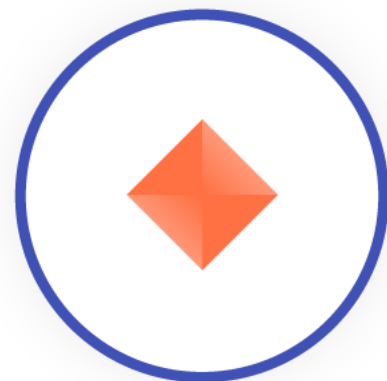


EdTech  
**Tulna**  
**DESIGN STANDARDS**



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## Introduction

There exist several dozen (perhaps hundreds) educational technology (EdTech) products in today's educational settings. There is an enormous variety in terms of the products' intended goals, target audience, type, the technology used, features available, cost, use case, etc. In such a scenario, stakeholders such as schools, teachers, parents, governments, philanthropists, and investors feel the need to understand the quality standards of EdTech products to make informed decisions.

This document provides an overview of the EdTech Tulna standards. The EdTech Tulna standards define a set of expectations for the design of EdTech products. They are categorized along three dimensions: Content Quality, Pedagogical Alignment, and Technology & Design to capture a holistic view of the quality of the product design. Each dimension comprises multiple standards.

The systematic approach towards the design of the EdTech Tulna standards is drawn from the disciplinary foundations in the Learning Sciences, Human-Computer Interaction, and Educational Technology. These standards are aligned to the national standards in India and built on theoretical and empirical research. These research-based standards help target beneficiaries to analyze the quality of the product design.

## Target beneficiaries

Tulna standards are beneficial for mainly four groups:

- a. **EdTech product developer**- Edtech Company makers thinking of developing new EdTech product
- b. **Decision-makers** - Entities prioritizing large-scale implementation of EdTech products (e.g., state governments or agencies providing consultation to governments).
- c. **Local community user** - Decision-makers responding to and balancing the learning needs of groups of students and implementation needs of groups of teachers (e.g., school principals, non-governmental organizations).
- d. **Private user** - Decision-makers valuing learning needs of a student as well as access to EdTech products in terms of affordability, usability, and sustainability (e.g. parents).

## Services provided by this report

- Help product companies understand standards to design EdTech products.
- Help stakeholders such as Decision-makers, Local community users, Private users understand the importance of the presence of Edtech Tulna standards in any EdTech product and then do comparative studies to choose the best product according to their need.

## Glossary of terms used in this document

1. **Dimension** - An aspect of the product's design. Each Tulna dimension (or construct) is an amalgamation of multiple standards for EdTech product design.
2. **PAL** - Personalized Adaptive Learning product
3. **DCR** - Digital Classroom product
4. **IAV** - Interactive Audio-Visual

## Edtech Tulna Standards

### 1. Standards for Content Quality

This dimension evaluates the accuracy of the content, coverage as per the national standards, appropriateness of the content for the targeted grade, and intended learners. This dimension comprises the following standards.

1. **Content accuracy:** Create content that has accurate facts, explanations, representations, and terminologies.
2. **Correctness and clarity in assessment:** Ensure that assessment questions and solutions are correct, clear, and unambiguous.
3. **Language comprehensibility:** Use easily understandable vocabulary and accent, keeping the intended learners in mind.
4. **Alignment to national standards (skill coverage):** Comprehensively cover grade-appropriate and subject-specific content, skills, and related practices as recommended by the current standards.
5. **Curriculum alignment:** Align the content with the board curriculum and sequence them logically to develop conceptual understanding.
6. **Inclusivity in learner representation:** Address the diversity of target learners in terms of gender, race, socio-economic background, religion, and appearances while creating content.
7. **Bilingual use (for vernacular products):** Use English technical terms to present mathematical terms & operations, in addition to vernacular terms, so that the learners get well-acquainted with the language of Mathematics.

## 2. Standards for Pedagogical alignment

This dimension focuses on whether the product has incorporated learner-centric approaches and how well it applies Learning Sciences theories and pedagogical design principles to create a meaningful learning experience. It evaluates the extent of alignment of the pedagogical strategies and assessment with the national educational policies. This dimension comprises the following standards.

1. **Constructivist approach:** Allow learners to construct their understanding of a topic by meaningfully connecting the content to what they already know and applying it to various problem-solving scenarios.
2. **Addressing alternate conceptions:** Help learners identify their prior conceptions or learning gaps on their own and support addressing them effectively.
3. **Content in Context:** Pay close attention to the learner's context (who is learning) and location (where is learning taking place) while designing pedagogy.
4. **Learner scaffolding:** Design supports for the learner to help them construct the correct mental model of the concept.
5. **Cognitive engagement:** Present the content and explanations in conversational form with proper visual organizers to invite the learner's participation in the learning process.
6. **Motivational features:** Include features that motivate the learner intrinsically and extrinsically to explore the content.
7. **Logical chunking and connectedness (for products containing audio-visual resources):** Segment the multimedia content meaningfully such that they are sequenced into separate smaller sub-topics and have relevant activities associated with them.
8. **Learning objective alignment:** Ensure that all learning objectives have assessment questions aligned at corresponding cognitive levels.
9. **Pedagogy-assessment method alignment:** Ensure tight alignment of grade-appropriate pedagogical strategies and assessment methods.
10. **Cognitive levels covered:** Ensure that Higher Order Thinking Skills are sufficiently addressed in the content, examples of activities.
11. **Feedback quality:** Design constructive feedback that informs the learners what is wrong, why it is wrong, and what should be done to refine their understanding.
12. **Opportunities for Collaboration:** Facilitate collaboration and scaffold learning via peer-to-peer interaction, logical argumentation, and feedback.
13. **Adaptivity (for PAL products):** Design the product such that the assessment and content are dynamically adaptive to the needs of the learners based on their profile,

interaction, and performance.

14. **Teacher support:** Design supports for the teacher so that they know how to use the product meaningfully and can customize it to a limited extent in response to the learners' needs on the ground.
15. **Facilitating goal-setting (for IAV products):** Provide a short description for each content unit (i.e., AVs with/without associated assessments) that indicate their targeted learning outcome and utility.

### 3. Standards for Technology and Design

This dimension evaluates how well the technological affordances integrate with the pedagogy and content to promote a meaningful learning experience. It comprises the following standards.

1. **Interface design (intuitive use):** Follow user-centered design principles to help the learner easily understand what action to take while learning a concept and how to take action.
2. **Interface design (assess consequences of an action):** Follow user-centered design principles to help learners understand what will happen if an action is taken.
3. **Learner navigation & pace:** Give learners adequate control over their learning trajectory.
4. **Universal design:** Ensure that the product adheres to Universal Design of Information Technology and Web Content Accessibility Guidelines to cater to learners with various learning challenges and physical needs.
5. **Analytics for learners' progress:** Provide meaningful information for the learners and other users to accurately interpret where the learner is in their learning trajectory and what needs to be done next to make progress to the desired goal.
6. **Tools to support problem-solving:** Provide relevant and specialized tools (e.g., scale, compass, protractor, trigonometric tables, log tables, symbol manipulation) needed to solve a problem.
7. **Meaningful interactivity:** Ensure that interactivity features are meaningful to the content being learned.
8. **Content-type -Technology alignment:** Map all the visualizations to the appropriate content.