Guidelines for Development of Engaging eContents for Educational Television

Version 2.0

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SECTION I

INTRODUCTION

1.1 Background

Education as a human endeavour has undergone various transformative changes across time. Learning in ancient times based only on verbal communication has passed through multidimensional transformations or evolutions leading to the metamorphosis of the state of affairs. Education and technology have shared bi-directional relationships and therefore, the process of learning and teaching has always been emulative in adopting new technologies contributing to the enhancement of learning outcomes. With the phenomenal development in science and technology, education has now come to virtual classrooms. The versatile, vigorous and virtual growth in information and communication technology (ICT) has equipped education with abundant potential and possibilities.

Recently, the bi-directional relationship between education and technology has changed from assistive to essential. The role of technology as an assisting tool in the delivery of education has broadened beyond the core concerns of education. Technology has now become an enhancer and enabler and also ensures education delivery. Education policies have always acknowledged the immense and indispensable potential of technology for education through various schemes and projects. Recently, this has received further impetus in the National Education Policy 2020.

1.2 National Education Policy 2020

The National Education Policy 2020 (NEP 2020) was announced by the Ministry of Education (MoE), Government of India (GoI) on 29 July 2020. The NEP 2020 is the first education policy of the 21st century and replaces the thirty-four years old National Policy on Education (NPE), 1986. Built on the foundational pillars of Access, Equity, Quality, Affordability and Accountability, this policy is aligned with the 2030 Agenda for Sustainable Development Goals (SDG4) and aims to transform India into a vibrant knowledge society and global knowledge superpower by making both school and college education more holistic, flexible, multidisciplinary, suited to 21st century needs and aimed at bringing out the unique capabilities of each student.

1.3 Ensuring Equitable Use of Technology in Education

Of various salient features of the NEP 2020, the key areas of focus include two major issues i.e. (i) Technology Use and Integration; (ii) Online and Digital Education for ensuring equitable use of technology. The emphasis on technology use and integration in education is aligned with the developmental goals of the country in general and education in particular. The policy has provisions for leveraging every available technology for ensuring accessible, equitable, affordable and quality education for all with accountability.

1.4 PM eVIDYA: DTH TV for School Education

In recent times, the use of television as an effective medium has received further impetus with the Government of India's move to support educational activities of school children especially during the outbreak of COVID-19 pandemic. The outbreak of COVID-19 pandemic in the recent past in 2020 and the sudden closure of schools exposed the limited ways of access to quality education residing in all the corners and all the sections of the learner in the country. It showed the great digital divide that existed in the country. In order to cater to the learning needs of the learners of the country and to overcome the learning loss, the GoI insisted upon the use of TV and radio as media for dissemination of educational material/ eContent. As access to the internet was limited to metropolitan and big cities, TV was thought to be a medium to have a larger reach in an economical manner. As a result, the PM eVIDYA initiative was started by the GoI from September 2020 onwards to cater to the learning needs of the school children.

From the existing channels of the SWAYAM PRABHA, 12 channels under "One Class One Channel" were solely dedicated to school education with one channel dedicated for one class from class 1-12. This initiative was started as part of *Atma Nirbhar Bharat Abhiyaan* or Self-Reliant India Movement announced by the Hon'ble Prime Minister on 12th May 2020. As part of the Hon'ble Prime Minister's appeal for *Aapda me Avsar* in the difficult times of the pandemic and in order to attain the goals of *Atma Nirbhar Bharat Abhiyan*, the Hon'ble Finance Minister exclusively mentioned that the aim of the initiative was to ensuring learning for all, with equity, so as to cover all students at all levels of education and in all geographical locations, even in the remotest parts of the country. The 12 DTH TV channels started telecasting curricular videos based on NCERT's textbooks with a mix of co-curricular videos and live interaction with experts. As part of the multi-modal strategy of NEP 2020, the curricular videos have also been made available on Digital Infrastructure for Knowledge Sharing (DIKSHA) platform as coherence. Since then, the viewership of these channels has increased and on the Jio TV app the viewership has reached around 95 lakhs and on the YouTube channel of NCERT about eight crore seventy five lakhs.

PM eVIDYA was rolled out in integration with various other ongoing initiatives such as, DIKSHA branded as "One Nation, One Digital Platform" and designed as Digital Infrastructure for School Education, Study Webs of Active–Learning for Young Aspiring Minds (SWAYAM) online courses in Massive Open Online Courses (MOOCs) format for school education, IITPAL (IIT-Professor Assisted Learning) for IITJEE/ NEET preparation with an addition of 12 DTH TV Channels.

With the successful implementation of PM eVIDYA initiative especially the 12 DTH TV channels branded as "One Class One Channel", the GoI, as per the Budget 2022-23 announcements, has decided to expand the 12 DTH TV channels to 200 more channels to enable states and UTs to provide quality supplementary education in regional languages.

1.5 Guidelines on eContents for Educational Television

The guidelines on eContents for Educational Television is an outcome of the emergent leveraging of educational television as a coherent tool for disseminating eContents amongst the unreached students due to limitations of various sorts including lack of ICT infrastructure and therefore, access to the resources pertaining to digital and online education.

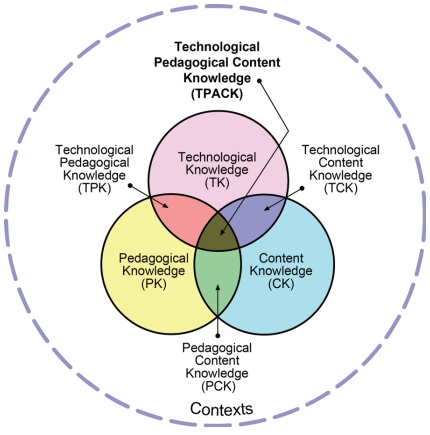
TV is audio-visual medium and despite its existing potential, generically it is a one-way medium and therefore, it lacks interactivity which is an essential element for active learning. Hence, in the process of leveraging educational television as a feasible tool for dissemination of eContents at par with other ICT tools, it is imperative to design and develop the eContents that can address the engaging issues of the TV as a medium.

The development of eContents for educational television for assuring engagement of the viewers necessarily needs to fulfill 3 tasks: **entertain**, **engage** and **educate** i.e. any eContent from design to dissemination must carry such elements or features so as to fulfill these three tasks. For developing eContents for educational television, following points must be considered as pre-requisite before embarking upon the technical guidelines for production and dissemination of the eContents.

Points to Consider for Preparation of Engaging eContents

1. Age: Age appropriateness is of prime importance in the selection of type/format, language, graphics, animation, sound-effects etc.

2. Grade: Grade appropriateness corresponds to age appropriateness, however, it refers to appropriate balance of technology, pedagogy and content (known as TPACK model) i.e. the eContent should utilise grade appropriate pedagogy.



3. Format/Types: eContents or programs whether syllabi-based or enrichment programs can be designed in various formats namely illustrated lectures, drama, documentary, docu-drama, dramatisation-

based program, experiments-based illustration, illustration of models, animation, location shooting, spot interviews, biographical sketch, story-based programs etc can be taken as formats for creating eContents.

4. Script: Script needs to be in simplest language based-on a predefined format for the proposed program, well-knit, and detailed with instruction for production process.

5. Production: Production from recording to editing of the program needs to be creative (accommodating suggestive modifications for script) and enriching the script in terms of production tools i.e. graphics, animation, sound effects etc.

Since eContents for educational television lacks interactive elements at large, the element of **interactivity** can be brought in with the help of quizzes, assignments and games for ascertaining viewers' engagement and participation.

All tasks pertaining to the development of eContent for educational television should be a creative team-work hence work in silos must be avoided at all stages of development. All team members beginning with subject-matter experts to script writers and production team including graphic artist, sound artist, and special effect artist to editors need to work in a collaborative and cooperative manner.

Besides the principle points mentioned above, following points based-on researches are worthwhile to consider while making educational videos:

- On-screen text or symbols can be highlighted for the important information. In a similar way the appearance of two or three key words, a change in color or contrast or a symbol can draw attention to a region of a screen (deKoning et al., 2009).
- While scripting the chunking of information will allow learners to engage with small pieces of new information as well as to give them control over the flow of new information (Guo et al., 2014).
- While making videos, extraneous information can be eliminated from the video, that is, information that does not contribute to the learning goal. For example, music, complex backgrounds etc (Ibrahim, 2012).
- To make video engaging use of both the audio/verbal channel and the visual/pictorial channel should be used to convey new information (Mayer and Moreno, 2003).
- Animation can be used for younger students demonstrating the process on screen while narrating so that it uses both channels to elucidate the process (Brame, 2015).
- Use of conversational rather than formal language during multimedia instruction has been shown to have a large effect on students' learning, perhaps because a conversational style encourages students to develop a sense of social partnership with the narrator that leads to greater engagement and effort (Meyer, 2008).
- Student engagement was dependent on the narrator's speaking rate, with student engagement increasing as speaking rate increased. It can be tempting for video narrators to speak slowly to help ensure that students grasp important ideas, but including in-video questions , "chapters", and speed control can give students control over this feature—and increasing narrator speed appears to promote student interest (Guo et al., 2014).
- When telling a story, it can be very effective to show the storyteller's face or to show an animation of the story. When solving a problem, showing students step-by-step with narration how to work through the problem. When teaching about an invisible phenomenon, it can be helpful to provide an illustration. In each case, providing visual elements that add to the lesson can not only promote student understanding but also engagement with the lesson (Guo et al., 2014).

- Asking questions can encourage inquiry and exploration which may have greater success in initiating dialogues with their children around television content (Vural, 2013).
- Guo, Kim & Robin (2014) found that Shorter videos are much more engaging, Videos that intersperse an instructor's talking head with slides are more engaging than slides alone; Videos produced with a more personal feel could be more engaging than high-fidelity studio recordings and Videos where instructors speak fairly fast and with high enthusiasm are more engaging.

SECTION II

TELEVISION AND EDUCATIONAL TV

2.1 Television: A Historical Overview

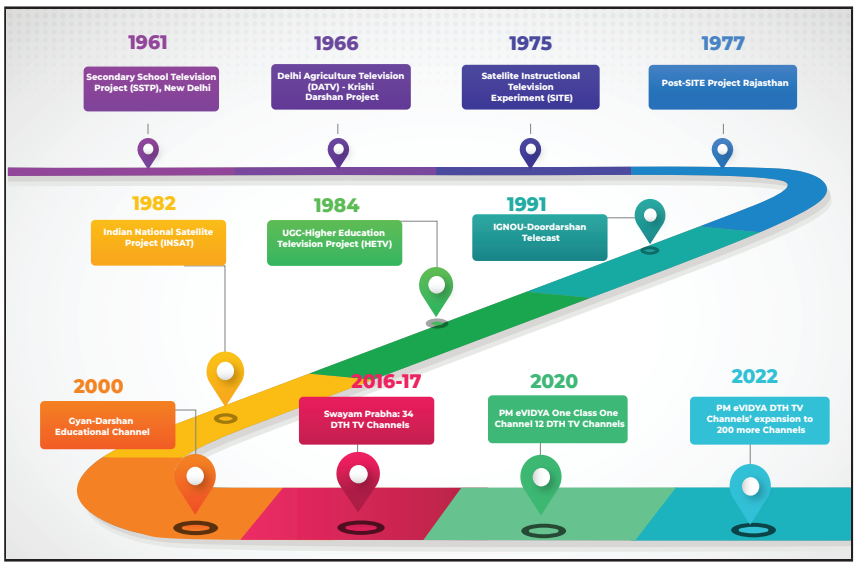
Television, one of the most significant inventions by mankind was designed and developed by J. L. Baird in 1927. It is an audio-visual device used for dissemination of information, entertainment and education. Television has also passed through generations of transformations along with developments in electronics, information and broadcasting technology. In present times, television has evolved into smart television due to technological convergence with computer technology. Television broadcasting has also undergone paradigm shifts from analogue to digital and community antenna to DTH besides the latest developments designated as IP TV.

In India, television was put up for demonstration at an exhibition in Madras (now Chennai) in January 1950 and the first transmitter of India was installed in the Electronics and Telecommunications engineering department of the Government Engineering College, Jabalpur, on 24 October 1951. Television was first used in Srinagar in a house, which was a huge milestone for the TV industry. Wider use of television in India started with the experimental telecast in Delhi on 15 September 1959 with a small transmitter and a makeshift studio. Encouraged by UNESCO, India started using this medium for educational purposes.

2.2 Television and Education

Television as an audio-visual and sophisticated scientific device has enabled us to disseminate information to larger mass in remote places. The unique feature of combining audio and visual technology has made television effective and preferable than audio media. By virtue of its inherent features, television serves multiple purposes of entertainment, information and education. It is precisely due to the unprecedented features of television that it was adopted to be used for educational purpose soon after its invention in 1927 and as early as in 1932 by State University of IOWA in USA on an experimental basis and continued with great interest by educationists thereafter. The indispensible role of television in daily life motivated the educationists to extend its application in teaching and learning and gradually television as an instructional medium began to spread across the world.

In India, as noted above television had arrived in 1950s and ever since its inception television has been perceived as an efficient force of education and development. The first project on educational use of television named Secondary School Television Project for the Secondary School Students of Delhi began in 1961. Thereafter, several projects and schemes pertaining to the use of television for educational and training purposes have been launched. The following timeline briefly captures the journey of educational television in India.



2.3 Potential of TV for Education: Reaching the Unreached

As per World Bank Report (2020), the COVID-19 pandemic has driven more than 85 percent of countries around the world to close schools entirely or partially leaving more than 1.6 billion students out-of-school (as of April 10, 2020). Countries have responded by adopting remote learning approaches with many deploying online learning solutions. However, online learning has exposed deep digital divides between and within countries, including high-income countries. Countries are therefore turning to education programs on lower-technology options like television and radio to dramatically increase access to remote learning. Many low and middle income countries have used educational television programming for decades, including Brazil, China, Ethiopia, India and Ghana. Telesecundaria, is the oldest example of educational television in Latin America dating back to 1968 and led to the formation of its education television network Televisión Educativa.

The vast majority of countries offer multiple modes of remote learning. According to the Joint Survey, most countries delivered remote learning through online media (91 percent) and TV (85 percent), followed by paper-based take home materials (82 percent), and mobile phones (70 percent) (World Bank, 2021). Television has been shown to be an exceptionally important educational tool during the pre-school years. Researchers, from the Department of Human Ecology at the University of Texas, have found that very young children 'who spent a few hours a week watching educational programs had higher academic test scores than those who didn't watch educational programs' (Science Daily). The study's lead author, Aletha C. Huston, also claims that good educational programs can provide lasting benefits to children at many ages. In a similar vein, Roger Martin, of the University of Kansas, has reported on a study undertaken by Deborah Linebarger, who found that children 'who, as preschoolers, watched educational TV engaged in more leisure-time book reading as teenagers (Wood, 2003). The social interactions that occur around television can often enhance learning opportunities for viewers. For instance, children can learn a great deal from educational television programs (Clifford et al., 1995; Dorr & Rabin, 1995; Huston et al., 1992; Huston & Wright, 1994; Wetzel, Radtke, & Stern, 1994). Also the interactions with peers and parents during television viewing can change the otherwise "passive" viewing experience into one where children actively question content (Collins et al., 1981; Dorr et al., 1989; Dorr & Rabin, 1995; Haefner & Wartella, 1987; Salomon, 1977).

2.4 eContents for TV: Various Formats

Since TV is a visual medium, videos are the basis for dissemination of information of any kind here, educational eContent. The term video is eventually being referred to as a form of eContent these days. eContent is any form of learning material available digitally which a learner access or interacts with to achieve related learning outcomes. Video is precisely one form of eContent which is the basis for dissemination of information, entertainment material and educational content through TV as a medium and through other platforms based on the internet. The commonly used format of video is .MP4 which should be used for various purposes. Other forms of eContent are often made up of separate units or a combination of text, video, images and audio.

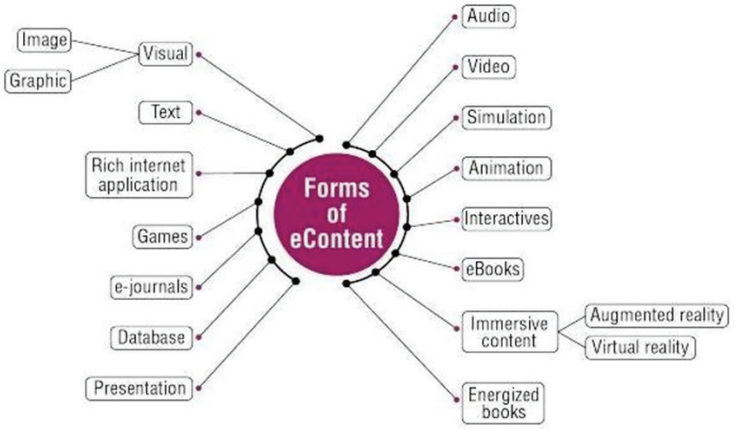


Figure: Various Forms of eContents

Gradually, technology has been making its way to revolutionizing the methods of teaching and learning. Cost, access, and time often form considerable barriers to classroom implementation, but another obstacle is a lack of knowledge regarding how technology can best be used to benefit students across diverse subject matter.

Punya Mishra and Matthew J. Koehler's (2006) suggested TPAC (Technological Pedagogical Content Knowledge) framework, which focuses on technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) offers a productive approach to many of the dilemmas that teachers face in implementing educational technology (EdTech) in their classrooms. By differentiating among these three types of knowledge, the TPACK framework outlines how content (what is being taught) and pedagogy (how the teacher imparts that content) must form the foundation for any effective EdTech integration. This order is important because the technology being implemented must communicate the content and support the pedagogy in order to enhance students' learning experience.

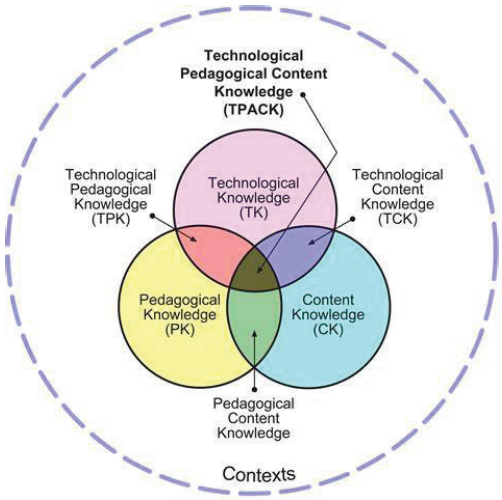


Figure: TPACK Model of Integration

2.5 Types of Programmes for Educational Television

As mentioned earlier videos can be of different types depending upon the nature of content being disseminated through them. Video progammes can be categorised into three different types that can be used on educational TV channels as given:

1. **Live broadcasts:** These involve recording a teacher teaching a live lesson in a created (not natural) classroom setting and broadcasting the recorded lesson on television. These lessons are typically aligned to the curriculum. Pedagogically strong teachers or master teachers with a good speaking skill must be identified to deliver these lessons. This type of video production can be low-cost rapid productions. Gujarat has been broadcasting such live broadcasts on its Vande Gujarat DTH TV channel.

2. **Pre-recorded broadcasts:** Another type is to have existing video content from past educational television programs or from online education providers that can be accessed 'on-demand' through their websites or YouTube. Apart from the usual telecast, such pre-recorded content can be used in various creative ways. For instance, the television teacher can play the role of an anchor who introduces different videos and strings them together into a lesson aligned to the curriculum. Some things to consider would be video quality when using existing online videos for television programs (as videos are typically compressed when hosting online) as well as licensing and copyright issues. These aspects have been discussed in the pre-production section of the guideline.

3. **Edutainment programs:** Edutainment programs are used to provide education in the form of entertainment and are typically engaging. Many countries have an expansive set of private organizations including non-profits providing forms of edutainment. Apart from in-house production, sourcing, curating and obtaining intellectual property rights for existing edutainment content from local, regional or international providers can also be considered.

Format of Educational Videos

A video can be educational video, promotional video, informational video, documentary and entertainment video. Since here the focus is on videos for educational purposes, educational videos will be the focus. Educational videos are excellent examples of teaching-learning concepts. As video uses the primary senses of sight and sound, using video in education allows concepts to be taught more easily and be retained better than reading off a page. Educational videos go beyond merely informing the viewer – these videos go deeper into the 'why' such and such is important, in addition to just the 'what'. Educational videos should be concept based, started with objectives, introduction and culminate with summary. Examples of educational videos are:

- Video Lesson Series
- Animated Videos
- Remote Online Classroom Instruction
- Online Courses with Video Lessons (MOOCs)
- How-to Training Videos
- Student 'Show and Tell' Videos
- Webinar Informational Videos
- Whiteboard videos
- Typography videos
- Demonstration/experiment-based Videos
- Documentary-based Videos of famous personalities/achievers
- Travel Videos
- Videos based on emerging technologies like Augmented Reality-Virtual Reality (AR-VR)

Though educational videos can be classified in the mentioned categories, there can be a combination of other types of videos also alongwith educational video. For example, an educational video can be in the form of documentary or drama or entertainment videos with dance and music performances (videos on Kala Utsav being telecast on PM eVIDYA DTH TV channels) and also promotional in nature for any initiative of the Government (promotional videos of ePathshala or OLabs being telecast on PM eVIDYA DTH TV channels). So, the videos suitable for educational purposes in an engaging manner should ideally have a mix of educational information and entertainment or edutainment.

SECTION III

eCONTENT FOR TV: Pre-production Guidelines

3.1 Process of production

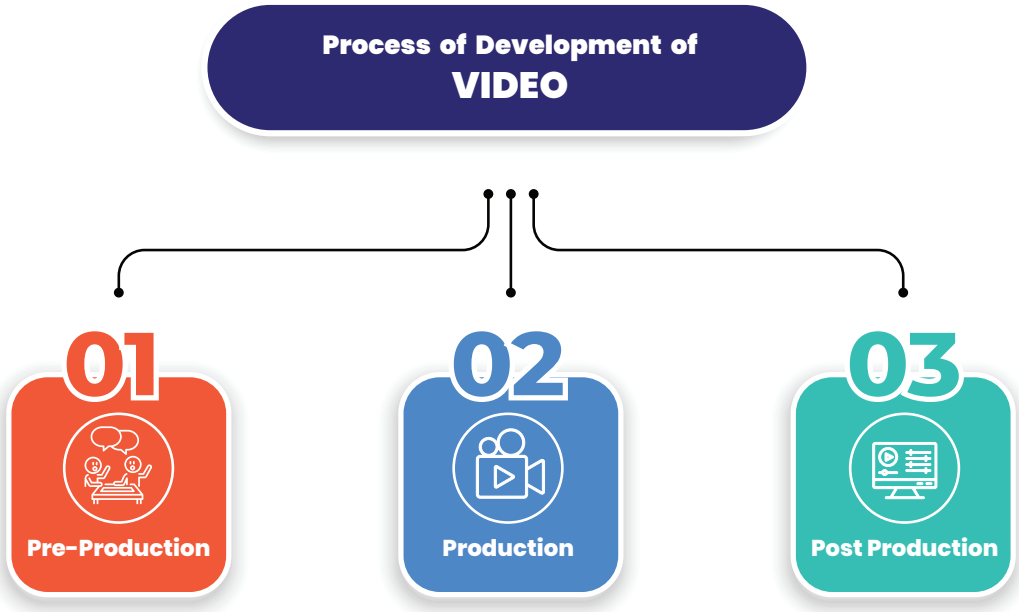
The process of production or development of an eContent or video is a teamwork process and therefore, it requires a plan, coordination and collaboration from the starting point. It is essential not only for timely production of the eContent but also determines the quality of the product. Following are the thumb rules to remember while beginning the project:

- Define a team for the project and identify the resources/resource persons for the team.
- Define timeline for every task to be done for production.
- Distribute the tasks among resource persons/team.
- Allot deadlines for every task to be done by the resource persons/team
- Discuss each task with all the team members by meeting and incorporate the inputs.

**** All this can be managed having a Production Plan Meeting (PPM) at regular interval. Besides this, it is advisable to keep a back-up plan always ready to accomplish the tasks in a timely manner.***

- A production team may consist of Producer, Subject-matter Expert (SME), Script Writer (preferably same as SME, Cameraman, Editor, Graphic Artist, Animator and finally a team of reviewers of the end product.
- Reviewers should essentially consist of both experts from production as well from the field of academics. Ideally each program should be rigorously evaluated by the target audience (i.e. students and teachers) in pilot-project mode before it is made public.

The process of development of video can be broadly categorised in three major steps:



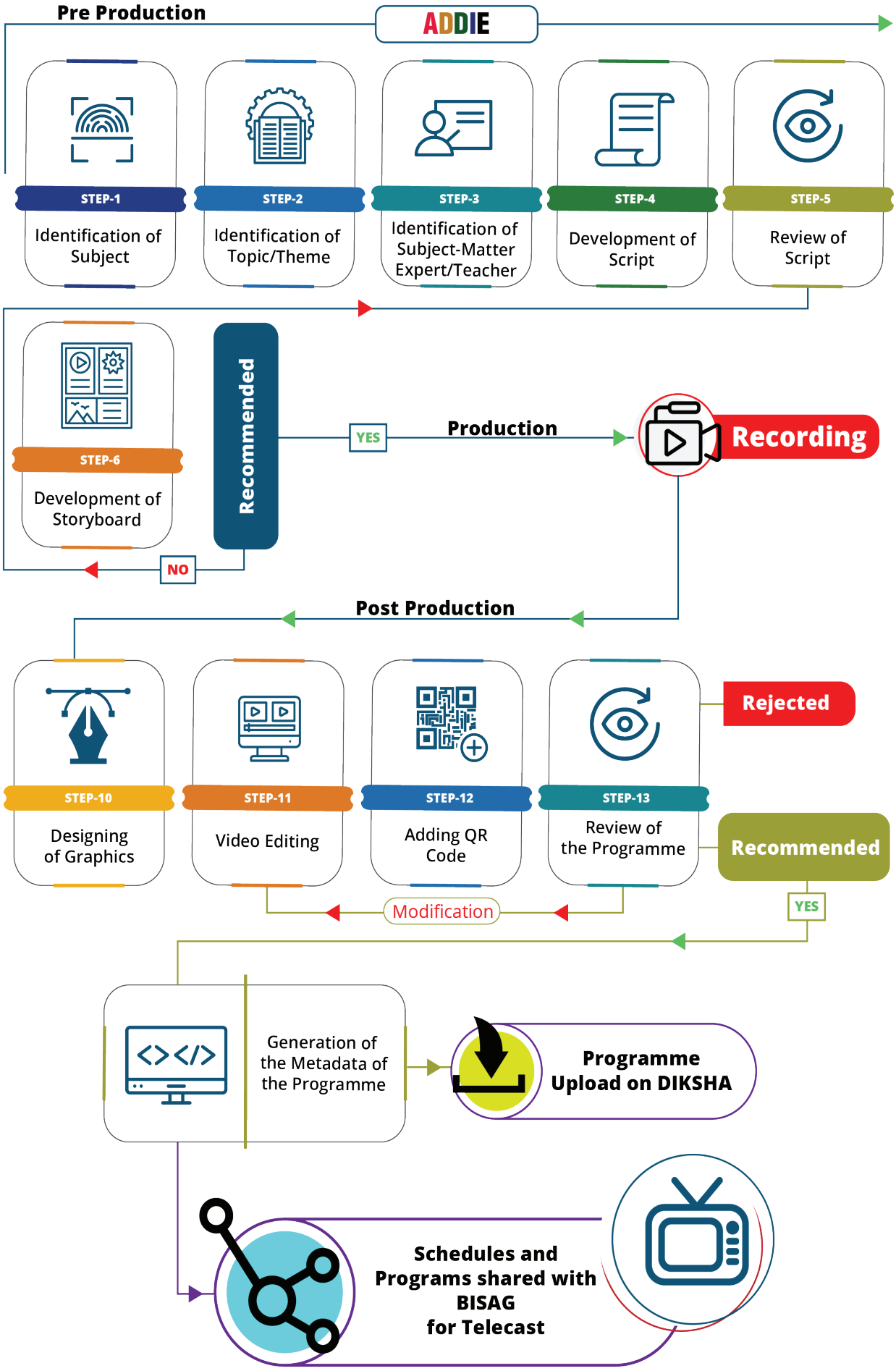


Figure: Flow Diagram of Educational Video Production and Dissemination

3.2 Pre-production Guidelines

This stage involves preparation and setting the groundwork for development of a video and involves:

1. **Identification of subject/topic and related reference-** The first and foremost requirement of development of a video is identification of the subject/topic on which the video is to be developed. Based on this, the selection of subject-matter experts is done.

2. **Selection of Subject-Matter Experts (SME)-** Subject-Matter Experts should have some proven experience of teaching/developing e-resources in their subject background. A team of SMEs should contain practicing school teachers, college and university teachers and teacher educators. They should be well-versed in writing scripts and storyboards and should be oriented before recording the video. A screen-test is mandatory before recording the video programme. Apart from other things, the fluency, efficiency and overall presentation of a SME/presenter is important to make a video engaging for the learners. An undertaking from SME should be taken regarding the content-pedagogy authenticity and appropriateness of the script/content.

3. **Instructional design-** The process of developing eContents depends upon the nature of the content and its target learners. Instructional design is the practice of systematically designing, developing and delivering instructional materials and experiences. It is required for developing effective eLearning solutions and making the eContent and here, a video engaging for the learners. There are various instructional design models available but the most commonly used one is the Analysis Design Develop Implement Evaluate (ADDIE) model. (See detail in https://ciet.nic.in/upload/GuidelinesforeContent3.pdf).

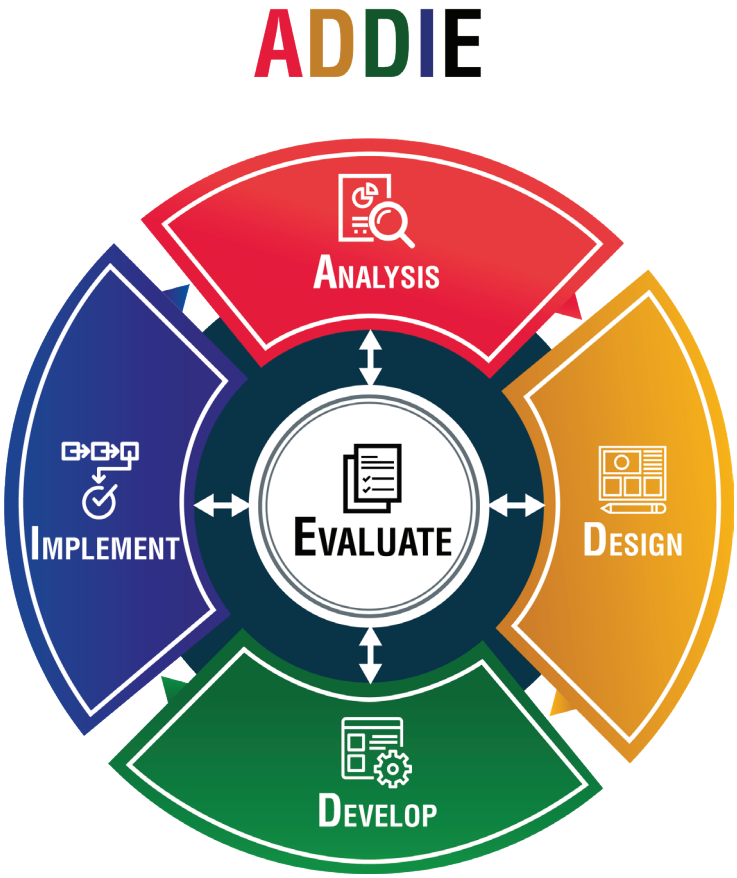


Figure: ADDIE Model

NEP 2020 has emphasized to focus on experiential learning therefore, each program should in all possible way involve and evolve experiential learning among learners

4. **Programme Brief and Script Writing-** Once the instructional design has been thought of, a programme brief is designed. The Programme Brief is an outline definition of what a programme is expected to achieve in terms of benefits, outcomes, scope and objectives. Each video programme should have a separate programme brief attached with the script and storyboard. A programme brief consists of the following points to outline the script:Title of the programme

- Series title
- Theme & sub-theme
- Subject
- Language
- Duration
- Class (s)
- Age-group
- Target audience
- Presentation format
- Objectives
- Content
- Coverage/synopsis
- Production type/treatment
- References

After the programme brief has been developed, the script of the programme is developed. Scriptwriting or screenwriting is the art and craft of writing scripts for mass media such as feature films, television productions or video games. This involves, researching the story, developing the narrative, writing the script, screenplay, dialogues and delivering it, in the required format, to development executives. A script should neither be too long to make it boring nor too short to miss out the explanation. Ideally a script should result in a video between 10-15 min or at the maximum 30 min (Guo, Kim & Robin, 2014).

Before writing the script for a video programme, few points should be addressed so that the script and ultimately the video developed out of it comes out to be interesting and engaging. These are:

Need Analysis- Specifies the need/purpose of creation of the video

- Context Analysis
- Learner Analysis
- Content Analysis
- Learning Objectives/goals
- Content Structure
- Learning Strategies
- Learning Outcomes
- Copyright Issue

Need Analysis- Specifies the need/purpose of creation of the video

Context Analysis- It is an analysis of a text (in whatever medium, including multimedia) that helps to assess that text within the context of its historical and cultural setting, but also in terms of its textuality or the qualities that characterize the text as a text.

Learner Analysis- Analyses the characteristics of learners for whom the video is being produced

Content Analysis- Content analysis is a method of researching communication patterns. It can focus on words, subjects, and concepts in-texts or images.

Learning Objectives/goals- Objectives/Goals of producing a video need to be defined.

Content Structure- The classic structure of writing a script is to divide a screenplay into three acts: the set-up, conflict, and resolution. Countless stories adhere to this format, and there's a reason why it has

been the go-to structure for films pretty much since cinematography began. Another format is to divide the screenplay into connected sequences, treating each sequence as a self-contained story that leads into another story.

Learning Strategies- The strategy for development of a video can be categorised into 3 main points:who is the audience, why will they watch the video you will make and how can they apply/use the video.

Learning outcomes- Learning Outcomes need to be defined for the video

Copyright Issue- Copyright issue is an important factor that needs to be taken into consideration while writing a script, inserting graphics, music, video etc. in the video. No content having copyright should be used in the video otherwise legal hassles may be invited. Self-generated contents like images/graphics, animations, music etc. are advisable for use in the development of video but sometimes, due to the scarcity of resources, one may take the content from the internet or from any other resources. If so, it is advisable to look for content with **Creative Common License** with proper attribution as per the license of the content. Details of Creative Commons Licensing and how to access copyright free images on the web are given in Annexure 1.

A script is written in a designated format with details of audio, visuals and references (Annexure-2). Once the script has been developed, it needs to be converted into storyboards with visual treatment. Usually, a storyboard is required for the script having lots of graphics and for 3D videos. In other cases, it can be avoided to ease and speed up the process of production of a video.

The way a script is written, depends upon the format of the video being produced. For example, if a documentary video is being produced then the script will have narration by an expert with audio and visual effects. In case of drama, apart from the audio inputs, the script will have narration of more than one expert/narrator which can also have different sets and that needs to be mentioned in the script in the visual section. An experimental/demonstration video will have the script with all the instructions to perform an experiment with results and also the instruction on focus of camera and the important texts to be shown during each step of the experiment. A script of a dance performance covered during an event might have a very brief introduction or just an informational text at the beginning of the video.

Quick tips for writing a script for engaging video:

- Understand the audience
- Plan before you write
- Outline what is going to be delivered in the present script/program
- Use conversational, informal language
- Adapt the language and tone to the type of learner
- Speak directly to the learner
- Make the script relatable
- Don’t repeat text that is on the screen
- Get the timing right i.e. not too long nor too short
- Use short sentences
- Use an active voice
- Avoid colloquialisms, local phrases, local references, and anything else that might get lost in translation
- Avoid any jargon where there is a possibility it won’t be understood
- The shorter the better (avoid unnecessary information)

- Stay rigorously on-topic
- Don't fill silent periods if it's not necessary (wrt narration, avoid where there is no need)
- Read the script out loud i.e. it should be proofread
- Let the voiceover artist read the script out loud before recording
- Indicate the background for the program i.e. indoor or outdoor

5. **Storyboard and Script Enrichment (Media Selection)-** A storyboard is a graphic representation of how your video will unfold, shot-by-shot. It is made up of a number of squares with illustrations or pictures representing each shot, with notes about what is going on in the scene and what is being said in the script during that shot. It allows the stakeholders to see a visual representation of the script before animation or filming begins. Steps for creating a storyboard:

Following are the steps followed in preparing a storyboard:

1. Break down the script
2. Define the visual style
3. Prepare a list of graphics
4. Start drawing
5. Add text descriptions
6. Include animator's/videographer's notes
7. Review

An example of a storyboard is given in Annexure-3.

Once the script is developed, it has to be submitted for review along with the programme brief.

8. **Review of the script and storyboards-** As a script is the basis for development of a video it needs to be up to the mark in order to avoid confusion and facilitate smooth recording and subsequent production of the programme and is therefore reviewed. After finalization, the script should reach the production department for recording.

It is important to note that the way a script is written determines how engaging the video will turn out to be. A poorly written script lacking flow in writing, missing instruction for audios and visuals can turn out to be a boring and monotonous base for the video. An interesting script with effective format, proper flow in the writing, simple and effective use of language, adequate instructions for text, audios and visuals is required for an engaging video.

The structure and presentation of content across the entire script should be systematically synergized with animation, graphics, sound effect, lighting effect etc. for its optimal result.

Script in general should contain real-life examples rather than imaginary/hypothetical ones while introducing or elaborating on a subject/topic. The script should also be inclusive of a variety of elements that can indirectly help in inculcating life skills, moral values, etc.

Once script and storyboard is finalized after review, graphics and animation element required for enrichment of the program should be defined, listed, and created in advance to be used while editing the program.

SECTION IV

eCONTENT FOR TV: Production Guidelines

4.1 Production

After the script and storyboard have been approved and finalised, they are sent for production to the production team. A schedule is prepared after discussion with the producer and SMEs and recording of the script takes place on the said date. At this stage, the actual recording of the video is done in the studio. Production process consists of few important steps:

4.1.1 Setting Up of Studio

A studio environment is ideal for creating professional, high-quality videos. Here, by high-quality content, it is meant as the following key points to setup a good video studio with minimal requirements:

i. **Space:** Choose the right space. While having dedicated video studio space is ideal, combining it with a meeting/waiting room along with dressing is also possible. A permanent studio setup will save a lot of preparation time and motivate employees to record. Studio time should be distraction-free for production staff.

ii. **Size of the Room:** Generally, room dimensions should be not smaller than 12 feet by 18 feet. There should be at least four feet between the camera and the subject, and another four feet between the subject and the background. Shooting very close to a wall isn't optimal because doing so can cast harsh shadows.

iii. **Soundproofing:** Finding a quiet space is often one of the most challenging aspects of setting up a corporate video studio, but it is also among the most important pre-requisites. After all, nobody wants air conditioning, construction, chit-chat, wailing sirens, and other background noises to end up in the final video. If the space is too large and sparsely furnished, sound will bounce off walls and create echoes. With the use of acoustic foam panels echoes and outside sounds can be "dampened".

iv. **Equipment:** Video production studios will need reliable, high-end equipment. Following is the list of equipment required in the studio:

- Camcorder
- Croma Green Background
- Desktop
- Headphone
- Lavalier Mic for recording , boom mic
- Editing softwares
- TV for display
- Mic stands
- Various cables
- Speakers for audio output
- 2 TB Storage Unit (HDD)
- Furniture
- Network router
- Sony MCX-500
- Audio mixture
- Lighting - Studio Cool Light

4.1.2 Recording and Set Instructions

Production of the scripts involves the actual recordings as per the script and storyboard. A copy of script/ storyboard should be available with all the stakeholders involved in production and post-production work viz; producer, cameraperson, editor, etc. Normally during the recording, the experts should keep following points in mind:

- Use of teleprompter: Teleprompter has a screen to show text/script and is embedded with a camera. It helps the experts to keep the pace as per the script. If the expert wants to use a teleprompter then, only the written part (yet black) of the script should be sent to the producer in requisite format and font size to make it visible from the distance where the presenter is standing. It can be in word or in .ppt format.

Figure: A Teleprompter

- Use of Chroma set: If chroma is being used during recording as a background, experts should avoid wearing anything green/blue (not even buttons/Bindi) as the colour of croma cloth is green or blue in colour.

Figure: Studio set-up with chroma

- Makeup: Light makeup or touch up is required during recording as the camera captures lots of details which the naked eyes may not capture at one go. Though too much makeup is not advisable, experts may also come with talcum powder, needed in case of sweating (although these things need to be made available in the studio).
- Dress: The expert should always come with an extra dress to avoid any mishappening at the time of recording. Shiny clothes, clothes with small checks, bold stripes and lots of patterns should be avoided. Excessive ornaments/jewelry should also be avoided to retain the purpose of educational videos.
- The presenter should add required cinematic features through his/her gestures, voice-modulation, acting to catch the attention of the viewer i.e. students. In other words, the presenter should be cautious of going monotonous in the presentation in any manner. However, all cinematic elements must be appropriate to the level of the audience and comply with the inherent nature of a pedagogical program.

- The presenter should be energetic and prompt in his/her delivery of speech. The speech should be simple and lucid. The flow of speech should be natural at all level synchronized with the content.
- It is advisable for the presenter to rehearse his/her presentation before actual recording takes place.
- The presenter should use Hello, Namaste and avoid temporal greetings like good morning, good evening etc.
- The presenter should use earpiece for giving and receiving instructions.
- Proper lighting: The studio should have ample lighting facilities to avoid dark and dull videos. Too much light can also lead to white faces. The lightman, cameraperson and producer can work out the right amount of light being focussed on the expert. Glares of spectacles turn out to be painful, that need additional efforts to fix.
- The editing involves the essential step of adding/editing sound effect and music to the recorded program. A library or bank of musical scores/sounds should be appropriately developed and maintained for using in variety of programs.

By keeping in mind the above mentioned points, a video is produced or recorded.

SECTION V

eCONTENT FOR TV: Post-Production Guidelines

5.1 Post-Production

After recording, the data (video) is ingested on the server/hard drive along with metadata and unique serial number of the program. Post-production involves editing and review of the recorded video.

5.1.1 Editing of the Video Content

Editing involves the mixing of recording videos with graphics, texts, animations, audio etc., as per the storyboard. To edit the video, a video editor is then assigned to the concerned producer. The editor then downloads the recorded data from the server/hard drive to his/her computer and editing is done. This is the step where graphics, animations, sound effects, etc. are inserted in the video. Adequate and good quality insertions are necessary to make a video interesting and engaging for the learners. It is to be noted here that as mentioned earlier, all these insertions should be copyright free. After the editing is done, the video is said to be produced and is saved in the required format with suitable technical specifications. The important technical specifications required for a video for telecast has been given below:

Category	Specification
Format	.mp4
Video Resolution	1920*1080i or 720*576i
Audio sampling	48khz
Frame rate	25fps
Overall Bit rate	more than 2.5Mbps

Table: Technical Specifications

The final video is processed by putting QR (Quick Response) codes. The QR code is especially used for the curricular videos that are based on a textbook (NCERT/State). This code embeds the link of the same programme on any other media such as, DIKSHA portal/App. This helps in providing coherent access to educational resources on various mediums/platforms. Every program telecast on PMeVIDYA DTH TV channels has a QR code embedded on it.

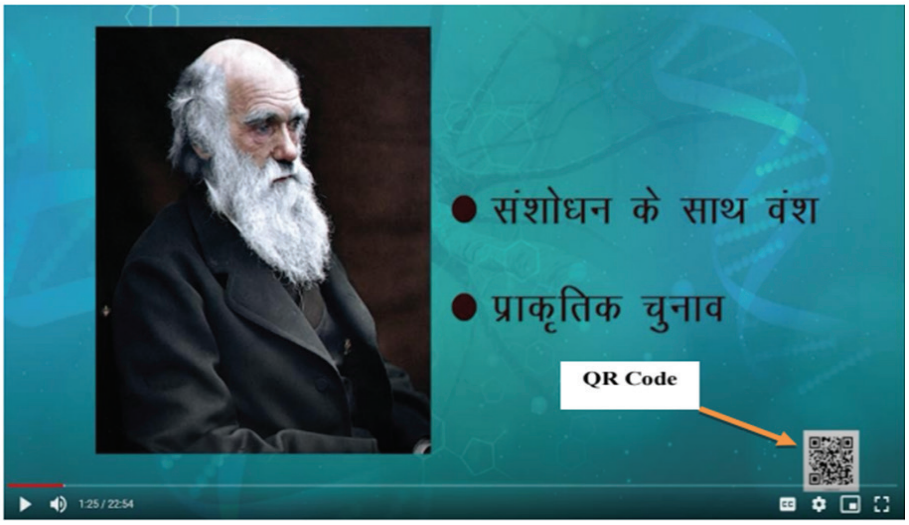


Figure: Screenshot of a QR Code Embedded Video

After embedding QR code in video, it can then be used for dissemination on TV and on other platforms after a review by the experts.

Note:It is very important to keep the record of every file at a secure place including in digital formats. The scripts, storyboard, raw video footage, master copy of the video programme and review report should be saved on server or secure location for further use.

5.1.2 Review of the Video Content

Reviewing the programme is the most important checkpoint to find out any subjective/technical error.

Checklist for Review

Every programme should follow the basic ethos like:

A. Factual Accuracy: Content being presented through text, diagrams, pictures, maps, data, audio/video, animation, simulation, etc. have no factual errors. Utmost care be taken while using the maps. Only authorized maps by "Survey of India", Department of Science and Technology in current version be used. This is the responsibility of the Subject Matter experts, Reviewers and State coordinator/Nodal person to verify this.

B. Legal Use of Proprietary Content: The content piece should not use proprietary content unauthorized.

C. Content Piece Free from Technical Glitches: Sound is in sync with visuals, there is general usability in terms of rendering and visual experience.

D. Constitutional and Statutory Appropriateness of Content: Content does not reflect violation of constitutional obligations. For example, the content should be adhering to Fundamental Rights and Duties, the content should not promote any stereotypes or derogatory depiction based on caste/class/gender/community/ethnic groups/religions etc.).

E. For example and otherwise too, the colure, size and ratio of Indian National Flag and statutory norms while displaying it must be maintained and complied with. Similarly, Indian National Anthem, if played, must be in prescribed duration i.e. 52 seconds.

F. A disclaimer, This program is for educational purpose only, should accompany every program/eContent and must be placed in the last in the credit page.

G. Correspondence with Topics/Subtopics Covered in the Textbook: Relevance of the content piece with the topics/subtopics mentioned in the textbook.

H. Pedagogic/Andragogic Structure:

(The Suggestive Criteria do not offer an Exhaustive but an Indicative List)

- Content presentation is supported by relevant examples
- Content piece is learning outcome oriented
- Cause and effect relationship is used to explain various phenomena wherever applicable, concrete to abstract.
- Content piece attempts to initiate reflective thinking among learners
- Content piece attempts to integrate with other domains of knowledge
- Content piece prescribes to the following Maxims of Teaching and Learning
- Easy to difficult
- Simple to complex

- Concrete to abstract
- Whole to parts/Parts to whole
- Content prescribes to the following maxims of teaching and learning
- Spatial contiguity of message forms: corresponding words and pictures are presented near rather than far from each other.
- Temporal contiguity of message forms: corresponding words and pictures are presented simultaneously successively.

I. Language and Comprehensibility: Content should have no grammatical errors. Content is presented in a manner which is understandable as per the grade/level of the learner.

J. Format of Content Presentation: Content has been presented in a format that is best suited for the theme, (For instance, a content which is in the form of a group discussion would score low on these criteria, if the best way to explain the concept would have been an experiment.)

K. Pace of the Programme: The content is appropriately paced leading to ease of comprehension.

Points to Remember While Reviewing Video Program

1. The target audience
2. The main focus should be on the concept and accuracy in the context/text- As conceptual errors are unavoidable, absence of such errors in the program should be ensured.
3. The video program should neither start nor end abruptly.
4. The objective of the video should be achieved by the end of the video.
5. Video programs should not hurt any caste, creed, gender, race, color, etc. in any case.
6. The audio of the program should be appropriately audible.
7. If National symbols or National Anthem or National Flag is used in a video program, then it should be used carefully and appropriately.

Once the programme is reviewed by the experts, it should be categories into the following categories in the review report:

1. Recommended - This means that the programme can be used for educational purposes through telecast and uploading on the portal (DIKSHA or any other platform) without any modifications.
2. Recommended after Modification - This means that the programme can be used for telecast with minor modifications. (Note: If Recommended after Modification has been mentioned in the Review Report, a timestamp is to be mentioned: mentioning the time/timestamp with specific modifications that need to be done/corrected before dissemination). Once notifications are suggested, re-editing of the video is done before it is finalised.
3. Not recommended - This means that the program is not suited to be disseminated through telecast or through any other platform.

Central Institute of Educational Technology, NCERT has developed a Tool of evaluation of Video content that will be helpful for reviewers (Annexure-4). It will be helpful for reviewers and need to be shared with them while sending scripts and video programmes with them.

5.1.3 Translation of Video Content

Translating a video programme requires academic and technical skills. Translation may be done manually or machine translation, automatically by using third party software/portals.

A. Manual Translation: The best way is the translation of the final version of the script with the help of experts. Once subject experts finish the translation, it should be properly vetted by language experts.

B. Machine Translation: There are many third-party software/portals available for machine translation. But betting on machine translation should be done by an external expert manually to avoid any confusion.

After translation is done, a sub-title in translated content on the original video is given or altogether a new video is recorded. In the latter case (translated audio on original video), lip-syncing should be avoided.

After all these steps, a video on the required topic is produced that can be disseminated through TV and other platforms.

Annexures

Annexure-1

In the field of education, Creative commons (CC) has become a popular licensing system. 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:

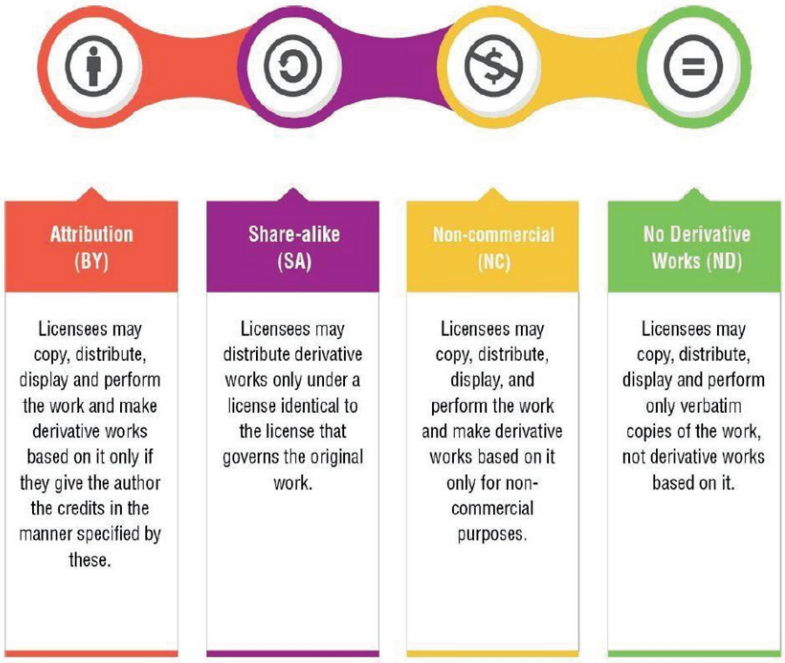


Figure: Creative Commons Licensing System

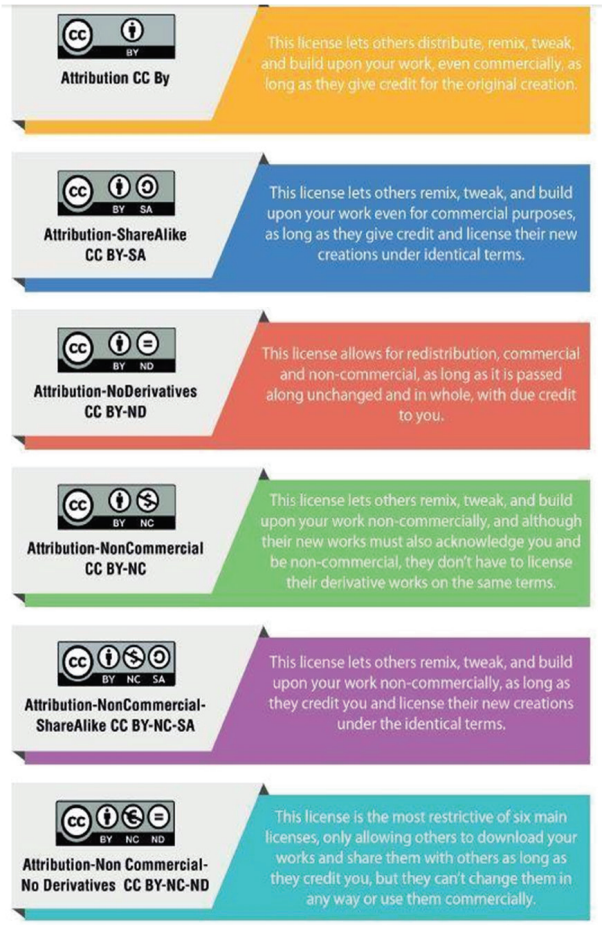


Figure: Creative Commons Licensing System

If an image/graphic/music is available under any of the above licenses, proper citation of the content as per condition of that license is required.

How to search the Images/Graphics on Web under Creative Commons licenses

Sometimes, we may search images/graphics to be used in videos from the internet. It is very evident to take only creative commons image/graphic to avoid any copyright violation. For example, you are making a program on different parts of a flower and need some image/graphics to be searched on the internet. So, open a web browser (like google) and type your keyword (flower). Click on image to get image/graphics relevant to flower:

Step I

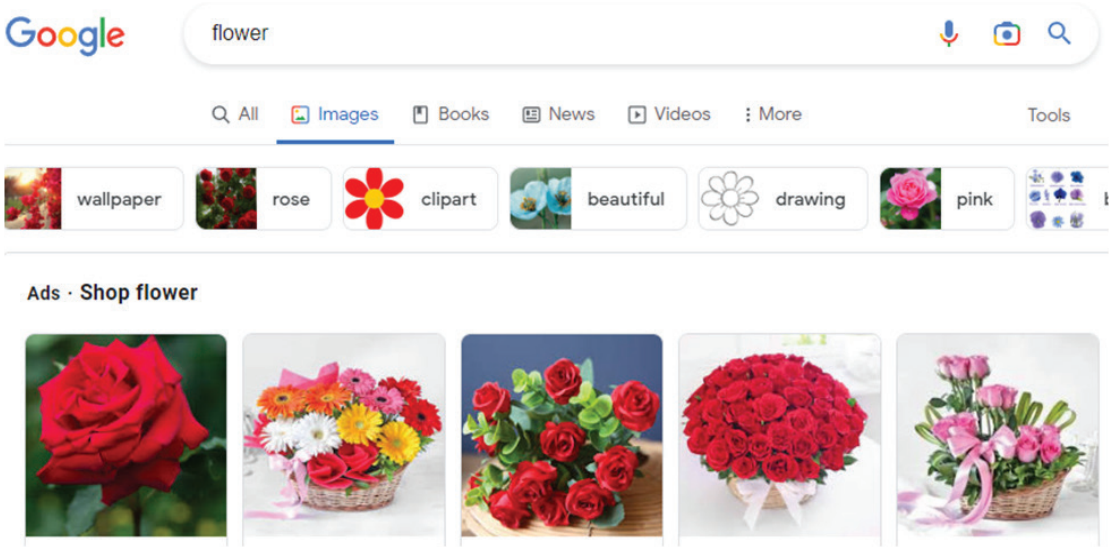


Figure: Searching Images/Graphics on Web

Step II

Now click on theTool button, a new menu window will appear:

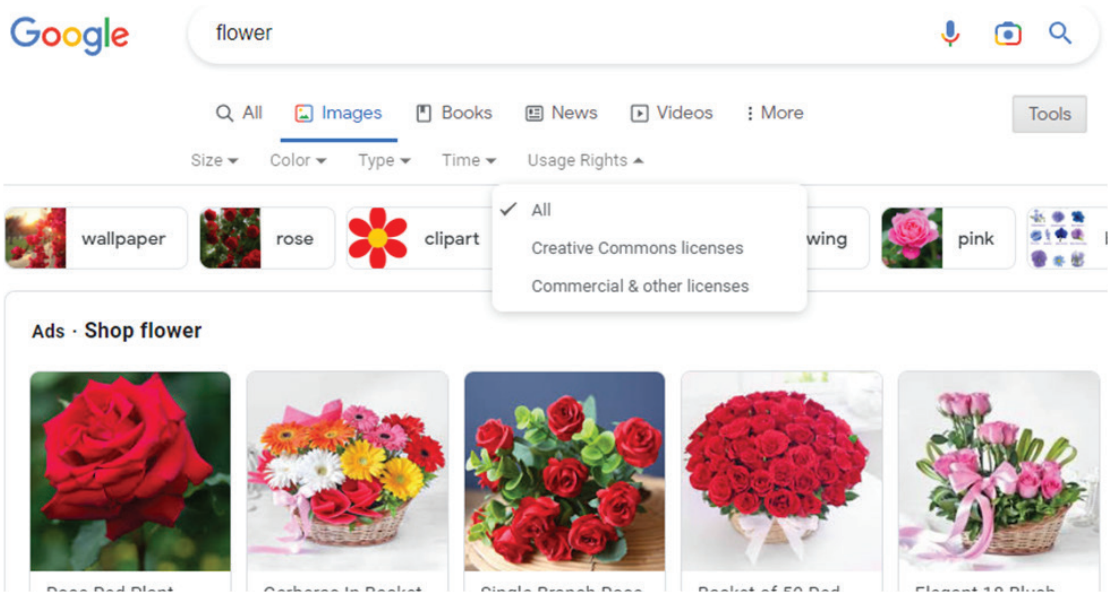
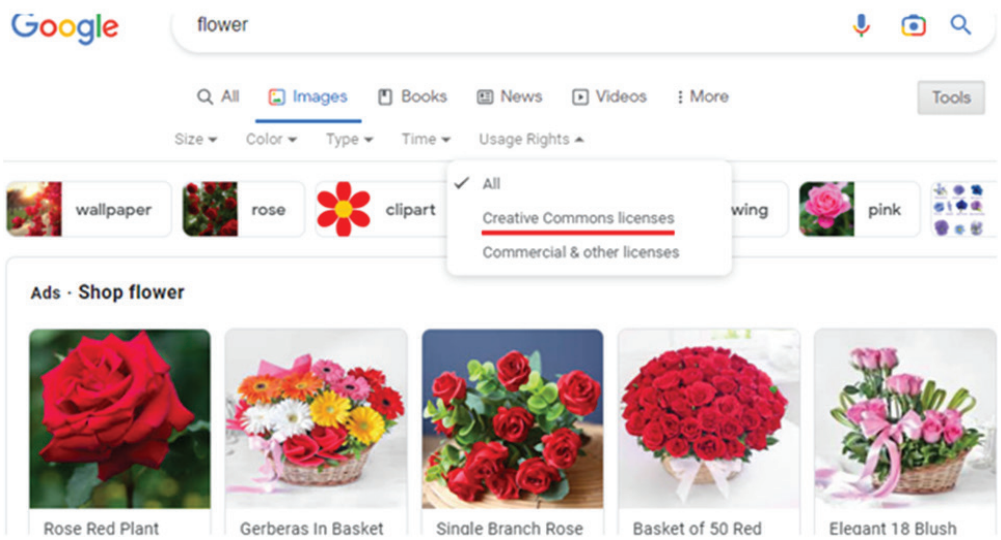


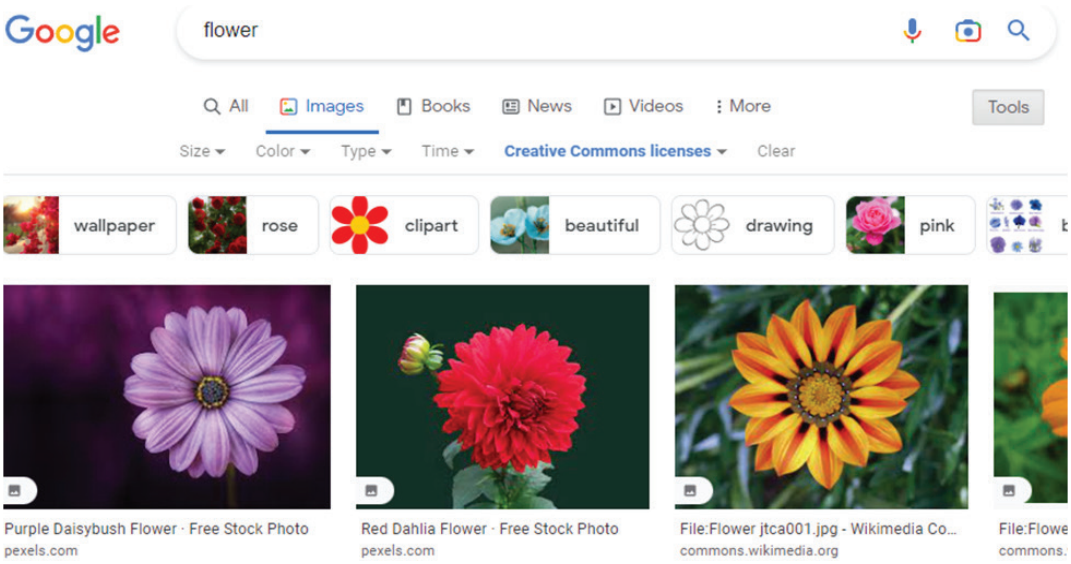
Figure: Searching Images/Graphics on Web under Creative Commons License

Step III

Following step II, we get the Creative Commons licensed images. By clicking on the image, we want to use, one can visit the page from where it is being fetched, to verify the license:



(a)



(b)

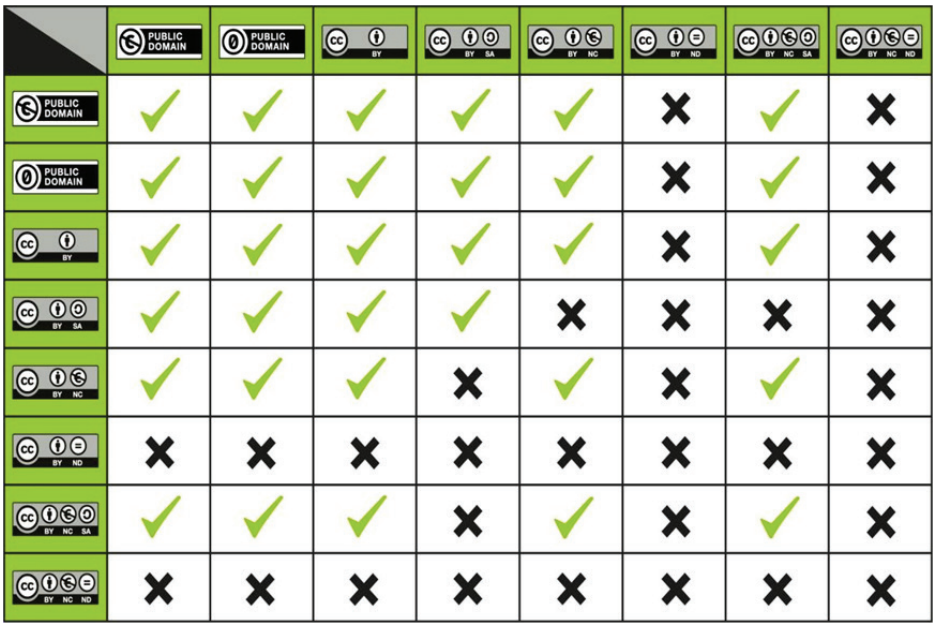
Figure: Locating the original source of the image under Creative Commons

As shown in the Figure, the image comes from "Wikipedia" or "Pexels" under "Public Domain", we can download this image in high resolution and also save the URL to give the attribution (if required) simply by copying it from the address bar as:

https://commons.wikimedia.org/wiki/File:Flower_jtca001.jpg

Mixing of Creative Commons Licenses

Since every CC license has its own condition to use and if you are using images/graphics of different licenses together in a single video programme. It is very important to know that images/graphics from which licenses you can mix. The following table will help in mixing the content of different licenses:



(Retrievedfrom https://wiki.creativecommons.org/images/5/5b/CC_License_Compatibility_Chart.png)

Figure: License Compatibility Chart

Annexure-2

Format of Script

S.No.	Content/dialogue	Suggestive visual	Audio	Remark

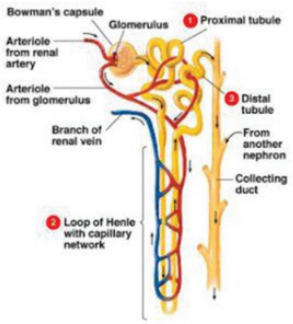
Annexure-3

Content (Voice Over)

Visuals

Learning objective
1. Let us learn about the structure and function of a nephron.

Nephron
2. A nephron is a basic structural and functional unit of a kidney. Each kidney has a large number of nephrons packed close together.



Sample Storyboard

Annexure-4

Parameters For eContent Evaluation

Class	
Subject	
Book Name	
Chapter No.	
Video No. (with duration i.e. minutes:seconds)	
Video Link	
Content approved/requires modification	

S.No.	Parameters	Response	Remarks/ Rating (If No/ Poor/Very Poor, Give Justification)
1	**Factual accuracy** 1.1 Content being presented through text, diagrams, maps, pictures, audio, animation, simulation etc. have no factual errors. 1.2 Whether the updated facts/data are represented. e.g. Personalities/ State/UTs/ Districts/Country/Geographical territory/ Articles in the constitution/ Governance/ GST/ Demonetization/COVID protocol etc. 1.3 The content is sensitive towards CWSN/ peace oriented values/Gender/environmental concerns etc.	Yes-Content is factually accurate No-Content is not factually accurate	
2	**Legal use of proprietary content** 2.1 The content piece should not use proprietary content which is unauthorized.	Yes-Content legally uses proprietary content or doesn't use any proprietary content at all No-Content may have used proprietary content in an illegal manner	
3	**Content piece free from technical glitches** 3.1 Sound is in sync with visuals 3.2 There is general usability in terms of rendering and visual experience	Yes/No Yes-Content piece is free from technical glitches No-Content piece has technical glitches	

4	**Constitutional and statutory appropriateness of content** 4.1 Content does not reflect violation of constitutional obligations. (For example a. Adhering to Fundamental Rights and Duties b. Should not promote stereotypes or derogatory/discriminatory depiction based on caste/class/gender/community/ethnic/ religious groups etc.)	Yes/No Yes-Content does not reflect violation of constitutional obligations. No-Content may be violating constitutional obligations.	
5	**Correspondence with topics/subtopics covered in the textbook** 5.1 Relevance of the content piece with the topics/subtopics mentioned in the textbook	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	
6	**Pedagogic structure** *SUGGESTIVE CRITERIA (NOT AN EXHAUSTIVE LIST BUT AN INDICATIVE LIST*) 6.1 Content delivery is supported by relevant examples. 6.2 Content piece is learning outcome oriented. 6.3 Cause and effect relationship is used to explain various phenomenon wherever applicable, 6.4 Concrete to abstract 6.5 Content piece attempts to initiate reflective thinking among learners 6.6 Content piece attempts to integrate with other domains of knowledge Content piece prescribes to the following Maxims of Teaching and Learning 6.7 Easy to difficult 6.8 Simple to complex 6.9 Concrete to abstract 6.10 Whole to parts/Parts to Whole Content piece prescribes to the following Maxims of Teaching and learning 6.11 Spatial contiguity of message forms: Corresponding words and pictures are presented near rather than far from each other. 6.12 Temporal contiguity of message forms: Corresponding words and pictures are presented simultaneously rather than successively.	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	

7	**Language and Comprehensibility** 7.1 Content piece should have no grammatical errors 7.2 Content is presented in a manner which is understandable as per the grade of the learner	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	
8	**Format of content presentation** 8.1 Content has been presented in a format that is best suited for the theme, (For instance, a content which is in the form of a group discussion would score low on this criteria , if the best way to explain the concept would have been an experiment.)	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	
9	**Pace of the programme** 9.1 The content is appropriately paced leading to ease of comprehension.	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	
10	**Duration of the program** 10.1 The content is of appropriate duration to sustain attention of the learner.	Rating (1-5) 1. Excellent 2. Very Good 3. Good 4. Poor 5. Very Poor	

Notes for content curation administrator:

1. Each content piece shall be curated by a single curator.
2. A content piece shall be deemed fit for consumption when it has scored 'Yes' in the first 4 curation parameters (i.e. Factual Accuracy, Legal use of proprietary content, Content pieces free from technical glitches, Constitutional and statutory appropriateness of content) AND has scored 3 or above in the remaining 6 curation parameters.
3. Curation process shall be terminated for a content piece if it has scored 'No' in the first 4 curation parameters (i.e. Factual Accuracy, Legal use of proprietary content, Content pieces free from technical glitches, Constitutional and statutory appropriateness of content). Such content pieces need not be evaluated with respect to the remaining 6 curation parameters. Such content pieces shall be deemed unfit for consumption.
4. In the interest of reducing the positive or negative bias in the curation process, the curators shall not be informed of the ratings required for content to be deemed fit for consumption. This information shall be restricted to the person who is overseeing the curation process.

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