Project brief

Supporting the quality of digital learning

Digital learning has gained tremendous importance in the present time. High quality content and pedagogies are critical for digital solutions to be effective. This calls for a review of digital content with the help of technically robust evaluation frameworks and processes. Khan Academy, the leading online learning resource used and trusted by teachers and students worldwide, initiated this review.

Since the COVID-19 pandemic, there has been a boom in EdTech platforms in India to provide learning solutions to students. Digital education has the potential to improve learning alongside traditional classroom instruction.

Khan Academy introduced the Science Essentials Course to build a strong foundation in fundamental concepts among learners using deep conceptual videos. The course consists of learning videos and exercises - the videos help strengthen conceptual understanding for students, while the element of focused practice allows learners to retrieve concepts learnt, make mistakes, receive feedback, and in the process, master skills.

The Australian Council for Educational Research (India) reviewed a sample of videos and exercises in physics, chemistry, and biology of the Science Essentials Course for students in grades 11 and 12.

ACER's role

The Khan Academy collaborated with ACER India to technically assist in three main aspects:

Evaluate the design efficacy of the Science Essentials Course in terms of content quality and pedagogical practice

Develop a standardised quality assurance process to meet the objectives of the course

Provide findings and recommendations for future improvement

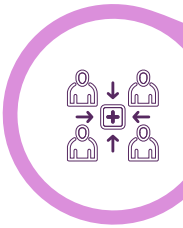
Content evaluation standards for videos

ACER developed content evaluation standards for videos and practice exercises in order to conduct a robust and fair review. The standards were adapted from the EdTech Tulna design standards, developed by the Indian Institute of Technology, Mumbai. ACER evaluation standards were designed to achieve consistency and transparency in the review of content across all three sub-domains of science - physics, chemistry and biology, and to serve as a point of reference for future quality assurance and standardisation of the content development process.

Evaluation standards for videos

Content accuracy

The content has accurate facts, explanations, illustrations, graphical representations, and terminologies.



Learner engagement

The videos are effective in engaging the learners of relevant age group and sustaining their interest.

Language comprehensibility

The videos contain easily understandable vocabulary and accents, keeping intended learners in mind.

Alignment with the national curriculum

The videos are aligned with the competencies and learning outcomes listed in the national curriculum.

Inclusivity of learners from different backgrounds

The videos are accessible to all target learners regardless of gender, socioeconomic status, culture, and religion.

Scaffolding of learning

The videos support the learners in constructing their knowledge and understanding of concepts through a multi-layered approach to enhance learning.

Alignment with classroom pedagogies

The videos demonstrate grade appropriate classroom pedagogical approaches.

Content evaluation standards for exercises

Evaluation standards for exercises

Content accuracy

Practice questions and solutions are valid, clear, and unambiguous for the particular grade.

Cognitive skills distribution

Practice questions are well distributed across different cognitive domains, vis. knowledge and understanding, application, and higher order thinking skills.

Difficulty level across the questions

Practice questions are well distributed across different levels of difficulty, viz., easy, medium, and hard.

Alignment with the learning objectives

Practice questions align with the specific learning objectives.

Language appropriateness

Practice questions have appropriate levels of language comprehension in terms of vocabulary, sentence construction, and grammar for students of that particular grade.

Precision and clarity in feedback

Practice questions provide adequate and precise feedback on questions where learners have answers incorrectly.

Methodology

A representative sample of 50 videos and 400 practice questions were selected for the review. Videos and exercises were independently evaluated through a workshop approach.

Subject matter experts for each domain – physics, chemistry, and biology – with extensive teaching experience independently reviewed each video and exercise based on the rubrics for standards described in the evaluation framework. They jointly recorded their observations, findings, and feedback on a predefined data recording sheet. ACER subject experts extensively discussed the findings in the workshop and drew conclusions from the reviewers' feedback received during the workshop.

The scope of the content evaluation framework did not include a review of programme implementation or effectiveness of the content in terms of learning outcomes, user interaction, or learner satisfaction.

Learnings

1. The length of the videos plays a critical role in learner engagement and interest. Shorter videos are likely to be more engaging.
2. Videos supported with animation or illustrations, particularly for abstract concepts, make them engaging and interesting.
3. Interactive student-centric videos are more engaging and interesting than teacher-centric videos following a lecture format.
4. Assessments need to move beyond testing knowledge and understanding skills to application and higher order thinking skills.
5. An assessment format in the form of well-designed multiple-choice questions can serve as an excellent tool to capture misconceptions.
6. Constructed response questions with a robust scoring guide can be used to assess divergent thinking in students.
7. A standardised quality assurance process plays an important role in effectively targeting content for improving learning outcomes.

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