EVALUATION REPORT

Tulna

EVALUATION REPORT

TICTACLEARN
MATHEMATICS
GRADES 3-5

Evaluated in August 2021
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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

TicTacLearn is an online interactive audio-visual learning solution with a curriculum mapped to the CBSE board. The product contains short, animated, engaging videos and practice questions for each learning unit. TicTacLearn content is available for Math (Grades 1 to 10) and Science (Grades 3 to 10). This report evaluates the English version of TicTacLearn for Maths for Grades 1-2. Teachers can use the content to supplement their teaching in the classroom or assign different videos or practice tests to students. Students can learn from the content in and outside the classroom, whereas parents can help their children visualize concepts and address their learning gaps.
3. Executive Summary

TicTacLearn | Mathematics | Grades 3-5

Content Quality
Exemplary

Pedagogical Alignment
Exemplary

Technology and Design
Valuable

Potential benefits of this product

- Students, teachers and parents can be assured of the correctness of the content and assessments.
- The product covers all the math concepts and skills as per the NCERT Curriculum.
- The content addresses learners’ alternate conceptions in most topics and thus supports the formation of the correct understanding of the concept.
- The use of relevant real-life examples and relatable objects helps learners see the connection between their day-to-day lives and mathematical concepts. This aids in developing a positive attitude towards the subject.
- The conversational presentation style and the presence of short videos are likely to keep the learner effectively engaged in the learning process.
- The product adheres to user-centered design, making it easy for learners to use.
- Images, diagrams and animations are relevant to the content and can enrich the learning experience.

Potential limitations of this product

- There are no explicit scaffolds or hints in the quiz to help the learners progress if they are stuck, especially when working independently.
- The absence of teacher support features could hamper the effective integration of the product into the teaching process.
- Basic features such as captions, transcripts are missing making it inaccessible to diverse learners.
TicTacLearn (Grades 3-5): Summary of Review Ratings by Criteria

Content Quality: Exemplary

C1. Content accuracy
The content is accurate and includes correct facts, explanations, examples and realistic schematic diagrams.

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

C3. Language comprehensibility
The language used in the voice-over and on-screen text are easily understandable by an Indian learner.

C4. Mathematics skill coverage
The content comprehensively covers the skills for Grades 3-5 that are recommended by NCF 2005 and NEP 2020.

C5. Curriculum alignment
The content is aligned with NCERT recommendations.

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

Pedagogical Alignment: Exemplary

P1. Constructivist approach
The content and activities allow the learners to construct an understanding of the topic most of the time.

P2. Addressing learning gaps/ alternate conceptions
Alternate conceptions and learning gaps are effectively addressed.

P3. Content in context
Wherever required, sufficient and relevant context is provided.

P4. Learner scaffolding
The product attempts to provide scaffolds to learners.

P5. Cognitive engagement
The content presentation style is capable of enhancing learners' cognitive engagement with the content.
| **P7. Logical chunking and connectedness** | The content is adequately structured to facilitate meaningful learning. |
| **P8. Learning objective-assessment alignment** | All learning objectives have assessment questions aligned at corresponding cognitive levels. |
| **P9. Pedagogy - assessment method alignment** | The pedagogical strategies used and the assessment methods are in line with the grade-specific recommendations of NEP. |
| **P10. Cognitive levels covered** | Higher-order thinking skills are sufficiently addressed both in content and assessments. |
| **P11. Feedback quality** | The feedback to assessment questions indicates the correct answer and its explanation but doesn’t redirect to remedial content. |
| **P14. Teacher support** | There was no evidence of teacher support, either in terms of using the product or integrating it into their teaching process. |
| **P15. Facilitating goal setting** | All the videos have meaningful titles aligned to their content, helping the learner understand the learning outcome of the same. |

**Technology and Design: Valuable**

| **T1 Interface design: Enable intuitive use** | The product interface satisfies the user-centered design principles to facilitate the learning process. |
| **T4 Universal Design – Content accessibility** | Captions and transcripts are absent, making the product less accessible to diverse learners. |
| **T8 Content type – Technology alignment** | The visualizations used suitably map to the content type. |

*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. The criteria in this dimension focus 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 was accurate and contained correct facts, explanations, examples and realistic diagrams.

Illustrative example: Topic: Where to look from? Different views of objects, Grade 3

The different views of an object, namely, top view, side view, and front view, were explained using clear examples. For example, a carrom board is shown as a rectangle from the side and front views but as a square in the top view.

Illustrative example: Topic: Shapes and Angles: Angles in closed figures, Grade 5

The videos in the learning unit help the learner distinguish between closed and open shapes with appropriate examples. They were provided with appropriate examples showing closed shapes as those with the same starting and ending points and open shapes as those with starting and different from the ending points.

However, as an exception, there is some ambiguity observed in an example used.

Illustrative example: Topic: Who is heavier?: Weighing using standard units, Grade 3

The example used to explain weighing using standard units assumed the weights of two different sets of four apples to be equal. This could be considered as an incorrect choice of example.
Correctness and clarity in assessment (C2) is rated Exemplary. The practice and assessment questions were clear, and solutions contained accurate answers for all topics. The questions were unambiguous and informed the learner what to think about and what is expected as a response.

**Illustrative example:** Topic: Halves and Quarters: Meaning of 1/2, 1/4 and 3/4, Grade 4

There was a question to find the number of stars that were not coloured red out of twenty stars, given a quarter of them is coloured red. The word 'not' in the question was capitalized to highlight what is expected. At the end of the quiz, the correct answer with its explanation is displayed. No ambiguity in the question or solution is observed.

**Illustrative example:** Topic: Shapes and Angles: Angles in closed figures, Grade 5

In the quiz, a question is posed to the learner: 'Which of the following is an open shape?', and four images were provided as options. At the end of the quiz, the correct answer with its explanation is displayed. No ambiguity in the question or solution is observed.

Language comprehensibility (C3) is rated Exemplary. Across most topics, the language used was easily understandable by the learners of Grade 3 to 5. Simple, short, and easy-to-understand sentences were observed. Overall, the accent used was neutral in the sampled learning units. The vocabulary used was familiar and was well supported by images or animations, which likely helped the learners to comprehend the content.

**Illustrative example:**
Topic: Fun with Give and take: Story problems involving addition and subtraction, Grade 3

The voice-over in the video of this learning unit is as follows: Addition and Subtraction want to go and play in the park. But the gate of the park is closed. And a puzzle is written on it, "Come let us see what is the puzzle written on the gate of the park."

**Illustrative example:**
Topic: Ways to multiply and divide: Multiplication of two numbers, Grade 5

The voice-over in the video of this learning unit is as follows 'Bola noticed that the box was closed with a lock, which could be opened with a four-digit code. Bola noticed this multiplication is written under the lock. Well, now I understand the code to open this lock could be 37x52.'
4.1.2. Alignment to National Standards

**Mathematics Skill coverage (C4)**

Mathematics skill coverage (C4) is rated Exemplary. The overall Mathematics mindset and skills required for grades 3-5 (recommended by NEP 2020 and NCF), like developing a liking towards Math, seeing a connection of mathematical thinking to their daily lives, spatial understanding, computational and arithmetic skills, data handling, estimation, and approximation were covered across various topics.

**Curriculum alignment (C5)**

Curriculum alignment (C5) is rated Exemplary. The reviewers found that, broadly, all the topics and sub-topics covered were aligned with the content present in NCERT textbooks for Grade 3-5. Within each chapter, the videos covered different aspects of the topic comprehensively. The content is sequenced logically across the grade ranges.

**Illustrative example:** Topic: Shapes and Angles: Right Angle, less or more, Grade 5

The topic covered in videos in this section is aligned to the sub-topic 'Right angle, More than a right angle, Less than a right angle' in the NCERT Grade 5 Mathematics textbook chapter 2, 'Shapes and Angles.'

4.1.3. Inclusivity in Learner Representation

**Inclusivity in the representation of learners (C6)**

Inclusivity in representation of learners (C6) is rated Valuable. The reviewers observed some evidence of inclusivity in representation in terms of gender, colour and socio-economic backgrounds. The characters used in the video and assessment questions denoted a balanced gender representation. Learning units in this grade range also had representation of diverse socio-economic backgrounds evident through the settings used in the videos.

**Illustrative examples:**

- Various Indian names like Reva, Meena, Appu, Babban, Raju, Bablu, Meenu were used. They were also shown with varied skin colours.
- The settings of the video contents include that of a village, city, small and big houses, Indian food varieties like paratha.
Despite the examples mentioned above, the reviewers found that such attention to inclusivity was given in only a few learning units. There was no evidence of systemic representation, especially concerning differently-abled individuals and religious inclusivity across sampled units. Some learning units were based in settings that may not be relatable to a large group of learners.

Illustrative examples

- Teacher characters in the video were seen wearing a suit that could be un-relatable to a learner in a rural setting. All the characters in the elite school setting were fair-skinned.
4.2 Pedagogical Alignment

*Pedagogical Alignment* 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. This dimension focuses on learner-centred pedagogy, enhancing learner experience, assessment of learning, and adaptivity and teacher support.

### 4.2.1. Learner-centered Approach

<table>
<thead>
<tr>
<th>Constructivist approach</th>
<th>Addressing learning gaps / alternate conceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P1)</td>
<td>(P2)</td>
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</table>

**Constructivist approach in pedagogy design** *(P1)* is rated *Valuable*. The product can help the learners construct an understanding of the concepts, rather than merely doing information transmission in most of the sampled units. This was done in different ways across the grade range. Videos contained reflection spot questions that required them to connect to their previous knowledge and apply the understanding. Well-sequenced set of multiple examples with applications of the topic in most units can help the learner in the discovery of the concept and building understanding through it.

**Illustrative example:**

**Topic:** Rupee and Paise? Representation of money in the form of notes and coins, Grade 3.

Images of different types of notes and coins were used to introduce the concept. But before any information was given to the learners, they were asked, "Have you seen notes/coins like these? Have you ever used these to buy something?". This gives the learner the opportunity to connect the content to what they already know, organize and make sense of what is explained ahead.
**Illustrative example:**
Topic: Fun with numbers: Number names and expanded form of 3 digit numbers, Grade 3.

To explain common mistakes while writing the expanded form of three-digit numbers, the video takes a format of a conversation between three characters. Each time a question was posed to the characters (Chanda and Bolu) by Uncle Big Mouth, the video encouraged the learner to think about the answer. Further, it explains the solution in detail, allowing the learner to check if their understanding was correct.

However, a few units don't provide opportunities for the learner to apply, test and revise their understanding or express their reasoning.

**Illustrative example:** Topic: Cart and Wheels: Circle and its properties/parts, Grade 4

The beginning of the video contains a few examples, such as the wheel of a tractor and a bicycle. The rest of the video followed a format of student characters asking about each of the properties, namely centre, radius and diameter, followed by the teacher giving the definition. There were no opportunities to apply, test and revise one's understanding. Reflection spots were absent.

**Addressing learning gaps/alternate conceptions (P2) is rated Exemplary.** Common learning gaps were identified and addressed very well wherever there was a need. This was primarily done through videos addressing specific points.

**Illustrative examples:**
Topic: Who is heavier?: Estimating weighing balance using non-standard units, Grade 3

In part 3 video, it clearly explained the following and addressed learner’s common alternative conceptions:

- Larger items need not be heavier. This is explained by comparing the weight of a large balloon and a cricket ball.
- A group of multiple objects need not be heavier than a single object. It is explained by comparing the weight of ten marbles to a cricket ball.
Illustrative example: Topic: Long and Short: Meaning of a centimetre, Grade 4

In part 3 video, it clearly explained the following and addressed learner’s common alternative conceptions:

- To make a correct measurement using a scale, the lower end of the object should be placed at the 0 cm mark on the scale. This is illustrated by measuring the lengths of two new pencils using a scale, one by keeping the lower end at the 0 cm mark and another at the 2 cm mark.

4.2.2. Enhancing learning experience

Content in Context (P3) is rated Exemplary. Most of the topics had relevant and sufficient real-world context, which aided in a better understanding of the topic. Mathematical problems were placed in various contexts and scenarios which were relatable to the learner. Different objects from the surroundings or the daily activities which the learner likely performs or observes around them were presented sufficiently.

Illustrative example:
Topic: Who is heavier?: Estimating weighing balance using non-standard units, Grade 3

The video used familiar animals like a tiger, panda and donkey as characters. The video used situations where these characters walked back from school and discussed whose school bag was the heaviest. They took the help of weighing balance to find this out. The 'weight of a school bag' is a familiar context to the learner, and at the same time, relevant for this content.
Illustrative example: Topic: Halves and Quarters: Meaning of 1/2, 1/4 and ¾, Grade 4

The context was relevant to the content as well as motivational, as it included real-life examples like dividing a paratha, distributing oranges, and sharing chart paper. This can make the learner aware of real-life applications of the content.

Learner Scaffolding (P4) is rated Valuable. The reviewers observed some aspects of scaffolding to be present in the product. The videos in the learning units progressed gradually, helping the learners to take on higher difficulty levels. However, none of the quizzes in the learning units had hints or remedial content to help the learner solve the problem.

Illustrative example:
Topic: Who is heavier?: Estimating weighing balance using non-standard units, Grade 3

The content videos in the learning unit were sufficiently scaffolded. It starts from comparing two objects directly on weighing balance to comparing each object against balls to addressing possible alternate conceptions in the topic. The questions in the quiz section were placed in the increasing order of difficulty, starting with apply level to move onto analyze level. However, no hints or remedial content was provided to support the learner if they face confusion/difficulty in solving a question.

Cognitive Engagement (P5) is rated Exemplary. Appropriate highlighting and different colours and borders were used to engage the learners. The tone was conversational in the sampled units and learners were encouraged to think along with watching the content.

Illustrative example:
Topic: Fun with Give and take: Story problems involving addition and subtraction, Grade 3

The content was presented in a conversational style and used active voice and words such as 'We will learn,' 'We have learnt,' 'Yes children, you guessed it right.' In addition, there is evidence highlighting important words like 'How many', 'What is the difference' that can enhance a learner's cognitive engagement with the content.
**Illustrative example: Topic: Tick Tick Tick: Clock time, Grade 4**

The content was presented in a conversational style and used active voice and words such as, 'Hello children,' 'We will learn,' 'We have learnt,' 'Come, let us see.' In addition, there were visual cues, for example, the use of contrasting colours like orange and blue to represent the hour and minute hand of the clock.

**Logical chunking and connectedness (P7) is rated Exemplary.** All the learning units were chunked into small videos of generally 5-7 minutes duration discussing a single concept. Many of the sampled units included reflection spots. All the evaluated units had assessment questions aligned to the videos in the form of multiple-choice questions. Overall, the sampled units were structured adequately to aid a meaningful learning experience.

**Illustrative example: Topic: Smart Charts: Collection and arrangement of data, Grade 4**

The learning unit consisted of three videos. Part 1 introduced 'Collections and arrangement of data,' part 2 provided more examples on collection and arrangement of data, and part 3 covered common 'Misconceptions.' All the three videos were less than 7 minutes long. The quiz was aligned to the videos.

**Facilitate goal setting (P15) is rated Valuable.** The sampled units had meaningful titles. But there was no accompanying description. The beginning of each video explained what the learner will learn (task value). However, why they should learn it (utility value) was not explained.
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 **Exemplary**. All learning objectives had assessment questions aligned at corresponding cognitive levels in the videos in the sampled learning units. The assessment questions can enable the learners to achieve the purpose of the learning objectives.

Illustrative example: Topic: Fun with numbers: Number names and expanded form of 3 digit numbers, Grade 3

The learning unit had a meaningful title, 'Expanded form of three-digit numbers.' Each video clearly explained what the learner will learn through the video. For example, 'In this video, we will learn about the expanded form of three-digit numbers.' But, it doesn't tell the learner about why they should learn it.

Illustrative example: Topic: Rupee and Paise? Conversion of rupee to paise, Grade 3

The learning objective of the unit was to help the learner understand the concept of conversion of rupee into paise and the application of the same. There are examples used to explain the same. Similarly, the quiz has assessment questions that require the learner to apply their understanding of the concept like the one shown below.

Q(1) Asha has five ₹10 coins. Bela has ten 50 paise coins. Chanda has ten ₹ 5 coins.

Who has the least money?

- (1) Asha
- (2) Bela
- (3) Chanda
- (4) All of them have equal amount of money.
Pedagogy-assessment method alignment (P9) is rated **Exemplary**. Pedagogical strategies are recommended for each grade group in NEP, 2020. Recommendations for the Preparatory stages (Grades 3-5), include building on play, discovery, and activity-based pedagogical and curricular style used in Foundational stages (preschool-Grade 2). The product had sufficient scenario-based problems through stories and relatable real-life examples to ensure alignment with these recommendations. The overall pedagogy of assessments was largely activity-based.

**Illustrative example:** Topic: Who is heavier? Weighing using standard units, Grade 3

In one of the activities, the learners were asked to match the pictures with their correct weight.

**Illustrative example:** Topic: Shapes and Angles: Angles in closed figures, Grade 5

The assessment quiz in the learning unit required the learner to do an activity with matchsticks to answer the question.

<table>
<thead>
<tr>
<th>Angles In Closed Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q(6) Take 7 similar matchsticks.</td>
</tr>
<tr>
<td>Make a closed shape with them such that no two matchsticks appear in the same line. Draw the shape formed by them in your notebook.</td>
</tr>
<tr>
<td>Now, make another shape with the same 7 matchsticks, that is different from the first shape. Draw the shape in your notebook.</td>
</tr>
<tr>
<td>What is true about the 2 shapes formed?</td>
</tr>
<tr>
<td>(1) Both shapes have equal sized angles inside the shape.</td>
</tr>
<tr>
<td>(2) Both shapes have the same number of angles inside the shape.</td>
</tr>
<tr>
<td>(3) We can make only one shape with 7 similar matchsticks.</td>
</tr>
<tr>
<td>(4) All of these</td>
</tr>
</tbody>
</table>
Cognitive levels covered (P10) is rated Exemplary. The questions were present at various cognitive levels as required, ranging from understanding and identifying, to application, analysis and evaluation. Most topics contained problems where learners need to apply the concept, solve problems, and connect different ideas. The maximum HOTs were at an application level, but there were some instances of analyzing and evaluating level questions as well.

Illustrative example:
Topic: Who is heavier?: Estimating weighing balance using non-standard units, Grade 3
- A container gets filled with 50 bottle caps having a total volume of 400 ml. The learner needs to choose the correct statement from the four options given about the volume of the new container required to store 100 such bottle caps.
- It is given that dropping two coins raises the water level by 10 ml. The learner was required to find the number of coins that should be dropped to level up the mark till 50 ml from the initial level of 30 ml.

Feedback Quality (P11) is rated Valuable: The feedback to the assessment questions explains what the correct response was and why it was so. But, it doesn't direct students to revisit related content.

Illustrative example: Topic: Tick Tick Tick: Clock time, Grade 4
The correct answer and its explanation were given. But it doesn't redirect the learner to related content.

Q(3) If the short hand of the clock is at 5, what can the time be?

- (1) 6:50
- (2) 5:05
- (3) 7:15
- (4) 8:35

Solution: Correct Option: 2
The hour hand is at 5, so the time has to be between 5 and 6. Option 2 is correct.

4.2.4. Teacher Support

Teacher Support (P14)

Teacher Support (P14) is rated Potential to Improve. The reviewers found that there was no evidence of teacher support in the sampled learning units. There was no support on how to use the product and also on how to effectively integrate the learning unit in the teaching-learning process to enhance the learning experience.
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 affordances that facilitate learning.

4.3.1. User interface design

<table>
<thead>
<tr>
<th>Interface design: Enable intuitive use (T1)</th>
<th>Universal design – Content accessibility (T4)</th>
</tr>
</thead>
</table>

**Interface design: Enable intuitive use (T1) is rated Exemplary.** The product interface adhered to user-centered design principles to facilitate the learning process. The learner can easily locate the visual elements of the interface. Also, there was consistency in the way actionable elements were used and highlighted across the product. There was a precise mapping between control and effect, and expected responses were observed with user actions like button clicks.

**Illustrative examples:**

- Icons such as 'share link,' 'go back,' 'Next,' 'Submit responses,' 'See answers' were easily locatable and gave a clear indication of an action to be taken.
- Different types of learning content like videos and practice quizzes were placed in separate tabs.

**Universal Design - Content accessibility (T4) is rated Potential to Improve.** The product does not include features that ensure accessibility for diverse learners. Voice-over was present in the videos, however, no caption or transcript was provided. Assessment questions in the form of quizzes also didn't have any audio support.

4.3.2. Technology for meaningful learning

<table>
<thead>
<tr>
<th>Content type – Technology alignment (T8)</th>
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</table>

**Content type - Technology Alignment (T8) is rated Exemplary.** The visualizations like animation, diagrams used in the sampled learning units map to the content type.
Illustrative example: Topic: Be my multiple, I'll be your factor: Factors Grade 5

Animation was used in the video to show the factors of the number 24 and to develop the factor tree. This visualization suitably maps to the content type and makes it easier to explain the concept to the learner.
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.