this phase.

Implement: In the implementation phase, materials are distributed to learners. A comprehensive implementation strategy document is developed. This document should cover the course curriculum, learning outcomes, method of delivery in terms of hard ware and soft ware requirements and testing procedures. Ensure that the web site is functional if the material is on the web site.

Evaluation: The evaluation phase consists of two parts i.e. Formative and summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation determines the adequacy of the distributed materials in achieving the course objectives. Material is to be revised at all the stages based on the feedback received.

Now, let us learn the main features of some popular alternative models.

Dick and Carey Design Model

Starts by identifying instructional goals Ends with summative evaluation Focuses on specific objectives Similar to that of software engineering.

Hannafin and Peck Design Model

The Hannafin Peck model (1987) uses a three phase process

Phase 1: perform a needs assessment

Phase 2: design

Phase 3: develop and implement instruction

(Note: All the phases involve a process of evaluation and revision)

Knirk and Gustafson Design Model

The Knirk and Gustafson model (1986) also uses a three stage process:

Stage 1: identify the problem and set instructional goals

Stage 2: design and develop objectives, set instructional objectives and specify strategies

Stage 3:develop materials

(Note: This can be used for individual lessons or modules; focus is on evaluation and development seems to come late in the process.

E-content standards are rules that most E-content developers should abide by. Standards are *engineering or technical specifications* that help E-content developers to establish uniformity. The different kinds of standards are mandatory, voluntary and de-facto. Mandatory means one should comply, voluntary is one may or may not follow and defacto which are well established common practices but may not be formally published. Ensuring the high quality of the E-content is concerned with creating, communicating, and maintaining consistent development standards. Writing and textual, graphical and page design, questions and test, interactivity and audio/video standards and guidelines are to be ensured before finalizing. With respect to the quality of the E-content it should be correct, adaptive, communicative, interactive, reflexive, explorative, standardized, etc.

Formal standards bodies such as the World Wide Web Consortium (W3C), the Internet Engineering Task Force (IETF), and International Organization for Standardization (ISO) etc publish the electronic standards. W3C is international standards organization for World Wide Web.

E-learning industry follows certain standards for integration of course ware. There are several standards available today for content integration and interoperability. International bodies generally design and publish the standards.

According to International Organization for Standardization(ISO) standards can be defined as "documented agreements containing technical specialization or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose."

Shareable Content Object Reference Model (SCORM): It is a powerful tool. Content can be created and used in many different systems. Content can also be used in many situations without modification. It is the most widely used standard in all LMSs. It has applications in general usage as well as defense related uses.

Aviation Industry CBT Committee (AICC): This was the first standard to be adopted by the e-learning industry. It is still actively used in the aviation industry.

Institute of Electrical and Electronics Engineers (IEEE) IMS Standards: This enables high quality accessible and affordable learning experiences. This standard is mainly used today schools, colleges, universities, government institutions, etc.

Instructional Management System Global Learning Consortium (usually referred to as IMS GLC, IMS Global or simply IMS) is a global, nonprofit, member organization that strives in shaping and growing the learning industry through community development of interoperability and adoption practice standards. Their main activity is to develop interoperability standards and adoption practice standards for distributed learning,

Learning Objects and Reusability of E-content

The term learning object was coined in 1994 by Wayne Hodgins. It gained quick popularity among educators and instructional designers because these digital materials are designed to allow easy reuse in a wide range of teaching and learning situations. Before understanding the meaning of learning object it is essential to know the meaning of asset. In Wikipedia 'Asset is defined as the smallest, indivisible digital unit for information transfer, e.g. a picture or a short text, a plain picture/text combination or a small and simple animation.

Learning Objects

Learning Objects are defined in different ways by different organizations and individuals. Let us consider some of the definitions of Learning Objects here. According to Wikipedia 'a learning object is a resource, usually digital and web-based, that can be used and reused for learning'.

According to the Institute of Electrical and Electronics Engineers (IEEE) a learning object is *"any entity, digital or nondigital, that may be used for learning, education or training".* Chiappe

defined Learning Objects as: *"A digital self-contained and reusable entity, with a clear educational purpose, with at least three internal and editable components: content, learning activities and elements of context. The learning objects must have an external structure of information to facilitate their identification, storage and retrieval: the metadata."*Daniel Rehak and Robin Mason define it as *"a digitized entity which can be used, reused or referenced during technology supported learning"*.

Learning objects are any items which have the potential to promote learning. An object which can promote learning and teaching is considered as a learning object. For example a printed book, a news paper report etc. Digital learning objects are anything in the digital form such as learning design or whole course or other forms of resources from a set of learning out comes. These are cataloged and stored in leaning objects repositories. A learning object consists of several learning assets that are structured in a pedagogically meaningful way.

Following are some important characteristics of learning objects:

Learning objects are a new way of thinking about learning content.

Learning objects are much smaller units of learning, typically ranging from 2 minutes to 15 minutes.

They are of discrete nature. Because of their discrete nature they can be categorized and stored independently They are self-contained – each learning object can be taken independently. They are reusable in the sense a single learning object may be used in multiple contexts for multiple purposes. They can be aggregated means learning objects can be grouped into larger collections of content. Every learning object has descriptive information. It becomes easy for identification, search and reuse.

Reusability of E-content

Three aspects are important in the reusability of E-content. They are technical, nontechnical and pedagogy related ones. Technical reusability is concerned with various kinds of tools used to support E-content. Non-reusability of E-content is related to the standardization initiatives, intellectual property protection, knowledge transfer, organizational, managerial, social aspects etc. Pedagogy related reusability includes content, scenarios and pedagogic approaches. E-content can be modified and reused easily. Technical reusability of E-content is concerned with the various kinds of tools used to support E-content.

These tools may include documentation such as guidelines and instructions saved in the repository. Modifying the book information is not as flexible as in the case of digital form material.

E-content Tools

E-content can be created in a variety of ways by using variety of tools and software. E-content development combines Content Management System (CMS) and Learning Management System (LMS). There are several proprietary software, freeware, open source software, public domain software and so on are available for E-content development. Among available tools and

software packages Microsoft Office Software Package can be used easily by the beginning E-content developers.

Freeware: It can be used without any monetary charges. However, restrictions are imposed for its use, modification and redistribution. In this source code is not provided. This tool can be passed on to any one free of cost.

Open Source Software (OSS): It is computer software and its source code is made available to the public. It is licensed with an open source license. Copy right holder provides the rights to study modify and distribute the software free of cost to anyone for any purpose. Open Source Software is very often developed in a public collaborative manner.

Proprietary Software is software that is owned by an individual or a company. It will have major restrictions on its use and its source code usually kept secret. These are exclusive property of their developers and can't be copied or distributed without complying with their licensing agreements.

Public domain software: The copy right holder donates it to the public. It is available free of cost to everyone and it can be used by any one for any purpose and only with very minimal restrictions.

Graphics, Audio and Video Creating and Editing

There are several audio, video and graphic creators and editors available online. Some are free and some are proprietary. Wevideo is a video creator and editor which allows us to edit and make video in an easy and intuitive way on this cloud-based app. It allows you to control the video sections easily in areas like the transition, fast and slow motion, adding effects, etc.

Magisto is a video editor that can help you make your video in just a few steps. Upload the video, than you can choose one of the premade editing styles, add a sound track, add a title and the video will be ready for download or for sharing on the social media.

DrawPad is a Graphics editor and an easy to use image composition and manipulation program for all types of graphic design projects. You can make sketches and paintings on your computer, create logos, banner ads or billboards, draw diagrams, icons and other web graphics

WavePad: This is a audio editing software. This is a full featured professional audio and music editor for Windows and Mac. It lets you record and edit music, voice and other audio recordings. When editing audio files, you can cut, copy and paste parts of recordings, and then add effects like echo, amplification and noise reduction.

WavePad works as a wav or mp3 editor.

VideoPad is a powerful and easy to use video editor that lets you import videos, add music and effects, then burn to DVD. You can edit video from any camcorder Capture video from a DV camcorder, webcam, or import most the video file format. More than 50 visual and transition effects are available to add a professional touch to your video.

You Create videos for DVD, HD, YouTube etc. You can burn movies to DVD for playback on TV, or as a standalone video file to share online or put on portable devices.

Authoring Tools

Various tools are available to produce E-content.

Microsoft Power Point and word processors are also e-learning tools.

these tools are not appropriate to present interactivity, testing and scoring. To develop interactive content various elements such as examples, illustrations, animations, audio, video, interactivity etc are assembled. For this purpose we can use special tools which are authoring tools or authorware.

An e-learning authoring tool is software packages which can be used create and modify web content for the use by other people. Examples are blogging, wiki online forums etc. This tool can be used by E-content developers for creating, packaging and delivering the E-content to the learners. By using authoring tools one can produce attractive and useful graphics. Authoring tool or authorware is a programme that helps to write hypertext or use multimedia applications. Authoring tools allow authors or E-content developers to integrate or use any array of media to create professional, engaging and interactive E-content.

In Wikipedia 'An authoring tool is defined as a software application used to create multimedia content typically for delivery on the world wide web(www)'. Content authoring tools may also create content in other file formats so that material can be provided through compact disc (CD) or in other format for various different uses. Authoring tools can be used by people with minimum technical skills.

The main advantage of authoring tools is their easier and faster use. Using these tools E-content can be developed and transferred easily. There are many categories of authoring tools which differ with respect to their features. Very simple Microsoft PowerPoint converters to powerful tool boxes are available for E-content development and delivery. These authoring tools have some common features. They are Scope for interactivity Navigationability to move throughout the content based on the content menu.

Editing E-content developers can make changes or update the material easily. Preview or play back it is possible to preview or play back the material. Cross platform and cross browser inter **offerability**. Iit is possible to run on all platforms and different browsers.

There are many authoring tools in which there are Proprietary software, free software, open source software, etc.

eXe Learning is a free software tool that can be used to create educational interactive web contents.eXe learning can generate interactive content and it allows one to create easily navigable web pages including text, images, interactive activities, image galleries or multimedia clips. All the educational material generated with eXe Learning can be transferred to different digital formats. That can be used independently or to integrate them into a Learning Management System(LMS) like Moodle.

The Xerte is a free and open source authoring tool which provides a full suite of open source tools for e-learning developers and content authors producing interactive learning materials.

Adobe Captivate is proprietary software. It is a rapid responsive authoring tool that is used for creating e-learning contents such as software demonstrations, software simulations, branched scenarios, and randomized quizzes in Small Web Formats (.swf) and HTML5 formats. It can also convert Adobe Captivate generated files formats (.swf) to digital MP4 (.mp4) formats which can be played with media players or uploaded to video hosting websites. For software simulations, Captivate can use left or right mouse clicks, key presses and rollover images. It can also be used to create screen casts, and to convert Microsoft PowerPoint presentations to Small Web Formats and HTML5 formats.

Authorware is the leading visual authoring tool for creating rich media e-learning applications for delivery on corporate networks, CD/DVD, and the Web. We can develop accessible applications that comply with learning management system (LMS) standards.

Adobe Authorware (previously known as Macromedia Authorware) is an interpreted, flowchart-based, graphical programming language. Authorware is used for creating interactive programs that can integrate a range of multimedia content, particularly electronic educational technology (also called e-learning) applications.

Open Educational Resources

Resource rich environment is necessary for making teaching and learning effective. However for teachers many of the educational resources were not easily available because they used to be copy righted. Hence there was a movement to produce learning resources and make them available with no or very less copy right restrictions. During late 1960's with initiation of United Kingdom Open University (UKOU), concept of open learning was initiated. This ideology of open learning later led to the 'Open Movement.' Open Educational Resources (OER) are the part of Open Movement. OER is considered as the subset of Open Education. It is a recently evolved concept. In 1999 some educational resources were released for free by the University of Tubingen (Germany) and the UKOU. In the beginning of 21st century OER initiative came from the Massachusetts Institute of Technology (USA) by releasing the courses with open licenses. The term Open Educational Resources (OER) was coined in 2002 in UNESCO Forum on the Impact of Open Course Ware for Higher Education in Developing Countries. The Cape Town Open Education Declaration (2008) and Paris OER Declaration(2012) provided guidelines and encouragement to the Governments to release Educational resources with open licenses. Countries such as USA, South Africa, Kenya etc., have successfully integrated the OER into their National Policy. In India in 2014 the National Mission on Education through ICT (NMEICT) released all content generated with its funding as OER and adopted an Open License Policy for all its outputs.

(Source: https://de.wikipedia.org/wiki/Open_Educational_Resources)

Open Educational Resources (OER) are freely available, openly licensed materials and media that are useful for teaching, learning and assessing as well as for research purposes. Wide variety of OER is available for free use for teachers, instructors, researchers and students. It is gaining

importance in open and distance learning domain.OER allows us to bring the excellent teaching learning materials into our education system and use them.

Meaning and Importance of Open Educational Resources

Many organizations and eminent people have attempted to define OER. Some definitions are provided here for you to understand the meaning of OER. The William and Flora Hewlett Foundation defines “Open educational resources as the teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge."

Wikipedia defines "Open educational resources (OER) as digital materials that can be reused for teaching, learning, research and more, made available free through open licenses, which allow uses of the materials that would not be easily permitted under copyright alone."

According to UNESCO Open educational resources are "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no cost access, use, adaptation and redistribution by others with no or limited restrictions."

Based on these definitions we can say that OERs are openly licensed digital teaching, learning and research materials that are available in the public domain or under an open license and can be used, reused and repurposed for teaching, learning and research. In the context of OER Public Domain means materials for which copy right has expired or for which copy right has been waived off by the author. These resources are available online...OER movement lead to the origin of Massive Open and Online Courses (MOOC)

Importance of Open Educational Resources

Following are some of importance of OERs.

OERs are useful in improving education across the globe.

They offer free access to some of the world’s best courses.

OERs allow us to bring the excellent teaching learning materials in to our education system.

They offer equal access to knowledge and reusability.

They provide self-paced learning.

They offer flexibility in study time i. e. anywhere and anytime the learner can study.

Provide access to huge amount of study materials.

Help in enhancement of content knowledge.

Accessible and affordable for all.

OERs are adaptable and allow others to reproduce them for their use.

Help in advancing knowledge and widening participation.

Help in one’s own professional advancement.

Promote lifelong learning.

Bridge the gap among formal, informal and non-formal education.
Offers for sharing and reusing resources.
OER promote informal learning.

Various OER Initiatives

Several countries have witnessed OER initiatives. Some of the initiatives are provided here for your reference.

Karnataka Open Educational Resources (KOER)

During 2013-14, the “Karnataka Open Educational Resources” (KOER) program was designed and implemented by RMSA Karnataka with DSERT for its 'in-service teacher education' component. Mathematics, science and social science teachers have collaborated to create digital learning resources for the new class IX textbook topics for KOER. These learning resources include a concept map, learning outlines, notes for teachers, activities, assessment and project/community project ideas. In each section apart from text, teachers have provided images, videos, slideshows and animations, through resources accessed as web links. These resources are created/modified/adapted by them, in the line of the OER philosophy of the 4 R's i.e., reuse, revise, remix and redistribute.

Resource institution for KOER, the IT for Change (ITfC), designed and implemented a series of workshops for the KOER core group of 30 teachers each in the identified subjects and another set of around 30 teachers per subject. These teachers have trained their peers from nearly 1,000 high schools at DIET/ CTE which have computer labs. They were trained in accessing web resources, adapting them and co-creating resources to contribute to KOER. Karnataka Open Educational Resources (KOER) includes academic resources, training support resources and school administration resources, to support interactions for all participants in school education. The use of the “wiki” public software which is used by the world’s largest encyclopedia Wikipedia has enabled the easy creation, review, adapting and publishing in interlinked
web pages. More than 3,600 web pages in English and Kannada have been created in KOER by around 300 teacher users and several more teacher contributors.

KOER has already crossed 400,000 views. This is a resource repository of the Karnataka teachers, by the Karnataka teachers and for the Karnataka teachers. KOER has potential to democratize teacher education and empower teachers to participate actively in their own professional development. KOER aim is to cover all classes, subjects and media of instruction used in Karnataka education.

Objectives of KOER are:

To support the practicing teachers of Karnataka in their professional development
To support the practicing teachers of Karnataka in their classroom teaching learning processes.
To engage the Karnataka teacher community in the creation, review, and publication of digital curricular resources on a
continuous basis.

To make the quality curricular resources available to all the teachers specially Karnataka High School teachers.

Features of KOER are:

Mainly meant for Karnataka High School Teachers.

Open access to those who want to access the resources.

Relevant resources are available free of cost.

Users can share, reuse, remix the Resources.

All resources on any particular subject or topic are available in one place.

They are comprehensive.

Resources may be contextualized.

Resources can be added to the KOER pool using proper licensing.

National Repository of Open Educational Resources (NROER)

NROER is launched by the Ministry of Human Resource Development (MHRD), Government of India. NROER is developed as a solution to address the challenges faced by the education sector of our country. It aims at reaching the unreached and prioritizes to extend education to all. It is a collaborative platform involving everyone who is interested in education. It offers resources for all school subjects and grades in multiple languages. It brings together all the digital resources for a school system such as educational videos, audio, images, documents and interactive modules and also allows you to contribute your own resources. NROER enables access to a library from where teachers can access audio, videos, learning objects, images, question banks, activities/presentations and more related to the concepts of the subject that they teach. They can also upload resources which are subject to review by experts. In addition to this, NROER allows teachers to download, share, comment and rate media resources.

Objectives of NROER are:

To store, preserve and provide access to a variety of digital resources to students and teachers.

To engage the teacher community in the development and sharing of digital resources.

To improve the quality of the education system of the country.

To facilitate teachers to create and share contextual teaching and learning resources.

To celebrate innovations in resource creation.

Features of NROER are:

Open access to those who want to access the resources.

Resources are available free of cost.

Users can share the Resources.
Resources are available in the form of discrete chunks not as bulk.
All resources on any particular subject or topic one desires are present in one place and are comprehensive.
Resources may be contextualized.
Resources can be added to the NROER pool using proper licensing.

OER Impact Map

To understand the global impact of OER, the OER Impact Map was developed. It was built by the OER Research Hub. It provides a visual reference regarding both positive and negative impacts. Themes such as policy change, student impact, improved access and so on have been mapped. It is also possible to drill down to a specific region, country or city to monitor specific OER impacts. This tool is especially useful to policy makers and researchers.
Here is a link http://oermap.org of 'OER impact map' which gives you additional information about it.

OERu

The Open Educational Resources universitas (OERu) is an education platform offering a number of MOOC type, university level courses and programmes. There are several courses offered on this platform. Some of these courses offer credits towards further study. This initiative is useful for individuals interested in studying further.
For more detailed information about OERu please visit the site http://www.col

Creative Common Licensing

Copy right is a legal right created by a law of a country that grants the creator of an original work exclusive rights for its use and distribution. This is usually only for a limited time. Traditional educational materials, such as textbooks, are protected under conventional copyright terms. Previously copy right was binary i.e. all rights retained or available in public domain. However, alternative and more flexible licensing options are available as a result of the work of Commons. Creative commons (CC) is a global non-profit organization which provides free legal tools i.e. Copy right licenses. It is an organization that provides readymade licensing agreements that are less restrictive than the "all rights reserved" terms of standard international copyright. These copy right licenses enable sharing and reuse of creativity and knowledge. These legal tools help us to reuse the work of others. CC vision is to help others like us to realize the full potential of the internet. CCs offer other legal and technical tools that also facilitate sharing and discovery of creative works such as CCO a public domain dedication. It is for rights holders who wish to put their work into the public domain before the expiration of copy right. Another license, typically used by developers of OER software, is the GNU General Public License from the free and open source software (FOSS) community. Open licensing allows the user adopt and adapt the work done by someone under different circumstances. Open licensing allows us to use the materials

that would not be easily permitted under copyright alone. It is essential to know that open licensing is a concept with in copy right law.

Creative Commons Licensing System

In education Creative commons (CC) has become popular licensing system. Creative commons (CC)has designed a collection of licenses to suit to sharing content under various conditions. Advantages of using Creative Commons License are as follows.

They are easily understood and commonly used. Conditions of a work can be easily understood by the users and re-users of that work.

It is easy for others to find a CC licensed resource on the Web. They have Legal code, Commons code and Digital code. All Creative Commons Licenses are constructed from a combination of four specific "rights" or conditions that can be reserved by the creator or author of the resource. They are provided below:

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For learning more about OER and Creative Commons Licenses take the free course 'Understanding Open
Educational Resources' in 'Technology Enabled Learning Lounge' available at tell.colvee.org/

DEVELOPMENT OF E-CONTENT

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Wide varieties of digital materials which are of educational significance are available online. Some of the quality materials which are available free of cost or with minimum restrictions can be used, re-used and modified by teachers and students for their teaching and learning. As textbooks are too expensive, the students are switching from textbooks to digital course materials. These materials provide both teachers and students a greater interactivity and social collaboration. One of the materials which can be designed and developed used, re-used and distributed is e-content.

E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers. It has a significant implications for open and distance learning institutions.

It encompasses eTexts and digital learning resources. These could be digital textbooks, workbooks, articles, videos, or multimedia. Switching from traditional textbooks to digital course materials is a growing trend in higher education. Advantages for students and faculty include greater interactivity, customizability, and opportunities for social collaboration.

Electronic content (e-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. According to Oxford dictionary 'e-content is the digital text and images designed to display on web pages'. According to Saxena Anurag (2011) 'E-content is basically a package that satisfies the conditions like minimization of distance, cost effectiveness, user friendliness and adaptability to local conditions'.

Well developed e-content can be delivered many times to different learners. Individual course components i.e. units, lessons and media elements such as graphics and animations can be re-used in different contexts.

The purpose of e-content development is to create an information rich society. Every one in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated e-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

E-content design, development and approach will depend upon the nature of the content and the learners. It will also depend on the quality and complexity the learning you wish to create. Various instructional design models are available according to our requirements. Most of the models involve the process of analyzing the learner needs and goals of the instructional material development, development of a delivery system and content, pilot study of the material developed, implementation, evaluating, refining the materials etc. In designing and development of E-content we have to adopt one of the instructional design models based on our requirements. Before understanding the designing and development of e-content it is essential to understand the meaning of instructional design.

According to Wikipedia '**instructional design** is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process broadly consists of determining the current status of learner understanding, defining the end goal of the instructional material and creating some 'intervention' to assist the transition. This systematic approach provides a step by step process for the analysis of the learners' needs, the design and development of the material'. Most common and popular model used for creating instructional materials is the **ADDIE** model. This abbreviation stands for the five phases involved in the model. They are **analyze, design, develop, implement and evaluate**. This model is initially developed by Florida State University to explain the processes involved in the formulation of an instructional systems development (ISD) program for military inter-service training. ISD was meant for training individuals to do a particular job. This can also be applied to any inter-service curriculum development activity. Originally the model contained several steps under its five original phases (analyze, design, develop, implement and evaluate). Over the years the steps were revised and finally the model itself became more dynamic and interactive.

Analysis: It is the first phase of this model meant for examining the suitability of the e-content to be developed. It is related to analyzing the learning needs, context, learner, task and content. Analyzing the learning needs is identifying the needs from the perspective of different learners, teachers, subject experts, practitioner, policy makers etc. Needs are to be clearly stated.

- **Contextual analysis** is collecting data related to the context of learning such as learning environment. Whether the e-content developed is for the individual or group, formal or informal, facilitated or self-learning etc.
- **Learner analysis** is collecting data related to learners academic levels and attributes such as skills, motivation, visual literacy, language competency, learning styles etc. That is nothing but preparing the learner profile. It helps to know about the learner.
- **Task analysis** is stating the purposes of developing the e-content. Deciding whether that is developed for educating, training, creating awareness, developing skills etc.

- **Content analysis** is nothing but preparing a content outline. Good content comprehension is required before designing and developing content. It includes verifying the content with respect to cognitive appropriateness, factual accuracy, completeness etc. It also includes classifying the content into facts, concepts, principles, processes and procedures.

Design: It is concerned with defining the learning objectives, structuring the content logically, specifying the instructional and evaluation strategies, and preparing for visual and technical design.

- **Learning objectives** are to be defined in clear, realistic and measurable terms. Learning objectives are the statements that describe what the learner will be able to do at the end of the course or program. Learning objectives should specify performance and communicate their purposes. Prepare a detailed content outline in which content is thoroughly analyzed and logically organized. Content is to be structured logically following simple to complex, known to unknown, concrete to abstract, general to specific etc.
- **Instructional strategies** are to be stated clearly. Depending on the learning style and nature of the content we have to decide the appropriate instructional strategy. Appropriate **media mix** that is combination of audio, video, graphics, animation; simulation etc is to be decided.
- **Learner evaluation strategies** such as practice, computer marked or tutor marked assessments, pretest, post-test, remedial tests etc are to be specified. We have to decide about the formative and summative assessments. Before developing the content for the selected course review the proposed learning objectives. Make sure that content, assessment tests and exercises match the objectives stated. Provide the information and knowledge required to meet the learning objectives.

Development: It is related to the creation of story board. **Story board** is nothing but scripting the entire course content. The term ‘story board’ is taken from film production. In a movie it indicates the visual representation of the various scenes. In e-content development the story board describes step by step script of the final outcome of the e-content i.e. story board is created to provide a blue print of the course with each and every detail along with the content notes. The story board is created based on the objectives and instructional strategies. Here the developers create and assemble the content assets and learning objects. **Programming and integration** of all media elements into a cohesive multimedia package are the part of this phase.

Implement: In the implementation phase, materials are distributed to learners. A comprehensive implementation strategy document is developed. This document should cover the course curriculum, learning outcomes, method of delivery in terms of hard ware and soft ware requirements and testing procedures. Ensure that the web site is functional if the material is on the web site.

Evaluation: The evaluation phase consists of two parts i.e. Formative and summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation determines the adequacy of the distributed materials in achieving the course objectives. Material is to be revised at all the stages based on the feedback received.

Learner's Characteristics and needs

Educational audio and video materials are invariably addressed to specific learner groups of conventional or ODL systems. It is, therefore, of utmost importance that audio/video scriptwriters have as much information as possible about their target audiences. In ODL systems where learners are placed at a distance and are scattered and almost invisible, it is all the more important to have such vital information about them, viz. their age, sex, maturity level, attitudes, beliefs and aspirations, socio-economic background, lifestyles, (urban/rural), existing knowledge, skills, language proficiency, vocabulary, likes, dislikes, preferences and information needs. It is also important to know about the context or conditions in which the audio/video programmes will be listened/viewed by these audiences.

Access to and knowledge of this kind of learner profile is very useful for educational audio and video scriptwriters. It gives them greater insight into learners' needs and helps in tackling their communication problems. Such detailed information about the target audiences is also useful in formulating precise learning objectives and identifying appropriate content and presentation formats for different programmes. Similarly, need assessment studies help in ascertaining the actual needs of the target audiences and identifying suitable programme topics, themes and content areas. Audio and video scriptwriters can certainly develop relevant need-based scripts and programmes if they are familiar with the needs, interests and characteristics of their specific learner groups.

Instructional objectives and programme briefs.

Another necessary condition for a scriptwriter to be able to write a meaningful and effective audio or video script is concerned with 'what' and 'why' of a programme or what is generally known as 'programme objectives'. Therefore, the crucial questions that a scriptwriter must ask himself/herself right in the beginning are:

- Why am I writing this script? Or, in other words, what are the instructional objectives I am required to achieve through this programme script?
- What is the precise content to be presented? Does the content really lend itself to audio or video treatment?
- What do I want to happen to my audiences through this particular programme or a series of programmes (in terms of gaining knowledge, information or acquiring certain skills, or influencing their attitudes, habits, behaviors, etc.)?

When analyzed and researched further, these questions get expanded into what we call a 'programme brief' or 'an academic note' or a 'programme outline'. A programme brief is a written, typed or printed statement of intent. It represents a 'road map' that traces the scripting

path from the beginning to the end. It serves as a basic document that provides all related content – information, ideas, sources and suggestions – for a proposed audio or video programme at one place. Researchers are scriptwriters can freely draw upon such materials to design their scripts. A programme brief should usually include the following information:

- Series title
- Programme title (working title only)
- Target audience (their characteristics, needs, and entry behavior)
- Programme length or duration
- Programme objectives (stated in behavioural terms)
- Brief content outline (preferably in distinct sequences matched with one or more programme objectives)
- Expected learning outcomes (as reflected from objectives, but more concrete and performance-oriented)
- Suggested treatment and production hints (for each sequence)

Usually, detailed programme briefs are designed jointly by a team consisting of subject experts, instructional designers, researchers, scriptwriters, and media producers. Programme briefs serve as basic reference material for scriptwriters, researchers, producers and evaluators. Programme briefs facilitate the scriptwriters and producers to the given mandate and help them remain on track while developing audio and video scripts and producing final programmes.

Script as the core of the programme

The script is the foundation of any programme whether for stage, radio, film, television or videotape. It is crated and evolved step by step into a carefully designed blueprint that provides detailed instructions for actors/participants, technicians and producers who finally transform the script into a worthwhile listening experience or a viewable programme. In the ultimate analysis, the script is the ‘core’ of any educational audio or video programme. In other words, we can say that it is the quality of the script that determines the quality of the programme.

At this point, we may return to the basic questions raised earlier. How are educational audio and radio scripts planned and developed? What is the scripting process like? What are the steps involve in the scriptwriting process?

Undoubtedly, planning and writing educational audio/video scripts is a demanding task. It requires intelligence, imagination, creativity, knowledge of a subject, a deep insight into the nature, attributes and constraints of the medium, its language, grammar and techniques and above all the ability and willingness to work in a team.

The felicity of the language and the skill to convert simple ideas into powerful aural (audio) experiences and/or to transform abstract ideas and concepts into visual illustrations and appropriate analogies, are other important traits of scriptwriters of educational audio and video programmes.

Developing scripts for radio/audio programmes

Writing for radio differs from other forms of writing such as 'writing for print' or 'television'. The reasons are given as follows:

- In radio/audio writing, words are required to be spoken and heard (not required to be read).
- Unlike a television of film viewer, the radio listener only hears the speaker (but does not see him/her).
- The potential listeners, especially those targeted in open schooling and distance learning systems, comprise of all ages and conditions and have vast variations in their levels of understanding, achievement and intelligence. In this case, therefore, the audio/video writer must use the simplest possible language and avoid long, usual and bombastic words and sentences. In other words, ew may say that the educational radio/audio writer must learn to:

    - Write for the ear, not the eye,
    - Write for speaking, not for reading,
    - Write in a simple language, using short sentences so that he/she is understood correctly, and not misunderstood.

General guidelines for radio/audio scriptwriting

Writing for educational audio/radio programmes appears to be a rather simple activity. It is, however, not so in actual practice. It is a demanding task that requires a lot of creativity and imagination. Whereas the ways to writing may vary form writer to writer, the process of script development entails a few essential steps, which all writers follow consciously or unconsciously. The general guidelines that we present below will provide you a better insight into the scriptwriting process for radio/audio.

Carry out programme research

Once you have acquainted yourself fully with a particular 'programme brief' or have thoroughly understood the scriptwriter's mandate in terms of general objectives, content, target audience and programme length, your first task is to carry out a through research on the given topic/ content by consulting books journals, experts and other knowledgeable people or subject specialists. You must keep your target audience and programme objectives in focus while selecting appropriate content and authentic information. You must also ensure that your facts are correct and up-to-date. You must double check every bit of information before you put in your script. Always look for some information that may enrich and provide interest to your storyline. Select only the most relevant content, resources and ideas, which match your programme objectives.

Select key ideas

The next step is concerned with the selection of content for the programme. Here, you have focus on the basic content and reduce in to a few key ideas. Put these key ideas in a logical sequence and this will help you define the main focus or the central theme of your program. You will also be able to decide on the weightage and emphases you need to give to different programme objectives.

Make a plan

At this point, you are ready to concretize you presentation strategy. You may choose a special format or combination of formats to put your content in certain style, pace and sequential continuity. You are ready with a detailed story structure or script outline, which is essential designing a draft script.

Write your draft script

While putting your draft script on paper, the most essential rule to follow is to always keep individual listener in focus. That means you must address your writing to one person, not thousands and millions of distance learners. Radio, of course, is a mass medium, yet your was end up in the mind of one person, i.e. the individual listener. Radio writing is, therefore, an intimate, one-to-one talk. It is just 'you' and 'me'. By that reason, you must consciously construct your sentences in 'active voice'.

Think of a good beginning and a good end

Give adequate attention to the beginning of your programme. The first sentence or the open of the programme. The first sentence or the open of the programme must be interesting and should hold the listeners attention. Thereafter, you may follow it with other key points and ideas linking them together in a sequence that you already decided above. Join each sequence by signposts of aural indicators, which will help draw the listener's attention and move from one point to the other.

After you have dealt with all key points in your script, spend some time on finding a good of your programme. In educational radio, it is a good idea to return to the introductory remark end the programme reinforcing the same point. There can be several other interesting way round off our pgoramme. For example, you may choose to leave your listeners with a spy theme, a punch line, a particular action or task. The programme must close on a positive me and in natural way – not in an abrupt, sudden or unnatural fashion. Openings and closing although most difficult to visualize and write certainly make radio programmes a memorable experience for the listeners.

Check and rewrite

Write the draft script in your hand, it is now time to shape the final script. It is the good idea I discuss the draft script with some of your colleagues or media experts to get their reaction suggestions and incorporate the same in the revised version of the script. Now, read you're to yourself and ask the following type of questions:

- Is the script interesting? (If not, change it.)

- Is it easy to understand? (If not, replace difficult words and expressions with simple and straight ones.)
- Is it accurate and authentic in information and content? Is it free from controversies that may invite criticism or an objection later? (If not, update it.)
- Are there too many facts and details? (If yes, reduce and simplify.)
- Is it logically sequenced? (If not, alter the sequences accordingly.)
- Does the content match with the given objectives? (If not, modify the content.)
- Does it have enough 'signposts' for joining different key points? (If not, add more.)
- Does it begin and end with a punch or memorable sentence? (If not, add think more and modify.)
- Is the language conversational so as to engage the listener in a one-to-one interaction? (Remember that it will be
- Are the sentences and phrases short and simple to understand and speak? (Modify to remove tongue twisters and bombastic words and phrases.)

As you answer the above kind of questions to yourself, you must try to revise, refine and rewrite your script into the final form. One golden rule to test eh quality of your script is to read it out aloud to yourself – speaking reach sentence one, twice, thrice, exactly in the same way you would like it to be heard. In this way, you can modify, rearrange, refine and polish your language and ideas on the basis of your own feedback and judgment. You may add some more attention-catchers in your script, if you find the need to do so at this stage,

The final script, as described above, is ready for recording at this stage. The radio producer will arrange all studio facilities and production resources, crew and artists to produce and record the programme for broadcast or playback.

The educational audio script, in its final form, must indicate all relevant instruction in CAPITAL LETTERS so that these are not mistaken for a 'dialogue to be spoken'. Instruction on the script can also be underlined, as these are not to be spoken by actors or performers. Such instructions must be noted and followed both by the artists and the production crew.

Developing scripts for TV/video programmes

Writing for television or video is a kind of visual scripting. It is just not an activity or coordinating words with pictures in sequential continuity. It requires intelligence, creativity, drawing capability, knowledge of the medium, its nature, language, grammars and techniques.

Television or video is primarily a visual medium. That means it is the visuals or pictures that come first, and are the main carriers of messages. Words do have their place but only in support of the visuals. Many a time, pictures need no words; they speak for themselves and make powerful statements. A TV/video scriptwriter has, therefore, to learn to think in terms of visuals, visual ideas and visual illustrations for ideas.

In television, a writer has to communicate in an entirely new language: in which the writer uses the video camera as his/her and all the different kinds of shots, movement devices, techniques,

effects, transitions, dialogues, sounds, noises and even silences as his/her language. Writing for TV/video is thus quite different from other forms of writing particularly 'writing or print' or 'writing for radio'.

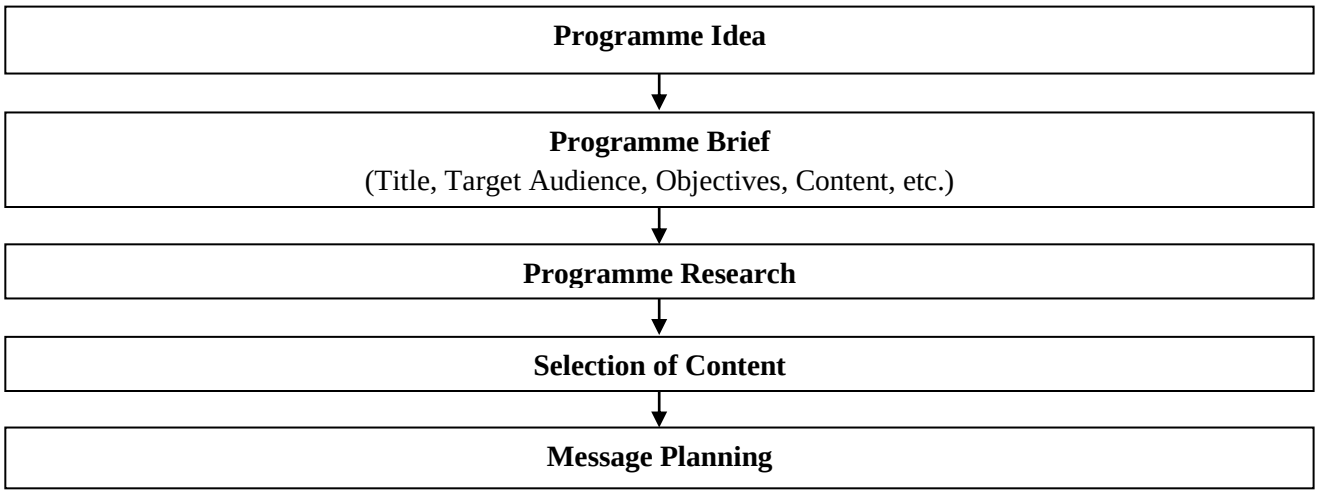
Writing as such is a solitary activity. However, writing for television or video is largely a co-operative effort; a team mode approach. It may be seen as a sort of a continuous dialogue or a constant interaction among the scriptwriter, the researcher, the subject specialist, the producer and other members of the production team. This dialogue or interaction generally begins with a 'programme idea' or a 'programme topic' or a 'theme' around which a video script is proposed to be evolved and continuous up to the end when there is no time left and the programme script has got to be finally produced. While the scriptwriter is the principal architect of the script other team members contribute in many different ways to its instructional effectiveness, authenticity, visual quality, technical perfection and overall embellishment. To put it differently, we can say that video or television scripts are evolved step by step. Creatively, imagination and cooperative effort are the key words in the video scripting process.

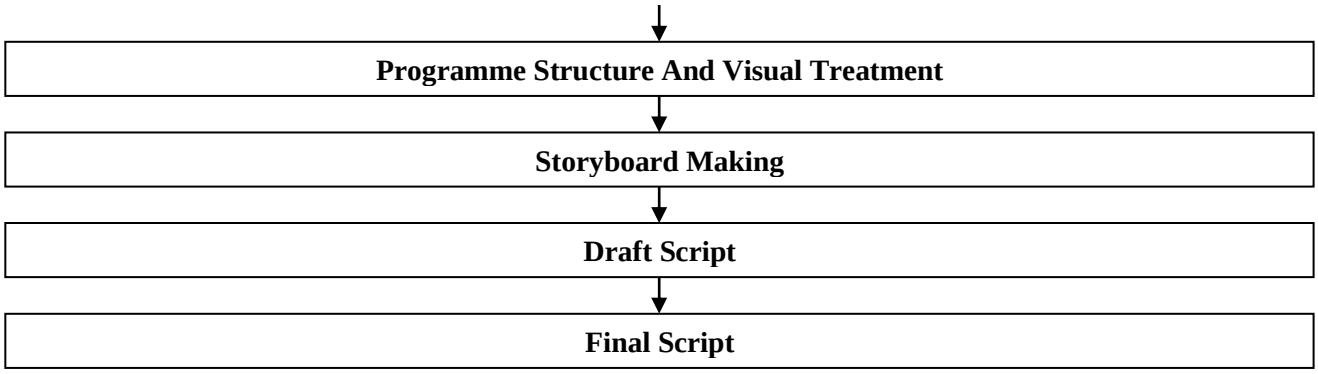
Process of TV/video scriptwriting

It is rather difficult to describe what the video scriptwriting process like. Experiences vary from writer to writer and from script to script, and it is very hard to generalize. However, television./video scriptwriting may be seen as consisting of a series of steps or stages or processes which together and often overlap. But the basic pattern of the scripting and programming processes remain almost the same. All TV/video scriptwriters, whether consciously or unconsciously, go through these stages or steps in one way or the other. The sequence and timing of these steps may vary and even overlap in most of the cases.

Major steps of TV/video scriptwriting process

A descriptive presentation of the steps involved in the video scriptwriting process suggested below may be helpful to you. Certainly it is a loose, flexible and arbitrary arrangement. Yet this process framework will give you sufficient insight into the creative activity of TV/video scriptwriting.





Programme ideas

Ideas are basic to any kind of writing, not just television writing. Indeed, all educational TV/video scripts originate with an idea. Once an idea or a theme has been identified, it needs to be analyzed for its possible expansion into a worthwhile visual presentation. If the idea is found to be entertaining, educative and appropriate for the intended audience and suitable for television presentation, it meets the criteria for being 'production worthy'.

Programme brief

Once an idea or a theme or a topic is adjudged as 'production worthy' for TV/video production, it can be further analyzed and expended into a 'programme brief' or an 'academic note'. As already discussed, a programme brief is the first written statement-which forms the basis of an educational video script. It provides a road map to the scriptwriter.

Programme research

A well-designed programme brief delineates the parameters of the proposed video script and enables the scriptwriter to begin the process of programme research. Programme research is the most essential pre-requisite for developing a video script. It is at this initial stage that the scriptwriter must plan and carry out thorough research both on the topic as well as the target audience. He/she should look for suitable visual materials and other interesting and related information on the topic. Not only should she/he consult books, journals, census reports, yearbooks and encyclopedias hut should also talk to experts and knowledgeable people in that particular field.

At this stage, it is important for the scriptwriter to get to know the target audience well - their background, maturity level, interests, likes, dislikes preferences etc. Such knowledge about the audience enables the scriptwriter to collect, select and organizle1 relevant programme materials and information in a manner most interesting for the viewers. It is not uncommon for writers and researchers interact with small groups of their target audience and know their first-hand experiences and interests on the topic. Some writers do not attach much importance to programme research and tend to skip this step, often claiming, that they already know a lot about the topic and the audience. It is, however, a grave misconception and must be guarded against.

Selection of content

During programme research, the writer is often able to coma across a large mass of material and information (both written and verbal) besides pictorial evidence on the programme topic. At this stage, therefore, he/she must go through this mass of materials and select the most relevant material, visual resources and information which match the programme objectives, are relevant to audience needs and interests and are sufficient to cover the given content and fill programme time most appropriately.

To put it conversely, the scriptwriter must eliminate what is not relevant to programme objectives or is not likely to click with the viewers or may go over-their heads, or may even unnecessarily lengthen the programme and increase its information size.

Message planning

Message planning is the most decisive and creative stage of video script development. Here, the scriptwriter explores interesting ways of dishing out his/her programme to the audience. Many options and considerations come into sharp focus and the writer has to design a strategy taking appropriate decisions on each of the following aspects:

- Identifying key teaching concepts or ideas to be highlighted.
- Selecting a suitable format or a combination of formats for presenting the programme.
- Adopting a particular programme style and approach.
- Exploring media possibilities; use of visual examples and analogies, graphics, photographs, reality bites, stock shots, animation, experiments, demonstrations and other resources, both visual and aural.
- Choosing a definite storyline for message presentation: using human characters in the story - men, women, children, presenter, anchor, puppets, cartoon figures, animals, birds etc.

While deciding on the above aspects, as suggested earlier the writer must always keep in view: (i) the nature and requirements of the topic or the subject, (ii) viewers' age, characteristics, needs and interests, (iii) programme objectives, and (iv) a balanced presentation of the given content in an interesting way.

Programme structure and visual treatment

Programme structuring is the creative process of giving the programme a definite shape and form. It is at this stage that the programme begins to unfold its shape or structure with a clear-cut storyline with a beginning, a middle and an end. Here, the scriptwriter must give some thought to such questions as:

- How will the programme begin? (or what will be the first or introductory sequence of the programme?)
- How will the programme end? (or what will be the concluding sequence of the programme?)
- What will be the shape and Order of the sequences that will form the middle part (or the body) of the programme?

- How many sequences will the programme finally contain? And in what order?
- What will be the length, sequence, emphases and amount of educational content of each of the sequences?
- Does the content of each of the sequences contribute to and match the programme objectives set out in the beginning? If yes, to what extent? If .not, how can content and objectives be matched optimally?

While finding solutions to such questions as noted above, the writer must rethink of a good beginning for the programme. Most often, it is the introductory sequence which holds the attention of the audience and keeps their motivation high for receiving the rest of the programme. On the contrary, however, if the beginning is uninteresting and dull, the programme may fail to click with the viewers.

The scriptwriter should also devote some time to think about a good natural ending for the programme. Viewers invariably tend to like and remember for long a programme that ends on a cheerful and satisfying note and provokes them to think and act in the desired way. Rest of the sequences that constitute the middle part or the body of the programme, must also receive writer's attention in the same way - arranging the visual and aural content logically and meshing it with the given objectives.

As the programme structure takes a definite shape, the writer has to work out simultaneously a detailed visual treatment for different sequences of the programme. The visual treatment must provide at each step a full description of:

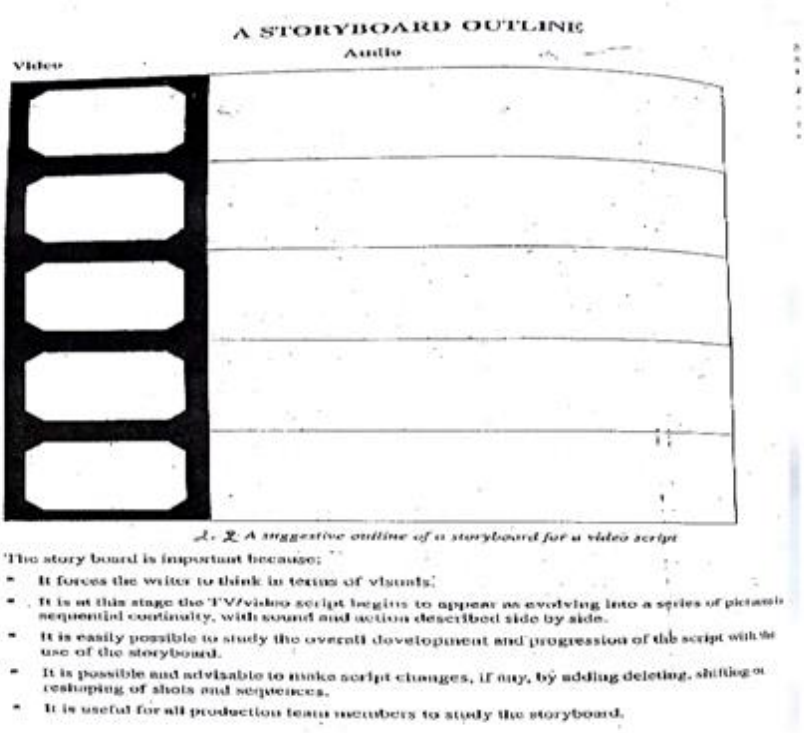
- What will the viewers see?
- What will they hear?
- What will they think?
- How will they feel and react to a particular visual sequence or a part of it?

In this process, the writer must again think of and provide for visual illustration and analogies for abstract ideas and key concepts proposed to be presented in the programme. Different sequences of the script should be arranged in a logical and natural order so that they appear to be evolving from one sequence to the other. The writer must also think of and decide on possible visual and/or aural links or transitions from one sequence to the other. It is very helpful to draw a 'timeline' showing how Much time should be devoted to each sequence keeping in view: (i) the coverage of the content, (ii) weightage or emphasis on programme objectives and key teaching points, and (iii) the attention span of viewers. Some scriptwriters, especially those who write for young children, draw up an 'interest curve' or a 'tension chart' to ascertain uninterrupted attention of viewers.

Storyboard making

The storyboard means a detailed, shot-by-shot description of the programme on sheets of paper divided into two vertical columns. The rectangular boxes (3:4) in the left hand column are used for drawing pictures/sketches with shot sums described on each; and the right hand column is used for writing supporting words, sound effects and music, as shown in Figure 2.2.

A STORYBOARD OUTLINE



2. 2 A suggestive outline of a storyboard for a video script

A suggestive outline of a storyboard for a video script

The story board is important because:

- It forces the writer to think in terms of visuals.
- It is at this stage the TV/video script begins to appear as evolving into a series of pictures in sequential continuity, with sound and action described side by side.
- It is easily possible to study the overall development and progression of the script with the use of the storyboard.
- It is possible and advisable to make script changes, if any, by adding deleting, shifting or reshaping of shots and sequences.
- It is useful for all production team militias to study the storyboard.

Some experienced TV Scriptwriters skip the storyboard stage and straightway prepare a draft script. For beginners, however, storyboard Making is immensely useful and is strongly recommended. Let's at this stage describe a little more about a draft script and the final script.

Draft script

The storyboard, when complete, at once road to the preparation of a draft script. The draft script is the first full length script that includes a complete listing and description of all visuals, captions, accompanying commentary, dialogues, actions, movements, music, sound effects and any kind of pre-recorded inserts or audio/video inputs. The draft script must be shared and discussed with all team members, experts as well as the producer to get their reactions and suggestions on various aspects. The scriptwriter must be open to criticism and ideas fur improvement of the Script should be welcomed.

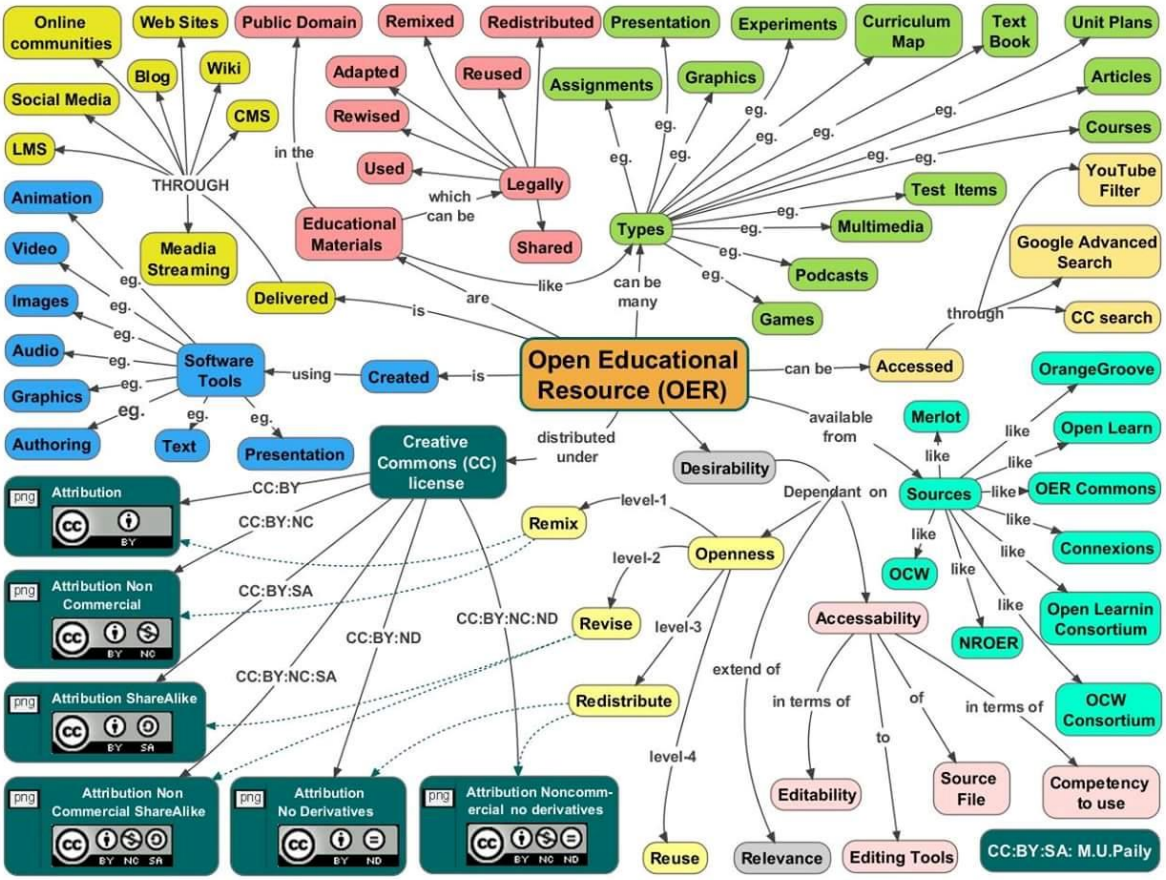
Final script

At the final script stage, the writer incorporates all suggestions made at the stage of the draft script. This stage suggests that the scriptwriter has more or less finally accomplished his/her job. In most cases, he/she hands over the script to the TV producer. As the scriptwriter usually bows out at this stage, the producer and his/het team take over. However, the interaction between the scriptwriter and the producer and other team members must continue up to the point the programme has been finally produced.

From the above description, it may be amply clear that video scriptwriting is a co-operative activity. It is not just a process of writing words and sentences and thinking of pictures to accompany them or vice versa. TV/video scriptwriting is indeed a highly creative process. Video scripts are evolved bit by bit, rather than written. That is why each video programme is unique Milts message, design, format, style and technique. In all cases, however, a video scriptwriter must go through all the stages and processes of script development as described above.

SOURCES

e-Pathshala
National Repository of Open Educational Resources (NROER)
e-pgpathshala
Gyanpitara
Karnataka Open Educational Resources (KOER)
Open Education Resources (OER)



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LIST OF PRODUCTIONS AND STUDIO ENGAGEMENTS - 2024-25

Facilities Available in the Studio

1. Studio/Live studio

2. Content distribution system

3. Lecture Capturing System (LCS)

4. Teleprompter

5. Editing and graphic unit

6. Drone

LIST OF E-CONTENT DEVELOPED IN-HOUSE

S.No.	List of e-content developed in house	Courses for which e-content is developed in house	Teacher engaged in e-content development
1.	Aasta Chamma	RIE Bhopal	Dr. Sanjay Pandagale
2.	Telescope - MeraKhilona	RIE Bhopal	Dr. Shivalika Sarkar
3.	Gudiya	RIE Bhopal	Dr. Suresh Makwana
4.	Janak Didi	RIE Bhopal	Prof. N.C Ojha
5.	Sangeet Ki Dhoon	RIE Bhopal	Dr. Suresh Makwana
6.	Khilona	RIE Bhopal	Dr. Suresh Makwana
7.	Apda seva	RIE Bhopal	Dr. Seybu
8.	Dharoher	RIE Bhopal	Dr. Suresh Makwana
9.	Kabira- Khada Bazar Main	RIE Bhopal	Dr. Arunabh
10.	RIE Bhopal Documentary	RIE Bhopal	Prof. N.C Ojha
11.	Swatchta Song	RIE Bhopal	NCERT/DMS
12.	Vishala Promo	RIE Bhopal	Prof. N.C Ojha
13.	TRI Audio File	RIE Bhopal	Prof. N.C Ojha/ Dr. Suresh Makwana
14.	TLM Video Sports Day	RIE Bhopal	Principal
15.	TLM Video Shiksha Spatha	RIE Bhopal	Principal
16.	TLM Video DMS School	RIE Bhopal	Principal
17.	TLM Lecture	RIE Bhopal	Principal
18.	Yuva Sansad	RIE Bhopal	Dr. Kulveer
19.	Kala Utsav	RIE Bhopal	Prof. N.C Ojha
20.	Malhar Drama	RIE Bhopal	NCERT
21.	PehliBoondDhara Per Aayi	RIE Bhopal	NCERT
22.	DCTE English Lectures	RIE Bhopal	Dr. Ganga Mehto

Film Developed by Studio

S.No.	Programme	Class	Remark
01	Aasta Chamma	Secondary	Documentary
02	Telescope - MeraKhilona	Senior secondary	Documentary
03	Gudiya	Primary	Documentary
04	Janak Didi	Senior secondary	Documentary
05	Sangeet Ki Dhoon	Senior secondary	Documentary
06	Khilona	Primary	Documentary
07	Apda seva	Senior secondary	Documentary
08	Dharoher	Secondary	Documentary
09	Kabira- Khada Bazar Main	Senior secondary	Documentary
10	RIE Bhopal Documentary	Senior secondary	Documentary
11	Swatchta Song	For All	Song
12	Vishala Promo	Senior secondary	Educational Promo
13	TRI Audio File: Prime minister's 'Man ki Baat' President's Speech	5000 Files edited	PM/President Audio file
14	TLM Video Sports Day	Senior secondary	TLM
15	TLM Video Shiksha Spatha	Senior secondary	TLM
16	TLM Video DMS School	Senior secondary	TLM
17	TLM Lecture	Senior secondary	TLM
18	Yuva Sansad	Senior secondary	TLM
19	Kala Utsav	For All	Associate Editor
20	Malhar Drama	For All	Drama
21	Pehli Boond Dhara Per Aayi	Poem secondary	Poem

Achievements

E-contents related to the various subjects of different levels were developed. Nine documentaries, namely, 'Aasta Chamma', 'Telescope – Mera Khilona', 'Gudiya', 'Janak Didi', 'Khilona', 'Apda Seva', 'Dharohar', 'Kabira- Khada Bazar Main' and 'RIE-Bhopal' were developed. Except RIE-Bhopal all the documentaries were nominated to different national Competitions. Out of these, 'Telescope – Mera Khilona' and 'Gudiya' received the best documentary award in the national audio-video, e-content competitions-2025. 'Apda Seva'

received the award in National competition oganised by National Institute of Disaster Management (NIDM), New Delhi. ‘Deogarh’, a documentary on Gond Dynasty won the best prize in ‘Chitrabharti’, Mahakaushal Film Festival, Jabalpur, Madhya Pradesh.

5000 Files Audio files were edited in Hindi and Bhili language which are related to Prime minister’s ‘Man ki Baat’ President’s Speech.

Standard Operating Procedure (SOPs)

For Studio Services of the Institution

For availing any kind of Studies Services of the institutions, following SOPs are to be followed:

1. The Program Coordinator (PC) needs to submit the Note Sheet to the in-charge Studio with the approval of the Principal, at least, before 05 (Five) days of the commencement of the Program (excluding holidays), after obtaining the status of availability/engagement of the Studio for the required duration from the In-charge, Studio.
2. The time, venue, date, duration of the program and the activities to be performed needs to be specified, in the approved Note sheet.
3. For Outdoor services, the PC needs to provide the list of equipment required for the programme, in consultation with the studio team. The equipments will be issued to the PC, as per the list submitted/equipments available. It is the responsibility of the PC to submit the equipments immediately after the completion of the programme, in the exact/same condition it was issued. The PC will be held responsible for any wear and tear/loss of the equipment.
4. For shooting/recording (indoor/outdoor) of e-content/documentary, the PC must submit the Script to the in-charge studio. After the approval of the script by the competent authority, the shooting shall be allowed, keeping in view the availability of time/slots of the studio.
5. The PC must submit the approved script along with the properties required for the e-content/documentary prior to the shooting/recording schedule.
6. The PPT/Script (digitalized version) of the e-content/documentary must be submitted to the studio Team before shooting/recording.
7. The PC must submit the PPT/Graphics (if, required) before the editing to the studio team, if any.
8. For live telecasting/on-line meeting (Google meet/zoom meeting) the PC needs to provide the respective link(s) to the studio team with the approved note sheet before 05 (Five) days of the commencement of the Program (excluding holidays).
9. Approval of the Artists/VO Resource Person(s)/Technical Personnel(s), etc. required for the e-content/Documentary must be taken in advance and be submitted to the In-charge, Studio.

Note: Notwithstanding the fulfillment of any of the above point(s), the competent authority reserves the decision to provide and/or not to provide the studio services to the PC for any other reasons. In the event of non-compliance of above point(s), the PC will be held responsible.