## Contents

1. What Does This Report Contain? .......................................................... 3
2. Overview of the Product ........................................................................ 3
3. Executive Summary ............................................................................... 4
4. Detailed Review ...................................................................................... 8
   4.1 Content Quality ................................................................................ 9
   4.2 Pedagogical Alignment ................................................................... 12
   4.3 Technology and Design .................................................................. 22
Appendix ................................................................................................... 26
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

iPrep Digital Class is a digital classroom learning solution with a curriculum mapped to the CBSE board. The product contains animated videos and practice questions for each learning unit, along with DIY project videos for some topics. Teachers can use the content to supplement their teaching in the classroom or assign different videos or practice tests to students. The English version of the product has been evaluated in this report.
3. Executive Summary

iPrep Digital Class | Mathematics | Grades 1-2

Content Quality
Exemplary

Pedagogical Alignment
Valuable

Technology and Design
Valuable

Potential benefits of this product

The stakeholders, like the students, teachers, and parents, can be assured of the correctness of the content and all the learning activities.

- Schools can be assured of the alignment of the content with the National Curriculum.
- The content is cognitively engaging and is likely to keep learners meaningfully engaged.
- The product uses sufficient real-life examples and scenarios for learners to relate mathematical concepts to their day-to-day lives.

Potential limitations of this product

The effectiveness of the learning experience may be negatively impacted in the following ways:

- Due to the lack of explicit scaffolds or hints in the assignments, struggling learners might get stuck if they are working independently on the activities.
- The lack of group activities or prompts might lead to low encouragement from the teacher for collaboration among the learners.
- The lack of some key Universal Design features might make the product unsuitable for some learners.
- The absence of motivational features can hamper learners from completing assessments.
- The lack of breakdown in the mastery level can hinder the identification of the exact areas where the learner would need additional support.
## iPrep Digital Class (Grades 1-2):
### Summary of Review Ratings by Criteria

**Content Quality: Exemplary**

<table>
<thead>
<tr>
<th>C1. Content accuracy</th>
<th>The content and associated activities are correct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2. Correctness and clarity in assessment</td>
<td>The assessment questions are not always correct, clear, and unambiguous.</td>
</tr>
<tr>
<td>C3. Language comprehensibility</td>
<td>The language, accent, and vocabulary are easy to follow.</td>
</tr>
<tr>
<td>C5. Curriculum alignment</td>
<td>The content is aligned with the NCERT curriculum.</td>
</tr>
<tr>
<td>C6. Inclusivity in the representation of learners</td>
<td>The content attempts to represent various sections of society across religion, gender, skin color, socio-economic groups.</td>
</tr>
</tbody>
</table>

**Pedagogical Alignment: Valuable**

<table>
<thead>
<tr>
<th>P1. Constructivist approach</th>
<th>The content allows the learners to construct ideas of the topics, but some of the important features of constructivism are missing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2. Addressing learning gaps/alternate conceptions</td>
<td>The content identifies and effectively redresses alternate conceptions.</td>
</tr>
<tr>
<td>P3. Content in context</td>
<td>A relevant and sufficient real-life context is included, which will help the learners to relate to and care about the topic.</td>
</tr>
<tr>
<td>P4. Learner scaffolding</td>
<td>The content does not provide the learners with incremental support to take on problems with greater difficulty.</td>
</tr>
<tr>
<td>P5. Cognitive engagement</td>
<td>The content presentation style is conversational and important topics are highlighted to enhance the learning experience.</td>
</tr>
</tbody>
</table>
**P6. Motivational features**
The content lacks effective motivational features that will prompt the learners to explore the content.

**P7. Logical chunking and connectedness**
The learning unit is not adequately structured to lead to meaningful learning.

**P8. Learning objective - assessment alignment**
Most of the learning units have assessment questions and activities mapped at the corresponding cognitive level.

**P9. Pedagogy - assessment method alignment**
There is a misalignment in the pedagogy assessment method used in the content. Therefore, it is not aligned with the recommendation by NEP 2020.

**P10. Cognitive levels covered**
Higher-order thinking skills are addressed to some extent, but some of the important ones are missing.

**P11. Feedback quality**
The assessments state whether the attempted answer is right or wrong but do not provide any explanation.

**P12. Opportunities for Collaboration**
There is no scope for collaboration.

**P14A. Teacher support for in-class orchestration**
There is no teacher support provided to help the teacher inside the classroom.

**P14B. Teacher support to generate out-of-class activities**
There is limited teacher support provided to help the teacher outside the classroom.

---

**Technology and Design: Valuable 🌟**

<table>
<thead>
<tr>
<th>T1. Interface design: Enable intuitive use</th>
<th>🌟</th>
</tr>
</thead>
<tbody>
<tr>
<td>The platform is easy to use, and the elements are clearly visible.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T2. Interface design: Assess consequences of an action</th>
<th>🌟</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interface provides an appropriate response to the learner’s action.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T3. Learner navigation &amp; pace</th>
<th>🌟</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is easy for the learners to navigate within and between learning units, but they can watch the videos only at a certain pace.</td>
<td></td>
</tr>
<tr>
<td><strong>T4. Universal Design</strong></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Essential features of Universal Design are not present, making it difficult to use by diverse learners.</td>
<td>😞</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>T5. Analytics for learners’ progress</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The dashboard provides easily interpretable progress of the learners but does not provide sufficient guidance on where to put in additional effort.</td>
<td>😊</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>T6. Tools to support problem-solving</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical tools which would enhance the learning experience were not observed.</td>
<td>😞</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>T7. Meaningful interactivity</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive features like drag and drop or input boxes were not present.</td>
<td>😞</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>T8. Content type - Technology alignment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a perfect match between the visualization type present in the learning units and the content type.</td>
<td>🔄</td>
</tr>
</tbody>
</table>

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

4.1 Content Quality 🤔
Content Accuracy and Clarity ........................................ 9
Alignment to National Standards .................................. 10
Inclusivity in Content Representation .......................... 11

4.2 Pedagogical Alignment 😊
Learner-Centred Approach ........................................ 12
Enhancing Learner Experience ..................................... 14
Assessment of Learning .............................................. 18
Teacher Support ....................................................... 21

4.3 Technology & Design 😊
User Interface Design ................................................ 22
Affordances that facilitate learning ............................ 24
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 reviewers observed that all the content is accurate, and the videos explain the concepts clearly. There were no inaccuracies observed in the content from either a conceptual viewpoint or in the representation of any content.

Illustrative example: Lines and Lines, Grade 2

The video provides a correct explanation of types of lines and how straight lines can be joined to form letters and numbers. The difference between curved lines and straight lines and various forms of curved lines have been explained with different examples.

Correctness and Clarity in Assessment (C2) is rated Valuable. The assessment questions were clear, and solutions contained accurate answers for most of the topics. The questions were mostly unambiguous and clearly informed the learner what to think about and what is expected as a response. An example of a clearly phrased question is shown below.

Illustrative example: Money, Grade 1

Assessment questions asked the learners to choose the combination of currency that would yield the final amount. The questions were clear, properly framed, and had correct answers.

However, the reviewers observed unclear and ambiguous assessment questions in around 30% of the sampled learning units. Some examples of such questions are shown below.
Mathematics skill coverage (C4) and curriculum alignment (C5) are rated Exemplary. The reviewers found that, broadly, all the topics and sub-topics covered were aligned with the content present in NCERT textbooks for Grades 1-2. In addition, within each chapter, different aspects of the topic were covered comprehensively with the videos and other learning activities.

**Illustrative example: Shapes and Space, Grade 1**

The learning unit shows videos for children to identify and list comparison words and give examples for the learners to compare and classify across different dimensions.

**Illustrative example: What is Long, What is Round? Grade 2**

The learning unit allows the learners to compare and classify objects into what is long and what is round and identify shapes, which are the skills that are expected of this grade.

**Illustrative example: Give and Take, Grade 2**

The videos in this learning unit have explained the concept of carry-over, subtraction with borrowing through the examples of beads and necklaces, which is perfectly aligned to the curriculum. Additionally, the assessment gives examples with word games and counting, which is an essential skill for this grade range.

An example of an assessment question is: Daljit has 35 marbles. Kuldeep has 25 marbles. How many marbles do both of them have together?

The overall Mathematics mindset and skills required for Grades 1-2 (recommended by NEP 2020 and NCF ), like making comparisons and classifying dimensions and identifying shapes, were covered. The content was sequenced logically across the grade ranges in alignment with the national curriculum.
4.1.3. Inclusivity in Content Representation

Inclusivity in representation of learners (C6) is rated Valuable. The reviewers observed some evidence of inclusivity in representation from diverse sections of the society in terms of gender. The representation of religion was evident from the names used in the assessment.

Illustrative examples

Diverse Indian names like Ahmad, Amar, Avni, Mala, Miku, Soni, Uday, Yash, Soni were used in the assessments.

While gender inclusion was apparent in most of the chapter videos, the other forms of representation, for example, different skin colors, different abilities, was missing.
4.2 Pedagogical Alignment

Pedagogical Alignment focuses on learner-centred 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>
</thead>
</table>

Constructivist approach (P1) is rated Valuable. The product goes beyond the mere transmission of information and helps learners make sense of the content by using various scenarios and problem statements before explaining the Mathematical concepts and ideas.

**Illustrative example: Topic: Counting in Groups, Grade 2**

The video helped the learners understand counting through various examples, like counting groups of balloons, balls, pencils, flowers. The concept of pairs was explained through shoes and earrings, which usually occur in pairs.

**Illustrative example: Topic: Patterns, Grade 1**

The introductory video was situated in the park. The video helped the children identify breathing patterns by showing yoga sessions and rhythm from musical instruments.

**Illustrative example: Topic: Lines and Lines, Grade 2**

The video allows the learners to have a mental model of curved lines by drawing lines using bangles and bottles.

However, the product lacked other strategies like in-video spot-reflection questions, experimentation, problem-solving, which would have helped the learners reflect, test, and revise the concepts. In addition, in some learning units, the learners were not given time to think and express their reasoning.
Illustrative example: Topic: Give and Take, Grade 2

The video asks, ‘Vani wanted 16 pearls. Now tell me, students, how the shopkeeper will give 16 pearls to Vani?’ and immediately provides the answer, without giving a chance to pause or think.

Interactive activities, questions, or games, which could help construct an understanding of the concepts especially for this grade range were missing from the product.

Addressing learning gaps / alternate conceptions (P2) is rated Exemplary. The product identified the common learning gaps in the chapters and addressed them systematically, and whenever required. This was done either through presenting multiple ways to think about a concept or specifically addressing certain points.

Illustrative example: Topic: What is Long, What is Round, Grade 2

The video provided multiple ways of thinking about what rolls and what slides. The video also explains which objects roll as well as slide, for example, pencils and coins.

Opportunities for collaboration (P12) is rated Potential to Improve. The reviewers did not find any evidence of activities that could encourage collaboration among the learners. There were no in-built activities in the product which the learners could collaborate on or perform in groups. There were also no prompt questions observed in the videos, which suggest the learners discuss the response or engage with fellow learners in any way.
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) is rated **Exemplary**. Most of the topics have relevant and sufficient real-world context, which aids in a better understanding of the topic. Mathematical problems are placed in various contexts and scenarios which are relatable to the learner. Different objects from the surroundings or the daily activities which the learner likely performs or observes around them were present sufficiently.

**Illustrative example**: Topic: How much can you carry? Grade 2

The video shows the child picking up different objects like feathers and marble. In the next part, there is evidence of weighing different objects on a balance, which a child can easily relate to and helps to understand the concept.

**Illustrative example**: Topic: Lines and Lines, Grade 2

The introduction video shows a classroom setting, which is relatable to the children. The teacher asks the children to fold a paper, and the children fold the paper in different ways. It is through this that the children are introduced to standing, sleeping, and slanting lines.

Learner Scaffolding (P4) is rated **Potential to Improve**. The reviewers observed that the product did not provide support for learners to tackle or address difficult questions. There were no support structures in the form of hints, or summary maps that could help learners to take on difficult questions. The assessment questions are multiple-choice questions, but there are no hints in case a learner gets stuck.

**Illustrative example**: Topic: How much can you carry, Grade 2

The assessment question asks the learners to choose the light object among mosquito, lion, cheetah, kangaroo; or plane, handkerchief, tree, bed; choose the tallest among house, building, plane; heaviest thing out of lemon, watermelon, lychee, jambolan.

A visual representation in the form of a hint would be helpful for a second grader, who might be making errors not because of the concept of heavy or light, but because of lack of knowledge. An additional tool could be present that would help the learner weigh the objects before answering.
Illustrative example: Topic: Give and Take, Grade 2

The learners are introduced to single-digit addition through examples. One example is, $5+7=12$, $5+6+4=15$. The answers are directly provided without showing any steps that can help the learners arrive at that answer. It continued even in word problems. The question was posed as, Mita has 7 chocolates, she buys 7 more. How many chocolates does she have in all? A direct answer of $7+7= 14$ was given right after, without any explanation. A supportive image was produced, but there was no guidance regarding how to count.

The assessments only provided a binary response of correct or incorrect. There was no guide for the learners to tackle a difficult question. There were no instances of hints, prompts, or breakdown of difficult questions into smaller parts.

Cognitive Engagement (P5) is rated Exemplary. The tone used in the learning units was conversational and engaging. The labeling was appropriate, and highlighting was done using different colors.

Illustrative example: Topic: Data Handling, Grade 1

The voice-over used a conversational style to count the number of objects, for example, the voice-over mentioned “Let us count the marbles.” before counting the number of red, blue and green coloured marbles. As the voice-over counted the marbles, the corresponding marble was highlighted to draw attention of the learners. A similar process was followed while counting orange fish in an aquarium, or while counting books on the table.
Detailed Review: Pedagogical Alignment

**Illustrative example: Topic: Patterns, Grade 1**

The learning unit introduced the learners to various forms of shapes and patterns around them. The voice-over was in active voice, for example, “Look at this arrangement of rings.” The graphics aided in building the cognitive engagement of the content. Several examples were used to help learners identify patterns in rings, shapes, like standing and sleeping lines, patterns in musical instruments and appropriate highlighting was used.

**Illustrative example: Topic: What is Long, What is Round? Grade 2**

The video used appropriate images with the voice-over to explain the difference between long and round. For example, a cricket bat is long, whereas a ball is round, a flag pole is long, whereas the wheel is round. The video further makes a list of long and round objects for the learners.

**Motivational Features (P6) is rated Valuable.** The assessments have a progress bar that shows a mastery bar at the top of the screen. The bar goes up if a question is answered correctly and goes down if there is a mistake. There are also smiley faces that are shown upon choosing the correct option.
However, the operation of the mastery bar was ineffective, especially when the learners made mistakes. There were instances where the mastery fell disproportionately on giving an incorrect response, suggesting that the motivation was not used effectively in the product.

Illustrative examples: Topic: Money, Grade 1

Once the learner attempts three questions and reaches a 50 percent mastery, the mastery bar does not change until three incorrect attempts. However, with the fourth incorrect attempt, the mastery falls to zero. Thus, while correct answers lead a learner to a higher mastery level, a single mistake from a higher mastery can disproportionately drag the mastery level to a lower mastery level.
**Illustrative examples:** Topic: Patterns, Grade 1

The mastery level falls to zero, and when the learner gets the third question wrong, there is another instance of disproportionate fall of the mastery level.

The reviewers do not observe any additional motivational features like sound along with a visual, or stars awarded whenever a learner answers a question correctly or encouragement when a question is answered incorrectly. There were no motivational features observed at the product level.

**Logical Chunking and connectedness (P7) is rated Valuable.** Some of the learning units were structured adequately to aid in a meaningful learning experience. However, there are several videos with time exceeding eight minutes that explain multiple concepts simultaneously. They could have been chunked better for the intended learner.

**Illustrative examples:**

- Topic: Give and Take, Grade 2. The video 'Addition and Subtraction' is 13 minutes 26 seconds long. A single video explains concepts of the addition of two-digit numbers and the addition of three-digit numbers.
- Topic: Addition, Grade 1. A single video explains the following concepts: picture addition, forward counting, horizontal and vertical counting.

The videos do not have reflection spots with them, but they have a set of practice questions. The content pieces were supported by an assessment that serves as formative assessments.

### 4.2.3. Assessment of learning

<table>
<thead>
<tr>
<th>Learning objective - assessment alignment (P8)</th>
<th>Pedagogy-assessment method alignment (P9)</th>
<th>Coverage of cognitive levels (P10)</th>
<th>Feedback Quality (P11)</th>
</tr>
</thead>
</table>

**Learning objective - assessment alignment (P8) is rated Valuable.** The videos and assessment questions were somewhat aligned to the stated learning objectives and the expected objective as per the National Curriculum. In addition, the cognitive levels in the practice activities were aligned with the content discussed in the videos.
Illustrative examples: Topic: Lines and Lines, Grade 2

The learners were asked to identify which letters and numbers could be drawn using curved and straight lines aligned to the video for that learning unit.

Illustrative examples: Topic: Patterns, Grade 2

The videos helped the learners form an understanding of number patterns. The assessment asks the learners to apply this knowledge and complete patterns.

However, in several of the sampled learning units considered, the reviewers did not observe an alignment between the learning units and assignments.

Illustrative examples: Topic: Addition, Grade 1

In this learning unit, the learners learn to add numbers through pictures, add numbers vertically and horizontally. The assessment only had questions where the learner could add numbers horizontally.

Illustrative examples: Topic: Data Handling, Grade 1.

The learning objectives were to collect things in a group and count and arrange the total number of given objects. The assessment question asked the children to ‘Count the number of letters in the name: Uday/ Rehman/ Joseph’. There were unrelated questions like ‘Choose a round-shaped item’ (could relate to shapes and spaces) in the assessment.

Illustrative examples: Topic: Counting in Groups, Grade 2

Whereas the topic introduces the children to count in groups or pairs, all the assessment questions asked the children to arrange the numbers in ascending or descending order. Example question: “Write the number in order from largest to smallest: 35, 40, 39, 37, 36, 38.” None of the questions allowed the learners to count in groups.
Pedagogy-assessment method alignment (P9) is rated Potential to Improve. Relevant pedagogical strategies are recommended for each grade group in NEP, 2020 and NCF 2005. According to the NCF recommendations, the pedagogical strategy recommended for Pre-Primary Education (Grades K-2) is Learning through Play. The product does not provide any components which would engage the learners in play-based activities. The reviewers only observed formal tests with questions and answers.

Illustrative examples:

- Topic: Give and Take, Grade 2. Soni bought packets of biscuits for Rs.24 and chips for Rs. 16. How much will he have to pay?
- Topic: My Funday, Grade 2. ‘One week = ___ days’ or ‘Which month has 30 days?’
- Topic: Addition, Grade 1. 2+7 = 7+ __ / 3 + 0 = ___

Cognitive levels covered (P10) is rated Valuable. Some assessment questions are present at various cognitive levels, ranging from understanding and identifying to application and estimation. There is good coverage of Higher Order Thinking Skills (HOTS) questions in many topics, going much beyond just recalling or identifying. The maximum HOTs are at an application level. Most topics have problems where learners need to apply the concept, solve problems, and connect different ideas.

Illustrative examples: Topic: Lines and Lines, Grade 2

The chapter introduced the learners to straight and curved lines. In the assessment, the learners were asked to apply their lines to identify which objects would require straight lines or a combination of straight and curved lines.

However, some of the assessments only have questions at the recall level.

Illustrative examples: Topic: My Funday, Grade 2

The assessments had questions only at the recall level, for example, ‘Which month has 30 days?’/ ‘Which is the shortest month?’/ ‘Which month comes after March?’ The assessment questions did not move past recall level.
Feedback Quality (P11) is rated Potential to Improve. There were no explanations of the correct answers in all the questions, and only a binary response (correct or wrong) was provided. There was also no option for the teacher to integrate remedial content along with the tests. Only if the learner attempts an assessment question incorrectly at least four times does the learner get a prompt to revisit the content. However, it does not specify or map the incorrect attempt to the content that needs to be revisited.

4.2.4. Teacher Support

Teacher support for in-class orchestration (P14A) is rated Potential to Improve. The product did not have any features to support teachers in lesson planning or using the learning material built in the product, which are important for digital classroom products. However, the product company has stated that they provide teacher training and professional development workshops as a part of the school onboarding and engagement process.

Teacher support to generate out-of-class activities (P14B) is rated Valuable. The reviewers observed some instances of teacher support outside of class.

Illustrative examples: What a teacher can do

- The teacher can assign students to certain grades
- The teachers can assign a predetermined set of assessment questions to the entire class.
- The teachers can interact with the learners by sending messages.

Illustrative examples: What a teacher cannot do

- The teachers cannot choose different questions for different students
- The teachers cannot edit or delete a question from the predetermined set of questions that have been provided in the chapter.
4.3 Technology and Design

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

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) is rated Exemplary.** The overall interface was very intuitive to use. Different types of learning content like the videos, assessments, projects were placed separately. The important buttons were clearly visible. For example, in the assessments, the button for submission was clearly visible. The play/pause and fast forward/rewind buttons were clearly visible in the videos. Additionally, there was consistency in the way actionable elements are used and highlighted across the product. The learner could easily see the next topic by clicking on 'Next topic.'

*Illustrative example: Patterns, Grade 2*
Interface design: Assess consequences of an action (T2) is rated Exemplary. There was instant feedback every time a learner answered a question. If a learner opts to press back in the middle of the assessment, a prompt asks whether the learner wants to close the assessment midway or continue to improve content mastery. If the learner wants to retake a test, the prompt informs the learner that the last recorded mastery will be erased should they choose to retake the test. In case the learner chooses to quit midway, the test starts from the previously ended point.

Learner Navigation and pace (T3) is rated Valuable. The product allowed the learners to control their learning and navigation space to a great extent. For example, a learner could easily move from one video to another within a certain chapter and across different chapters. Likewise, the learners could easily move to a certain part of the video with a single click.

Illustrative examples: What a learner can do

- It was very easy and intuitive to navigate between different content pieces across different chapters.
- The learner can pause a video at any point or stop the video.
- The learners can see all the videos in the learning unit from the beginning and can choose the order of watching them.
Illustrative examples: What a learner cannot do

- The learner can only view the video at a predetermined pace. There was no option of increasing or decreasing the pace of the video.
- In the case of assessments, the learner needs to answer the questions serially. The product does not allow the learner to skip a question and move forward.

The learners can navigate within and across the learning unit, but not at the pace they desire. Hence, this criterion is marked as valuable.

Universal Design (T4) is rated Potential to Improve. The learners had sufficient time to read and understand the content. However, many important features of Universal Design according to the WCAG design principles were missing. Some of the videos had voice-overs but no written caption for the video content.

Illustrative examples:

- Topic: What is Long, What is Round? Grade 2, parts of the introduction video had only voice-over and no caption.
- Topic: Give and Take, Grade 2, the introduction section of the video has only voice-over and no associated caption.

The questions of the assessments could only be read, and the answers could be operable through the keyboard. There was no alternate option like audio instructions.

4.3.2. Affordances that facilitate learning

<table>
<thead>
<tr>
<th>Analytics for learner’s progress (T5)</th>
<th>Tool to support problem-solving (T6)</th>
<th>Meaningful interactivity (T7)</th>
<th>Content type - Technology alignment (T8)</th>
</tr>
</thead>
</table>

Analytics for learners’ progress (T5) is rated Valuable. The product allows the learners to view progress reports related to video lessons, assessments, projects, and books. In addition, the learners can select a subject and a topic to understand the mastery level along with a timestamp. However, the dashboard only provides an overall mastery level which does not allow the learner to identify the specific areas in which the learner would need additional support.
**Tools to support Problem-solving (T6) is rated Potential to Improve.** Mathematical tools were not present to encourage problem-solving in the topics that were reviewed.

**Illustrative example: How much can you carry? Grade 2**

The children were introduced to the concept of weights in this learning unit. In the assessment, there were questions like: 'Choose the heaviest item out of these' with the options: butterfly, elephant, rat, fly. Here it would have been useful if there were tools such as a weighing machine that could help the children understand the relative weights and solve the problem.

**Meaningful interactivity (T7) is rated Potential to Improve.** The product lacks appropriate interactivity features which are meaningful for learning. While the reviewers did observe basic interactive features like radio buttons in all the assignments, other features like input boxes, drag and drop, click to select, dropdowns, sliders and checkboxes were missing. Features like drag and drop would be useful in solving addition/subtraction problems, especially ones requiring carry-overs and borrowing.

**Content type - Technology alignment (T8) is rated Exemplary.** The visualizations used in the product map suitably to the content type. Images and animations were also used appropriately to help learners visualize a process.

**Illustrative example: Shapes and Space, Grade 1**

The video attempts to help the learners identify solids. The video explains the properties of a solid by labeling the length, breadth, and height of a brick and by specifying that a solid has a definite shape that cannot be changed by pressing it.
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.