



Skill India

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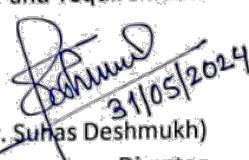
राष्ट्रीय व्यावसायिक शिक्षा और प्रशिक्षण परिषद
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Ministry of Skill Development and Entrepreneurship
Government of India
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Subject: Guidelines on Digital Content Creation and Quality Framework

1. The National Council for Vocational Education and Training (NCVET) was notified by the Government of India vide Gazette notification number SD17/113/2017-E&PW dated 5th December 2018. As per para 19 of the notification, the NCVET has been granted with the power to frame guidelines for delivering its functions as a regulatory body for the Vocational Education Training and Skilling (VETS) ecosystem. In pursuance of this mandate, the "Guidelines on Digital Content Creation and Quality Framework" have been made by the NCVET.
2. The National Education Policy (NEP) 2020 underscores the imperative of incorporating cutting-edge methodologies and learning modes to stay abreast of evolving trends and technologies. With the growing need for online content, the policy highlights the significance of ease of access and flexibility, especially when considering diverse learning environments and requirements. This aligns with the overarching goal of NEP 2020 to modernize the Indian education system and ensure it meets contemporary demands by providing high-quality, inclusive, and equitable education for all.
3. In this context, the "Guidelines on Digital Content Creation and Quality Framework" have been introduced to enhance the quality and accessibility of digital content in blended and online learning programs. These guidelines aim to systematically build a comprehensive content repository while also establishing a marketplace for Vocational Education Training and Skilling (VETS) content. By doing so, the guidelines aspire to significantly transform and optimize the learning experience, making it more effective and relevant to the needs of both students and the workforce. The guidelines emphasize holistic learning and employability by integrating academic knowledge with skill development and experiential learning. This approach aligns well with the adaptable and multifaceted nature of sustainability.
4. The guidelines were presented and approved in the 11th council meeting of the NCVET held on 31st May 2024 and are being notified herewith. These guidelines may be further amended/updated from time to time with approval of NCVET based on the feedback and requirements received during the implementation of these guidelines.


31/05/2024
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Guidelines for Digital Content Creation and Quality Framework





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Preface

The landscape of education is rapidly evolving, propelled by emerging trends and technologies. The introduction of advanced methods and modes of learning, as advocated by the National Education Policy (NEP) 2020, aligns with these transformative shifts. The necessity for online content has surged, offering accessibility and flexibility to learners across diverse environments, and making digital content or blended learning a crucial and integral part of the education system.

As a national regulator in the skilling and vocational education ecosystem, the National Council for Vocation Education and Training (NCVET) is entrusted with the development, qualitative improvement and regulation of vocational education, training and skilling (VETS). The Council has been entrusted with the powers to frame guidelines in order to discharge the functions, duties and responsibilities assigned to it. In this direction, NCVET has come up with the "Guidelines on Digital Content Creation and Quality Framework" to encourage learning through blended mode and to standardize the creation of digital content for the benefit of various stakeholders. The guidelines emerge as a beacon of innovation and progress within this dynamic education and Skill Ecosystem.

The guidelines have been meticulously developed to enhance the quality and accessibility of the digital content within blended and online learning programs by prioritizing the creation of engaging, relevant, and universally accessible digital content to ensure a positive and inclusive learning experience for all users. Its core focus lies in making a transformational impact on education, skills and employability by revolutionizing learning experiences. By integrating academic knowledge, skill development, experiential learning, and sustainability principles, the guidelines foster holistic learning and amplify skills and employability prospects. It underscores the importance of engaging content that caters to diverse learner needs.

The guidelines introduce a quality framework for ascertaining the quality of digital content, which is inspired by the similar framework created by Karmayogi Bharat. This framework provides a comprehensive quality assurance approach to ensure consistent quality across all types of digital content, elevating the standard and quality of skilling within the Vocational Education Training and Skilling (VETS) ecosystem. Technological integration

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lies at the heart of these guidelines, enabling the development and calibration of apt digital content that utilizes cutting-edge technology for effective learning in VETs programs. By encouraging the crowd-sourcing of digital content from specialized and niche sectors, the guidelines ensure diverse content sources and robust quality processes to meet the varied learning needs of stakeholders.

I extend my sincerest gratitude to all stakeholders who actively participated in the consultations and contributed significantly to the development of this comprehensive policy document which is the need of the hour. With unwavering conviction, I believe that the "Guideline on the Digital Content Creation and Quality Framework" shall serve as an important milestone in the skilling ecosystem, fostering inclusivity, lifelong learning, and improving the accessibility of education in both formal and informal education.

I also acknowledge the work done at NCVET under the able guidance of Executive Members, Dr. Neena Pahuja and Dr. Vinita Aggarwal with the NCVET team comprising Dr. Suhas Deshmukh, Director, Shri Amresh Kumar, Consultant, Ms. Ratna Priya Kanchan, Young Professional and Ms. Pragya Sharma, Young Professional. NCVET also received valuable inputs from the MSDE, Karmayogi Bharat and other organizations in the development of these guidelines which are well appreciated. NCVET welcomes further suggestions for improvement to this document which is dynamic in nature and shall be updated periodically.

I strongly implore all stakeholders to embrace these guidelines wholeheartedly and earnestly undertake the implementation of these guidelines, ensuring the much-deserved recognition of the vast reservoir of skills acquired through various modes of learning.



Dr. Nirmaljeet Singh Kalsi

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Guidelines for Digital Content Creation and Quality Framework

1. INTRODUCTION AND BACKGROUND

1.1 Overview of Digital Content Creation

One of the most important components that plays a critical role in a blended learning education/skilling programme is the content. The content should not only be engaging but also of very high quality, so that it has a significant impact on learners' competency level enhancement. As a result, all learning platforms should be loaded with learner-centered, action-oriented, and transformative content, where the content can either be offline or online. Due to the emerging trends and technologies, the scope and need of online content is increasing day by day as the digital content can be assessed on the go, from anywhere and at any place. Additionally, the aides such as AI/ML enabled tools and Robots as trainers in the learning ecosystem can do wonders for the digital learning paradigm.

Any content that exists in the form of digital data is considered digital content. Digital content, also known as digital media, is stored in specific formats on digital or analogue storage devices. Information that is digitally broadcasted, streamed, or stored in computer files is an example of digital content. When viewed narrowly, digital content includes popular media types, whereas when viewed broadly, digital content includes any type of digital information (e.g., digitally updated weather forecasts, GPS maps, and so on). For a learning tool using a game or a simulator, the network hierarchy of various steps in game/simulator also has digital content.

Look at the importance of a critical mass of high-quality content from the start, it is desired to create a strategy in which content is either created internally or purchased from external providers, with very strict quality control. Process of gradually onboarding content can eventually create a full-fledged content repository that may turn to a marketplace or use it as a part of an application/game for learning/simulator.

The points that should be identified and executed when analyzing or creating content are:

- i. The competencies that the content seeks to address should be identified right from the start of the content creation process.
- ii. At the start of content creation for each course and module, learning outcomes should be established. Learning outcomes and competency requirements should have a strong correlation.

- iii. The content available on the platform may be consumed by a diverse audience. As a result, any content made available on the platform should be inclusive, gender transformative, and free of bias.
- iv. The content must be available in a blended mode for the increasing the scope and scale of its usage for the learners.
- v. All content created, used, and maintained on the learning platform should be accessible to people with disabilities and meet accessibility standards as laid by the Government of India (GoI).
- vi. The content being onboarded on the learning platform should be the content provider's original work and free of plagiarism. There should be no copyright violations in the material used to create content (images, content, etc.). As appropriate, credits and references to the content must be mentioned.
- vii. Content should use style guidelines, such as:
 - a. grabbing the reader's attention with a relevant and appealing headline.
 - b. dividing content into bite-sized learning modules that are no longer than 10 minutes long.
 - c. making content more appealing by using animations, images, and eye-catching formatting.
 - d. making the content more attractive by using relevant colours, cartoons, images etc.
 - e. embedding it with formative assessment to ensure the reader understands the concepts before going further.
- viii. For the ease of diverse users, the language used should be simple and easy to understand, in most cases the content should be language agnostic.
- ix. Users should be tested on each learning outcome covered in the course content during assessments.
- x. Natural interface including an interface in the language of choice of learner with the user, which are learners in this case, should exist.

1.2 Current Scenario and the Drivers for Digital Content

“Digital First” for Digital Generation in today’s environment, Vocational Education and Assessment is mostly carried out in blended mode as it requires training and learning in hands-skills. With the availability of newer and affordable technology tools for the effective delivery of education, training and skilling, a combination of offline and online teaching and learning is fast emerging as a new norm that may be used to enable anywhere, anytime and by anyone learning. In the current scenario ‘learning/education/skilling on demand’ and ‘assessment on demand’ are becoming very common needs in this fast-changing skill ecosystem.

Different generations interact with technology differently. Today’s generation is a Digital Generation with widespread access to modern-age technology such as the internet, computers, tablets, and smartphones, with access to digital information on the internet. Digital Simulators and Digital Twins have further changed the process of learning. Millennials (born between 1980–1995), Gen Z (born between 1995–2010) and Gen Alpha (born in 2010 to the

present day) adapt to ever-evolving technological advancements at their own pace. For this digital generation which has witnessed the benefit of online classrooms and courses during the pandemic in the last two years, blended learning has been established as a new normal.

‘Digital First’ is a communication theory that states that publishers should release content into new media channels (i.e., web, mobile, social media, AI engine, Simulators, Robots, etc.) in preference to page-oriented print channels. As a strategy, this focuses on customers, the “learner” in this case, and the educator needs, helping them in becoming future ready by enabling them with the process of “Learning to Learn”. “Digital First” today is the need of the hour not only in basic education and continued education over the job roles but is also required for changing requirements of the industry. It is also the most effective way to move towards “Personalized Education” and to provide a “Continued and Consistent Positive Experience” of education across a large country with very high diversity like India.

The concept of ‘Digital First’ will help reimagining education via Blending Learning, especially the Vocational Education and training paradigm, which is still done mainly in off-line mode as in classrooms, laboratories, and workshops. Digital-First education is being encouraged on all educational platforms and mediated education to all students, irrespective of the urban-rural divide or income divides. The Government of India’s National Education Policy 2020 (NEP 2020) also aims to improve quality education delivery for all learners, including digital learning. Both in school & higher education and on-the-job continued education, the “student/learner” is at the centre of information, with a secure cloud providing the content and emerging technologies providing continuous innovative solutions for learning. With a focus on Digital India, the unconnected and remote areas of India are also getting connected. The Low Orbit Satellite communication in India is further expected to provide connectivity to remote areas in India.

NCVET as the unified skills regulator draws the power from **Para 16, point 1(g), 1(h) ,1(i) & 2** of the NCVET Gazette Notification **No. SD-17/113/2017-E&PW dated 5th December 2018**, to affect the training conducted under the affiliation of NCVET recognised Awarding Bodies. NCVET was created after subsuming the erstwhile NSDA and NCVT, the erstwhile NSDA housed the NSQC for the NSQF alignment of qualifications which is now housed with NCVET. The NSQF Gazette Notification No. **8/6/2013-Invt Para 8, Point (ii) –b** mentions Breadth of knowledge can range from a single topic to multi-disciplinary areas of knowledge. The above provisions provide NCVET the mandate to formulate the guidelines on various aspects of Qualification development and quality training and assessments including guidelines for sourcing, creation, sharing and dissemination of Digital content (VET & Skilling).

Smt. Nirmala Sitharaman also announced during her budget speech (Annual Budget 2022) that a Digital University will be established to provide access to students across the country for world-class quality universal education with personalized learning experiences at their doorsteps. In today’s era, Digital universities have become an increasingly important aspect of modern education, as more and more students look to the convenience of online learning. Digital universities can offer the same quality of education as traditional universities but with the added convenience of flexible class schedules and the ability to learn from anywhere. They can also provide students with access to the latest technology, allowing them to stay up to date. Digital Universities shall offer curricula and courses which will enhance the scale and scope of learning as there shall be no bar on the engagement of learners through the shortfall caused by infrastructure deficit.

The government of India has a high focus on the digital ecosystem for skilling and livelihood, the DESH-Stack e-portal is a very prominent example of the same. This portal aims to empower citizens to skill, re-skill or upskill through on-line training. It will also provide API-based trusted skill credentials, payment, and discovery layers to find relevant jobs and entrepreneurial opportunities. This portal is thereby a pioneering step towards digital content and commensurate learning.

The need and benefits of digital content may be summarized as:

- i. Increasing the scope, scale and access of learning in the skilling ecosystem.
- ii. Adopting digitisation as the modern means of learning with higher penetration of digital devices and media.
- iii. Digital content has many possibilities for increasing retention and recall.
- iv. Provides higher flexibility and encourages higher engagement.
- v. Digital Content offers personalised, self-paced and self-directed learning along with Collaborative learning.
- vi. It enables Gamification and other modes of Blended learning.
- vii. It further empowers Competency-based learning.
- viii. Digital assessment tracks progress in a much more established way and provides the required governance to the learning process.
- ix. Digital Learning is more inclusive and provides a level-playing learning environment.
- x. Digital Learning can offer a multitude of real-world skills.
- xi. Easy adoption of the best global practices.
- xii. Digital technology/simulators can be used to optimize the cost of training.

1.3 Challenges in Operationalisation and Scaling of Digital Content in the Skilling Ecosystem

- i. The current ecosystem is heavily reliant on offline content and participant handbooks, the change to digital content is an opportunity yet a challenge.
- ii. The pedagogy is currently made for the offline content and needs to be calibrated for the digital ones.
- iii. The delivery of the digital content in vernacular language.
- iv. The digital infrastructure available in the skilling ecosystem with the TPs/TCs and governed by ABs need to be strengthened.
- v. Preparing teachers to teach in a blended format.
- vi. Need for specialized tools/techniques to create simulation games/AR/VR/XR products for learning.
- vii. Penetration of the required Internet Facility in the remote location.

2. SCOPE AND OBJECTIVES OF THE GUIDELINES

2.1 Scope

The scope of these guidelines is to enable effective and efficient digital content-based learning and assessment for different types of qualifications:

- i. These guidelines shall apply to the bodies (ABs and AAs) recognized and regulated by NCVET for multiple sectors across the allocated geography (which may be Pan-India or a respective State/s or UT/s)
- ii. These guidelines may also be utilised by the Awarding Bodies for the Training Partners/Training Centres which are either owned or are third-party affiliated to the ABs.
- iii. These guidelines provide basic norms for different types of digital content, resources, tools and methodologies.
- iv. It recommends the extent/ mix/ flexibility of each type of digital resource, tools and methodology.
- v. These guidelines encompass topics such as digital content creation platforms, copyright and ownership of materials, target audience, and the use of multimedia for effective engagement. Additionally, the stakeholders should focus on the use of digital content to promote and support their vocational learning goals.

2.2 Objectives

The objectives of these guidelines are as under: -

- i. To ensure that the digital content is engaging, relevant, and accessible for all users.
- ii. Provide a framework for consistent quality across all types of digital content.
- iii. Enable the development and calibration of suitable Digital content which shall aid in leveraging technological advancements for learning systems in the vocational education, training and skilling ecosystem.
- iv. Categorise different tools/techniques of delivering digital content to the learners in the skilling ecosystem.
- v. Enable through technological means holistic learning that integrates academic knowledge, skill development, and experiential learning, leading to enhanced employability.
- vi. Enable crowdsourcing of digital content from specialized industries/institutions and define the required quality processes with it.
- vii. Recognising/enabling experiential learning, new pedagogical curriculum structure, and learning flexibility which may provide opportunities to improve the overall standard and quality of skilling.
- viii. Provide high-level content conversion process, for catering to any localization, or internationalization.

2.3 Key Players for Content Creation

The key players for content creation are:

- a. Content Creator,
- b. Content Reviewer (local language),
- c. Content Publisher and
- d. Administrator.

Content Creator (SME - Industry, Academic, Awarding Body/ies, Content creating agency- third party, freelance third party, Assessment Agencies, supply from designers, etc.)	<p>Content creators are responsible for creating high-quality, engaging, and valuable content that meets the needs of their target audience. Content creators have to be creative, organized, and detail-oriented in order to create effective content that resonates with the learners. They need to be able to research topics, write compelling copy, and use various marketing tools such as SEO* and social media to promote their content. Content creators must also be able to work with other team members such as designers and editors in order to create a cohesive campaign.</p>
Content Reviewer (SME - Industry, Academic, Awarding Body/ies, Content creating agency- third party, freelance third party, etc.)	<p>Content reviewers are highly important for the quality of any content. They help to ensure that all content is accurate, relevant, and meets the standards set by an organisation. With the help of AI technology, content reviewers can quickly review large amounts of content and make sure that it meets all requirements, where these tools help them to identify any potential errors or discrepancies in the content to enable more accurate reviews.</p>
Content Publisher (Third party publisher, In house publisher - AB, TP - publisher - both online and offline, etc.)	<p>Digital content publishers are businesses that create and distribute digital content, such as websites, video content, audio content, and other multimedia content. They typically have a library of content that can be accessed online, either through a website/ digital portal/ LMS or through a streaming service. Digital content publishers often work with digital advertising networks to promote their products and services. They may also have partnerships with other digital content publishers, allowing them to share content across platforms. Digital content publishers may also create and manage their own digital content, such as blogs, podcasts, and video channels.</p>
Administrator (Awarding Body, Industry/ies, Assessment Agencies, etc.)	<p>Administrators for digital content are responsible for the day-to-day management, content creation, and maintenance of websites, blogs, LMS, Digital Portal and other digital content. This includes managing webpages, images, and videos, keeping track of user accounts, managing databases, and maintaining a secure environment for all online activity. They also ensure the accuracy, relevance, and quality of digital content and collaborate with other departments to develop tools and strategies to maximize digital engagement. They are also responsible for ensuring the website/ LMS/ Digital portal adheres to all relevant regulations and has a visually appealing design.</p>

**SEO - Search engine optimization is the process of increasing the quality and quantity of website traffic from search engines to a website or web page.*

3. ROLES AND RESPONSIBILITIES OF ASSOCIATED STAKEHOLDERS

The Stakeholders associated with digital content/ digital platform are responsible for providing, managing and maintaining digital content and digital platforms, and for ensuring that the content is up-to-date, accurate and accessible to users. They also focus on delivering value for the audience and engaging users through the platforms.

The main roles and responsibilities of stakeholders associated with digital content/ digital platform include:

- Developing content that is interactive, engaging, and informative for the user.
- Ensuring the content is up-to-date, secure and accurate.
- Encouraging user engagement and feedback from users.
- Monitoring the performance of the platform and responding to user needs.
- Analyzing user data and providing insight into the overall performance of the platform.
- Ensuring the platform is compliant with industry standards & regulations, and government guidelines.
- Integrating the platform with other digital media and services to create a cohesive experience.
- Providing language, technical and creative support when needed.

The expected roles and responsibilities of the various stakeholders involved are detailed in the following subsections:

3.1 Digital Content Creators/Reviewer

Digital content can be of type(i) Written or text, (ii) Visual/ Animation/ Graphics, (iii) Audio, (iv) Video Content. The content may also be presented in form of games, simulators or AR/VR.

Digital content may be created by:

- i. **In-House Content Creation Team:** In-house Content teams the part of the Awarding body/ Assessment Agency that works with the operation, quality and/ or standard department to develop digital content on the NSQC-aligned and approved qualifications.
- ii. **Content Creation Agency:** The Content Creation Agency works with a wide range of clients. They can simultaneously work with multiple sectors and industries. The Awarding body/ Assessment Agency hires these agencies to develop digital content on their NSQC-aligned and approved qualifications.
- iii. **Freelancer Content Creator:** Freelancer Content Creators are individuals having strong portfolios and work experience in a particular domain/ sector/ industry and have opted for freelancing as a career option. The Awarding body/ Assessment Agency/ Content Creation Agency hires these individuals to develop digital content on their NSQC-aligned and approved qualifications.
- iv. **Crowdsourcing of Content:** Crowdsourcing leverages the collective knowledge and skills of a large group of people/institutions, who can easily create high-quality content faster and more cost-effectively than ever before. Crowdsourcing content can be used in many ways, including creating videos, writing reviews, and or even developing software. It enables creators to tap into the collective wisdom and to create compelling and engaging content that resonates with the learners. However, there must be a

process of quality check for the content and also a process of providing 'copyright' with such content. In case any digital content is taken from the industry/website an MoU/agreement must be signed. Additionally, a reference to such copied content should be provided. "Guidelines on Creditisation of Skilling & Training Courses & Qualifications of Multinational Companies (MNCs) and Leading Indian Enterprises" has been notified by NCVET and can be referred at- <https://ncvet.gov.in/wp-content/uploads/2024/02/Guidelines-for-Creditisation-of-Skilling-and-Training-Courses-and-Qualifications-of-MNCs-and-Leading-Indian-Enterprises.pdf> which enables the MNCs s including, OEMs, ODMs, and VARs, or a Leading Indian Enterprises to recognise, formalise and creditise the skill training.

3.2 Target Audience

Digital contents are created on the basis of the target audience. In the skilling ecosystem, one of the most typical target audiences is the Prospective Students/ Learners. Simple Formative Assessment may be added to the content to ensure it is understood by students before proceeding further (customization of assessments for different target groups of learners). The Prospective Students/ Learners include a diverse range of users:

- i. Learners pursuing short-term Training (STT)/ Long Term Training/ Apprenticeship (NAPS/ NAC)/ Up-skilling training/ reskilling training.
- ii. Learners/ students undergoing assessment/ RPL assessments.
- iii. School-going students.
- iv. Undergraduate and graduate students,
- v. Part-time students, international students, transfer students, and other audience segments.

3.3 Awarding Body

These bodies are responsible for the effective implementation of VET and skilling programs as per the relevant guidelines. They determine the requirements of the digital content based on the in-demand qualifications and modes of training delivery and then develop the digital content accordingly. They may have their own digital platform/ LMS for the publication of the content. They are also responsible for the circulation, monitoring and continuous upgradation of the Digital content throughout the skill ecosystem. They are also responsible for bringing the required localization in the content together with delivery in the language of choice of the learner, i.e., the content created shall be language agnostic. They may work with other sectors to even create Cross-Sectoral Skills.

3.4 Assessment Agency

The range of assessments that are deployed post successful completion of training or during it can be digital, and for the same, the assessment agencies may have to develop content for the specific assessment type. These agencies may function as content creators and administrators of the same. They also create the question bank for the assessment to ensure that learning outcomes are achieved from the learning material.

3.5 Sponsoring Bodies

Digital Content Creation/ development of Digital Platforms involves huge capital/ investment. The funds may be provided by the Awarding body, Assessment Agency, or other sponsoring bodies which can be Private or Government. Some MNCs may also want to provide their training content for a wider use. They may also create content for their products.

3.6 Service Providers

Service Providers provide the necessary infrastructure, tools and support for the digital platform/ LMS and publication of the digital content and also assessment, as the need may be. It facilitates interaction between end-users and producers/ manufacturers through online service platforms for mutually beneficial transactions.

3.7 Institutions/ Schools/ Colleges/ Training Partners

These bodies are responsible for the effective use of digital content as per the qualifications. They will also provide the necessary training/ links to students for its usage.

3.8 Industry/ Employer

Industry/ employers validate the authenticity and relevance of the digital contents as per the recent trends of the industry/ sector/ market.

3.9 Regulatory Bodies

These bodies provide rules and regulations for the development, circulation, monitoring (content) and credit assignment on assessment of digital contents such as NCVET, AICTE, etc.

4. FINANCIAL MODELS USED IN DIGITAL CONTENT

4.1 Fee-Based/ Subscription Based

The edtech giants and other global organisations have already started the fee-based models for subscribing or buying content and this can with certain progressive regulations be used in the skill ecosystem by the various stakeholders which are content creators, aggregators, reviewers among others. The incentives of paying for the developed resource can be a robust quality of the content. The continuous stream of funding can lead to the creation of strong revenue line for content creation and facilitate business sustainability and marketing outreach.

4.2 Subsidized/ No-Fee

This model of creating content may be through a government program/scheme or public sector or via a PPP model. It may also be via a private entity where they run free/ low-cost courses on their products but charge for certifications subsidized/without fee content through CSR or as a part of crowdsourcing or via industry where they have a non-direct revenue line generated with this training content. For example, in technology domain, there are a large number of free courses, where companies charge at the time of certification. Also, a lot of courses on FutureSkills Prime are subsidized by MeitY.

*Refer to Annexure 3.

5. NATIONAL SKILLS QUALIFICATION FRAMEWORK (NSQF) ALIGNMENT OF DIGITAL CONTENT

The National Skills Qualification Framework (NSQF) is formulated as an outcome and competency-based framework that organizes qualifications according to a series of levels defined in terms of learning outcomes to be acquired by learners through formal, non-formal, or informal learning which may comprise academics, vocational education, training & skilling and experiential learning including relevant experience and proficiency/ professional levels acquired, subject to assessment. The NSQF is a skills quality assurance framework.

The NSQF is composed of levels 1 (one) to eight (8), comprising of Level-1, Level-2, level-2.5, Level-3, Level-3.5, Level-4, Level-4.5, Level-5.0, Level-5.5, Level-6.0, Level-6.5, Level-7.0, and Level-8. Each level represents a different level of skill, complexity, knowledge, responsibility and autonomy required to demonstrate the competence commensurate with that level. Level one of the frameworks represents the lowest complexity while the highest level i.e. level eight represents the highest complexity.

**Refer to the detailed description of the NSQF Notification that explains the NSQF Level Descriptor and the parameters required to map the competencies of the learner with the various NSQF Levels.*

(<https://ncvet.gov.in/wp-content/uploads/2023/07/National-Skills-Qualification-Framework-notification-June-2023.pdf>)

TABLE 1: THE DETAILED NSQF LEVEL WISE CRITERION FOR THE CREATION OF eLEARNING/ DIGITAL CONTENT:

Note: The following table indicates the basic level of compliance for the eLearning/ Digital content creation. More features can be added based on the availability of the funds/ budget, which would also make the content user-friendly and easily accessible.

NSQF Level Digital Content Characteristics	NSQF Level 1 to 3.5	Additional Features for NSQF Level 4 to 5.5	Additional Features for NSQF Level 6 & above
Description	The Content shall be a medium complex (functionally) course with images and simple built-in formative assessment.	The courses at this level shall be complex in terms of content, animation, and functionality. They may have 3D graphics with zoom-in and out functionality.	These shall be high-end courses in terms of content, animation, and functionality. The content shall be presented through a life-like skill set of complex cues and responses, branched navigation, and games/simulations.
Feature	<ol style="list-style-type: none"> 1. Informational e-Lessons 2. Focus on awareness 3. Linear content flow consisting of text & static graphic 4. May build simple interface with AI products like ChatGPT for simple questions/ answers of students 5. Reference materials covering demonstrations/ videos providing real-life examples. 	<ol style="list-style-type: none"> 1. Procedural e-Lessons Focusing on the application of knowledge and skills - with reference to papers/ videos/ books/ contents 2. Non-linear content and synchronized visuals 3. Text effect animations 4. Software Application simulations 5. Simple scenario-based learning (offline case study) 6. Scored assessments 	<ol style="list-style-type: none"> 1. Analytical content Focusing on Decision making 2. Offers a high degree of interaction and provides real life/ application-oriented training 3. Multiple paths to accomplish an objective, and fosters learning by doing and learning through making mistakes 4. The design includes rich multimedia elements like illustrations and animations that are created specifically for the program to enhance the overall learning experience.

NSQF Level Digital Content Characteristics	NSQF Level 1 to 3.5	Additional Features for NSQF Level 4 to 5.5	Additional Features for NSQF Level 6 & above
		7. High degree of content layering 8. Logical and Conditional Branching of screens 9. Discovery learning	5. Multiple branches (two to three levels) and rapid response are provided to support remediation. 6. Simulations can be presented via graphics, including complex images and animation 7. Instructional design techniques for engagement in a complex interaction include complex simulations where the learner must enter actual data into fields and experience consequences for errors and faulty data. In addition, scenario-based branching logic is introduced, where learners experience jeopardy for incorrect responses. 8. Non-linear content and synchronized visuals.
Inter-activity	1. No inter-activities 2. Click-to-Reveal: (Optional, One template only) 3. Hot-spots (Tabs/Images)	1. Click-Plus-Pop-up 2. Interactive timelines	1. Slideshow 2. Interactive timelines 3. Branching 4. Simple games such as hangman, tic-tac-toe, word search etc. (Gamelets)

NSQF Level Digital Content Characteristics	NSQF Level 1 to 3.5	Additional Features for NSQF Level 4 to 5.5	Additional Features for NSQF Level 6 & above
	<p>4. Roll-over text</p> <p>Graphics:</p> <ol style="list-style-type: none"> 1. Stock Images/ photographs/ live videos provided by industry/ AB/AA/ knowledge Partners, in case of purchase or specific photo bank/live video to be created, an agreement/ MOU can be signed for the rights transfer. 2. Simple 2D drawings such as flowcharts, diagrams only 20% in the entire course 	<p>Graphics:</p> <ol style="list-style-type: none"> 1. Double-toned, semi-realistic 2D graphics 2. Graphic avatars with basic animation like eye blinks & hand gestures 3. Backgrounds – Photographic 	<p>Graphics:</p> <ol style="list-style-type: none"> 1. Semi-realistic, realistic graphics created 2. 2D graphics (characters and scenarios) 3. 3D graphics (characters and scenarios) 4. Graphic avatars/mascot with smooth animation & walk cycles 5. Backgrounds – Illustrated.
	<p>Animation:</p> <ol style="list-style-type: none"> 1. Content effects (animated text, bullets, transitions, etc.) 2. Audio sync with animated text 3. Animation with semi-complex effects <p>Audio:</p>	<p>Audio-video:</p>	<p>Audio-Video:</p>

NSQF Level Digital Content Characteristics	NSQF Level 1 to 3.5	Additional Features for NSQF Level 4 to 5.5	Additional Features for NSQF Level 6 & above
	<p>1. Limited choice i.e., not more than 2 pre-fixed artists for voice-over</p> <p>2. The Audio shall be preferably in the local language/ or the language of choice.</p> <p>Note: In an ideal situation, a learner should also be allowed to pick the language of his/ her choice.</p>	<p>1. More than 2 pre-fixed artistes for voice-over</p>	<p>1. Up to 3 pre-fixed artistes for voice-over</p>
Navigation	<p>1. One level - Index / TOC / Menu structure</p> <p>2. Other Functionalities: Next, Back, Exit, Help Audio On/Off, Page counter, Glossary (optional)</p> <p>3. Feature to change colour/ font</p>	<p>1. One or Two level - Index / TOC / Menu structure</p> <p>2. Screen control functionality</p> <p>3. Other Functionalities: Progress Bar</p> <p>4. Pointers to further reading</p>	<p>1. Upto 3 level and highly custom - Index / TOC / Menu structure</p> <p>2. Additional notes</p>
Knowledge check/ assessment	<p>1. Multiple Choice Single Select</p> <p>2. Multiple Choice Multiple Select</p>	<p>1. Match the Following</p> <p>2. Sequencing &Sorting</p>	<p>1. Crossword Puzzles</p> <p>2. Presentation</p> <p>3. Group discussion</p>

NSQF Level Digital Content Characteristics	NSQF Level 1 to 3.5	Additional Features for NSQF Level 4 to 5.5	Additional Features for NSQF Level 6 & above
		3. Scenario-based/game-based/simulation-based/ case-study based summative assessments	
Tools that can be used	1. AVCs/GIFs (2D animations) 2. e-books	4. Tracked formative assessments	
	3. PPTs 4. Simulators 5. Video Content 6. E-Resource library 7. Assessment engine	1. AVCs/GIFs (3D animations) 2. Robots/Digital twins 3. Video-play PPTs 4. AR (Augmented Reality), VR (Virtual Reality) (Note: Details are provided at annexure 2) 5. AI bots/ engine 6. Natural language translators 7. AI for personalized training/learning.	1. XR (Extended Reality) (Note: Details are provided at annexure 2) 2. Simulators 3. Gamification

*Refer to Annexure 6 for learning hours in blended/ digital mode.

6. PROCESS FOR CREATING DIGITAL CONTENT FOR NSQF ALIGNED QUALIFICATIONS

6.1 Creation of Digital Content

Content creation is the addition of information or knowledge to any media, particularly to digital media, for a target audience or end-user in a particular context. It may consist of speech writing, or any of various art forms for self-expression, distribution, marketing and/or publication, i.e., blogs*, videos, podcasts*. With the rise of digital technology, organizations or training partners are finding new ways to engage their learners through their content.

Content creation is a complex process that involves many stages. From researching the topic to finding the right words to express the ideas, creating content is a challenging task. It requires an understanding of the subject matter and an ability to communicate effectively with learners/readers.

Formally, the stages involved while creating content are (i) Ideation, (ii) Creation, (iii) Revision/Refurbishment, (iv) Optimization

Content creation also includes researching the topic, outlining the content, writing drafts, editing, and proofreading, formatting, and publishing. Each of these steps is essential for producing quality content that resonates with the learners/ readers and meets their needs. By understanding each step of the process, one can create compelling and engaging content.

*Note: * Refer to Annexure 1.*

i. Ideation: Idea of Creating Content.

Ideation is the process of coming up with new ideas and concepts for content creation that can engage learners. It is an essential step in the content creation process, as it provides a platform for writers to explore different possibilities and come up with creative ideas. It can be done in many ways, such as brainstorming, mind mapping, or research. With the right ideation techniques and tools, copywriters can create compelling content that resonates with their audience.

In the domain of Vocational Education and Training & Skill Development, the ideation is triggered via a need analysis and segmentation of the learning group and the idea generated thereby must be ideally tested in a pilot, to gauge the overall applicability, scale of operationalization, and scope of different qualifications/courses, among other such important parameters.

a. Identify the Audience

It is one of the most crucial steps in the skill ecosystem as the scope of learners varies which may include school dropouts, traditional workers, and advanced technical workforce among others. By understanding the needs of audience, learning and grasping potential and expectations, one can craft content that meets these needs and engages the students. This will also include a choice of language of content, the audience will be interested in. At this stage, it is also important to decide the platform on which content will be seen by the audience, and prepare accordingly.

b. Align Strategy

Based on the level and type of audience/ learners, it is important to plan content that will resonate with the learners. The content's planning phase is crucially significant as the broader strategy of content implementation is chalked out here, such as the type of content, the level of difficulty, the user-friendliness, the length of the content, etc. This will also include planning for built-in formative assessment.

c. Create Concepts

The next step is to conduct research on potential content subject topics which can give the desired learning outcomes. Substantial time and resource need to be devoted to researching the topics and discovering the learner's requirements. Under this step, substantial time and resources need to be devoted to searching for the potential content and topics that may give the desired learning outcomes (LOs) or performance criteria (PCs). For this, the qualification framework should be able to explain the model curriculum (MC) which consists of a job role having a few national occupational standards (NOSs) and several performance criteria (PC) in each NOS defining the learning objectives (LOs) of NOS of the qualification. These LOs play a vital role in the content development or content development strategy.

d. Concept Approvals

The process of ideation identified above must be approved as a process via a formal review process.

ii. Creation: Jotting Down the Ideas for Creating Content

Creation helps to put ideas and concepts into action. The following workflow may be followed for the final deliverables to transition from planning to production.

a. Secure Talent.

The first and most important step is to find artists/ systems that can transform the idea into creative content. It can be done by either collaboration of the in-house staff or by hiring freelancers to supplement the existing team.

b. Prepare Logistics.

Content-assignment procedure should be established, where the assignments should be always consistent and accessible. A shared cloud-hosted content management and calendar system will keep everyone up to date on when assignments are due so that they can plan the time required to create the content.

c. Project Management.

A regular review of the status of the content that is under creation should be done.

d. Deliver Draft Content.

The content when uploaded to a cloud-based platform for public viewing, should be reviewed by content consumers. An infographic should have the text scripts that will eventually be overlaid on top of the visual.

iii. Revision/ Refurbishment, Presentation & Optimise

Revision/Refurbishment helps in improving the clarity of the content by ensuring its accuracy and relevancy. It also helps in making sure that the content speaks directly to its learners by using language they understand. Furthermore, it can help in finding out if there are any errors or inconsistencies within the content that may affect its overall quality.

a. Feedback Process with Need to Create/ Modify/ Recreate Content and Optimise

The content after being reviewed is returned to the creator or team who created it to incorporate the feedback after the first review of draft content. Constructive criticism should be presented in a concise summary with specific actionable requests, such as where to revise the language, add an additional source, delete a specific sound bite, or crop out a distracting background and thus make the content easily resonate with the learners.

b. Final Approval.

The final review will include an editorial review for any errors. It usually checks for formatting errors or quick typos from previous edits at this point. Even, the legal and compliance teams will review the content to ensure that it does not violate any laws or IPR, branding initiatives, or internal ethical codes.

Note: Content updating happens quite frequently in digital format. To ensure the learners of a specific content (course) that got refreshed do not lose their learning journey/progress, there should be a mechanism to ensure the course in the previous version is available until all the registered learners for the course finish later which the course may be archived.

iv. Content and Distribution Process

At the stage of distribution to the public/ learner, the following process may be followed:

a. Reviewing SEO and UI/UX

The content must be easily traceable which requires the availability of all the relevant metadata & taxonomy as per the content in the search engine optimization (SEO).

b. Review Experiences for the Content

The content published is seen differently by different persons/learners and based on their findings, review the content differently. The content is viewed and consumed by the learners via different platforms whether it be a desktop or a mobile app, hence it should be mobile responsive and platform compatible.

c. Facilitate Distribution of the Content

The final step is to ensure that the content is ready for all its intended destinations and that the audiences can easily share it. The distribution mainly can be done using a third-party distribution service, a native advertising campaign, a content discovery platform or even a social media tool.

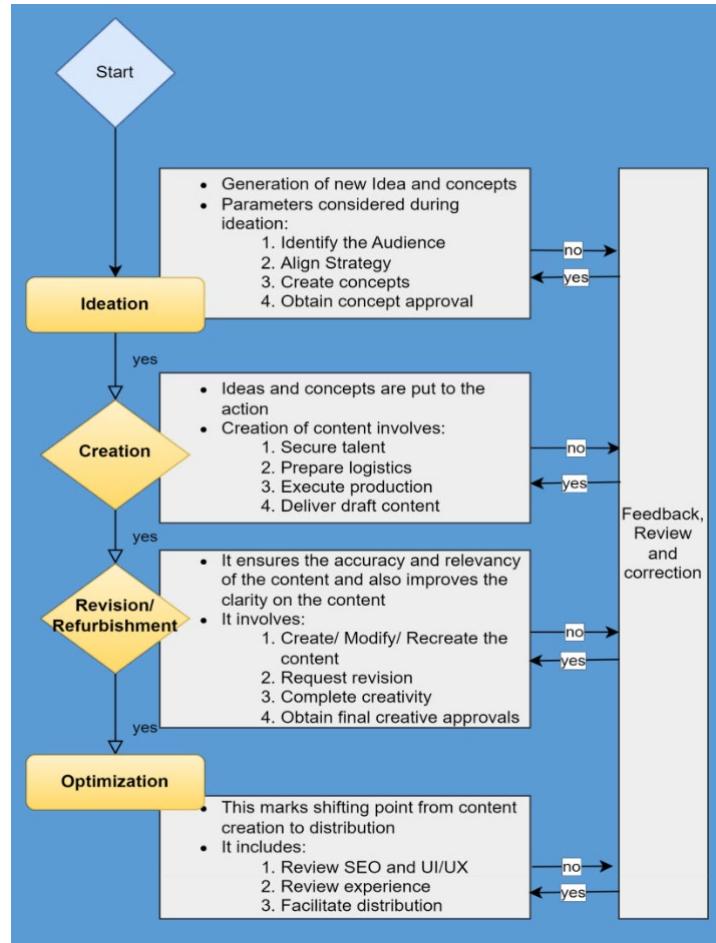


Fig: Digital Content Creation Procedure.

*Refer to Annexure 7 for a detailed course evaluation on the content quality framework.

6.2 Mapping the Content to the Learning Outcomes and Learning Indicators

The content creation team must identify and define clear learning objectives and outcomes to help students understand what they can expect from a course. The key Learning Outcomes is a set of defined outcomes for a module. This acts as the basis for the selection of the content. An effective digital content mandates a definite understanding and achieving the learning indicators for learners.

Stating the objectives clearly will help in designing the tests/assessments and then finding out whether the objectives have been accomplished. Also, it will help the trainees organize their own efforts to accomplish the desired objectives.

While writing the objectives, the following steps can be taken into consideration:

1. Objectives should begin with a lead-in line, such as, 'The trainee will be able to:'
2. An objective always says what the learner is expected to be able to do.

3. Unit objectives must be actionable, measurable, and observable. Some verbs that can be used to state the objectives are define, describe, identify, list, demonstrate, organize, develop, design, explain, etc.

4. Verbs like understand and know, should be avoided as they are not measurable.

A qualification framework (QF) explaining the model curriculum (MC) consists of a job role, which has a few NOSs and each NOS has some performance criteria (PC) defining the learning objectives (LOs) of the NOS of the qualification. These LOs play a vital role in the content development or content development strategy.

While making the content development strategy, the following steps should be taken into consideration:

- The content should cover all performance criteria or learning objectives mentioned in the qualification to ensure the mapping of each learning objective for the success of the qualification. It consists of all LOs in each NOS.
- The content for each LO should be unique and linked to the previous learning objective. The uniqueness of the content will avoid any kind of repetition in the content, whereas a linkage between all LOs will work in achieving the common goal of qualification.
- Each module of content should ensure the sequencing of the learning objective to help the trainee understand the qualification in a systemic way.
- The content presented in the course should be as concise as possible, i.e., it should be bite sized to make the overall learning effective and conducive.
- A content when successfully mapped to the LO will enable students to achieve/obtain the end result.

6.3 Crowdsourcing of Content and Validation

Crowdsourcing has become an increasingly popular way to generate content. By leveraging the collective knowledge and skills of a large group of people/institutions, they can easily create high-quality content faster and more cost-effectively than ever before. Crowdsourcing content can be used in many ways, including creating videos, writing reviews, and even developing software. It enables creators to tap into the collective wisdom and to create compelling and engaging content that resonates with the learners.

Crowdsourcing may counter the capital-intensive nature of the development of Digital content and enable digital content at a lower cost to prospective learners. Customization to the specific needs of the industry/market can very well be achieved through parts of content fetched through crowdsourcing. It can be done by leveraging the power of the internet, social media, and other technologies. It can be used to gather ideas, feedback, and resources from a large group of people to help generate learning content which is effective. It will heavily save on resources, time, and finances as the content that already exists may be utilized for learning.

The following principles shall govern the crowdsourcing of content: -

- i. Allowing for crowdsourcing from the SMEs/Domain experts/ in each sector/subsector where the Awarding Bodies shall be responsible for mapping and validating the content as per the NSQF-aligned Qualifications.

- ii. Aligning the crowdsourcing agencies/individuals as knowledge partners of the Awarding Bodies/ Assessment Agencies or Training Providers.
- iii. Quality Assurance of content shall be the primary responsibility of NCVET recognised ABs.
- iv. The IPR issues of the crowdsourced content shall be dealt in accordance with the Indian laws and NCVET-recognised Awarding Bodies collecting/ creating content shall be responsible for the same.
- v. Any approved and published content may give reference to the person/organization it had been sourced from.
- vi. The MNCs/ Industry may also want to provide content of courses for their products or processes for a wider spread of training on them.

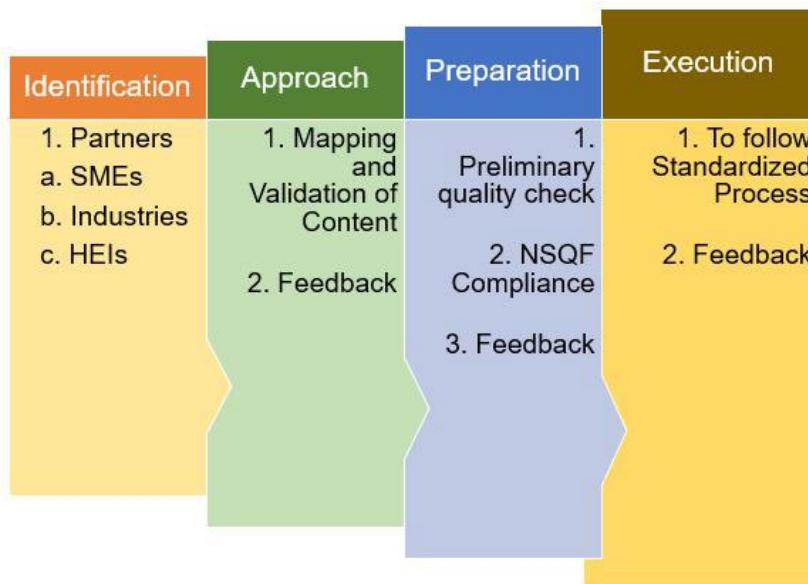


Fig: Process for Crowdsourcing of Content

**Annexure 7, i.e., “Detailed Course Evaluation on Content Quality Framework (CQF)” shall be referred during crowdsourcing of various digital content for maintaining the quality and efficiency of the content.*

6.4 Publishing of Digital Content

Publishing of digital content refers to the process of creating and sharing digital media such as images, audio, video, and text. It is made possible with the advancement of technology and the wide use of the internet and other media networks. Digital content can be created using specialist software, images and audio recorded using digital media devices, or text written in a word processor (MS Word, LibreOffice Writer, etc.). Once the content is created, it can be uploaded to the internet, shared with groups, friends and family, or even sold online to generate an income. Some popularly available tools such as ChatGPT etc. can also be used for language correction. Tools that have AI-driven language translation systems, breaking down language barriers and enabling conversations between speakers of different Indian languages such as ‘Bhashini’ may also be used to speed up the work of creating content in other languages.

Finally, publication of digital content is often a long process and requires a significant amount of time and effort to ensure that the content is of high quality and that it reaches its intended audience. It is important to be aware of the challenges of publishing digital content and to be prepared to put in the necessary effort in order to make it a success. When publishing digital content, it is important to be aware of copyright laws, as any content that is not owned by the publisher can be subject to copyright claims. It is also important to make sure that all digital content is correctly credited, and the author's original work is respected.

The following shall be ensured while publishing any Digital Content:

1. All digital content must be reviewed and approved by the appropriate authority before being published.
2. Digital content must comply with applicable local and national laws and regulations.
3. Digital content must not infringe upon the rights of any third parties.
4. Digital content must not contain any obscene, defamatory, or offensive material.
5. Digital content must not contain any links to inappropriate websites or material.
6. All digital content must be accurate and up to date and in case of statistics of data, the data may be mentioned.
7. Digital content must be free from viruses and malicious software.
8. Digital content must be secure and private and must not infringe on anyone's privacy as per the rules of GoI.
9. The ownership and copyright of digital content must be clearly stated.
10. Any changes to digital content must be documented and tracked.
11. By publishing digital content, it can also be easily commercialized.
12. Digital content should also follow the guidelines of accessibility laid by GoI for it to be available to people with disabilities.

6.5 Publishing/ Delivering of Digital Content for the Areas, that are Underserviced or Unconnected through the Internet

In order to deliver digital content to a not well-connected area, it is important to consider the cost of the technology needed to make this happen. Additionally, the area needs to have access to reliable internet infrastructure such as satellite or wireless connections. Furthermore, it is important to consider how the digital content is packaged before sending it to the area. This could involve formatting the content for different types of connections and devices, as well as optimizing the file size to reduce download times. Finally, it is important to ensure the content is easy to understand and can be easily accessed by the target audience. A Digitruck equipped with all the necessary setups can be used for these types of areas, additionally, content can be put on a disc (if it does not change frequently), and preloaded on tabs/laptops.

7. DIGITAL PLATFORM/ LEARNING MANAGEMENT SYSTEM

7.1 Types of Learning Management System

A learning management system (LMS) is a software application that provides a framework for managing all aspects of the learning process; LMS is used to store, deliver, and track training content. While an LMS is the most used term, other terms that may be used include training management system, learning activity management system, or even learning experience platform (LXP).

(Note: Annexure-3 provides various features which may be used to create a financial model

The most important and commonly used Indian e-learning Indian platforms/LMS are Swayam, Diksha, e-ShodhSindhu, e-PG Pathshala, Swayam Prabha and NTPEL, which can be accessed free of cost and are developed by GOI.

A Learning Management System (LMS) is a web-based software that is used to facilitate the delivery of online, face-to-face, and blended courses in an academic or business setting.

- i. **Online learning:** a type of learning that takes place over the Internet, usually through a web-based platform.
- ii. **Face-to-face:** a type of learning that takes place in person between a teacher and a student.
- iii. **Blended Learning:** a type of learning that occurs partially in person and partially online or way similar games/Metaverse/XK.

An LMS, regardless of delivery method, is ostensibly designed to foster learner-centered approaches with integrated learning activities grounded in learning objectives, thereby making it the most advanced tool for facilitating learning. A SCORM-compliant LMS is a learning management system that abides by the rules set out within SCORM. SCORM makes LMS and e-learning content compatible across many different SCORM-friendly systems. SCORM stands for Shareable Content Object Reference Model (SCORM 2004, formerly known as SCORM 1.3) and is a set of technical standards for e-Learning software products, it tells programmers how to write their code so that it can play well with other e-Learning software's. SCORM helps to develop content once and then reuse the same content in several applications without further. The modern LMS may also be based on techniques such as Gamification and Simulation.

**Refer to Annexures 4 and 5 for different types of LMS and security involved for LMS respectively.*

8. ROLE OF AWARDING BODY (AB)

An awarding body (AB) is an entity which is recognized by the NCVET to award certification to trainees/ learners for NSQF Aligned and Approved (NAA) qualification by ensuring quality training and reliable assessments. They are also responsible for the development of qualifications/ courses, curriculums, and contents. The contents can be in the form of books, PowerPoint presentations, audio/ video content, etc. The content forms a vital part of the

learning solution for the qualifications, which may be supported by technologies and tools such as AR/VR/XR.

The AB plays the following roles in providing various learning solutions as per NSQF Aligned and Approved (NAA) qualification, which includes:

- i. Conducting research work for the identification of job roles across the sectors/ industries which are in demand and trend.
- ii. Development of qualifications and their learning content in both online and offline mode as per requirement.
- iii. Ensure the validity and efficacy of the contents as per industry/ sector norms and standards.
- iv. Ensure the proper utilization of all the learning resources by the concerned stakeholders.
- v. Create awareness among the potential learners/ candidates about their qualifications and learning resources.
- vi. Creating a pool of trainers and assessors on the NSQF-aligned and approved qualification through Training of Trainers (TOT) and Training of Assessors (TOA) programs.
- vii. Recognition of Training Centers/ Partners for running training (both online and offline) on the NSQF-aligned and approved qualification.
- viii. Coordinating and Monitoring the assessment process (both offline and online) by the NCVET recognized assessment agencies.

9. ROLE OF ASSESSMENT AGENCY (AA) & TYPES OF ASSESSMENTS

An Assessment Agency is a NCVET recognized agency which tests or conducts assessments/ examinations to assess whether a learner has met the requirements necessary to be competent and qualified with respect to a skill or qualification. These agencies are vital for the implementation of the VET and Skilling programs across the various sectors. Some important functions of an AA are as mentioned below:

- i. Conduct quality-assured standardized assessments and upload/ record the evidence and results.
- ii. Develop assessment strategy, Standard Operating procedures (SOPs), question bank, assessment analytics, a digital portal for assessment, infrastructure for the assessment in blended mode, etc.
- iii. Ensure the availability of accessible standardized assessment tools across languages and learner groups.
- iv. Ensure availability of Industrial Experts, Master of trade, Master Assessors, Assessors, and proctors for the assessment activities, and ensure that they are skilled/ trained to conduct assessments in blended mode.

9.1 Types of Assessment

Assessments are a critical part of the learning process, as they help to measure the progress of students and provide feedback on their performance. These assessments include formative assessment, summative assessment, self-assessment, peer assessment, etc.

*Details of different possible ways of assessment are given in Blended Learning Guidelines, at-
(<https://www.ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20or%20Vocational%20Education,%20Training%20&%20Skilling.pdf>)*

10. LEARNER'S EXPERIENCE AND ENGAGEMENT

Learning and teaching have evolved significantly over time. Schools and Educators are changing the way they teach students. They are transitioning to a **student-centered environment and working on a personalized education approach that ensures student engagement and success**. Learner's attention spans have shrunk because of technological advancements, making it more difficult to pique and maintain their interest. Keeping students engaged in the learning process has become a difficult task for educators in the field of education.

According to studies, **student engagement in a digital classroom is greater than in a traditional classroom**. Students who use technology for learning are more likely to be engaged. Although teachers have incorporated digital content into their pedagogical practices, increasing student engagement is not easy.

Courses that engage audiences are more likely to attract eager learners who enjoy the learning process. Similarly, **engaged learners are more likely to succeed in the course and may become excellent "course ambassadors."** The key to successful student engagement is to create a learning environment that offers learners a stimulating and interactive experience.

The level of engagement of a learner determines their commitment to finishing their courses and gaining new knowledge and skills. When learner engagement increases, the following occurs:

- i. Lower dropout rates
- ii. Higher retention of knowledge
- iii. Improved learner performance

In all learning, there are three types of interactions:

- i. interactions with instructors,
- ii. interactions with the content itself, and
- iii. interactions with other learners.

To retain all three, effective online learning must take special care.

a. Collaboration:

Interactions between students and teachers that can be done through online chats that are the most effective interactive tool for increasing student engagement. Students are fully engaged in the digital classroom when instructors create a community in which everyone can interact. So, it is critical to actively participate in group discussions and provide students with regular updates. Usage of tools like video conferencing can help students feel more connected to their instructor and increase engagement. Additionally, discussion forums, and discussion projects also help in improving collaboration.

b. Self-Reflection:

The platform should be simple to use in order to encourage behavioral engagement. Students must be able to log in and easily navigate to the information they require to complete their learning tasks. Fostering more cognitive engagement means having students reflect on what they've learned and experienced after the initial learning activities have occurred. Incorporating self-reflection papers, discussion boards, and other similar tasks will keep students engaged in the material, resulting in higher retention. Students should also be allowed to contribute to the existing course material to improve engagement.

The principle of backward design, an approach to instructional planning that begins with the end goal, is equally applicable to online and in-person learning. LMS should provide features of the personalized learning journeys. Scenario-based learning, self-reflection opportunities, and consistent communication from instructors, all promote student engagement and active learning. Technology should be utilized to improve skills with authentic and adaptable resources that add value.

11. EMERGING TECHNOLOGIES/ TOOLS – AR/VR/XR, SIMULATORS, DIGITAL TWINS

The use of technology is unavoidable in today's world. It **raises the bar for efficiency, productivity, and safety** to levels that humans alone cannot achieve. The Edu-tech technology is expected to bring in a positive shift in employment.

The industrial sector around the world is embracing technology to improve efficiency and productivity. Machines can reduce the production of defective products as well as the production time. However, if unskilled and semi-skilled labourers remain uneducated and untrained, they may lose their jobs or cause risk to the environment/ industry they are working in. **Automation will benefit them as long as they can learn to use the new tools.**

Emerging technologies are gradually influencing many areas, including how we consume information, shop, learn, and communicate, as well as our working environment. While we are still a long way from total robotization and sci-fi technologies, some aspects are already pervading many job roles and industries. This infiltration could result in the emergence of new job requirements, new skills, and a completely new approach to how we perform our jobs.

- i. Simulator-based workshops and laboratories such as flight, welding, painting, games, firearms practice simulators, etc. They not only save cost, they provide a risk-free environment of learning.
- ii. Gamifications help to increase user engagement by providing rewards for completing tasks in a more engaging way, while chatbots provide automated minimal customer service that is available 24/7.
- iii. Use of cobot or collaborative robot (AI-led), especially for role play practice in job roles like customer service, sales, etc. They can be used for practical practice sessions.
- iv. AR/VR/XR, 2D, 3D and 4D, based practical experience, for example, high altitude mountaineering, deep sea diving, and difficult surgeries (Some Demonstrations can be made in 2D rather than 3D to have better cost efficiency. Use of 3D and above only for experiential practice in place of physical practical).
- v. Digital twins which are more detailed than AR/VR/XR, for example, factory control, critical surgeries such as Robotic Surgeries, etc.

- vi. Metaverse-based immersive experience in 3D and 4D, which are more detailed and sophisticated, for example, autonomous vehicles.

On a global scale, **new technologies in automation and robotics, material sciences, 3D printing, IoT and connectivity, alternative feedstock, virtual reality, cybersecurity, Big Data, biotechnologies, machine learning, and AI have already pushed the various industries forward**. However, the goal of emerging technologies is not solely automation and digitalization.

Technologies that have the potential to change the future of work include:

- i. Data analytics, machine learning, and algorithms enable prevention, early detection, and intervention.
- ii. Robotics, nanotechnology, and tissue engineering enabled intervention.
- iii. Data-driven insights enable personalized and curative solutions.

Sl. No.	Examples of the components of Vocational Education, Training and Skilling Ecosystem	Tools that can be used
1	Showing Practical Demonstrations to the learners	<ul style="list-style-type: none"> i. Simulators ii. Video Content E-Resource library iii. AR/ VR/ XR
2	Imparting Practical hands-on Skills, Skills for working with Hands, Lab Work/ workshop/ shop floor training	<ul style="list-style-type: none"> i. Simulators ii. Digital Twins iii. Meta-verse iv. Video Play presentations
3	On the Job Training (OJT), Project Work, Internship	<ul style="list-style-type: none"> i. Simulators ii. Proctored Online tests iii. Offline assessments

**Refer to the comprehensive list mentioned in the Blended Learning Guidelines.*

**Refer to Annexure 1.*

12. INTEGRATING DIGITAL CONTENT WITH NCrF

Every learning can be creditised under the National Credit Framework (NCrF) subject to assessment. The National Credit Framework (NCrF) also allows for the crediting of experiential learning, with weightage given to relevant experience and proficiency levels attained, subject to assessment.

For all learning modules, which can be in form of qualification, NOS, MicroCredentials, NanoCredentials, credits and credit levels are assigned based on learning outcomes rather than learning hours.

12.1 Assignment of credits as per National Credit Framework (NCrF) levels

- i. The **credit assignment** is based on a **student's total hours of learning in a year versus the total credits available in a year**. The learning hours, regardless of mode of learning (offline, online, or blended), must continue to adhere to the broad principles specified in previous sections, which serve as the foundation of the NCrF. The only exception is that in the case of distance education, home-schooling, alternative schooling, and open education, the hours may include self-study hours.
- ii. Credit assignment has also been enabled for online and blended learning in vocational education and skills in order to expand open/distance learning options and promote widespread use of technology in learning and skilling.
- iii. NCrF makes no mention of credit assignments based on course delivery patterns. This gives the learner learning flexibility without compromising the National Credit Framework (NCrF).
- iv. For the vocational education and training/ skilling ecosystem, with respect to credit assignment, the following shall be applicable:
 - a. Total notional learning hours in a year (for purpose of calculating credits): 1200
 - b. Credits to be allocated in a year with 1200 notional learning hours: 40
 - c. Therefore, the number of notional hours leading to one credit unit= $1200/ 40 = 30$
- v. The total Credit Points earned by the student could be obtained by multiplying the credits earned with the NCrF Level at which the credits have been earned. A candidate with work experience for a defined period, employed after completing certain education/ skilling shall have its overall credit points calculated as credit points earned multiplied by the weightage of relevant experience.
- vi. Credits are however earned post the assessment of the content.
- vii. Students may also earn credits based on their prior learning or learning during the experience. The RPL guidelines detail the process.

**For more details, refer to National Credit Framework
(<https://ncvet.gov.in/sites/default/files/NCrF%20Report.pdf>)*

12.2 Credit accumulation in Accredited Bank of Credits (ABC)

The NEP 2020 proposes to establish an 'Academic Bank of Credit' (ABC) which could digitally store the academic credits earned from recognized institutions so that the degrees can be awarded taking into account credits earned.

Every student/ learner of the skilling/ formal education system will be given a unique APAAR ID (Automated Permanent Academic Account Registry) which will be used to store details of all the courses/learnings done by him/her, together with credits earned, in ABC.

The credit points may be redeemed as per Academic Bank of Credit (ABC) guidelines for entry or admission in school, higher, technical, or Vocational Education programs/ courses at multiple levels enabling horizontal and vertical mobility with various lateral entry options.

The total credit points earned by a student/learner is a multiplication of total credits earned at a level of study/ skilling and NCrF level assigned to that level of skilling/ academic class.

12.3 Credit Transfer

To improve the competitiveness and efficiency of India's education system, the ABC will promote equity, quality, flexibility, mobility, collaboration, transparency, and integration. ABC enables credit accumulation, credit transfer, and credit redemption via account opening, closure, and validation, as well as multiple entry-multiple exit options in a programme. After accumulating credits, a student can use them to obtain any academic degree that meets the standards set by the regulatory body/ institution for further accruing an additional higher educational degree/ diploma.

13. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Quality assurance refers to the procedures and measures put in place to ensure that a digital product is of the intended and planned quality, whereas quality control refers to the procedures used to determine whether that quality is being or has been achieved. Quality control (QC) is a subset of quality activities that is part of Quality Assurance (QA). QA and QC are intertwined and equally important; one is proactive, planning to avoid defects and flaws and putting that plan into action; the other is reactive, checking to see if the plan worked (and if not, prompting the appropriate remedial action). The focus and specifics of the two may differ, but the overall goal is the same: a high-quality product that fully meets both user and training needs.

13.1 Data Analytics

Every content professional understands the value of analytics in today's digital world. Even the most knowledgeable content professionals may struggle to define and apply analytics. Analytics is becoming far more sophisticated and complex wherein the page views or the unique visitors for a webpage can even be tracked.

In addition, analytics are more important than ever in making sound content decisions. Everything from strategy to user experience to individual tactics should be guided by analytics.

13.2 Process of Content Analytics

The measurement and analysis of visitor traffic and engagement with published content is known as content analytics, also known as content intelligence. To conduct Content Analytics, one has to focus on:

i. Production

Setting production goals and keeping track of content production statistics will enable timely content creation. Depending on what is appropriate or necessary for skilling, one can include any of the following areas:

- a. **Author Output:** Keep track of the number of content pieces created by each author.
- b. **Content by Type:** The number of blog posts, webinars, ebooks, white papers, YouTube videos, and so on.
- c. **Content by Persona:** the number of pieces of content that are aimed at each of the customer personas.
- d. **Content by Category:** the number of pieces of content that is in each category.

ii. Engagement

Content engagement is a good metric for determining the value of the content to the learners. Among the various types of engagement metrics that can be tracked are:

- a. **Page views:** The number of times a piece of content is viewed is a good metric for engagement, together with time spent on the page.
- b. **Total shares:** The total combined shares from Facebook, LinkedIn, Twitter, Pinterest, and so on.
- c. **Comments:** Comments left on each piece of content.
- d. **Links:** The number of backlinks received by the content is another important engagement metric.

iii. Performance

This refers to how effective, profitable, and successful a piece of content is at assisting one in achieving skilling objectives. To provide a higher level of insight into the content, performance metrics can be a combination of production and engagement metrics.

This can be accomplished by keeping track of the following:

- a. **Top articles:** For example, one can monitor the top ten posts in any given timeframe.
- b. **Authors to watch:** Discover which author's work receives the most attention from the public.
- c. **Top categories:** Determine the most popular content-related categories.
- d. **Feedbacks:** The user/ learner can share the experience for the content viewed based on which the content quality or the content flow can be enhanced.

iv. Content Scoring

This is an aggregate number that demonstrates the effectiveness of any piece of content using an attribution model. It demonstrates its ability to convert leads into usable content and allows one to calculate the ROI of each piece of content. This post goes into greater detail about content scoring.

The content scores can be sorted by: a) Category b) Author

14. DATA ETHICS, IPR ISSUE, SECURITY

14.1 Data Ethics

Every stakeholder involved in the business of data/ content management must establish their own best and ethical practices. Data ethics are applicable to every organisation, and it also has legal compliances. The basic characteristics of the ethical data use are:

- i. Data Security and protection of customer/ learner's information.
- ii. No religion/person/caste or category is used to create content.
- iii. Measurable benefit to both consumers/ learners and organisations.
- iv. Rating of the agency involved in content creation.

Businesses need to create and maintain a structured and transparent data ethics strategy as AI algorithms become more prevalent and without regulated codes of ethics. A structured and transparent data ethics strategy can yield three significant benefits for businesses:

- i. **Trust** - Using the ethical principles of fairness, privacy, transparency, and accountability in the development of their AI models and outputs can help companies retain trust in how they use their data, which increases their reputation and brand value.
- ii. **Fair Practices** - It is possible for unintended bias to creep into business decisions from anywhere. By adhering to data ethics principles and standards, companies can demonstrate their fairness in decision-making. Data can even be referred to from the Open Source or other free websites to avoid conflict.
- iii. **Data Privacy Compliance** - There is no direct link between ethics and existing data privacy regulations. However, key privacy requirements, such as accountability and lawfulness, closely overlap with AI ethics principles. In this way, ethical AI helps ensure data privacy compliance.

14.2 IPR issue

The Digital portal/ LMS would store data, contents, methodologies, etc. that could be easily accessed. The IPR applies to these portals/ LMS as well. Current copyright laws do not address current technological protection measures or electronic rights management. The IT Act 2000 may provide lawful protection in such cases.

Intellectual Property is made of originality of content, but it is separated into two different parts:

- i. The content is used for industrial services. Furthermore, it includes patents, new creations, trademarks, designs, and geographical indications of origin. A patent is a right granted to someone who makes a new type of product or invented a new way to produce it.
- ii. Contents are copyrighted.

14.3 Security

Digital infrastructure is continuously evolving and requires security to keep pace. Digital platforms/websites collect and store a large amount of personal information such as login details, account details, browsing habits, digital content, Aadhar, etc. This makes the Digital infrastructure vulnerable to cyber theft. Therefore, organizations shall frame/ adopt protection norms and govern the security of the portal/ infrastructure. They need to follow information security and data privacy guidelines given by GOI.

15. PROCESS FOR MODIFICATION/ UPDATION OF GUIDELINES FROM TIME TO TIME

15.1 Guidelines issued with the approval of the Council after following the due process of public consultations.

The guidelines shall be prepared by NCVET in consultancy with all the stakeholders and then released for public consultation for the 21 days. After, 21 days of public consultation, all the

comments/ suggestions are evaluated and incorporated as per the relevance/ requirement. The draft guidelines are then approved by the NCVET council committee and released for implementation.

15.2 Removal of Difficulties in Implementation, with the approval of the Chairperson, NCVET

NCVET shall designate ownership of the guidelines to a consultant/ official/ team/ committee. The owner of the guidelines shall be given responsibility to make a record of all the challenges/ difficulties which would be faced during the implementation of the policy. Subsequently, these challenges/ difficulties shall be evaluated, and a possible solution shall be provided with the approval of the Chairperson, NCVET.

All notifications required to be issued under the Guidelines to be issued with the approval of the Chairperson, NCVET. Urgent/ Minor modifications required to be issued with the approval of the Chairperson, NCVET and to be approved post facto by the Council. Interpretation of the Council regarding any of the provisions of the guidelines to be final.

ANNEXURE 1 – DEFINITIONS

1. Video: A video is defined as an electronic recording with audio and visual elements. Video has been used to teach and communicate subjects/ Qualifications. Video has been proven to be an effective tool for supporting adaptable and self-paced learning.
2. Content Management System (CMS): A content management system (CMS) allows the organization to manage and distribute content stored in different servers at different locations based on user requests. By using the CMS, content can be created, published, managed more cost-effectively.
3. Digital Platform: A digital platform refers to the software or hardware of a website allowing for the interaction of its users. The digital platform is a digital space that provides facilities for users to collaborate, interact or transact digitally. It is an environment in which a piece of software is executed.
4. Knowledge Partner (KP): The Knowledge partners are integral to the process of creating an e-aggregator portal/ Digital Platform. The KP provides the user/learner with content related to a variety of topics, sectors, sub-sectors, and qualifications that will enhance their skills within a specific field.
5. AI/ ML in Digital Content: The ability of AI to imitate human abilities, such as learning and reasoning, has made it the next major technology in the field of digital marketing. With deep learning and natural language processing abilities, AI and ML can indeed transform digital publishing processes significantly.
6. Content Personalization: Content Personalization is a process used to ensure that the content resonates with the learners. Content can be tailored to the needs of individual users to maximize engagement and conversions.
7. Content Translation: Content translation helps to translate the content quickly and accurately into multiple languages, making it accessible to a global audience/ learner, thus effectively communicating its message across languages. It can easily be a human translator or an automated tools such as Google Translate. Automated tools help to eliminate the possibility of human error and produce accurate translations.
8. Auto-Tagging: Perhaps one of the most crucial applications of artificial intelligence in digital publishing lies in the process of auto-tagging. Tagging refers to the classifying of the content within categories to improve its discoverability.
9. Content Formatting: Content formatting helps to make the content more organized and easier to read. Processes such as formatting, structuring and grammar checks are unavoidable and cumbersome at the same time. The content writers can quickly format their work in terms of font color, font type and style, in a way that looks professional and appealing. Different formatting tools that are available for different types of content, such as HTML tags, bullet points, tables, etc.

10. **Digitize the Content Publication Processes:** Artificial intelligence has been one of the most transformational technologies of our age. Your digital marketing and publishing processes are no exception. Equipped with highly advanced tools empowered by artificial intelligence and machine learning, publishers can automate complementing processes and speed up their publishing schedules. Additionally, these tools ensure better accuracy and performance.

11. **AR/VR Technology:** Augmented Reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, (Reference: Wikipedia) including visual, auditory, haptic, somatosensory, and olfactory. (Reference: Wikipedia).
Virtual reality (VR) is a simulated experience that can be similar to or completely different from the real world. Applications of virtual reality include entertainment (particularly video games), education (such as medical or military training) and business (such as virtual meetings). (Reference: Wikipedia)

12. **Digital Twin:** A digital twin is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision-making.

13. **Simulation:** Simulations are used across industry to test products, systems, processes, and concepts. Often used during the design phase, simulations are often digital models using computer-aided design software applications. These models can be created in 2D or 3D to represent parts of a process or product, although they can also be created using mathematical concepts rather than computer-based models.

14. **Robots:** A robot is a machine, especially one programmable by a computer, capable of carrying out a complex series of actions automatically. A robot can be guided by an external control device, or the control may be embedded within. (Reference: Wikipedia).

15. **AI Chat Bots:** A chatbot or chatterbot is a software application used to conduct an online chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent. Chatbots are computer programs that are capable of maintaining a conversation with a user in natural language, understanding their intent, and replying based on preset rules and data.(Reference: Wikipedia).

16. **Audio-Visual Content (AVC) and Graphics Interchange Format (GIF):** Audio-visual content (AVC) and Graphics Interchange Format (GIF) are great tools for skilling and training, as they make content easier to understand and remember. AVC sources such as videos or presentations can be used to explain complex concepts, while GIFs can be used to show demonstrations or provide step-by-step instructions. Both types of media can break up text-heavy material and make it more engaging for learners. Additionally, AVCs/GIFs/MPEGs can be used to give feedback on performance and encourage learning.

17. Podcast: A podcast is essentially a talk radio series on demand. This means that listeners don't need to turn up and tune in live but can listen any time (and pretty much anywhere) they like. Podcasts tend to be focused on a theme or topic. They offer a unique way to access content and provide an immersive experience to listeners.
18. Blog: A blog is a website or a page that is a part of a larger website. Typically, it features articles written in a conversational style with accompanying pictures or videos. Blogging is a fun and flexible way for self-expression and social connection. Bloggers can create content that is both engaging and informative for readers.
19. Meta-verse: The metaverse is a virtual reality world where users can interact, game and experience things as they would in the real world. Using current AR and VR tech, they can immerse into this world and interact with overlaying objects and people in the visual projected in front of them. The metaverse can be defined as a simulated digital environment that uses augmented reality (AR), virtual reality (VR), and blockchain, along with concepts from social media, to create spaces for rich user interaction mimicking the real world.

ANNEXURE 2 – AR/ VR/XR CONTENT DEVELOPMENT

1. Introduction

- i. Technology is becoming more popular and capable, providing a great opportunity to scale up hard-skills training at much lower costs
- ii. XR (AR+VR) allows for “consumable free” training, providing guidance and objective scorecards & instantaneous and periodic progress reports that are otherwise difficult to deliver in conventional methods
- iii. Technology has been applied in silos in the past (e.g. welding simulator, electrical circuits simulation, etc.). With the current state of tech, it is wiser to build a common XR Lab for the entire institute (similar to how a library is common to entire institute), thereby helping more students from multiple trades instead of benefitting a single trade.
- iv. XR Lab should cater to an entire batch/ unit (20-21 students) instead of being able to handle only 3-4 students at a time

2. Defining the best approach

- i. Real scenarios for skill trainings are difficult (or costly) / dangerous to replicate at training environment/ centres. Therefore, while designing digital content, it shall be ensured to include all the major and essential skills and knowledge components into the content.
- ii. The content quality shall be high, and there shall be no lag or jerkiness in the software experience (avoiding content that causes VR sickness).
- iii. Use XR only for those in which it is most effective, those that are not effective when delivered through a simple video or text

Hardware and Software Requirements

3. How to Create Content, Examples, Steps Involved, Skill Sets

- i. Deciding the appropriate lessons - by subject matter expert/ Industrial experts
- ii. Deciding the sequence of lessons – by teaching experts
- iii. Defining the lessons in detail - by subject matter experts & teaching experts
- iv. Decide what lessons are best delivered in immersive XR simulation - by technology expert (Graphic Designer, Game Programmer, Technical Architect)
- v. The content can be centrally created by an empanelled list of creators, that are subject to rigorous quality checks by SMEs/ Awarding Bodies/ NCVET, and distributed through digital mode or over the internet, just like mobile apps

4. Scalability:

- i. Scalability comes from ensuring the hardware and software are accessible to learning centres and students across the country content and tech being easily usable by the students
- ii. The cost per student or institute will come down drastically with higher number of students
- iii. Initial the cost of setting up of the XR lab/ centre may be higher, but once a critical mass of such centres is reached, incremental cost of delivering more content will be negligible

Note: Scalability does not need teachers or students to be able to create AR-VR content, it is a specialized skill not related to the skills required by the students for their employability.

ANNEXURE 3 – FINANCIAL MODEL FOR THE DEVELOPMENT AND SUSTAINABLE OPERATION OF LEARNING MANAGEMENT SYSTEM (LMS)

There are several financial models that digital content creators can use to monetize their content. Some of the most popular revenue models used by content-based businesses include:

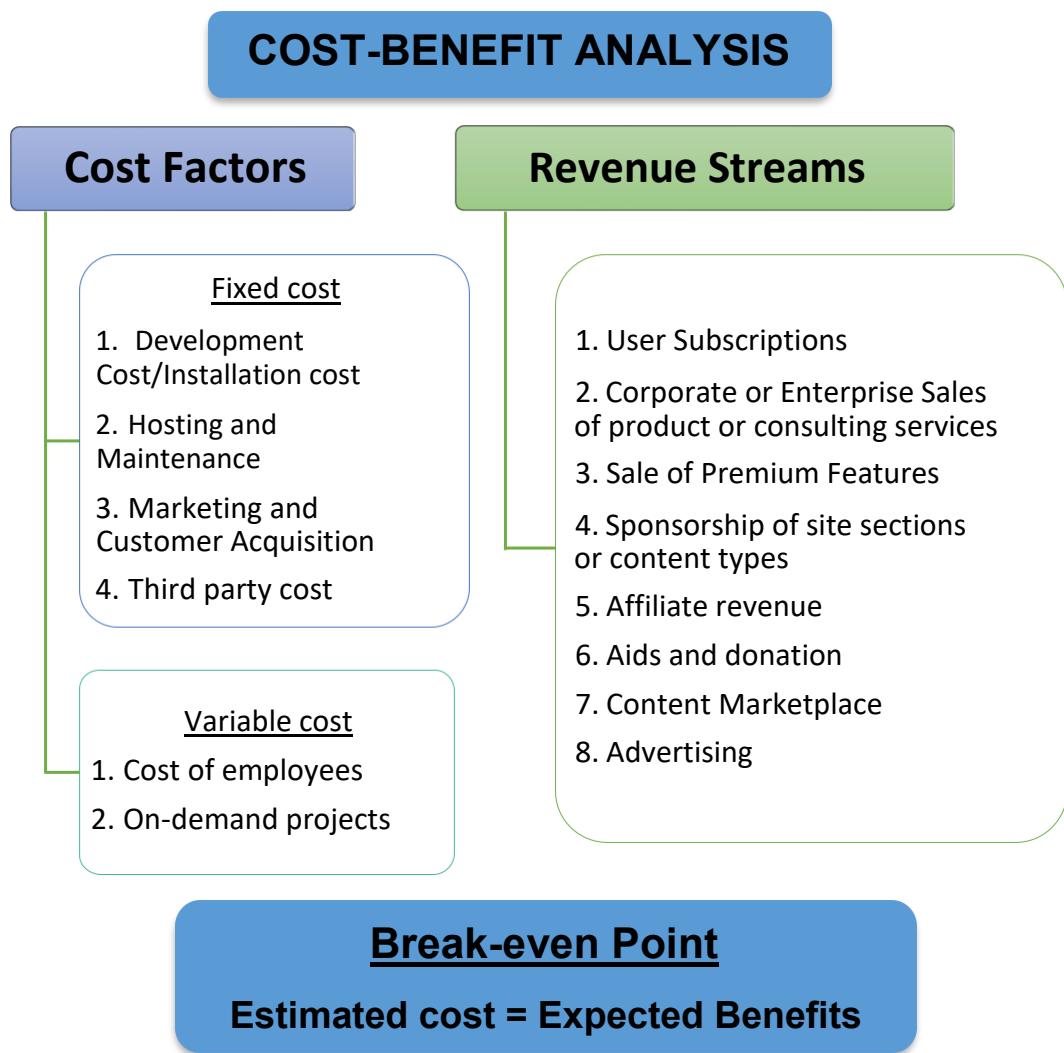
1. **Creating Content as a product:** The content itself can be sold as a product. For instance, audiobooks, pdf files, research papers, and market reports are still popular in various topics and can be considered as a source of revenue
2. **Subscription-based Revenue Model:** Subscription-based revenue models are very popular in the content industry. Many news outlets offer different packages for monthly, quarterly, and yearly access to their articles. But such a model is not limited to journals and news publishing companies. Many streaming services (such as Economic Times, Netflix and Spotify) use a similar model for selling their content to the audience . For example, BYJU's, an Indian edtech company, offers a subscription-based model for its learning app.
3. **Collecting Donations:** Collecting donations can be a revenue model for content creating organizations. In this model, you provide content to the audience and ask them to donate if the content is helpful and they are happy with it.
4. **Crowdfunding** is a popular method used by digital content creators to raise funds for their projects. It involves raising small amounts of money from a large number of people, usually via the internet. Crowdfunding can be used for various purposes such as creating new content, improving existing content, and marketing campaigns. For instance, a digital content creator can use crowdfunding to raise funds for creating a new video series or podcast. Crowdfunding can also be used to improve existing content by adding new features or improving the quality of the content.

There are several crowdfunding platforms available such as Kickstarter, Indiegogo, and Patreon. These platforms allow creators to set up a campaign and offer rewards to their backers in exchange for their support. Rewards can include early access to content, exclusive merchandise, and personalized messages.

5. **Sponsorship of site sections or content types:** This model involves generating revenue from sponsorship of site sections or content types (typically fixed fee for a period).
6. **Affiliate revenue:** Affiliate revenue is another popular model where you earn commissions by promoting other people's products or services 2.
7. **Subscriber data access for e-mail marketing:** This model involves generating revenue by providing subscriber data access for e-mail marketing 2.
8. **Access to customers for online research:** This model involves generating revenue by providing access to customers for online research.

In today's competitive and dynamic world, the Subscription-based Revenue Model is one of the most running models and working as a world financial model resulting in significantly good revenue collection. The general model behind that model can be Cost-Benefit Analysis, which incorporates all expected costs of producing the digital content and the expected revenues from its sale.

The suggested outline for creating a basic financial model for LMS development and its sustainable operation can be:



Note: This is a general framework, and the specific details for LMS development may vary. It's important to research the target market, competition, and gather data to make realistic assumptions when constructing the financial model.

1. Revenue Streams:

- User Subscriptions/ Licensing:** Charge individual users or companies a subscription fee for using the service. This could be on a monthly, quarterly, or annual basis.
- Corporate or Enterprise Sales/ Licensing:** Explore opportunities to sell the LMS to companies for employee training.

- iii. **Premium Features:** Keeping the basic version of LMS free and charging for advanced features could also bring in revenue. Features like analytics, additional storage, or priority customer support may be into premium packages.
- iv. **Content Marketplace:** Provide a platform for instructors to sell and share their courses.
- v. **Advertising:** Consider incorporating targeted advertisements or sponsored content within the LMS.

2. Cost Factors:

- i. **Development Costs:** These are costs for the initial creation of the LMS, including costs for developers, system architects, UX/UI designers, etc.
- ii. **Hosting and Maintenance:** Include recurring costs for hosting the LMS platform and ongoing maintenance.
- iii. **Content Acquisition:** If the course is created or acquired, factor in costs associated with content development or licensing.
- iv. **Marketing and Customer Acquisition:** Include expenses for marketing campaigns, customer support, and acquiring new users.

3. Key Metrics and Assumptions:

- i. **User Growth:** Define projected user growth rates based on your target market and marketing efforts.
- ii. **Churn Rate:** Estimate the rate at which users cancel their subscriptions.
- iii. **Average Revenue per User (ARPU):** Calculate the average monthly revenue per user across all revenue streams.
- iv. **Conversion Rate:** Estimate the percentage of free users who convert to paying subscribers.
- v. **Cost of Customer Acquisition (CAC):** Determine the cost to acquire each new customer.

4. Financial Projections:

- i. **Monthly Revenue:** Calculate revenue based on the number of paying subscribers, enterprise deals, content sales, and advertising income.
- ii. **Monthly Expenses:** Consider all the cost factors mentioned above, along with any other relevant expenses.
- iii. **Cash Flow:** Generate a cash flow statement by subtracting expenses from revenue on a monthly basis.
- iv. **Break-Even Analysis:** Determine the point at which revenue covers all expenses, indicating when the LMS becomes profitable.

ANNEXURE 4 – LMS – TYPES, MEANS TO ACCESS LMS, FEATURES

1. The Different Types of LMS Deployment Options

The following are the ways to deploy an LMS:

- i. **Cloud-Based Servers:** Cloud-based learning management systems (LMSs) are hosted in the cloud-based servers and frequently follow a software as a service (SaaS) business model. Cloud-based LMS vendors handle system maintenance and any technical updates or upgrades. Using a username and password, online users can access the system from anywhere, at any time.
- ii. **Self-Hosted Servers:** Self-hosted server based LMSs necessitate the user downloading software. Although the self-hosted platform allows for more creative control and customization, users must maintain the system themselves.

2. The Various Methods to Access LMS

The following may be the means to access an LMS:

- i. **Desktop:** Accessing LMS/digital content through a desktop requires the user to ideally have an internet connection and a compatible web browser installed. The user may also need to download any plugins or applications designed to access the content. Once the content is accessed, the user can then view, interact, and manipulate the content as instructed by the system. In remote areas, where internet is not available, content may be stored on desktop or servers of local area network.
- ii. **Mobile Application:** Mobile applications are a convenient way to access Learning Management Systems (LMSs) and digital content. By using a mobile application, users can easily access course materials, take quizzes, track progress and communicate with teachers/ instructors/ trainers or other students. Mobile applications also enable users to access content quickly, with many apps offering offline access.
- iii. **Simulation Tools:** Simulation tools allow learners to access digital content and Learning Management Systems (LMSs) with ease. With a simulation tool, learners can quickly and conveniently access the digital content, giving them the ability to learn at their own pace. Additionally, learners can quickly review their progress and get feedback from their peers, instructor, or supervisor. Simulation tools also provide an interactive, engaging experience for learners, allowing them to apply the concepts they are learning in real-world settings.
- iv. **AR/ VR/XR Tools:** AR/VR/XR allow learners/ students to access digital content in a unique and immersive way. Through these technologies, students can explore the content they are studying in a more interactive and engaging way. AR/VR/XR can also be used to provide virtual reality simulations of laboratory experiments and other activities that would otherwise be difficult to access or too expensive to provide. This technology can also be used to provide additional feedback and guidance to students, helping them make connections between different aspects of the content.

3. Features of a Learning Management System

Some common features found in a successful LMS include:

- i. **Responsive design** - Users should be able to access the LMS from whatever type of device they choose whether it's a desktop, laptop, tablet, or smartphone. The LMS should automatically display the version best suited for the user's chosen device. Additionally, the LMS should also allow users to download content, so it is accessible while offline.
- ii. **User-friendly interface** - The user interface (UI) should enable learners to easily navigate the LMS platform. The UI should also align with the abilities and goals of both the user and the organisation. An unintuitive UI risks confusing or distracting users and will make the LMS ineffective.
- iii. **Reports and analytics** - This includes eLearning assessment tools. Instructors and administrators must be able to view and track their online training initiatives to determine if they are effective or need adjusting. This can be applied to groups of learners and individuals.
- iv. **Course and Catalogue management** - The LMS holds all the eLearning courses and the related course content. Admins and instructors should be able to create and manage these catalogues and courses to deliver a more targeted learning experience.
- v. **Content interoperability and integration** - Content created and stored in an LMS must be packaged in accordance with interoperable standards, including SCORM (SCORM 2004 is the latest version being used in India) and xAPI.
- vi. **Support services** - Different LMS vendors offer varying levels of support. Many provide online discussion boards where users can connect and help each other. Additional support services, such as a dedicated toll-free service number, are available for an extra cost.
- vii. **Assessment** – The LMS enables the user or the learners to take up various types of assessments which can be referred to as in the Blended Learning Guidelines.
- viii. **Certification and Compliance support** - This feature is essential to systems used for online compliance training and certifications. Instructors and admins should be able to assess an individual's skill set and identify any gaps in their performance. This feature will also make it possible to use LMS records during an audit.
- ix. **Social learning capabilities** - Many LMSes have started including social media tools within their platform. This allows users to interact with their peers, collaborate and share their learning experiences.
- x. **Gamification** - Some LMSes include game mechanics or built-in gamification features that allow instructors and admins to create courses with extra motivation and engagement. This can help students who need additional incentive to complete the course, possibly in the form of leaderboards, points and badges.
- xi. **Automation** - Learning management systems should enable administrators to automate repeated and tedious tasks. Examples include user grouping, new user population, user deactivation and group enrolments.
- xii. **Localization** - It is important for LMSes to include multilingual support features so the learning and training content can remain unaffected by language barriers. Some LMSes integrate geolocation features that allow them to automatically present the appropriate version of the course immediately upon access.
- xiii. **Artificial intelligence (AI)** - Finally, artificial intelligence can help an LMS create personalised learning experiences for users by providing course formats suited to their needs, and by suggesting topics the user may find interesting based on the courses they have already completed.

Learning Management Systems should have:

- i. the ability to monitor user progress and performance.
- ii. increased eLearning accessibility without geographic limitations.
- iii. the ability to personalise the online training and learning experience.
- iv. the ability to update eLearning modules and activities easily and efficiently.
- v. the ability to easily ensure online training and learning materials are being distributed effectively; and
- vi. the use of automation that allows users to forget about tedious, repetitive tasks, such as user enrolment and certification distribution and focus on more important activities.
- vii. Built in governance process for monitoring the learning process.

ANNEXURE 5 – ENSURING THE SAFETY AND CYBERSECURITY IN LEARNING MANAGEMENT SYSTEM (LMS)

Learning Management Systems (LMS) have been a cornerstone in educational, corporate, government, and non-profit organizations to deliver, manage, and track learning and training. With the vast amount of sensitive information existing in these systems, it's critical to assure the safety and security of LMS platforms. It can be subject to a variety of security threats, which includes data breaches, SQL injection, unauthorized access, Malware attacks, Denial of service attacks (DoS), Cross-site scripting, Zero-day exploits, Phishing attacks, etc.

Protecting the LMS from such threats, it is required to have robust cybersecurity measures, data encryption, regular system updates and patches, secure coding practices, and user awareness training should be implemented with strong access controls. A secure LMS is fundamental to protect sensitive student data, secure intellectual property, and maintain system availability.

Some of the key threats are:

1. Data breaches: Cybercriminals might try to access and extract sensitive data stored within the LMS, like personal user information, educational records, or credit card details.
2. SQL Injection: This involves the injection of malicious SQL code into queries, which can then manipulate the database, leading to unauthorized access, data breaches, or data loss.
3. Unauthorized Access: This refers to situations where individuals gain unpermitted access to the system, that can potentially access sensitive information. This could be due to weak login credentials, insufficient access control mechanisms, or successful phishing attacks.
4. Malware Attacks: Malicious software can be used to disrupt system operations, gather sensitive information, gain unauthorized access, or even damage the system.
5. Denial of Service Attacks (DoS): These attacks overwhelm the system's servers with traffic, making the LMS slow or unavailable to legitimate users.
6. Phishing Attacks: Users of the LMS can be targeted by phishing attempts, where attackers try to trick individuals into giving up login credentials or other sensitive information.

In order to ensure the safety and cybersecurity in learning management system, the following measure can be taken:

1. **Data Protection**
 - i. Regular backup of data.
 - ii. Implement proper data retention and deletion policies following legal and regulatory standards.
 - iii. Use standard encryption algorithms to protect data in transit and at rest.
2. **Network and System Security**
 - i. Use secure communication protocols like SSL/TLS to protect data in transit.
 - ii. Regular updates and patches of the LMS to mitigate known vulnerabilities.
 - iii. Use firewalls, intrusion detection/prevention systems, and antivirus software.

3. Monitoring and Risk Management

- i. Regular vulnerability scanning and penetration testing.
- ii. Implement a comprehensive monitoring system for early detection of risks or breaches.

4. Incident Response

- i. Prepare an incident response plan detailing procedures for potential security situations.
- ii. Regularly test and update the incident response plan.

5. User Awareness and Training

- i. Regular training and awareness sessions for users to identify phishing attempts, suspicious activity, and more.
- ii. Conducting regular feedback and doubt-clearing sessions to avoid any miscommunication with respect to data security.

ANNEXURE 6 – LEARNING HOURS IN BLENDED/ DIGITAL MODE

The reduction/ increase in course coverage hours when converting an offline course into online content can vary depending on several factors. Here are a few assumptions to consider when estimating the reduction:

1. **Delivery Method Efficiency:** Online delivery methods often result in greater efficiency compared to offline methods. Assuming the online platform/ LMS is well-designed and user-friendly, it can help learners navigate through content more quickly and efficiently. This efficiency could potentially reduce the overall course duration.
2. **Interactivity and Engagement:** Online courses can offer more interactive elements and multimedia resources (such as formative assessments, quizzes, videos, and simulations) than traditional offline courses. These elements can enhance engagement and comprehension, potentially reducing or increasing the time needed for course coverage.
3. **Self-Paced Learning:** Online courses often offer the flexibility of self-paced learning. Learners can progress at their own speed and revisit specific sections as needed, which can result in faster completion times for some individuals.
4. **Collaborative Learning Opportunities:** Online platforms can facilitate collaborative learning through discussion boards, group projects, and virtual meetings. This interactivity can enhance the learning experience and potentially compensate for any reduction or increase in direct instruction time.

It is challenging to provide an exact percentage reduction/ increase in course coverage hours, as it depends on the content, instructional design, and learner characteristics. It's important to carefully plan and design the online course to ensure effective transfer of content and learning outcomes. **Regular assessment and feedback loops with learners can help refine the course further.**

Additionally, it's advisable to consult with instructional designers and subject matter experts to accurately determine the reduction in course coverage hours during the conversion process.

The following table provides an indicative way of completion of learning hours, based on the content available in form of blended format. However, the actual learning hours may be provided by the content creator based on the actual content.

TABLE 2: A ROUGH ESTIMATE/ RATIO OF COURSE COVERAGE HOURS (OFFLINE NOTIONAL HOURS: ONLINE LEARNING HOURS) WHEN CONVERTING AN OFFLINE COURSE INTO ONLINE CONTENT IS GIVEN IN THE FOLLOWING TABLE:

Sl. No.	Digital Content Delivery Methods	Physical/ Offline Learning Duration: Online learning Duration (in ratio and minutes)	Assumptions (if any)								
1. Learning Management System (LMS)/ Massive Open Online Courses (MOOCs)	<p>Note: Type of contents available on the LMS/ MOOCs:</p> <ol style="list-style-type: none"> 1. Video, 2. PDF/ Text/ e-books, 3. Animation, 4. Digital/ Meta-verse/ 5. High Quality PPT, 6. Assignment (online) based on learning outcomes of the qualification/ job roles, 7. Projects based on the learning outcomes of a complete topic/ units and/ or 8. any other innovative methods 	<p>1 : 1</p> <table border="1" data-bbox="788 520 1073 636"> <tr> <td data-bbox="788 520 961 589">Physical mode</td> <td data-bbox="961 520 1073 589">Digital/ online mode</td> </tr> <tr> <td data-bbox="788 589 961 636">60 min</td> <td data-bbox="961 589 1073 636">= 60 min</td> </tr> </table> <p>3 : 1</p> <table border="1" data-bbox="788 763 1073 879"> <tr> <td data-bbox="788 763 961 832">Physical mode</td> <td data-bbox="961 763 1073 832">Digital/ online mode</td> </tr> <tr> <td data-bbox="788 832 961 879">60 min</td> <td data-bbox="961 832 1073 879">= 20 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 60 min	Physical mode	Digital/ online mode	60 min	= 20 min	<ul style="list-style-type: none"> • Recorded Live lecture • Pace of Delivery: similar pace as the offline course <ul style="list-style-type: none"> • Assumption: the content is condensed for concise delivery (in form of video, may be supported by PDF/ Text/ e-books, Animation, high quality PPT, Pictures, etc.) without sacrificing essential information • Review the content 3 times for the appropriate learning • Assume a factor of 3 for digital + video content 1 hours of learning = 3 clips of 6.5 minutes each (18.5 minutes learning + 1.5 min Assessment), or = 20 minutes of High-End Video embedded in LMS <p>Note: the content may be divided into numbers of modules embedded with the provisions of formative and summative assessments (online) at suitable intervals. For instance, 7 minutes' module (video) shall be designed as follows:</p>
Physical mode	Digital/ online mode										
60 min	= 60 min										
Physical mode	Digital/ online mode										
60 min	= 20 min										

			<table border="1"> <tr> <td>2 min Learning</td><td>10 sec</td><td>2 min Learning</td><td>10 sec</td><td>2 min Learning</td><td>10 sec</td><td>30 sec</td></tr> <tr> <td colspan="7" style="text-align: center;">Total = 7 mins</td></tr> </table> <ul style="list-style-type: none"> • 10 sec – Online questions/ Formative assessment • 30 sec - Summative assessment 	2 min Learning	10 sec	2 min Learning	10 sec	2 min Learning	10 sec	30 sec	Total = 7 mins						
2 min Learning	10 sec	2 min Learning	10 sec	2 min Learning	10 sec	30 sec											
Total = 7 mins																	
		PPT: 25 slides per 60 minutes	<table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 25 slides</td> </tr> </table> <ul style="list-style-type: none"> • 15 maximum slides (main slides) – in 60 min – 4 min per slides • 10 Backup slides 	Physical mode	Digital/ online mode	60 min	= 25 slides										
Physical mode	Digital/ online mode																
60 min	= 25 slides																
2.	PDF/ Text/ e-books		<p style="text-align: center;">1 : 1</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 60 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 60 min			<ul style="list-style-type: none"> • Pace of Delivery : similar pace as the offline course 							
Physical mode	Digital/ online mode																
60 min	= 60 min																
3.	Lectures through Broadcast/ TV Channels (LIVE)		<p style="text-align: center;">1 : 1</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 60 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 60 min			<ul style="list-style-type: none"> • Pace of Delivery : similar pace as the offline course 							
Physical mode	Digital/ online mode																
60 min	= 60 min																
4.	Video Modules (Recorded)		<p style="text-align: center;">1 : 1</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 60 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 60 min			<ul style="list-style-type: none"> • Pace of Delivery : similar pace as the offline course 							
Physical mode	Digital/ online mode																
60 min	= 60 min																
	Note: these assumptions and estimates are just																

<p>approximations. The actual reduction in video duration will depend on the specific course content, instructional design decisions, and the level of detail required.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">60 min</td> <td style="width: 50%;">= 60 min</td> </tr> </table> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="2" style="text-align: center; padding: 5px;">(1 : 0.8) to (1: 0.6)</td> </tr> <tr> <td style="width: 50%; padding: 5px;">Physical mode</td> <td style="width: 50%; padding: 5px;">Digital/online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">to 36 min</td> </tr> </table> <p>i.e., 20 to 40 % reduction in video duration</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="2" style="text-align: center; padding: 5px;">(2 : 1) or (1 : 0.5)</td> </tr> <tr> <td style="width: 50%; padding: 5px;">Physical mode</td> <td style="width: 50%; padding: 5px;">Digital/online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 30 min</td> </tr> </table> <p>i.e., 50 % reduction in video duration</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="2" style="text-align: center; padding: 5px;">1:0.4</td> </tr> <tr> <td style="width: 50%; padding: 5px;">Physical mode</td> <td style="width: 50%; padding: 5px;">Digital/online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 24 min</td> </tr> </table>	60 min	= 60 min	(1 : 0.8) to (1: 0.6)		Physical mode	Digital/online mode	60 min	to 36 min	(2 : 1) or (1 : 0.5)		Physical mode	Digital/online mode	60 min	= 30 min	1:0.4		Physical mode	Digital/online mode	60 min	= 24 min	<ul style="list-style-type: none"> • If the content is condensed or adapted to fit the video format, assuming a concise delivery without sacrificing essential information <p style="text-align: right;">= 48 min</p> <ul style="list-style-type: none"> • Utilizing visual aids, graphics, and other multimedia elements in the video can enhance engagement and convey information more efficiently. Thus, further reducing video duration. <ul style="list-style-type: none"> • By identifying and prioritizing the core learning objectives of the offline course (Targeted Approach)
60 min	= 60 min																					
(1 : 0.8) to (1: 0.6)																						
Physical mode	Digital/online mode																					
60 min	to 36 min																					
(2 : 1) or (1 : 0.5)																						
Physical mode	Digital/online mode																					
60 min	= 30 min																					
1:0.4																						
Physical mode	Digital/online mode																					
60 min	= 24 min																					

		i.e., 60 % reduction in video duration									
5.	Web eLearning	<p>(1 : 0.8) to (1: 0.6)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 48 min to 36 min</td> </tr> </table> <p>i.e., 20 to 40 % reduction in course duration</p>	Physical mode	Digital/ online mode	60 min	= 48 min to 36 min	<ul style="list-style-type: none"> If the content is condensed, adapted, or restructured to fit the web eLearning format, assuming a concise delivery without compromising key information 				
Physical mode	Digital/ online mode										
60 min	= 48 min to 36 min										
		<p>1: 0.7</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 42 min</td> </tr> </table> <p>(2 : 1) or (1 : 0.5)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 30 min</td> </tr> </table> <p>i.e., 50 % reduction in course duration</p>	Physical mode	Digital/ online mode	60 min	= 42 min	Physical mode	Digital/ online mode	60 min	= 30 min	<ul style="list-style-type: none"> Web eLearning often offers self-paced learning, allowing learners to progress at their own speed.
Physical mode	Digital/ online mode										
60 min	= 42 min										
Physical mode	Digital/ online mode										
60 min	= 30 min										
6.	Online curated self-learning	1: 0.7	<ul style="list-style-type: none"> Web eLearning often offers self-paced learning, allowing learners to progress at their own speed. 								

		<table border="1"> <tr> <td>Physical mode</td><td>Digital/online mode</td></tr> <tr> <td>60 min</td><td>= 42 min</td></tr> </table> <p>i.e., 30 % reduction in course duration</p>	Physical mode	Digital/online mode	60 min	= 42 min	
Physical mode	Digital/online mode						
60 min	= 42 min						
7.	Presentations	<p>(1 : 0.7) to (1: 0.5)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/online mode</td> </tr> <tr> <td>60 min</td> <td>= 42 min to 30 min</td> </tr> </table> <p>i.e., 30 to 50 % reduction in course duration</p>	Physical mode	Digital/online mode	60 min	= 42 min to 30 min	<ul style="list-style-type: none"> Presentations often focus on concise and visually appealing delivery of information. Assuming the content is condensed and adapted to fit the presentation format.
Physical mode	Digital/online mode						
60 min	= 42 min to 30 min						
		<table border="1"> <tr> <td>Physical mode</td> <td>Digital/online mode</td> </tr> <tr> <td>60 min</td> <td>= 20 -30 slides</td> </tr> </table> <p>One-hour offline course (60 minutes), needs for approximately 20-30 slides.</p>	Physical mode	Digital/online mode	60 min	= 20 -30 slides	<ul style="list-style-type: none"> An average duration of 2-3 minutes per slide, with each slide containing enough content to cover the necessary information effectively A single slide might cover around 2-3 minutes of content If the content is condensed or streamlined, the number of slides required may be reduced. The inclusion of visuals, diagrams, and other visual aids can require additional slides to effectively convey the information as compared to a purely text-based presentation.
Physical mode	Digital/online mode						
60 min	= 20 -30 slides						

		(15-20 maximum slides (main slides) – in 60 min – 3 to 4 min per slides and 10 Backup slides)	<ul style="list-style-type: none"> Utilizing effective slide layouts, clear organization, and concise content can help maximize the information presented on each slide, potentially reducing the overall slide count. 										
8.	Micro Learning (Consisting of Micro Nuggets)	<table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 12 modules/ micro-nuggets</td> </tr> </table> <p>1 hour of offline course equals to approximately 12 modules/ micro-nuggets</p>	Physical mode	Digital/ online mode	60 min	= 12 modules/ micro-nuggets	<ul style="list-style-type: none"> Assuming an average duration of 5 minutes for each module or micro-nugget <p>(Refer: https://www.ispringsolutions.com/blog/how-to-create-training-module)</p>						
Physical mode	Digital/ online mode												
60 min	= 12 modules/ micro-nuggets												
9.	The meta-verse, AR/VR/XR	<table border="1"> <tr> <td colspan="2">1 : 1</td> </tr> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 60 min</td> </tr> </table> <p>(1 : 1.2) to (1 : 1.3) – (as per discussion with Industry experts/ SME)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 72 min to 78 min</td> </tr> </table>	1 : 1		Physical mode	Digital/ online mode	60 min	= 60 min	Physical mode	Digital/ online mode	60 min	= 72 min to 78 min	<ul style="list-style-type: none"> The meta-verse involves adapting the content to a virtual environment. Assuming this adaptation process is efficient. The meta-verse offers opportunities for learners to explore 3D environments, interact with objects, and engage in immersive experiences. Depending on the level of interactivity and the amount of additional content or activities included, the duration of the metaverse course might increase slightly compared to the offline version.
1 : 1													
Physical mode	Digital/ online mode												
60 min	= 60 min												
Physical mode	Digital/ online mode												
60 min	= 72 min to 78 min												

		i.e., 20 to 30 % increase in course duration due to increase activities/ contents									
10	Digital Twins Note: The actual duration of a Digital Twins mode will depend on factors such as the extent of content adaptation, the level of interactivity, the learning objectives, and the individual learner's pace.	<p style="text-align: center;">1 : 1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Physical mode</td> <td style="padding: 5px;">Digital/ online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 60 min</td> </tr> </table> <p style="text-align: center;">(1 : 1.2) to (1 : 1.3)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Physical mode</td> <td style="padding: 5px;">Digital/ online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 72 min to 78 min</td> </tr> </table> <p>i.e., 20 to 30 % increase in course duration due to increase activities/ contents.</p>	Physical mode	Digital/ online mode	60 min	= 60 min	Physical mode	Digital/ online mode	60 min	= 72 min to 78 min	<ul style="list-style-type: none"> Digital Twins mode involves restructuring, reformatting, and optimizing the content for effective delivery in a virtual environment.
Physical mode	Digital/ online mode										
60 min	= 60 min										
Physical mode	Digital/ online mode										
60 min	= 72 min to 78 min										
11	Social Networking Tool	<p style="text-align: center;">1 : 1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Physical mode</td> <td style="padding: 5px;">Digital/ online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 60 min</td> </tr> </table> <p style="text-align: center;">Physical mode Digital/ online mode</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Physical mode</td> <td style="padding: 5px;">Digital/ online mode</td> </tr> <tr> <td style="padding: 5px;">60 min</td> <td style="padding: 5px;">= 12</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 60 min	Physical mode	Digital/ online mode	60 min	= 12	<ul style="list-style-type: none"> Adapting the offline course to social media tools involves condensing and restructuring the content to fit the limitations and requirements of each tool. Assuming a streamlined adaptation process, the duration of the course in social media tools could be approximately equal to the offline course duration
Physical mode	Digital/ online mode										
60 min	= 60 min										
Physical mode	Digital/ online mode										
60 min	= 12										

		<table border="1"> <tr> <td>modules/ micro-nuggets</td></tr> </table>	modules/ micro-nuggets				
modules/ micro-nuggets							
		<p>1 hour of offline course equals to approximately 12 modules/micro-nuggets</p>					
12	Actual Plant/ process videos	<p>(1 : 0.8) to (1 : 1.2)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 48 min to 72 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 48 min to 72 min	<ul style="list-style-type: none"> Creating actual plant/process videos involves recording real-life scenarios and processes. The level of detail and complexity of the processes being recorded will affect the video duration. Some processes might require longer video footage to capture all the necessary steps and explanations, while others might be more concise.
Physical mode	Digital/ online mode						
60 min	= 48 min to 72 min						
13	Illustration/ Graphic/ GIF	<p>1:0.8</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 48 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 48 min	Assuming an efficient adaptation process, the duration of the illustrations, graphics, and GIFs might be less than the original offline course duration.
Physical mode	Digital/ online mode						
60 min	= 48 min						
14	<p>Photographic Image Instructional</p> <p>Note: Conversion of offline course into photographic images will heavily depend on factors</p>	<p>(1 : 0.5) to (1 : 0.7)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 30 min to 42 min</td> </tr> </table>	Physical mode	Digital/ online mode	60 min	= 30 min to 42 min	<ul style="list-style-type: none"> It involves selecting and capturing relevant images that represent the key concepts and information. This process may require condensing and selecting visuals that effectively convey the course content.
Physical mode	Digital/ online mode						
60 min	= 30 min to 42 min						

	like the number of visuals required, the complexity and variety of content, the availability of appropriate resources, and the desired visual quality.	<table border="1"> <tr> <td>Physical mode</td><td>Digital/online mode</td></tr> <tr> <td>60 min</td><td>= 10-20 photographic images</td></tr> </table> <p>1-hour offline course equals to around 10-20 photographic images</p>	Physical mode	Digital/online mode	60 min	= 10-20 photographic images	<ul style="list-style-type: none"> Assuming a moderate density of visual content, and assuming that each image can effectively capture or represent a key concept or idea Assume each Picture contains content equivalent to 1000 words
Physical mode	Digital/online mode						
60 min	= 10-20 photographic images						
15	Virtual Labs	<p>(1 : 0.7) to (1 : 0.8)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/online mode</td> </tr> <tr> <td>60 min</td> <td>= 42 min to 48 min</td> </tr> </table>	Physical mode	Digital/online mode	60 min	= 42 min to 48 min	<ul style="list-style-type: none"> Converting the offline course into a Virtual Labs mode will require designing and mapping out the virtual lab activities and exercises. This may involve identifying the specific experiments, simulations, or hands-on activities that can be translated into the virtual environment.
Physical mode	Digital/online mode						
60 min	= 42 min to 48 min						
16	Gamification	<p>(1 : 0.4) to (1 : 0.5)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/online mode</td> </tr> <tr> <td>60 min</td> <td>= 24 min to 30 min</td> </tr> </table> <p>i.e., 40-50% of the total course duration.</p>	Physical mode	Digital/online mode	60 min	= 24 min to 30 min	<ul style="list-style-type: none"> Converting the course into a gamified experience requires designing the game mechanics, progress structure, and related challenges. This process involves determining the game elements, interactions, and content integration. Assuming a moderate level of complexity
Physical mode	Digital/online mode						
60 min	= 24 min to 30 min						
17	Animation	<p>(1 : 0.5) to (1 : 0.7)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/online mode</td> </tr> </table>	Physical mode	Digital/online mode	<ul style="list-style-type: none"> Converting the offline course into animations involves condensing and transforming the content into visual storytelling. Assuming a moderate level of animation complexity 		
Physical mode	Digital/online mode						

		<table border="1"> <tr> <td>60 min</td><td>=</td><td>30 min to 42 min</td></tr> </table> <p>i.e., 50-70% of the total course duration</p>	60 min	=	30 min to 42 min		
60 min	=	30 min to 42 min					
18	Simulation based Drill and Practice	<p>(1 : 0.6) to (1 : 0.9)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 36 min to 54 min</td> </tr> </table> <p>i.e., 60-90% of the total course duration</p>	Physical mode	Digital/ online mode	60 min	= 36 min to 54 min	<ul style="list-style-type: none"> Converting the offline course into a simulation format will require designing and mapping out the interactive scenarios and exercises. Assuming a moderate level of complexity and efficient scenario design and mapping
Physical mode	Digital/ online mode						
60 min	= 36 min to 54 min						
19	<p>Online interactive mode (two-way) - Instructor/ teacher led</p> <p>Note: the ratio can vary significantly based on factors like the complexity of the course material, the desired level of interaction, the specific communication tools and technologies involved, and the availability and expertise of instructors/teachers.</p>	<p>(1 : 0.5) to (1 : 0.9)</p> <table border="1"> <tr> <td>Physical mode</td> <td>Digital/ online mode</td> </tr> <tr> <td>60 min</td> <td>= 30 min to 54 min</td> </tr> </table> <p>i.e., 50-90% of the total course duration</p>	Physical mode	Digital/ online mode	60 min	= 30 min to 54 min	<ul style="list-style-type: none"> This may include restructuring the course material, creating digital resources, and optimizing it for online delivery. Assuming a balance between prepared content delivery and interactive discussions The time required for evaluation and feedback will depend on the number of assessments and the size of the learner cohort. Assuming an efficient evaluation process, this might take around 5-10% of the total course duration.
Physical mode	Digital/ online mode						
60 min	= 30 min to 54 min						
20	Online interactive mode (two-way) – AI/ Robot Led	(1 : 0.8) to (1 : 1)	<ul style="list-style-type: none"> Designing and developing the AI/Robot-led interaction involves creating the conversational AI 				

	<p>Note: the ration depends on the factors like the complexity of the course material, the desired level of interaction and AI sophistication, the available AI development resources, and the user interface design requirements.</p>	<table border="1" data-bbox="790 235 1073 358"> <tr> <td data-bbox="790 235 945 298">Physical mode</td><td data-bbox="945 235 1073 298">Digital/ online mode</td></tr> <tr> <td data-bbox="790 298 945 358">60 min=</td><td data-bbox="945 298 1073 358">48 min to 60 min</td></tr> </table> <p>i.e., 80-100% of the total course duration</p>	Physical mode	Digital/ online mode	60 min=	48 min to 60 min	<p>system, programming the dialogue flow, and integrating it into the course platform.</p> <ul style="list-style-type: none"> Assuming moderate complexity Thorough testing/ assessment of the AI/Robot-led interactions is essential to ensure accuracy and address any issues or limitations. Assuming comprehensive testing/ assessment, this might take around 10-20% of the total course duration.
Physical mode	Digital/ online mode						
60 min=	48 min to 60 min						

ANNEXURE 7 – DETAILED COURSE EVALUATION ON CONTENT QUALITY FRAMEWORK (CQF)

Category	Parameters	Rating	Achieved	MaximumS core	Max Score	CriteriaTotalScore	CriteriaWeightage	WeightedS core	MaxWeighted	AttainedScore	PassingCriteria	Result
I. Course Overview and Introduction	1. Clear instructions to navigate the course and its components.											
	2. Instructions are enabled by an introductory video, or an introductory tour of the portal.											
	3. Course Provider's expectations are conveyed clearly to the learner (in terms of completion, evaluation expectations etc).											
	4. Prior skill or knowledge requirements are stated, and/or supported with prerequisite material.											
II. Learning Objectives (Competencies)	1. The course learning objectives, or course/program competencies are clearly stated, and describe outcomes that are measurable											
	2. The module/unit learning objectives or competencies describe outcomes that are measurable and consistent with the course-level objectives or competencies											
	3. All target competencies are clearly tested at the end of the course to demonstrate progression											
	4. Target competencies have been covered in the course using real-life scenarios											
III. Assessment and Measurement	1. The course features a clear assessment criterion during the course with clear instructions on evaluation. Course information specifies how successful completion of the course will be recognized											
	2. The learning activities and assessment are consistent with learning outcomes											
	3. The course provides learners with multiple opportunities to track their learning progress											
	4. Case studies and case-oriented assessment questions are based on real-life situations											
	5. The assessment uses more than one format of questions											
	6. The course avoids assessment patterns that are redundant in evaluating a learner such as unrealistic answer options for multiple											

	<p>choice questions, or distractors, where learners can easily guess the correct answer by eliminating incorrect ones</p> <p>7. All practice activities provide diagnostic feedback, i.e., in case a user attempts the question incorrectly/correctly, it provides them with descriptive feedback</p> <p>8. There is at least one active learning activity, such as online discussion/ debate, group project, synchronous online meeting, case study or a learning game per module/learning unit</p>										
IV. Instructional Materials	<p>1. Micro-learning approach, ensure shorter bytes of content (Watch)</p> <p>2. Encourage critical thinking and reasoning, use of reflection quizzes etc (Think)</p> <p>3. Context-relevant interactivities (Do) (Learner engagement related activities and materials)</p> <p>4. Learners are given examples of and asked to explore practical applications of the course in their setting</p> <p>5. Encouragement and opportunities (materials and sources) for self- learning (Explore)</p> <p>6. Application of concepts in real-life based assessments (Test)</p>										
V. Course Activities and Learner Interaction	<p>1. The learning activities promote the achievement of the stated learning objectives or competencies</p> <p>2. The requirements for learner interaction are clearly stated</p> <p>3. Learning activities provide opportunities to learners that support active learning, to avoid the learner's passive assimilation of the content</p> <p>4. Instructor support or feedback support from the course team is available, readily or on-demand.</p>										
VI. Course Technology	<p>1. The language used in the course is understandable by the target audience</p> <p>2. The instructional materials contribute to the achievement of the stated course and module/unit learning objectives or competencies</p> <p>3. The voice over accent is one that can be easily understood by the target audience</p> <p>4. Reading content (e.g., PDF, slides) is designed for on-the-go consumption and contains visual summaries, infographics and other similar techniques</p> <p>5. The voice used is not machine simulated and robotic</p>										
VII. Learner Support	<p>1. The course instructions articulate or link to a clear description of the technical support offered and how to obtain it</p>										

	2. Learners have access to additional resources that enrich the course content										
	3. Learners have access to troubleshooting resource(s) and contact details										
	4. The course features navigational help										
VIII. Accessibility and Usability	1. Videos feature closed captions and transcripts										
	2. Hyperlinks in the course connect to the correct location and all of them are descriptively titled (not using phrases as "Click here"), underlined, and a different colour.										
	3. Course uses appropriate font size and type, which is adjustable and conforms to all the required standards. (Please refer to document for standards)										
	4. The course uses both colour and symbols to convey messages or visual notifications.										
	5. The course uses patterns and textures as opposed to only contrasting colours for elements that require emphasis.										
	6. Colour schemes used are colour-blind-friendly (Please see W3C standards) and contrast is used in choosing colour combinations										
	7. PDFs are saved as searchable text not images.										
	8. Audio narration is available for static content.										
Diversity	1. The course uses language that is gender inclusive, e.g., the use of 'they' in favour of 'he' (with appropriate change to sentence structures)										
Culture Diversity & Tolerance	1. Courses developed are multilingual and available in multiple official languages										
	2. Human characters used in the course belong to the context that is being portrayed, e.g., use of Indian characters in Indian contexts and situations and use of international characters where the situation demands										
Composite Score = Course Category =											
Overall Remarks:											

Note: Rating Scale

- a. Meets Criteria Partially
- b. Meets Criteria Completely
- c. Does Not meet Criteria