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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

This report evaluated the product ConveGenius, Mathematics (Grades 1-2). ConveGenius is an adaptive learning platform with content based on the National Curriculum Framework. The product contains learning modules in the form of videos, guided practice questions and activities. A unique learning path is created for each learner based on their grade, learning level and performance. Teachers can view the interaction and performance data of the learners.
3. Executive Summary

**ConveGenius | Mathematics | Grades 1-2**

**Content Quality**  
Exemplary

**Pedagogical Alignment**  
Valuable

**Technology and Design**  
Valuable

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**Potential benefits of this product**

- Learners and teachers can be assured about the correctness of the content.
- Learners in Indian schools will be able to relate to the content. The videos embed the real world context very well for each topic. There is good representation of gender, appearance, religion and socio-economic settings.
- Learners will be likely engaged due to the highly conversational and real life scenario based approach in many of the topics.
- There is a good mix of questions at various difficulty levels, which help to keep the content meaningful for learners who are at different levels.
- The adaptive nature of the product creates different learning paths to support learners at different levels.

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**Potential limitations of this product**

- Learners who are stuck during solving problems may find it difficult to proceed due to the lack of constructive hints, detailed feedback and explanations for the questions.
- The pedagogy in the assessment questions is not very suitable for this age group. Elements of play and activity suggested by the NEP guidelines are missing.
- The long sentences used in the assessment questions, and also the lack of a voiceover, might come as a hindrance for the learners in understanding the questions.
- The inability to navigate and access content in a desired way might affect the motivation and the learning experience of learners.
ConveGenius (Grades 1-2): Summary of Review Ratings by Criteria

**Content Quality:** Exemplary

<table>
<thead>
<tr>
<th>C1. Content accuracy</th>
<th>The video content is accurate and there is no ambiguity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2. Correctness and clarity in assessment</td>
<td>The assessment questions are clear and the solutions are correct.</td>
</tr>
<tr>
<td>C3. Language comprehensibility</td>
<td>Short and simple sentences are used in most of the learning units, while a few of them require some effort to understand for learners of Grades 1-2.</td>
</tr>
<tr>
<td>C4. Mathematics skill coverage</td>
<td>All skills recommended by NEP for Grades 1-2 are covered extensively.</td>
</tr>
<tr>
<td>C5. Curriculum alignment</td>
<td>The content is aligned to the National Curriculum and is logically sequenced.</td>
</tr>
<tr>
<td>C6. Inclusivity in the representation of learners</td>
<td>The content includes representation of diverse sections of Indian society across gender, religion, socio-economic class, etc.</td>
</tr>
</tbody>
</table>

**Pedagogical Alignment:** Valuable

<table>
<thead>
<tr>
<th>P1. Constructivist approach</th>
<th>The content goes beyond mere transmission of information and enables meaning making. However, there are no opportunities for experimentation for the learner.</th>
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<tr>
<td>P2. Addressing learning gaps/alternate conceptions</td>
<td>Potential learning gaps are well addressed in some topics while others lack a complete addressal of learning gaps.</td>
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<tr>
<td>P3. Content in context</td>
<td>Real world examples and scenarios are used throughout the product.</td>
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<tr>
<td>P4. Learner scaffolding</td>
<td>The overall content and videos are well scaffolded but the assessments lack sufficient support or hints.</td>
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<tr>
<td>P5. Cognitive engagement</td>
<td>There is a lot of variation in the highlighting of important elements or use of an engaging conversational tone across various chapters.</td>
</tr>
</tbody>
</table>
### P6. Motivational features
There are good motivational features for a good performer but they are insufficient for a struggling learner.

### P8. Learning objective - assessment alignment
All the assessment questions are well aligned to the learning objective.

### P9. Pedagogy - assessment method alignment
The content videos have play-based pedagogy but the assessments lack that.

### P10. Cognitive levels covered
There are enough Higher Order Thinking questions where learners have the opportunity to apply the concepts.

### P11. Feedback quality
The feedback is just binary and there is a complete absence of any solutions or explanations.

### P13. Opportunities for Collaboration
The content and assessments adapt based on the learner's current level as well as the performance in the assessments.

### P14. Teacher support for in-class orchestration
There is basic information provided to the teachers on class progress which can be used to drive instruction in the class.

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### Technology and Design: Valuable

#### T1. Interface design: Enable intuitive use
The overall interface is quite intuitive to use, but visibility of some elements in the assessment is difficult.

#### T2. Interface design: Assess consequences of an action
No prompts for feedback or error reversal on user actions are present.

#### T3. Learner navigation & pace
The learner has very little control on the navigation and pace, and needs to follow a predetermined structure.
**T4. Universal Design**  
Important features of Web Content Accessibility like closed caption, operability through keyboard and compatibility with a screen reader are lacking.

**T5. Analytics for learners' progress**  
There are actionable analytics for the learners but very limited information on the teacher dashboard.

**T6. Tools to support problem-solving**  
No Mathematical tools to support problem solving are observed.

**T7. Meaningful interactivity**  
There is only basic interactivity like radio buttons and text inputs present which enables the learner to enter their responses.

**T8. Content type - Technology alignment**  
Appropriate and excellent visualizations are used in most topics based on the content type.
# 4. Detailed Review

## 4.1 Content Quality 🤖

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<td>Inclusivity in Content Representation</td>
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## 4.2 Pedagogical Alignment 😊

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## 4.3 Technology & Design 😊

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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>
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Content Accuracy (C1) is rated Exemplary. The video content is accurate. Scientifically correct terms are used throughout and there is almost no ambiguity observed.

Correctness and Clarity in Assessment (C2) is rated Exemplary. The assessment questions clearly convey what is expected from the learner. Answers for all of the questions are correct in all the sampled units.

Language comprehensibility (C3) is rated Valuable. Short and simple sentences are used in most of the places. The vocabulary is simple and is well supported by proper imagery wherever needed. For example, in the unit of Spatial Understanding (Grade 1), Spatial words like top, bottom, inside, outside, etc. are explained with good images which makes the whole content of the video easy to comprehend. The accent in the video content is mostly familiar to the Indian learner and it does not have any heavy foreign accent.

However, there are some units where some effort is required to comprehend the language. For example, in the unit of Rolling and Sliding, sentences are a bit long and spoken without enough stress and attention to the key words like smooth, curved and flat surface.
4.1.2. Alignment to National Standards

Mathematics skill coverage (C4) is rated Exemplary. All the skills recommended for grade 1-2 are covered extensively. Important skills like understanding the relation between numerals and number of objects have been covered well in the unit of Counting. The skills of basic comparisons have been covered in the units of length and capacity. The skills of Identifying shapes and classifying or sorting objects have also been covered well in the units of Identifying Shapes, and 2D and 3D objects.

Curriculum alignment (C5) is rated Exemplary. The topics are chunked into smaller objectives which are logically sequenced and aligned to the curriculum. There are however some topics which go slightly beyond the recommended curriculum for this grade range, for example, larger numbers are introduced in grade 2, which are generally recommended at grade 3-4 level. In 3D shapes, the content actually goes much beyond what is required and might be difficult and inappropriate at this grade 1 level, like formal nomenclature, identifying sides, faces and corners of different 3D shapes. This is still rated exemplary since the extra content might not cause a major hindrance to learning, and the learners could be guided to skip that content by a teacher.
4.1.3. Inclusivity in Content Representation

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

*Inclusivity in representation of learners (C6) is rated Exemplary.* A systematic effort has been made to include representation of diverse learners.

**Illustrative examples:**

Friends playing on a seesaw have boys and girls, fair and dark skinned, and children with different appearances. Many videos which are cartoon based, which too have a good representation of male and female characters. Although some video content has cartoon foreign character names (like Amber, Uncle Brown, Lousy, Sandy), they will not cause any significant hindrance in the learning. Especially in the assessment questions, Indian names have been used keeping in mind the common names across different religions. The setting used in most chapters will most likely be relatable to rural as well as urban Indian context.
4.2 Pedagogical Alignment

Pedagogical Alignment focuses on learner-centric 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

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<th>Constructivist approach (P1)</th>
<th>Addressing learning gaps / alternate conceptions (P2)</th>
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Constructivist approach in pedagogy design (P1) is rated Valuable. For many learning units, the learning content enables construction of knowledge to a good extent, and is much more than a mere transmission of information.

The content follows a problem solving approach in many topics. The videos begin with a broad real life problem which needs to be solved, and the concept is taught and discussed while solving the problem. This has been done really well in the chapter of Basics of Capacity. Conversational videos are observed in many topics where the thought process is made clear as the characters discuss and engage in questioning.

Illustrative examples:

- In the understanding of Spatial words, the video shows a conversation between different characters, and brings about different thoughts and ideas which each character is having regarding the spatial vocabulary words. Questions are asked and clarified through the conversation, helping even the viewer make sense of the topic.
- In Basics of Capacity, the video starts with a problem the character is facing at school, to take the right amount of water for classmates. Through the conversation with the teacher, a lot of questioning back and forth, the thought process is made visible. Many different scenarios are presented and are rooted in solving the problem of finding the perfect jar and filling the right amount of water.

However, some units lack sufficient resources for a learner to construct an understanding. Experimentation and interactivity are missing in the product. For example, in topics like comparing weights, including tools such as a weighing balance would have helped the learner build his/her idea of weight.
Addressing learning gaps/alternate conceptions (P2) is rated Valuable. An effort has been made to address the alternate conceptions in some units.

Illustrative example:

- In the topic, Basics of Capacity, clear examples and references show how words like BOTTOM and UNDER are used in different scenarios.

- The topic of Addition of numbers in Grade 1 - the concept of N+0=N is very well addressed in the video content and also the knowledge check section.

However possible learning gaps have been identified here but an effective resolution is lacking.

Illustrative example:

- There are questions like “Which objects could both roll and slide?” [coin], but for a learner not able to imagine this independently, there are no visualizations or explanations showing how both actions are possible for a coin. A similar lack is observed in 2D shapes where it might be hard for a child to make sense of how a 2D shape in different sizes and orientations can actually be the same.

- The topics of Comparing Lengths and Comparing Weights do not address some important possible learning gaps sufficiently. For example, Comparing lengths of objects with different starting positions, the idea that ‘bigger doesn’t mean heavier’, and similar looking objects may actually have different weights (filled vs empty opaque containers).
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>
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</table>

**Content in Context (P3) is rated Exemplary.** The context used in most of the topics is relevant to concept and well as the intended learners. In most of the learning units, it is sufficient for the child to care about learning the topic. Real world objects are used as well as they are placed in appropriate scenarios and settings which help the learner to appreciate the content.

**Illustrative example:**

- In Spatial Understanding (Grade 1), The characters are learning about spatial vocabulary words while arranging their room by following their mother’s instructions. In Rolling and Sliding, Simple objects from the real world are used, like coins, balls, toys; and characters are shown to be rolling/sliding them on slides in a park. In Comparing Weights, examples such as friends on a seesaw, weighing fruits and vegetables on a weighing scale.
- The learning unit of Geometry is introduced with student characters taking inspiration from nature (spider web) for their art project. Straight lines and curved lines are identified using a picture of a spider web. Similar example is also observed in the video of Basic 2D shapes where learners create a painting with the help of 2D shapes that they have learnt.

However, in some chapters like Time, context is relevant but insufficient. For example, in Reading Timetables, only one type of timetable is used, which is a classroom timetable. Train/flights/Bus timetables or daily personal schedule could be some more possibilities that could be considered.

Even though some improvements could be made in topics mentioned above, the overall context in the product is great.
Learner Scaffolding (P4) is rated Valuable. The progression of the content is meaningful and logical at a chapter level, i.e., the way different stages are organised within a chapter as well as the learning resources within a particular stage. Most videos are well scaffolded as the teacher character asks a lot of questions to the learner characters, challenging their thinking and helping the learners to form a correct mental model of the concept. Also, an attempt has been made to make thinking visible.

**Illustrative example:**

In the unit of Addition of number in Grade 1 - the learner solves a question “There are 4 strawberried in the box and I have to make it 7 so if I put 3 more strawberries in the box then they will be seven..hmm”

Some attention has been paid to the proper framing of the questions to aid with the same.

**Illustrative example:**

In the learning unit of Addition of Numbers in Grade 1 - the framing of questions and options helps the learner to build the correct mental model. “Which of the following options shows a correct representation of sum of 5 and 1?” The options show different ways of representing 5 + 1 (starting at different positions and jumping 1 unit in different directions), of which one is really correct.

![Image of addition options]

Which of the following options shows the sum of 5 and 1?

A B C D

But there aren’t enough scaffolds at a granular level (at the level of a single problem set or a particular question). There isn’t proper support for a child who might be stuck at a particular set of problems and is unable to figure out the right direction to think about the problem. Hints are available which give some idea about the problem, but they seem very generic at many places and do not always help the child to move ahead and think in the right direction.
Illustrative example:

- In the learning unit of Counting Numbers - the hint given for the question “How many butterflies are there altogether?” is - Altogether means counting total number of objects.
- In some places, the hint gives away the answer directly. An example is shown below. The question “Are there any cones in the picture?” is answered directly in the hint.

Although scaffolds are present to some extent as described above, they are mostly present in the videos and not enough to help a struggling learner come out of a stuck situation while working on problems or help a high performer take on challenges of higher difficulty. There is also an absence of any explanations and feedback.

**Cognitive Engagement (P5) is rated Valuable.** The quality of cognitive engagement varies across different chapters as well the content videos within a particular chapter. Among the highly engaging ones, the videos have a conversational style of delivery where multiple cartoon characters (a teacher character generally in the form of a parent or a relative, and learner characters in the form of children) are used. Also, a good signalling in the videos of most topics is observed which brings the attention of the child to the core idea of the concept.

Illustrative example: Topic - Spatial Understanding

In most units of Spatial Understanding, cognitive engagement is excellent with the use of a conversational story like tone in the videos, which is highly engaging. The images are also meaningful with proper signalling with bold words and bordering around the images wherever required.
Illustrative examples:

- The Basics of Capacity unit has a good signalling as well showing water levels in different containers very clearly as it is poured between different sized containers.
- In Counting objects, the visual cues and signalling is very effective as the objects in the room are counted and individual objects are highlighted and blinked to bring the learners attention and help them count them.

On the other hand, there are also some videos which are low on cognitive engagement. Either the delivery tone is very robotic or the content seems very hurried (observed in Comparing Lengths, Comparing weights, Bar graphs, Counting objects). In some videos, the vendor branding takes some time (upto 30s) which is irrelevant to the learning or the learner’s interest in any way.

Illustrative examples:

- Better signalling is needed like the unit of Rolling and sliding to clearly show different types of surfaces (curved, flat) and highlighting corners or sides in an object which prevent it from rolling. This is required to help the learner build a clear understanding of the topic.
- In the unit of Counting objects, the conversational voice is robotic i.e. the audio has been generated using text-to-speech.
- In Reading Timetables, the visibility of the timetable images is poor making it hard for the learners to read the contents.
Motivational Features (P6) is rated Valuable. The product has some motivational features which encourage the learner to engage further with the content. Some of these features include a proficiency level which is assigned to the child after the initial diagnostic test, a beginner or an expert. At an expert level, a lot of flexibility is offered to go through the content. There are some smileys and motivational comments like ‘You are doing great, champion’, ‘Good going genius’, when a child does well in the pre-test. On the other hand, for a beginner level, the motivational support is almost absent. Also, for a particular chapter, it is not possible for a ‘Beginner’ level profile to become an ‘Expert’ level profile even after doing well consistently for a set of assessment problems, or by having an opportunity to take the pre-test again.

Overall, video content with story-based scenarios have an element of affective motivation where the teacher character motivates the student characters to learn, for example Are you ready to do some basic addition of numbers so that you can pack your items easily? Did you understand? Let us do an example together etc.

4.2.3. Assessment of learning

<table>
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<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>
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</table>

Learning objective - assessment alignment (P8) is rated Exemplary. All the assessment questions are very well aligned to the learning objective. There is a good resonance between the concepts explained in the video and the level of questions. The objectives are very clearly defined for each set of problems, which are aligned to the content taught as well as NCERT.

Pedagogy-assessment method alignment (P9) is rated Valuable. In most chapters like Numbers (from 0 to 9), Spatial understanding, Capacity, Rolling and Sliding, Comparing lengths, the video content is very playful and story based, based on a conversation between different characters in the story, where the characters perform certain activities based on the concept being taught.

Illustrative example:

Counting Numbers, the characters are juggling a ball among themselves and keeping a count of the number of times they could throw the ball. In Spatial understanding, the characters are arranging the items in their room while being introduced to spatial vocabulary. This is aligned to the Play Based pedagogy recommended by NEP.

However, the assessment questions are direct MCQ question answer type, with no element of play. This is not in accordance with the guidelines of NEP, which does not recommend direct assessments for this grade range.
Cognitive levels covered (P10) is rated Exemplary. There are enough Higher Order Thinking questions where learners have the opportunity to apply the learnt concept in different settings.

Illustrative example:

After learning about 2D & 3D shapes and spatial understanding, some of these questions are presented:
- Who is nearest to the hut?
- Which of these objects can both roll and slide?
- Which of the objects is both long and round?
- Is it possible to stack and create a tower with the given objects?
- Can a globe slide?
- How many straight lines are there in the word ‘CUSHION’?

Illustrative example: Topic - Capacity

Inferencing level questions are also present in this topic. “Two different containers are filled with half a jug each. Is their capacity the same?” and many variations of such questions.

Feedback Quality (P11) is rated Potential to Improve. The feedback is just binary and there is a complete absence of any solutions or explanations for the questions. Also, no remedial content is present if the learner responds incorrectly. The learner only gets to know the correct response for the questions. Although for questions with multiple answer inputs, like Match the following, the system does give pointed feedback about which one is correct and which one is wrong. But again, no explanation is provided for either the correct or the incorrect responses.

Illustrative example:

In this example, the red ones are wrong and the green ones are correct.
4.2.4. Adaptivity

Adaptivity (P13) is rated Exemplary. The system adapts based on the user profile as well as the performance. A profile-based adaptivity is implemented with the help of a pre-test for each chapter based on which the learner’s journey is decided. For example, the child may be an EXPERT based on the pretest. Then, the learner gets more flexibility like fast-forwarding videos or directly moving to the practice questions. In the case a learner gets a BEGINNER profile, he/she doesn’t get the same flexibility and has to go through the entire content.

There is adaptivity based on the learner’s performance as well. This has been implemented in the following different ways:

- If an EXPERT profile learner answers multiple questions incorrectly, the profile changes to BEGINNER and the learner is forced to go through the videos, which could earlier be skipped.
- As the learner attempts a set of questions, the system identifies the learning objectives where the learner is weak. The set of questions can be attempted again with only questions from the particular learning objectives appearing in the second attempt.
- The number of similar questions presented within a unit also depends on the learner’s performance. For example, if two similar questions are answered correctly, the next questions are based on a different idea. On the other hand, if one out of two answers are wrong, another similar question is presented.

4.2.5. Teacher support

Teacher support (P14) is rated Valuable. There is a teacher dashboard which gives information on each student’s progress. For each chapter, different student groups are shown based on their performance. The product suggests some possible actions and interventions that could be made by the teacher. However, the teacher cannot customize the content or create any worksheets or learning material from the dashboard itself. The grouping is helpful only to a limited extent as the suggestions are very generic and most of the hard thinking work is left to the teacher. An example of a suggestion is: “These children will like a more challenging curriculum. Please give challenging classwork and homework to these students.”
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

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<th>Learner Navigation and pace (T3)</th>
<th>Universal design (T4)</th>
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**Interface design: Enable intuitive use (T1) is rated Valuable.** The interface is intuitive at a high level. For example, the buttons to select a chapter, playing/pausing the video, checking the answers and moving to the next questions are clear with simple and intuitive text. The assessment questions are organized well within the web template, the hints and explanation icons are available on the top left corner and most visual elements contain clear cues informing users of what they are and how to use them. Correct and wrong answers are highlighted on submit. The user has to select and submit answer options and thus allows for confirmation before final submit.

However, there are some specific problems, especially in visibility of the question sets.

**Illustrative example:**

Difficult to locate the text input field: For example in the diagnostic test for Grade 1 (Numbers from 0-9) - the placeholder for typing the answer is not highlighted - this makes it difficult for the learner (especially for a grade 1-2 students) to figure out where to type the answer out. This is observed in some other chapters as well.

**Illustrative example:**

Visibility of Images: The interface’s placeholder for an image in the questions is too small. The images need to be double clicked and even zoomed in certain cases rather than being directly readable. This problem is consistently observed in many chapters.
Detailed Review: Technology and Design

Interface design: Access consequences of an action (T2) is rated Potential to Improve. The consequences of an action are not conveyed throughout the product. There are no prompt messages as feedback to the various user actions like starting a new chapter or progressing to the next learning stage with a chapter. The error handling is also completely missing or not aligned to the action.

Illustrative example:
The images sometimes contain too much text, hence reducing the visibility. For example, Reading Timetables (in Grade 2 Time.) has the entire week's timetable in an image, which could be better represented as a table directly.

Illustrative example:
In Match the following question type- there is no prompt to help the learner understand how to match the options from each column - this is making the interface difficult to use. Only after trial and error, one can find that the options on the column on the right can be rearranged.
Learner Navigation and pace (T3) is rated Potential to Improve. The learner has limited control over their learning path, has to follow a predetermined structure and go linearly as decided by the system. The assessment question structure is such that there is no scope to go back and forth between questions. The learners also cannot fast forward the videos, which locks the later content if they try to do so.

Universal Design (T4) is rated Potential to improve. It does not provide sufficiently low entry barriers for diverse learner groups. Videos do not have closed captions, assessment questions sometimes rely on a pure audio mode and thus do not provide sufficient alternatives to multimedia as suggested by the Web Content Accessibility Guidelines (WCAG) principles. It was observed that in one of the diagnostic tests in the learning unit of Numbers (from 0 to 9) that a question asked is to listen to the number and select the number but there is no voice output.

Illustrative example:

In fill-in-the-blank question type - if the learner clicks on submit without answering - the prompt is “Option not selected” - this might confuse the learner as the action required and consequence prompted is not aligned.

Illustrative example:

- For an ‘Beginner’ level profile, fast forwarding the videos prevents the learner from moving to further activities. In case the learner tries to fast forward the video, there needs to be a prompt to warn the user and inform them about the consequence.
- While attempting the questions, clicking the continue button multiple times by mistake leads to skipping a few questions, which seems like a bug in the system. In any case, the learner should be prompted to press the button only once.
The interface does not allow all functionality to be accessed via a keyboard without the use of the mouse. The Tab and the shift+ tab button do not provide any functionality to help navigate within an assessment. No evidence of compatibility with an adaptive technology like a screen reader. Labels or instructions are absent to guide user input for example the match following questions in a diagnostic test.

### 4.3.2. Affordances that facilitate learning

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

**Analytics for learners' progress (T5) is rated Valuable.** Student: After the pre-test, the child can clearly see his/her level on various objectives. Also, after every set of questions (called Knowledge Check), the child can see their strengths and weaknesses. For the weakness section, the child can try that part again by clicking on the button next to it. So, the dashboard provides meaningful information and is actionable to some extent.

For the teacher, the dashboard provides a grouping of students based on their performance on different learning objectives. However, the teacher cannot take an action or assign appropriate activities to different groups of learners from the dashboard.

**Tools to support Problem solving (T6) is rated Potential to Improve.** No mathematical tools have been observed throughout the product. Basic tools like ruler, protractor or graphs which would be useful for learners to solve problems are also found missing.

**Meaningful interactivity (T7) is rated Valuable.** There is basic interactivity like radio buttons and text inputs present which enables the learner to enter the correct response for the questions. There is nothing specific observed which will aid in understanding of the concept. For example, drag and rotate in 3D shapes would be meaningful. However, there is no superfluous interactivity in the product.

**Content Type - Technology alignment (T8) is rated Exemplary.** In most topics, Appropriate and excellent visualizations are used in most topics based on the content type. Properly signalled images (present in Spatial understanding) and appropriate animations (for example, showing rolling and sliding) are present. In the unit of Capacity, proper animations (in the videos) showing pouring/conversion of liquids from one container to another. However, sometimes, few aspects of a chapter lack enough visualizations. For example, an animation would be helpful in 2D shapes when visualizing how 2 shapes in different orientations are actually the same.
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.