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1. What Does This Report Contain?

The section, 'Overview of the Product', provides a brief description of the product and its key features to give the context for the evaluation. The two sections following that present the findings from the evaluation. The Executive Summary provides the overall rating and offers implications in terms of benefits and limitations for teachers and learners. The Detailed Review section provides an in-depth evaluation of the product, categorized under three dimensions (or constructs) – Content Quality, Pedagogical Alignment, and Technology & Design. For each dimension, the product is reviewed on the criteria along with explanations for the rating, and grouped into clusters. Specific examples have been provided in this report to support and elaborate on the evaluation ratings.

The terms, ‘Exemplary’, ‘Valuable’, and ‘Potential to Improve’, used in the report refer to the rating scale for evaluating the product.

- **Exemplary** indicates that the product has been designed as per recommended learning theories and research-based evidence.
- **Valuable** indicates limited adherence of the product’s design to the recommended learning theories and research-based evidence.
- **Potential to Improve** indicates unsatisfactory or lack of adherence of the product’s design to the learning theories and research-based evidence.

2. Overview of the Product

Schoolnet is a Digital Classroom (DCR) learning solution with a curriculum mapped to the Central Board of Secondary Education (CBSE). The product consists of short animated videos, practice worksheets and assessment questions for each learning unit and supporting hardware. The product is available for the Grades Nursery-10 for different subjects including languages, Mathematics, EVS. This report evaluates Mathematics for Grades 6-8. Teachers can use this product in their classroom for various topics as part of the curriculum.
3. Executive Summary

Schoolnet | Mathematics | Grades 6-8

<table>
<thead>
<tr>
<th>Content Quality</th>
<th>Pedagogical Alignment</th>
<th>Technology and Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exemplary</td>
<td>Valuable</td>
<td>Valuable</td>
</tr>
</tbody>
</table>

Potential benefits of this product

- The content and assessment are accurate across learning units, and are taught using language that is easily comprehensible by learners in the intended age group.
- The product addresses the math concepts as per the NCERT Curriculum and are logically structured to aid meaningful learning.
- The content and activities support the development of the math skills recommended by the NEP (2020) for the intended learners.
- The product uses a conversational teaching style and a highly engaging presentation style with visual and verbal cues. This can help learners stay cognitively engaged.
- Content appropriate visualisations in the form of images, diagrams and animations are present which can enhance the learning experience.
- The product adheres to user-centered design and enables intuitive use.
- Teachers are provided with explicit support and guidance to use/customize the product for effective learning.

Potential limitations of this product

- The content presentation in the product predominantly uses a transmission of information format. There are limited opportunities for experimentation, reflection and meaning-making.
- Essential scaffolds such as hints in assessments, access to remedial content are missing that prevent learners from taking on more difficulty. Furthermore, feedback to assessments and worksheets are limited to binary responses (correct / wrong) and solutions are not explained.
- There are no opportunities for collaboration amongst learners.
- Some learners may not be able to relate to the examples given, as they mostly address a narrow socioeconomic class.
- Basic features such as captions, transcripts are missing that can pose a barrier for learners with diverse needs.
Schoolnet (Grades 6-8): Summary of Review Ratings by Criteria

Content Quality: Exemplary

C1. Content accuracy
The content is accurate and contains correct facts, explanations and examples.

C2. Correctness and clarity in assessment
All the assessment questions and their solutions are factually correct and unambiguous.

C3. Language comprehensibility
The sentences and vocabulary are easy to understand and the accent used is familiar.

C4. Mathematics skill coverage
The content covers the mathematical skills recommended by national standards for the grade range.

C5. Curriculum alignment
The content is aligned to the NCERT curriculum.

C6. Inclusivity in the representation of learners
The content makes an attempt to represent various sections of society across religion, gender, skin-colour, socio-economic groups, but is not consistent.

Pedagogical Alignment: Valuable

P1. Constructivist approach
Content presentation mostly resembles transmission of information. Key elements of the constructivist approach are present only in some learning units.

P2. Addressing learning gaps/alternate conceptions
Potential learning gaps in different topics have been identified and addressed in some learning units but not consistently in all the learning units reviewed.

P3. Content in context
An attempt has been made to provide context however in many learning units, the context provided is not sufficient and/or relevant

P4. Learner scaffolding
There has been some attempt to provide explicit scaffolds in content such as summary however, they are not sufficient

P5. Cognitive engagement
The content uses a conversational teaching style and is well supported by visual and verbal cues making learning highly engaging.
Technology and Design: Valuable

T1. Interface design: Enable intuitive use
The interface is intuitive, all elements are visible and actions are mapped to their expected response.

T2. Interface design: Assess consequences of an action
The interface does not facilitate reversal of unintended actions such as closing an assessment or the content interface.

T3. Learner navigation & pace
The learner has some control over their learning path. They are able to navigate within and across the learning unit however, not at the pace that they desire.
<table>
<thead>
<tr>
<th>T4. Universal Design</th>
<th>The product does not include features that ensure accessibility for diverse learners such as learners with disabilities/special needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T5. Analytics for learners' progress</td>
<td>A dashboard to summarize learner utilization of the product is present however it does not provide sufficient guidance on identifying exact areas where the learners need to put in more effort.</td>
</tr>
<tr>
<td>T6. Tools to support problem-solving</td>
<td>In this grade-range, the product provides some tools such as pen, pencil, eraser but not sufficient for problem solving in certain topics.</td>
</tr>
<tr>
<td>T7. Meaningful interactivity</td>
<td>All necessary interactivity features are included in the content and assessments such as input boxes and drag &amp; drop</td>
</tr>
<tr>
<td>T8. Content type - Technology alignment</td>
<td>The visualizations present within every learning unit map to the content type. No distracting or unsuitable visualization is present.</td>
</tr>
</tbody>
</table>

*Only relevant criteria have been included in the evaluation*
4. Detailed Review

4.1 Content Quality

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4.1 Content Quality

Content Quality measures the accuracy and content/skill coverage for the grade targeted and the specific domain. This dimension focuses on content accuracy and clarity, alignment to national standards, and inclusivity in content representations.

4.1.1 Content Accuracy and Clarity

<table>
<thead>
<tr>
<th>Content Accuracy (C1)</th>
<th>Correctness and clarity in assessment (C2)</th>
<th>Language comprehensibility (C3)</th>
</tr>
</thead>
</table>

Content Accuracy (C1) is rated Exemplary. The content presented in the product is accurate, contains correct facts, explanations and examples. Additionally, the terminologies used, the definitions provided and the step-by-step solutions to examples are accurate.

Illustrative example

Topic: Classification of triangles, Grade 6

In the above example, the topic of types of triangles based on sides is presented in text and as a diagram. Both forms of presentation are accurate.

Correctness and clarity in assessment (C2) is rated Exemplary. The assessment questions were presented in two parts namely assessment and worksheet in every learning unit. In most of the learning units evaluated, they were well-phrased, conveyed the intended meaning and clearly stated what was expected from the learner. The solutions provided were also accurate.
Illustrative example:

Topic: Multiplication of integers, Grade 7

The above snapshot is from an assessment in the learning unit. The instructions are clearly stated and the questions are presented accurately.

Language Comprehensibility (C3) is rated Exemplary. The content across all the learning units reviewed was easy to comprehend for learners in grades 6-8 since simple, short, and easy-to-understand sentences have been used. Furthermore, the vocabulary and the accent used are familiar for learners.

4.1.2. Alignment to National Standards

<table>
<thead>
<tr>
<th>Mathematics Skill coverage (C4)</th>
<th>Curriculum alignment (C5)</th>
</tr>
</thead>
</table>

Mathematics skill coverage (C4) is rated Exemplary. With regards to Math skill coverage, all the necessary skills recommended by NEP 2020 and NCF for the upper primary stage (Grades 6-8) are included in the product. These skills include –

- Understanding of abstract concepts (e.g., Multiplication of Integers, Grade 7; Finding square root using prime factorization method),
- Introduction to algebraic notation (e.g., Algebraic Expressions and identities, Grade 6; Algebraic expressions finding the value of an expression, Grade 7),
- Moving from number sense to number patterns, seeing relationships between numbers and looking for patterns in the relationships (e.g., Patterns in whole numbers, Grade 6; Direct and inverse proportions, Grade 8),
- Data handling, representation and visualization skills (e.g., Pictograph, interpretation and drawing of pictograph, Grade 6; Arithmetic mean median and mode, Grade 7),
- Introduction to geometry and observing geometrical properties (e.g., Classification of Triangles, Grade 6; Right-angled triangle and pythagoras property, Grade 7)
Curriculum alignment (C5) is rated exemplary. The content in this grade range is mapped to the NCERT Board. Therefore, all the topics covered in the NCERT curriculum for this grade range are also covered in the product. The learning units are found to be sequenced logically to build conceptual understanding.

4.1.3. Inclusivity in Content Representation

Inclusivity in the representation of learners (C6)

Inclusivity in the representation of learners (C6) is rated Valuable. Across the content that was reviewed, there were a few learning units which included characters as part of the context. An attempt to diversity in terms of gender, and socio-economic class has been observed. However, this representation of inclusivity is not seen across learning units. More attention to character names, looks, skin colours, and settings must be given for learners to be able to connect with the content being taught.

Illustrative examples:

<table>
<thead>
<tr>
<th>Topic: Multiplication of Integers, Grade 7</th>
<th>Topic: Distributivity of Multiplication over Addition for Rational Numbers, Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Integers: Multiplication" /></td>
<td><img src="image2" alt="Distributivity over Addition" /></td>
</tr>
</tbody>
</table>

In the examples shown above all characters are shown in fair skin colour. Likewise in other learning units wherever character names were introduced, the names chosen did not reflect religious diversity.
4.2 Pedagogical Alignment

Pedagogical Alignment focuses on learner-centered pedagogy, enhancing learner experience, assessment of learning, and teacher support. It measures the extent of alignment of the pedagogical strategies with national educational policies, Learning Sciences theories, and design principles to create a meaningful learning experience.

4.2.1. Learner-centered Approach

<table>
<thead>
<tr>
<th>Constructivist approach (P1)</th>
<th>Addressing learning gaps / alternate conceptions (P2)</th>
<th>Opportunities for collaboration (P12)</th>
</tr>
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</table>

Constructivist approach in pedagogy design (P1) is rated **Valuable**. This item evaluates if the product goes beyond the transmission of knowledge and allows for a meaningful construction of knowledge. Some essential features required for meaningful construction of knowledge are experimentation, a well-sequenced set of multiple examples and reflection spots.

In a significant portion of the learning units evaluated, the content presented followed a transmission of information approach with minimum scope for learners to construct their own understanding of the topic. Yet an attempt to allow learners to construct their own understanding of the concepts was observed in some learning units. Reviewers observed diverse examples providing a thorough understanding of the topic in some learning units. In a few learning units, **observe- reflect - learn** format for was followed, which can provide an opportunity for learners to make sense of the content. There were occasional reflection spot questions where learners could input their answers and get feedback from the system.

### Illustrative examples

#### Topic: Finding LCM, Grade 6

#### Topic: Comparison of decimal numbers, Grade 6
In the above examples, we can see two instances of an effort to support construction of knowledge in learners. On the left-hand-side we see an example of a reflection spot where learners are encouraged to type in answers in boxes that are verified by the system. By doing so, learners are prompted to reflect and assess their interim understanding of the topic. In the snapshot on the right-hand side, we see an example of a step-by-step explanation to compare decimals numbers with the same whole number. We also see that diverse examples are taken up to teach the comparison of decimal numbers. However, such examples are not very common in the learning units evaluated in this grade range.

**Addressing learning gaps/ alternate conceptions (P2) was rated Valuable.** In some of the learning units, care is taken to provide diverse examples that address learning gaps or alternate conceptions of the topic. However, this is not observed consistently throughout all the learning units reviewed.

**Illustrative example 1**

**Topic:** Construction of SAS triangle, Grade 7

In this learning unit only one example is taken up to explain the steps of construction. 60 degrees angles is made using a compass instead of a protractor and no reasoning has been provided for the same. Additionally, the method for drawing angles other than 60 degrees without a protractor is not explained. A lack of explanations could lead to learning gaps.

**Illustrative example 2**

**Topic:** Algebraic Expressions and Identities, Grade 8

There is a fair chance that the examples of binomials and trinomials used in this learning unit can cause a misconception that trinomials are always quadratic and binomials have linear term. By using diverse examples these can be avoided.

**Illustrative example 3**

**Topic:** Arithmetic Mean, Median and Mode, Grade 7

Possible misconceptions are preempted and explained in this learning unit by taking up examples that cover scenarios such as - Calculation of Median using odd and even number of observations, calculation of mode when two numbers repeat an equal number of times and when all numbers repeat an equal number of times.
**Opportunities for Collaboration (P12) was rated Potential to improve.** Collaboration refers to activities where learners are encouraged to work in small groups. Small group activities allow learners to discuss, debate and reason and develop a strong understanding of the concepts taught. In this product, opportunities for the learners to do group activities were not observed.

### 4.2.2. Enhancing Learner Experience

<table>
<thead>
<tr>
<th>Content in Context (P3)</th>
<th>Learner scaffolding (P4)</th>
<th>Cognitive Engagement (P5)</th>
<th>Motivational features (P6)</th>
<th>Logical chunking and connectedness (P7)</th>
</tr>
</thead>
</table>

**Content in Context (P3) was rated Valuable.** Context is something that motivates learners to care about the topic and aids in real-life application. Across the content that was reviewed in this grade range, an attempt to provide context was observed in some cases. However, in many learning units the context was found to be missing, insufficient and/or irrelevant.

#### Illustrative example 1

**Topic: Estimation, Grade 6**

In the above example, three real-life scenarios were introduced where arriving at an estimate of a number becomes more important than knowing the exact number. This example is a fitting context to the topic as students see a use case where estimation as a skill is important. This will motivate them to care about learning estimation.
Illustrative example 2

Topic: Multiplication of Integers, Grade 7

In the above example, two children are shown entering a house of integers in a math amusement park. The magician looking character takes them inside and explains them multiplication of integers just as a teacher would. Such a context is neither relevant nor sufficient. Though it can help make a lesson engaging but does not motivate the learners to care about learning the topic.

Illustrative example 3

Topic: Comparing Quantities, Grade 7

In this learning unit, students are explained about conversion of percent into fraction and percent into decimal. However, no context is provided in this learning unit for students to see where such conversions and comparisons will be helpful in real-life.

Learner Scaffolding (P4) was rated Valuable. In most of the content that was reviewed, the only scaffold that was consistently available for the learners was a summary at the end of the lesson which provided key takeaways from the lesson. Scaffolds in the form of hints were missing for assessments and in very few learning units there were hints to solve questions within the content. There was no provision for learners to come out of a stuck situation while solving assessment questions. Additionally scaffolds such as access to remedial content or guidance on specific topics to revise based on assessment performance is missing . Another important aspect of scaffolding is to enable learners to take on more difficulty. In this regard, the examples presented (in content and assessments) were not structured in the order of increasing difficulty.
Detailed Review: Pedagogical Alignment

Illustrative example 1  Topic: Circumference of a circle, Grade 7

In the above screenshot, we can see an example of a summary provided at the end of the learning unit. Since there is some support that is consistently provided to the learners, this item was rated valuable.

Illustrative example 2  Topic: Circumference of a circle, Grade 7

In the above screenshot, we can see an example of a question within the content, where learners are encouraged to use help while solving the question (if required) and also feedback in the form of step by step solution is provided.

Cognitive Engagement (P5) was rated Exemplary. The product uses a conversational style that is informal and invitational for the learners to engage with the content. For example, there were phrases such as “let us learn”, “let us see” and the like, which makes the learner part of the content and the learning journey. Furthermore, there are ample visual cues (e.g., circling, highlighting, optimal use of colours, bulleting) that can draw a learner’s attention to the content being taught throughout.
Illustrative example:

Topic: Right-angled Triangles and Pythagoras Property, Grade 7

In the above example, a figure with many triangles is shown and an appropriate visual cue (highlighting) is used to indicate the types of triangles in the figure.

Motivational features (P6) was rated Exemplary. This item evaluates the presence of motivational features that help learners to explore the content and motivate them to progress in their learning journey. In this product, motivational features like “Well Done”, “Excellent”, “You are right” are observed in the assessment, which would help the learners explore the content further.

Logical chunking and connectedness (P7) was rated Exemplary. The content videos in the learning unit are largely adequately structured leading to meaningful learning. The videos are presented in a logical order. They are short (<10 mins) and discuss a single concept. Assessments and a worksheet associated with the learning unit are mostly present.

4.2.3. Assessment of learning

Learning objective - assessment alignment (P8) was rated Exemplary. In all of the content reviewed, the assessment questions were found to be mostly aligned to the stated learning objectives as well as the expected objectives as per the National Curriculum. Furthermore, the assessments are mostly at the same cognitive levels as that of the content.
Pedagogy-assessment method alignment (P9) was rated Exemplary. For learners in the middle stage (grades 6 - 8), the National Educational Policy (NEP, 2020) recommends building on the pedagogical and curricular style of the preparatory stage which includes discovery and activity-based interactive learning. Additionally, the NEP recommends experiential learning and discussion of abstract concepts. Against this background, in the content and assessment of the product, scenario-based and real-life examples are discussed in most of the learning units wherever relevant. Yet there are learning units where the assessment questions are direct substitution in the formula and fewer instances of scenario or activity based questions were observed. However, as there are considerable learning units where there was alignment, this item is rated exemplary.

Illustrative example 1

Topic: Multiplication of Integers, Grade 7

In the above snapshot, we see an example of scenario based questions.
Illustrative example 3

Topic: Arithmetic Mean, Median and Mode, Grade 7 & Improper and Mixed Fractions, Grade 6

In the above snapshots, we see an Q2 as an attempt to include scenario based questions in both the worksheets.

Illustrative example 3

Topic: Right angled triangle and pythagoras property, Grade 7

Cognitive levels covered (P10) were rated Exemplary. In most of the content and assessments reviewed, higher-order thinking skills were sufficiently addressed. Following the Blooms Taxonomy, learners were frequently prompted to recall, understand, apply and occasionally prompted to analyze and evaluate while engaging with the content and assessments.
Illustrative example:

Topic: Finding C.P, S.P, Profit, Loss, Profit%, Loss%, Grade 8

In the above worksheet, learners are provided with a combination of question types. The first question involves simple recall of formula and direct application as CP, SP are provided. The following word problems require learners to deduce the CP, SP and analyze if there was a gain or loss and calculate the respective percentage.

Feedback Quality (P11) was rated Potential to improve. In all the learning units reviewed, learners were provided only binary feedback of whether their responses were right or wrong. A detailed solution for the questions in the worksheet was provided for very few learning units. Furthermore, the feedback is not constructive in the sense that it fails to make a learner aware of what they can do to correct their understanding of the concept. For instance, based on the questions that were answered incorrectly, learners could be prompted to review specific aspects of the content.
Illustrative example:

Topic: Finding C.P, S.P, Profit, Loss, Profit%, Loss%, Grade 8

In the above example, the right answer for the questions is provided but no detailed explanation of the solution is provided.

4.2.4. Teacher Support

| Teacher support for in-class orchestration (P14A) | Teacher support to generate out-of-class activities (P14B) |

Teacher Support for in-class orchestration (P14A) was rated Valuable. For optimal and meaningful learning to occur, it is important to provide support and guidance for teachers on how to use the product and how to effectively integrate the learning unit within the framework of the teaching-learning processes. In the product, though there is ample support provided to use the product, no guidance seemed to be present to effectively execute and implement the learning unit in the classroom.
As presented in the snapshot, in bottom right of the interface, there is a navigation guide and an admin guide that provide all the guidance needed to use the product

**Teacher Support (out-of-class) (P14B) was rated Exemplary.** There is sufficient teacher support for the out-of-class segment of the teaching-learning process. Teachers can make certain choices such as creating their own content for a specific learning unit, providing supplementary materials or videos to enhance learning and create their own assessments/workheets/quizzes.

As presented in the snapshot, at the bottom of the interface, there is a button called “Teacher’s Kit” where there is a provision for teachers to add supplementary materials/resources, notes and assessments. There are also other options for teachers to use to enhance the learning experience in the classroom
4.3 Technology and Design

Technology & Design measures how well the technological affordances and the user interface design integrate with the pedagogy and context to promote a meaningful learning experience for all learners. This dimension focuses on user interface design and visualizations vs. content type.

4.3.1. User Interface Design

<table>
<thead>
<tr>
<th>Interface design (T1 and T2)</th>
<th>Learner Navigation and pace (T3)</th>
<th>Universal design (T4)</th>
</tr>
</thead>
</table>

Interface design: Enable intuitive use (T1) was rated Exemplary. The user interface adheres to design principles that facilitate the learning process. All visual elements and functions are clearly visibly and logically placed together that guide learners use of the website. There are appropriate visual cues such as outlines around a box, dropdowns to help learners navigate through the interface. The visual elements are mapped well to their function. The interface design is consistent across all learning units and assessment.

Illustrative example

In the user interface (as shown on the left hand side), visual elements for the selection of content are clearly visible. Upon selecting the right combination of grade, subject and topic, the screen presents relevant learning units. Learners can then click on the topic of their choice. Likewise, a similar interface is seen within the learning unit (as shown on the right hand side) where visual elements are clearly visible, consistent across learning units and are mapped appropriately.
Interface design: Assess consequences of an action (T2) was rated Valuable. Evidence of feedback is observed for example in the form of a pop-up message that prompts users to continue from their previous learning unit when a user restarts the application. However, when users accidentally close the assessment interface or even the content interface, there are no prompts to recover from that action easily.

**Illustrative example**

In the user interface snapshot presented above, we can see a pop-up message reminding users if they want to resume their previous sessions. However, such a pop-up message is missing when users unintentionally close an assessment or content video mid-way.

Learner navigation and pace (T3) was rated Valuable. It was observed that there are affordances that allow learners to go back and forth between learning units. Learners can also go to a specific part within a learning unit. However, within every learning unit, learners cannot control the pace of the videos at the rate that they desire (for example slow down/speed up the video).

**Illustrative example**
In the user interface snapshot presented above, affordances that allow users to go back and forth between and within learning units is seen. However, within every learning unit there is no provision to adjust the pace of the videos. Only pause and play are possible.

**Universal Design (T4) was rated Valuable.** Some features of Universal design were present like allowing inputs from mouse click, sufficient time is given to the users to read and understand the content, the text is presented in a readable and understandable way and the content operates in predictable ways. However, many important features of Universal design according to the WCAG design principles were found to be missing. Some of these include operability from the keyboard, and captions/transcripts for the video content, voice over/audio-support for assessment questions.

**Illustrative example**

**Topic: Circumference of a circle, Grade 7**

The above picture is a snapshot from one of the learning units and evidently without the text support, it is hard to understand what the characters are discussing. In this learning unit, the characters and the story line provide the context and without audio support, it can get difficult for users to gain a complete understanding. This is true for all learning units in the product. There are no subtitles or transcripts which for instance makes the content unavailable for learners with hearing impairments.
4.3.2. Affordances that facilitate learning

| Analytics for learner’s progress (T5) | Tool to support problem-solving (T6) | Meaningful interactivity (T7) | Content type - Technology alignment (T8) |

Analytics for learners’ progress (T5) was rated **Valuable**. The product provides an aggregated view of the usage of the product called the “Multimedia usage report”. The aggregated view is mainly designed for teachers and administrators. This report gives the class wise, subject wise and student/user wise usage report. The report provides a detailed overview of the time spent by every class/user in each of the learning units in an understandable format. The dashboard is designed such that intended information is clearly visible and easy to find. There is a “Tracker Navigation Guide” which provides sufficient guidance on generating and using the usage report. Yet this item has been rated as valuable as there is no provision to track and show assessment scores and identify the area/topic in which each learner requires additional support to make progress.

Illustrative example

The example provides a sample snapshot of the interface.

Tools for problem solving (T6) was rated **Potential to improve**. In the product, in this specific grade range and in the learning units evaluated, generic tools such as whiteboard, pencil, pen, eraser were available in the “paint tool”. These tools were accessible for teachers. However, tools such as a protractor, scale, compass were not found. Especially in topics such as practical geometry, which involves the construction of geometrical shapes with certain properties, such tools become essential for students to use and experiment.
Meaningful Interactivity (T7) was rated Exemplary. Interactivity features such as input boxes, drag and drop, clicking on radio buttons to select the right answer are included in the content and assessments of the product. They are not superfluous and are meaningful interactivities for learning.

Illustrative example

Topic: Patterns in whole numbers, Grade 6

In the example, meaningful interactivity features such as drag and drop to match the columns and selecting the true or false is seen

Content type - Technology Alignment (T8) was rated Exemplary. In relevant learning units, appropriate visualizations such as diagrams have been provided to supplement and support learning. The visualizations were also appropriately mapped to the content type and were not distracting in any sense.
Illustrative example

**Topic: Right Circular Cylinder: Surface Area and Volume, Grade 8**

In this example, the visualization presented aptly supplements the content. In a step by step manner, the formula for curved surface and total surface area of the cylinder is arrived at and each step is also supported visually. This allows learners to understand the reasoning behind the formula and go beyond memorization.
Appendix

How does the EdTech Tulna evaluation work?

FRAMEWORKS

EdTech Tulna frameworks define a set of standards for quality design of EdTech products. A rigorous and research backed process is established and applied for the creation of various nuanced frameworks. These frameworks are use-case specific to enable transparent and precise, high stakes decision making. The process includes considering existing research literature, feedback from the ground on multiple stakeholder needs and an appreciation for the quality of solutions currently supplied in the ecosystem.

The frameworks are categorized along the three dimensions of Content Quality, Pedagogical Alignment, and Technology & Design to capture a holistic view of the quality of the product design. The frameworks are also made available at varying levels of depth for varying stakeholder needs and range from supporting governments and institutions in making high stakes, rank based, adoption decisions, to providing a brief overview of the key criteria to be considered while designing a product.

TOOLS

Each Tulna framework is accompanied by a toolkit that is specifically designed to guide experts to evaluate EdTech products. These toolkits are customized to the type of EdTech solution, grades, subjects, to drive meaningful and nuanced evaluations. The tools are informed by research as well as iterative empirical study and tested for inter-rater reliability and validity. A typical toolkit consists of rubrics and reviewer guidelines to enable evaluators to interpret the framework and conduct unbiased evaluations. Each criterion within the framework is rated along a three-point rating scale - ‘Exemplary’, ‘Valuable’, and ‘Potential to Improve’ - indicating the level of alignment with expectations laid out in the framework. Toolkits include supporting materials - videos, templates, and example illustrations - to guide experts while conducting evaluations.

PROCESS

Each product goes through a rigorous review process that takes approximately 160 hours for four grade ranges K-2, 3-5, 6-8, and 9-10. Each review team is designed to be independent and neutral. A typical expert review team consists of 3-4 members who are subject matter experts, instructional designers, user-interaction experts, user-experience design experts, and professionals with experience in teaching and implementing EdTech in field settings. Each review team has an anchor of at least one experienced evaluator.

Each member of the expert review team undertakes a two-week long intensive training on understanding the frameworks and the subsequent application of its toolkits to conduct evaluations. For each product, the review team applies a systematic sampling strategy and decides the representative learning units that will be reviewed. The team collectively reviews a subset of the learning units to check for convergence and establish inter-rater reliability. Team members then individually review the remaining learning units. The team finally meets to synthesize key points and takeaways of each review and elaborates their reviews into an in-depth report, which is overseen by the experienced evaluator.

The role of the product company is limited to an initial demo which supports the review team to deepen their appreciation of the intended use of the product, and its scope. The product company is then provided the final reviews and their unedited responses are published alongside the expert evaluations on the Tulna evaluation center.