*भारतीय मानक*

***Indian Standard***

**IS 18888 (Part 1) : 2024**

# ऑनलाइन पाठ्यक्रम सामग्री को डिजाइन करने और पाठ्यक्रम सामग्री एवं वितरण प्लेटफ़ॉर्म की गुणवत्ता मूल्यांकन — रीति संहिता

## भाग 1 पाठ्यक्रम सामग्री तैयार करना, वर्तमान रीतियाँ और अनुपालन सत्यापन मानदंड

# Designing Online Course Contents and Quality Assessment of Course Content and Delivery Platform — Code of Practice

## Part 1 Course Content Preparation, Current Practices and Compliance Verification Criteria

ICS 35.240.90



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E-Learning Sectional Committee, LITD 19

FOREWORD

This Indian Standard (Part 1) was adopted by the Bureau of Indian Standards, after the draft finalized by the E-Learning Sectional Committee, has been approved by the Electronics and Information Technology Division Council.

There is no ISO/IEC standard on this subject. This standard is one of the series of Indian Standards on 'Designing online course contents and quality assessment of course content and delivery platform — Code of practice' other standards published so far in the series are:

Part 2 Online course contents quality model and assessment methodology

Part 3 Online course hosting platform quality model and assessment methodology

Part 1 describes (a) the overview of the overall specification, (b) online content development guidelines, (c) assessment criteria for online course contents and delivery platform. Part 2 describes the online content quality model and assessment methodology. Part 3 describes the online course delivery platform quality model and assessment methodology.

The composition Committee responsible for the formulation of this standard is given at Annex A.

## Contents

## 0 INTRODUCTION

Quality assessment of online course delivery platform and online course contents is an important aspect in increasing the value proposition of technology adoption in education. Quality of the online delivery platform & contents is a major concern with regard to the successful implementation of online learning. A formal quality assessment practice of e-Learning solutions is a step forward to address these concerns. A national level policy on quality assessment practices of e-Learning solutions will not only harmonize the e-Learning quality assessment practices but also provides an effective mechanism for monitoring and adaptation of necessary changes to meet the present and future challenges in online learning.

In order to arrive at a holistic framework we need to closely look at the online content development and online course delivery practices and impact of technological challenges. This exercise needs some more understanding about instructional delivery process and how this is being dealt at present.

A learner is said to have learned the subject when his ability in accomplishing the task corresponding to the subject is judged. To assess this factor the only instrument that is available is assessment of student's knowledge level. Student's knowledge level will improve when he is given sufficient details about the subject matter. Sufficient details are nothing but information about what the student is expected to know/perform after completion of the course, actual content supplemented with illustrations/demonstrations wherever required, additional information about the topic's background or advanced details and a self-assessment.

If these details are designed in such a manner that would help students in engaging themselves in learning actively, generate curiosity about a topic, probe critical thinking skills and allow them to interact with the content in a variety of ways (which can be regarded as necessary elements to judge one's motivational level) then the content is expected to be used by many and thus can be regarded as quality content. This can be addressed by effective utilization of text and multimedia coupled with little programming skills for event generation, notification and handling during content development and delivery process.

This requirement can be addressed when the subject matter expert is provided with comprehensive set of guidelines corresponding to the technologies used for content development, rubrics for assessing content quality and tools to assess the conformance to these guidelines.

Development of content and its associated quality model alone is not sufficient. A quality model with quality dimensions in order to serve the content to the satisfaction of online learning stakeholder's namely, experts and students is also required.

*Indian Standard*

# DESIGNING ONLINE COURSE CONTENTS AND QUALITY ASSESSMENT OF COURSE CONTENT AND DELIVERY PLATFORM — CODE OF PRACTICE

## PART 1 COURSE CONTENT PREPARATION, CURRENT PRACTICES AND COMPLIANCE VERIFICATION CRITERIA

### 1 SCOPE

This standard (Part 1) defines the quality assessment criteria for online course content and delivery platforms. It outlines the recommended guidelines for developing and organizing online course content in accordance with these criteria. The recommended guidelines describe both the technical and instructional design aspects of the online course contents.

### 2 REFERENCE

The standard given below contain provisions which, through reference in this standard, constitute provisions of this standard. At the time of publication, the editions indicated was valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent edition of this standards:

| *IS No.* | *Title* |
|---|---|
| IS/ISO/IEC 40180 : 2017 | Information technology — Quality for learning, education and training — Fundamentals and reference framework |

Video bit rate calculator - https://www.dr-lex.be/info-stuff/videocalc.html

Blur, blockiness and ringing threshold limits a framework for multimedia educational content development and assessment of publication quality", CSI Transactions on ICT: Volume 3, Issue 1 (2015), Page 31-43

### 3 TERMINOLOGY AND ABBREVIATIONS

#### 3.1 Terminology

**3.1.1** *Course* — Collection of individual units.

**3.1.2** *Unit* — A unit is a collection of lessons corresponding to a specific area of the subject being dealt.

**3.1.3** *Lesson* — A lesson is a collection of content blocks belonging to a set of objectives that are related to each other.

**3.1.4** *Content Block* — Content block is defined as a self-contained unit of course material corresponding to a learning objective.

**3.1.5** *e-Learning* — Using computer resources and Internet technologies for educational purposes.

**3.1.6** *e-Content* — Educational contents developed using multimedia technologies such as audio/video, power point presentation, hypertext markup language, portable document format.

**3.1.7** *Rubric* — A set of instruction or rules used for assessment of a particular aspect.

**3.1.8** *Ordinal Data* — Data that is categorical, have natural, ordered categories and the distances between the categories is not known.

#### 3.2 Abbreviations

a) WCAG — Web content accessibility guidelines version 2.0 as per world wide web consortium recommendation 11 December 2008;

b) SCORM — Sharable content object reference model 2004 3rd edition or above;

c) MOOC — Massive open online course — Content designed for unlimited participation and open web access; and

d) SUS — Simple usability scale.

### 4 DEFINITIONS OF QUALITY ASSESSMENT CRITERIA FOR ONLINE COURSE CONTENTS AND DELIVERY PLATFORM

#### 4.1 Online Course Content Assessment Criteria

From the perspective of online course content, theassessment criteria should verify conformance to the following statement:

"A set of individual course contents suitable for offline and online reading which are organized in to

a course with objectives or expected learning outcome associated with each of them, visual and auditory legible, interoperable with course delivery platform, understandable to readers and having sufficient coverage of information".

### 4.2 Online Course Delivery Platform Assessment Criteria

From the perspective of online delivery platform, the assessment criteria should verify conformance to the following statement:

"A platform which is secured from most common web vulnerabilities and can support delivery of online courses organized according to the course developer's choice, accessible, ensures data privacy by upholding confidentiality, integrity and availability and meets the minimum expected performance in terms of its access through Internet and is easy to use".

## 5 ONLINE COURSE CONTENTS DEVELOPMENT APPROACH

Content development actually starts with course planning which include, but not limited to, identification of target audience, learner analysis, objectives or expected learning outcome. The subsequent phases of content development include processes related to choosing an appropriate instructional design, assessment of course material and publish the material under particular licensing terms. The course planning phase is outside the scope of this draft specification.

Choosing simple content formats which are supported by majority of operating systems, browsers and can support integration of individual multimedia components to make the content and its interaction with the user possible are important factors to be considered during content development phase. In order to measure the student's motivation level the possible option is to track how long a student is interacting with the content by performing various actions. This can be made possible by choosing technologies for content development which can provide support for communicating data between content being accessed by a specific learner and underlying tracking and analysis modules. The chosen technologies should support content editable in an easy manner to the extent possible.

This specification propose the following approach for content development which is based on the access and reading preferences of end users namely, whoever want to access the contents. This specification also recommends usage of certain content formats where open standards and/or open/free viewing platforms are available as well as from which information that pertains to assessment of quality concerns could be extracted as per the quality criterion in **4.1**. This specification proposes development of individual course contents that suits both online as well as offline reading/access preferences (for example, reading/access preferences could be like book style with running text in .pdf, .epub, .html formats and presentation style in power point presentation, mp4/ogg/webm video formats, MP3 audio format, images as given in Table 1).

**Table 1 Preferred Content Formats**

(*Clause* 5)

| Sl No. | Access | Internet | Offline |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Reading | | |
| ii) | Book | HTML | PDF/ePUB |
| iii) | Presentation | Video | PPT |

### 5.1 Organization of Individual Contents in to a Course

A standard way of course organization will make the course assessment easy. This standard specification recommends the following approach for composition of different units in to a course. The recommended course organization structure is provided below:

a) Each lesson in the course should have at least one learning objective associated with it, but it may have 'n' number of learning objectives associated with it;

b) Each learning objective that is associated with the lesson may be covered in one or more files referred as content blocks;

c) Each content block may be designed in more than one style namely book style with running text [DOC, HTML, Pdf, ePUB) and lecture style with points to ponder or class room videos (PPT, video, audio, Images)] with possibility to interact with the content;

d) Each content block may have lecture/demonstration/gamified content/ live lectures/ assessment/reference material associated with it;

e) The content related to an objective must be concise with references to sidebars for additional information;

f) The content should be suitable for offline and/or online learning;

g) The content block may provide;

h) information about estimated time to read or view the contents in that particular block; and

j) The sequencing and navigation of the course topics is the choice of the content developer. Fig. 1 depicts one such course structure in tree format though course structure can be in any form with conditional sequencing and navigation. To accomplish this task the content developer may consider SCORM, xAPI standards.

### 5.2 Content Development Guidelines

This clause gives details about guidelines to be followed while developing the content blocks. The guidelines pertain to various aspects such as content design, video presentation, audio/video clarity, instructional design, accessibility characteristics of online course contents.

**5.2.1** The recommended content design principles are provided below.

**5.2.1.1** *Text and font consistency*

a) Font size and face should be used in consistent manner across all pages;

b) Sans serif, arial, calibri fonts is recommended;

c) Determine and maintain same minimum font size across all the pages;

d) Difference in font size should be maintained between different headings and text and it should be consistently maintained across all pages;

e) Header/Title in the document/presentation should use same font size, font type and color for all the words in the title on all pages;

f) Minimal number of colors should be used as text color. Avoid blue and red colors which are used for hyperlink;

g) Avoid underlining text. Making the text bold can highlight important information;

h) Avoid use of click here link so many times which create ambiguity for screen reader; and

j) Use small and border less table with consistent color.

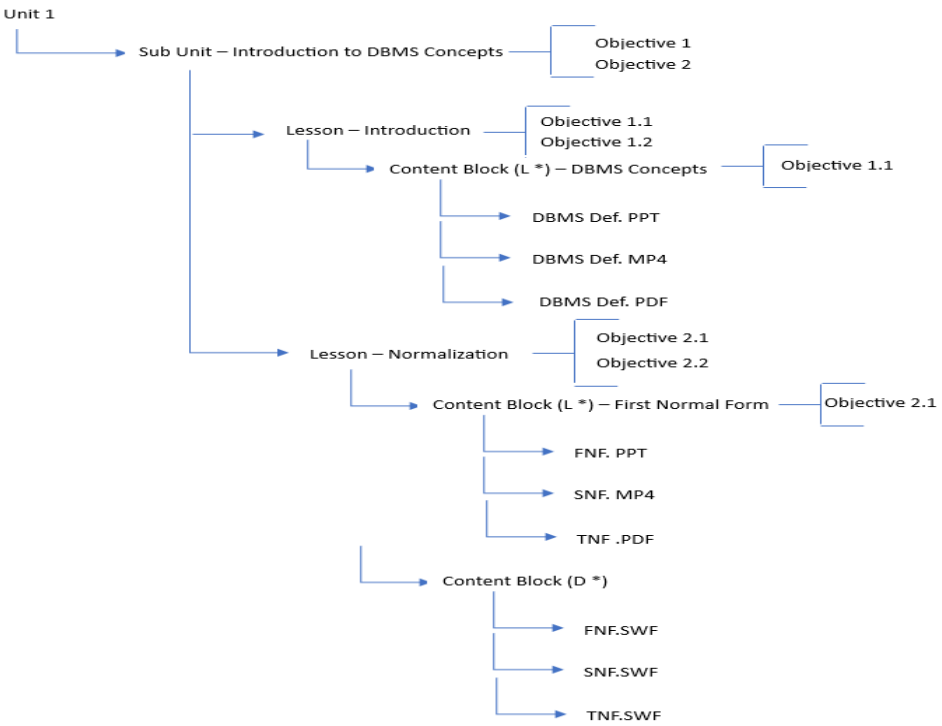


FIG. 1 SAMPLE COURSE STRUCTURE

**5.2.1.2** *Element placement and presentation:*

a) Uniform content layout should be followed throughout the course;

b) Navigational buttons and text should always be in the same place, preferred location either top or bottom right corner;

c) If links for multimedia is icon, then same icon should be used everywhere;

d) Icons being used should be relevant to the context and self-explanatory;

e) Use GIF and PNG formats when the images contain few colors;

f) Use jpeg format when the images contain more colors;

g) Same font and color combination should be used for labels & controls such as navigational buttons, action buttons etc; and

h) Every object (image, table, video) embedded in to the content should contain caption associated with it describing the object.

**5.2.2** *Video Presentation Quality*

**5.2.2.1** *Video recording*:

a) Record all videos in .mp4 format with H264 codec with 16 : 9 aspect ratio;

b) While recording videos subtitles have to be provided;

c) For streaming purpose, the video bit rate calculation process may be referred given in normative reference [2]; and

d) Following minimum resolutions may be considered when the video is recorded with 30fps and the recommendations are subject to change in future versions:

1) Preferably high-definition ready resolution (720 p – 1 280 × 720) when the minimum bandwidth available at the user end is 3 Mbps or higher; and

2) Preferably high-definition resolution (1 080 p – 1 920 × 1 080) when the minimum bandwidth available at the user end is 5Mbps or higher.

**5.2.2.2** *User experience*:

a) Suggestion about appropriate media players to view the video should be mentioned explicitly;

b) Control bar should be enabled in video player by default having start, stop, pause buttons etc;

c) Videos and simulations should be viewable in clear and functional manner;

d) Best viewed at X and Y screen resolution' caption should be mentioned explicitly about the video resolution; and

e) Simulation response should be quick and without undue delay.

**5.2.2.3** *Audio/Video Clarity*:

a) Distorted, overly grained images should not be used and considered as non-functional images;

1) How to meet the criterion:

i) The image to be used along with the text in the document or presentation should be tested for impairments like blur, blockiness, ringing, etc, before the video capturing process; and

ii) Software tools to detect/correct different video impairments can be used to assess the video clarity.

b) Any text either captured from the screen or recorded using camera;

c) should be clearly visible in the video content;

1) How to meet the criterion:

i) Always presentations/docs have to be shown in view/read mode while video recording is in progress;

ii) There should not be any delay between the content being displayed and the speaker’s voice while playing the video; and

iii) Use animation effect (for example, float in and float out) in the presentation to display images so that the space in presentation slide can be used effectively.

d) The contrast between foreground and background should be sufficiently maintained while shooting the video;

e) Audio that is difficult to hear, choppy should be avoided;

f) Low or no background audio; and

g) Before recording audio/video connectivity between audio/video devices and their features have to be checked.

**5.2.3** *Accessibility Guidelines*

**5.2.3.1** *See* http://www.w3.org/WAI/WCAG20/quickref/Overview.php?introopt=N (for HTML pages).

**5.2.3.2** *See* http://www.w3.org/TR/WCAG20-TECHS/pdf.html (with examples to create tagged PDFs from MS word, open office).

**5.2.3.3** *See* https://www.w3.org/TR/epub-a11y-11/.

**5.2.4** *Instructional Design Principles*

This specification recommends content developers to ensure following principles are adhered to while developing online course contents and a feedback questionnaire may be designed inline with the below suggested principles.

**5.2.4.1** *Entry criteria*

Whether the information is provided in such a manner that the student is given enough back/ground information in the beginning of the learning unit so that he/she will be in a position to recall their prior knowledge in current context of the subject:

a) How to meet the criterion:

1) Presence of overview/outline;

2) Objectives are clear and understood;

3) Appropriate background information of current topic to recall prior knowledge;

4) Expected learning outcome is given in clear manner; and

5) Pre-test covering pre-requisite topics.

**5.2.4.2** *Relevance to objective*

The focus of information in the learning unit is within the scope of objective:

a) How to meet the criterion — Adherence to the objective should be verified.

**5.2.4.3** *Depth of knowledge*

The information in the learning unit is helpful in achieving the expected learning outcome.

**5.2.4.3.1** *Scenario A*

Essential concepts are explained in detail to support students in applying the concepts. This scenario is relevant to most of the higher education students in common:

a) How to meet the criterion:

1) Appropriate meaning or purpose of important words/newly coined terms/ abbreviations should be described;

2) The learner is provided with suitable examples clearly demonstrating characteristics of concepts being explained in the learning unit if possible using visual representation (images/video);

3) The learner should be explained alternative ways of accomplishing a task or implementing a particular concept;

4) The learner should be provided with links leading to additional information relevant to the concept/principle being explained in the learning unit; and

5) Each concept in the learning unit is linked with self-assessment containing questions of various levels of low or medium complexity.

**5.2.4.4** *Self-Assessment*

The assessment is useful in testing learner's depth of knowledge on a given topic.

**5.2.4.4.1** *Scenario A*

The assessment is meant to test student's capability to recall or interpret the concepts learnt in the corresponding learning unit (complexity level-low):

a) How to meet the criterion:

1) Assessment should check given a name whether the student is able to identify the characteristic of the concept and vice-versa using different techniques (for example, multiple choice single options formats, matching); and

2) Assessment should check given an alternate version of the same question whether student is able to identify the correct answer or not.

**5.2.4.4.2** *Scenario B*

The assessment is meant to test student's capability to demonstrate the concepts learnt in the

corresponding learning unit (complexity level-medium):

a) How to meet the criterion:

1) Assessment should check given a problem statement whether the student is able to differentiate the output using different techniques (for example, multiple choice multiple options or fill-in the blank type of questions); and

2) Assessment should check given a problem statement whether the student is able to analyze cause-effect.

**5.2.4.4.3** *Scenario C*

The assessment is meant to test student's capability to apply the concepts in the corresponding learning unit (complexity level-high):

a) How to meet the criterion:

1) Assessment should check given a problem statement whether the student is able to draw conclusions using different techniques (for example, multiple choice multiple options or fill in the blank or descriptive format); and

2) Assessment should check given a problem statement whether the student is able to synthesize different concepts and produce results or obtain evidence.

**5.2.4.5** *Exit Criteria*

The learning unit is concluded in a logical manner summarizing what is learnt and where it is useful:

a) How to meet the criterion:

1) Summary of concepts learned is provided at the end; and

2) Concluding remarks about where the acquired knowledge can be utilized and information about further suggested reading is given.

## ANNEX A

(*Foreword*)

## COMMITTEE COMPOSITION

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| *Organization* | *Representative(s)* |
|---|---|
| Data Security Council of India, Noida | DR N. SARAT CHANDRA BABU **(*Chairperson*)** |
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| BIS Directorate General | SHRIMATI REENA GARG, SCIENTIST 'G' AND HEAD (ELECTRONICS AND INFORMATION TECHNOLOGY) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)] |

*Member Secretary*
SHRI PRIYANSHU SHARMA
SCIENTIST 'C'/DEPUTY DIRECTOR
(ELECTRONICS AND INFORMATION TECHNOLOGY), BIS

Panel involved in the Finalization - LITD 19/P1 Review of three Drafts on Code of Practice for Designing Online Course Contents and Quality Assessment of Course Content and Delivery Platform

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