

Practice Session Experience and Topic Page

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Quick links: [Section 1: WHY](#); [Section 2: WHAT](#)

Mock links: [Figma](#)

Technical Design Doc: [Figjam](#)

PRD Summary

This PRD proposes a redesign of the Practice Session experience to make it more engaging, and aligned with the learners' learning goals, while also making sure that it is discoverable in the onboarding flow, specifically focusing on the Topic Pages, Lesson Player and Learner Dashboard. We aim to enable learners to navigate easily to the lessons, practice questions, and revision cards, comprehending how each component fits into their overall learning journey.

Approval Summary

Section	Reviewer ¹	Role	Review Status	Last updated
WHY	Sean Lip	PM Lead	Go (fully approved) ▾	21 Sep 2023
WHAT	Sean Lip	PM Lead + Web Tech Lead	Approved (pending design work) ▾	21 Sep 2023
	Ben Henning	Android Tech Lead	Unreviewed ▾	

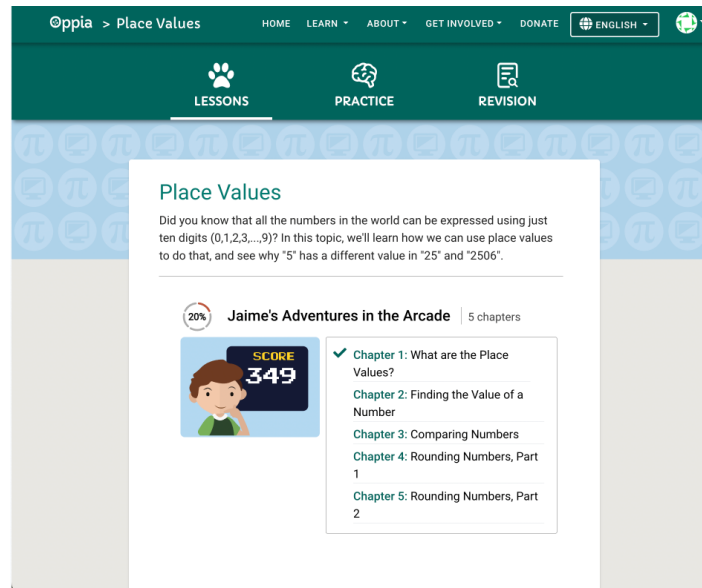
¹ TL/PM leads may, at their discretion, choose to replace their names here with their delegate(s)' name(s) instead.

Section 1: WHY

The aim of the WHY section is to demonstrate a good understanding of the problem we're trying to solve, why it's worth solving, and what's at stake if we don't solve it.

Problem Description

Target Audience	Primary users: ❖ Learners: can be of all ages and backgrounds but generally our target audiences are those 7-14 years old who are generally from under-resourced backgrounds. ➢ Are fluent in various languages and may or may not have strong literacy skills. ➢ Often don't have a lot of previous experience working with technology.
Core User Need	As a learner: ● I need to achieve mastery in Math skills ● I need to easily find my way to start learning ● I want to review the content I've learned ● I need to easily find my way to start practicing Math skills. ● I need to have fun while I'm practicing to master skills. ● I need to see my learning progress ● I need to be told which skills I need to develop ● I need to be guided to review concepts I'm not understanding ● I need to do the lessons and practice in my preferred language
Existing Status Quo	Currently the Topic Page provides 3 main tabs: Lessons, Practice and Revision. ● In the Lesson tab learners are able to select which lesson/chapter they want to do in a story. Currently, we only have 1 story for each topic, but additional stories are being developed:



- In the **Practice tab** learners can select one or more subtopics to practice. Each topic in Oppia comprises several skills. The skills in each topic are clustered into several subtopics. Confusingly, in the UI, we call subtopics "skills".
 - In the screenshot below, "Adding Numbers" is a subtopic in the topic "Addition and Subtraction", and it contains 4 skills. Skills are the most basic unit of learning and cannot be subdivided further. Each chapter in a lesson teaches some of those skills. It is known, for each chapter, what skills it teaches.

Oppia > Place Values

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LESSONSPRACTICEREVISION

Master Skills for Place Values Beta

Select the skills from the Place Values lessons you would like to practice.

☐ The Place Names and Their Values

☐ Naming Numbers

☐ Comparing Numbers

☐ Rounding Numbers

START

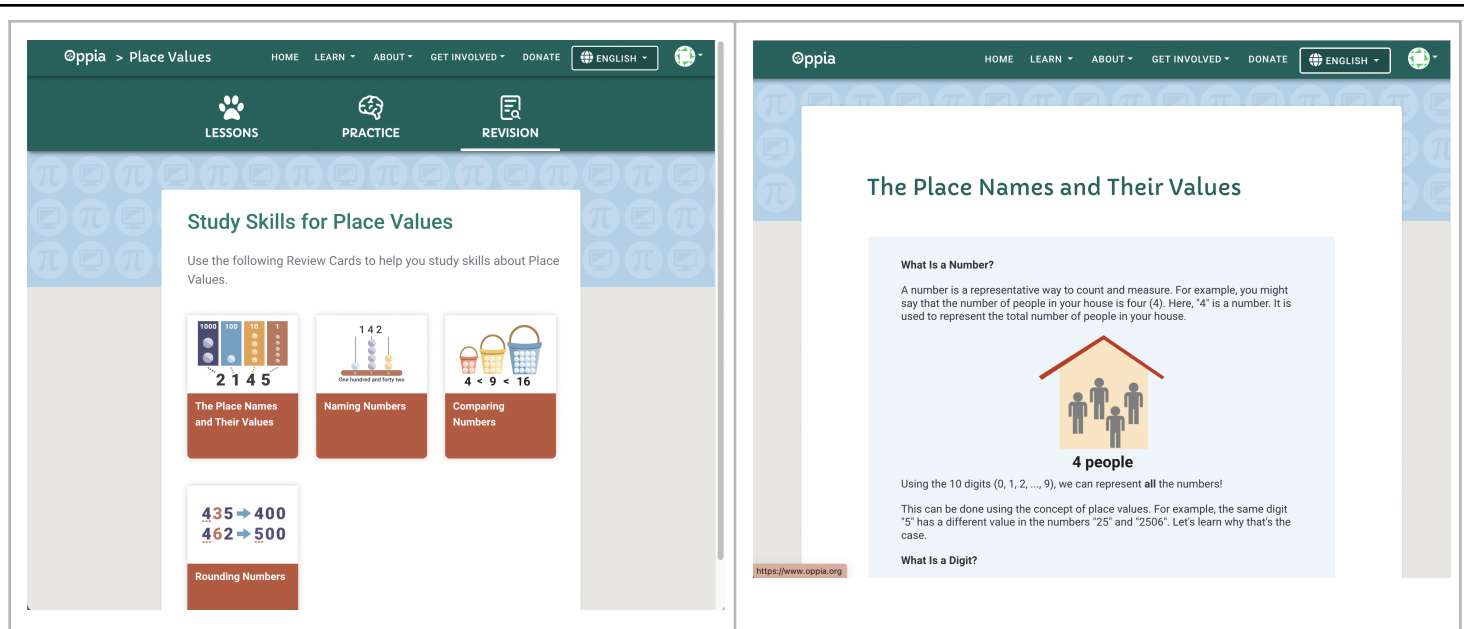
Subtopics

☐ Show Practice Tab to learners. ⓘ

+ ADD SUBTOPIC+ ADD SKILL

Name	# of Questions
Adding Numbers	13
Add two single-digit numbers.	4
Add a number to 0, or add 0 to a number.	5
Add multi-digit numbers without carrying.	1
Add multi-digit numbers with carrying.	3
Subtracting Numbers	27
Relationship Between Addition and Subtraction	1
Estimation	0

- In the Review tab, learners can choose to check out a review card which contains a summary of the contents of the available subtopics.



- In the **Practice Session** experience, once the user selects the subtopics, they are redirected to a set of 10 practice questions about different skills, that are randomly chosen.
 - These questions have three difficulty levels: easy, medium and hard. Easy questions are simpler than the skill and include outside help (e.g. multiple choice options might artificially constrain the answers). Medium questions are the “standard” case, and test exactly what the skill asks for. Hard questions generally require the learner to combine a couple of skills together.
 - At the end of a Practice Session we show the learner their results, including the overall score of the session, and the individual score for each skill.
 - For logged-in learners, we show their mastery score for the subtopic and topic in the Learner Dashboard, which is calculated by the percentage of correct first try answers over the total of questions.
 - If the learner achieves
 - Between 60% and 79% of mastery, they "earn a medal" of Bronze
 - Between 80% and 99% mastery, they "earn a medal" of Silver
 - 100% mastery, they "earn a medal" of Gold

Oppia

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Practice Session

Question 1/10Beta



Turn $500 + 30 + 8$ into a single number.

SUBMIT

Oppia

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Session complete. Well done!

100%

Score Breakdown

Write the name of the place occupied by a digit in a number.

1.00/ 1

Write a number, given its breakdown into place values.

2.00/ 2

Given a number, write it as a sum of its place values.

1.00/ 1

Build a number from several "number + place name" groups.

1.00/ 1

Arrange the place names in the correct order (up to "millions").

2.00/ 2

Find the digit in a number corresponding to a given place name.

1.00/ 1

Given a place name, state the corresponding place value (or vice versa).

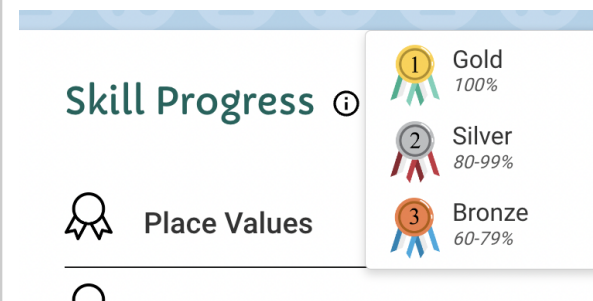
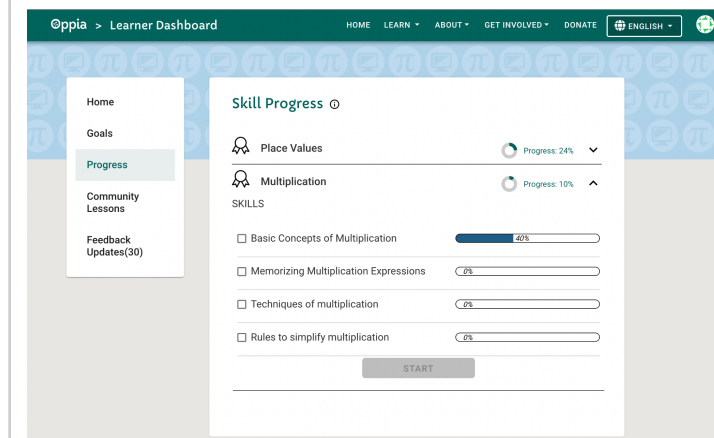
2.00/ 2

Answers Correct: 10.00/ 10

This score is based on the number of hints you used and incorrect answers you entered during this session.

MY DASHBOARD

REPLAY



Currently, there are several issues with the Practice Session experience, including:

- Lacks engagement, since it doesn't encourage and motivate learners to keep practicing until they achieve mastery.
- Users find it unclear how the selected subtopics to practice relate to the available lessons
- Learners are uncertain about **when** to engage in Practice Questions and see Revision cards
- Subtopics are confused as skills - (this is not necessarily an issue for learners. Learners won't know what "subtopics" are but will know what "skills" are. That's why we originally chose to call these "skills" in the UI. The main issue here is for lesson creators, developers and members of the Oppia team (since, when they say "skills", it's unclear what is being referred to).
- Skills are surfaced only at the end of a session, but nowhere else
 - Learners can't see their overall mastery progress of individual skills
- It's unclear for learners how their mastery is measured (Is it only by getting all 10 questions right or wrong? How many times are they supposed to keep doing the sessions so they can achieve 100% mastery? Is there anything else that is relevant to their mastery (like the lessons, level of difficulty of the questions, if they used a hint or not, etc.)
 - It's also unclear that they can achieve levels of mastery and earn medals
- There is no appropriated surfacing of these features in the Learner Dashboard, wasting the opportunity to recommend practice sessions based on the data that we have collected from users during their experience within the platform

	Additionally: • Learners overlook the revision and explore tabs and struggle to understand their purpose. • Lessons, practice questions and revision cards are presented separately, without explicit links or nudges between them. • The initial copy introducing the topic is not clear for students, leading to confusion. • Learners are uncertain about how to start a lesson or click on a chapter to initiate a lesson. • Learners are unaware if the chapter is available in the website language, and this discovery often happens after starting the lesson, causing frustration. • Although the previous Lesson Player project had already considered recommending practice questions and revision cards at the end of a Lesson, this has not been implemented yet and it should be double-checked to make sure this entrypoint of starting a practice session won't need any additional tweaks.
What goals do we want the solution to achieve?	• Increased user engagement (i.e. practice sessions and lessons started and completed, access to revision cards) - especially from new users • Increased average session length - especially from new users • Learners find it easy to start lessons and navigate chapters and practice questions • Increased user retention to all features in general (lessons, practice questions, revision cards, learner dashboard).

Overview of the proposed solution

Summary:

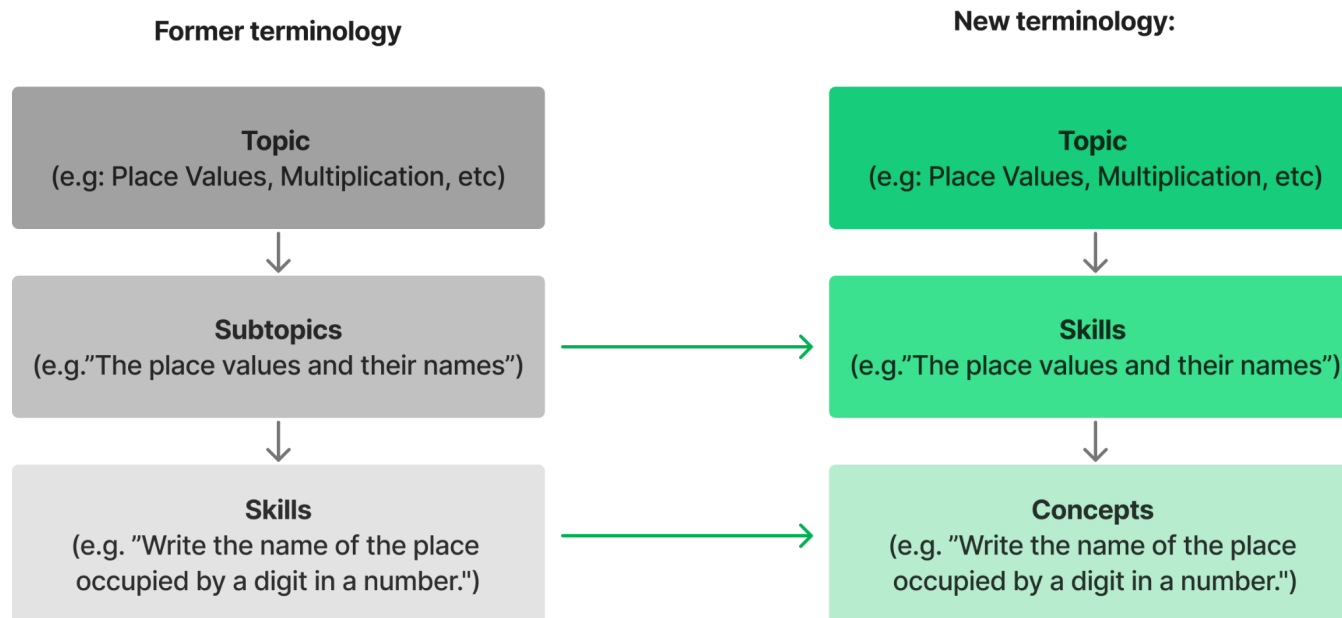
The solution proposes that, through gamification principles, learners are motivated to participate in Practice Sessions. In this solution, the measurement of mastery is redefined and categorized into levels, so learners are motivated to achieve new levels. Additionally, during the practice sessions, learners will accrue Points, depending on the difficulty level of questions. These elements should encourage learners to practice multiple times until they achieve mastery in the skills and topics.

The solution also ensures that learners can easily select secondary languages to initiate lessons when their preferred language is not available, and they can choose skills to practice through the redesigned Topic page. Practice Questions and Revision will be more discoverable and integrated into the learning process: once the user completes a lesson or a set of lessons that fully introduces a skill, they will be offered to start a practice session on that skill. Additionally, learners should be able to visualize the skill they struggle with and start Practice Sessions based on personalized recommendations on the Learner Dashboard.

- This needs to be developed according to this [Project Timeline \[Updated, Aug, 3\]](#) .

Details of the Proposed Solution

Update 1: As discussed with the UXW team, we are replacing the terms "subtopic" with "skill" and "skill" with "concept." This change is being made to ensure consistency in the terminology used by lesson creators and learners, while also ensuring that the terminology is easily understandable for the learners. As follows:



1. Gamifying Mastery of Skills

In a practice session, the student will answer 10 questions based on 1 chosen skill, where each question corresponds to a specific concept. The completion of multiple practice sessions will establish a "mastery" of concepts, skills, and topics.

Note: each skill must have at most 8 concepts.

2. What determines the content of a session?

The learner will be able only to choose the skill on the Topic Page, and the platform should select specific concepts accordingly (see below). Also, at the end of one or more lessons, the student will be offered the option to start a practice session on the introduced skills. In this case, the skill will be automatically chosen by the platform, based on lesson completion.

2.1. How to fit the revision/practice in the learning journey?

Although curriculum admins don't define where the practice sessions fit within the stories, they do define which concepts are taught in which lessons. So after lessons 1 to L have covered all the concepts of skill A (where L is as small as possible), then at the end of lesson L, it should show the option to start a practice session and/or review the skill A.

Note: it's possible for this to result in two practice sessions being shown after a particular lesson (in the topic page), or a practice session being shown after every lesson.

3. Calculating the average time to master a topic

Considering that:

- An average student takes, on average, between 1 and 2 minutes to respond to a question during a practice session (This data is based on empirical observations and hasn't undergone formal research validation. However, we consider it a reasonable estimate since the questions are concise, contain minimal text, and are objective in nature.)
- A practice session comprises 10 questions

So:

- A student would typically spend between 10-20 minutes to complete the entire session, with an average of 15 minutes.

Also, we are considering that the student has an availability of approximately 3-4 times a week to access the platform, according to the [recent research](#) validation.

Let's suppose that:

- They can spend 15 minutes 4 times a week for the practice session, or 1 hour once a week. So, on average, the student has about 60 minutes per week to do practice sessions, allowing for around 4 sessions per week, which is approximately 40 questions.
- A student would miss 20% of all answered questions, so we will consider that they need to answer 80% of the questions correctly to consider that they have mastered a topic.
- We want the student to take between 1 and 2 weeks to complete the mastery of a skill if they maintain this pace. (The rationale behind this is that a topic may have an average of 4 skills, so the student would take between 1 and 2 months to master the topic, which is a reasonable time to consolidate content - empirically).

Note: All of this depends on the variable of how much time the student can actually dedicate daily or weekly to practice, and also how many skills exist within a topic, but we are using average values here to be able to estimate an average time for consolidating a skill so that it doesn't become too lengthy or exhausting for the student.

So, on average, the standard student can complete 4 practical sessions per week, as mentioned above, and this results in 40 questions/week. If we want the student to complete the skill within 1-2 weeks, then the skill should have a maximum of 80 questions.

4. How to categorize the concepts within the skills?

When it comes to categorizing concepts within skills, it's essential to consider both their inherent nature and the distribution of different concepts levels within each skill. This approach ensures a well-balanced array of concepts across various categories while maintaining content consistency within each skill.

4.1. Concept Quantification:

- Each skill can have 1 to 8 concepts.
- Concepts should be tagged as either trivial, simple, or regular under each skill.
- Concepts within a skill should be categorized based on relative “difficulty” with each other, and considering that
 - **Trivial** concepts are the easiest, requiring minimal practice for mastery
 - **Simple** concepts need more practice and testing when compared to trivial skills
 - **Regular** concepts demand the most attention and require a larger amount of questions to be mastered when compared to simple concepts
- Where possible, concepts should be categorized trying to maintain proper distribution, as listed under 4.2. The aim of this is to try and maintain some consistency between skills (so that, e.g. each skill has a reasonable number of regular concepts). However, this is just a guideline, and in cases where the curriculum administrator cannot make this work, it is OK for them to prioritize the individual nature of each concept.

Note: The curriculum administrator can identify the regular concepts first and then categorize the remaining concepts as either trivial or simple, using the “regular” concepts as a reference point.

4.2. Proportional Distribution:

To maintain a balanced distribution of trivial, simple, and regular concepts within skills, adhere to the following proportions:

- **Skills with 1 concept:** In cases where a skill is dedicated entirely to a single concept, it is expected that this will categorize that concept as “regular” since it necessitated an entire skill to cover it comprehensively. However, if the curriculum admin observes that this concept can't be categorized as “regular” because of its nature, it's okay to categorize it as “basic”.
- **Skills with 2 concepts:** Skills containing two concepts are also expected to be categorized as “regular.” This designation signifies that these two concepts collectively warranted an entire skill for their explanation. However, if curriculum

administrators observe that one of the concepts is slightly easier than the other, or that they both don't have the nature of a "regular concept" they have flexibility to categorize one as "regular" and the other as "simple", or both as "simple".

- **Skills with 3+ concept:** For a skill featuring 3 or more concepts, a proportional approach can be applied:
 - 3 concepts: 1/1/1 (all the same category or one for each category), or 1/2 (simple/regular or trivial/simple)
 - And for 4+ concepts consider a distribution ratio for trivial/simple/regular for:
 - 4 concepts: 1/1/2
 - 5 concepts: 1/2/2
 - 6 concepts: 1/2/3 or 1/1/4
 - 7 concepts: 1/2/4 or 2/2/3
 - 8 concepts: 2/3/3

4.2.1. **Examples** of how to distribute the number of questions for the concepts within the skill:

- **Example 1: Skills A: 7 concepts - 80 questions**

In this example, we are using the proportion 1/2/4 (trivial/simple/regular):

Concept A1: Simple

Concept A2: Regular

Concept A3: Regular

Concept A4: Regular

Concept A5: Simple

Concept A6: Regular

Concept A7: Trivial

- **Example 2: Skills B: 4 concepts - 60 questions**

In this example, we are using the proportion 1/1/2 (trivial/simple/regular):

Concept B1: Simple
Concept B2: Regular
Concept B3: Regular
Concept B4: Trivial

However, these proportions are not rigid rules. Administrators can make nuanced distinctions if one concept is significantly easier than others and adjust the proportions accordingly. The categorization should always align with the nature and complexity of the concepts involved, as assessed by curriculum administrators.

In conclusion, curriculum administrators should carefully consider the nature of concepts, apply the "trivial," "simple," and "regular" criteria as outlined above, and aim for a roughly-proportional distribution as indicated. This approach guarantees a well-rounded learning experience that covers fundamental concepts while addressing more standard challenges within each skill.

4.3. Determine the target value for the number of questions of the skill

For each skill, the number of questions to be distributed will be according to the concepts of that skill, totaling something around 40-80 questions per skill. For more complex skills with many concepts, the student may be offered to answer 80 questions, while simpler skills with few concepts may offer around 40 questions. On average, skills should have 60 questions. The number of questions can exhibit a variation within a 5% range. In summary:

- Skills with 1-3 concepts = approximately 40 questions (adjustable to 38-42)
- Skills with 4-6 concepts = approximately 60 questions (adjustable to 57-63)
- Skills with 7-8 concepts = approximately 80 questions (adjustable to 76-84)

4.4. Find the value of "Y"

Each concept will have a value "Y" that represents the questions needed for each concept, "Y" is sub categorized as:

- "T" = Number of questions "Y" for trivial concepts

- "S" = Number of questions "Y" for simple concepts
- "R" = Number of questions "Y" for regular concepts

4.5. Find the value for "T", "S" and "R"

The recommended ratio for T:S:R should be 4:5:6. This allocation is based on a well-considered rationale: trivial questions should require less repetitive practice compared to simple concepts, just as simple questions should merit less repetitive practice than regular ones. This logic is grounded in the idea that simpler concepts require less repetition for students to grasp, while more comprehensive concepts necessitate additional practice for students to master and for us to effectively determine whether they have truly learned the concepts. To find the values of "T", "S" and "R", use the equations below:

$$T = \frac{4 * \text{Total number of questions (can be 40,60 or 80 dependinding of the total number of concepts)}}{(4 * \text{Number of trivial concepts}) + (5 * \text{Number of simple concepts}) + (6 * \text{Number of regular concepts})}$$

$$S = \frac{5 * \text{Total number of questions (can be 40,60 or 80 dependinding of the total number of concepts)}}{(4 * \text{Number of trivial concepts}) + (5 * \text{Number of simple skills}) + (6 * \text{Number of regular concepts})}$$

$$R = \frac{6 * \text{Total number of questions (can be 40,60 or 80 dependinding of the total number of concepts)}}{(4 * \text{Number of trivial concepts}) + (5 * \text{Number of simple concepts}) + (6 * \text{Number of regular concepts})}$$

The table below illustrates the distribution of questions into trivial, simple, and regular categories for the models presented in the concept distribution.

	Total number of Trivial concepts	Total number of Simple concepts	Total number of Regular concepts	Total number of questions	Number of trivial questions (Weight 4)	Number of simple questions (Weight 5)	Number of regular questions (Weight 6)
1 concept	0	1	0	40	0	40	0
1 concept	0	0	1	40	0	0	40
2 concepts	0	0	2	40	0	0	20
2 concepts	0	2	0	40	0	20	0
2 concepts	0	1	1	40	0	18	22
3 concepts	1	1	1	40	11	13	16
3 concepts	0	1	2	40	0	12	14
3 concepts	1	2	0	40	11	14	0
4 concepts	1	1	2	60	11	14	17
5 concepts	1	2	2	60	9	12	14
6 concepts	1	2	3	60	8	9	11
6 concepts	1	1	4	60	7	9	11
7 concepts	1	2	4	80	8	11	13
7 concepts	2	2	3	80	9	11	13
8 concepts	2	2	4	80	8	10	11

5. Calculating Student Mastery of Skills and Concepts:

The student's mastery of the concept, and consequently, the skill and topic, will be as follows:

- We will record the last "Y" questions for each concept (note: check [mastery progress](#) details to understand how to handle the case where there are < Y questions done.)

- The mastery of the concept will consider that the student needs to correctly answer 80% of the last Y questions the student answered on that specific concept.
- If the student achieves 80% in that concept, we will consider their mastery of that concept to be 100%.
- The mastery of the skill will be a simple average of the mastery of all concepts within that skill.

Note: We are using 80% as a reference to allow for some margin of typing errors, incorrect clicks, or even lack of attention. Also, we are using 80% as a reference, based on competitive analysis. Duolingo also uses 80% as a reference for when a student wants to skip a unit.

So, following the previous examples:

5.1. Example 1: Skill A: 7 concepts - 80 questions

Concept A1: Simple - 80% of 11 $\approx$ 9 = X

Concept A2: Regular - 80% of 13 $\approx$ 10 = X

Concept A3: Regular - 80% of 13 $\approx$ 10 = X

Concept A4: Regular - 80% of 13 $\approx$ 10 = X

Concept A5: Simple - 80% of 11 $\approx$ 9 = X

Concept A6: Regular - 80% of 13 $\approx$ 10 = X

Concept A7: Trivial - 80% of 8 $\approx$ 6 =X

So:

Concept A1: 9 out of 9 = 100% mastery

Concept A2: 10 out of 10 = 100% mastery

Concept A3: 10 out of 10 = 100% mastery

Concept A4: 10 out of 10 = 100% mastery

Concept A5: 9 out of 9 = 100% mastery

Concept A6: 10 out of 10 = 100% mastery

Concept A7: 6 out of 6 = 100% mastery

So the mastery of the skill A will be 100%.

5.2. Example 2: Skill B: 4 concepts - 60 questions

Concept B1: Simple - 80% of 14 $\approx$ 11

Concept B2: Regular - 80% of 17 $\approx$ 14

Concept B3: Regular - 80% of 17 $\approx$ 14

Concept B4: Trivial - 80% of 11 $\approx$ 9

So:

Concept B1: 9 out of 11 = 81%

Concept B2: 8 out of 14 = 57%

Concept B3: 9 out of 14 = 64%

Concept B4: 5 out of 9 = 55%

So the mastery of the skill B will be = $\frac{81\% + 57\% + 64\% + 55\%}{4} = 64.25\%$

5.3. Example 3: Skill C: 2 concepts - 40 questions

Concept C1: Regular - 80% of 20 = 16 = X

Concept C2: Regular - 80% of 20 = 16 = X

So:

Concept C1: 12 out of 16 = 75% mastery

Concept C2: 14 out of 16 = 87.5% mastery

So the mastery of the skill B will be = $\frac{75\% + 87.5\%}{2} = 81.25\%$

6. Concept Mastery Progress

The approach to tracking learner mastery focuses on immediate feedback and progress tracking. The mastery should be calculated right from the moment a learner answers their first question correctly, without waiting for a minimum number of questions to be answered correctly.

- **Starting at 0%:** When learners begin their practice journey, we assume they have an "infinite history" of wrong answers for each concept. Consequently, their mastery score for any given concept starts at 0%. This provides a neutral starting point from which their actual progress is measured.
- **Incremental Progress Tracking:** As learners engage with questions related to specific concepts, their mastery scores are calculated incrementally. For example, if a learner answers one question correctly out of a total of 13 questions required for mastery in a particular concept, their mastery score for that concept would be $1/13$, or approximately 7.7%. This incremental approach ensures that learners receive immediate feedback on their performance, even if they've interacted with only a few questions.
- **No Waiting Required:** One of the primary benefits of this approach is that there's no need to wait until learners have answered a predefined minimum number of questions correctly. Mastery scores are continuously updated as learners progress, regardless of the number of questions attempted. This means that even a couple of correct answers can significantly increase a learner's mastery for a specific concept, offering them a tangible sense of achievement early in their learning journey.
- This approach simplifies the mastery calculation process and guarantees that learners always have access to their mastery scores for all concept (which we show at the end of the relevant practice session). By providing immediate feedback on their progress, it not only simplifies calculations but also motivates learners by showcasing their accomplishments, no matter how small.

7. Topic Mastery

A mastery in a topic is determined by averaging the individual proficiencies of all concepts within that topic. This approach is preferred compared to assigning equal weight to all skills (because it accurately takes into account variations in the number of concepts per skill, thus ensuring a precise representation of the importance of each concept).

- For example: Topic "Z" has 13 concepts, from skills "A", "B" and "C"
 - Skill A:
 - Concept A1: 9 out of 9 = 100% mastery
 - Concept A2: 10 out of 10 = 100% mastery
 - Concept A3: 10 out of 10 = 100% mastery
 - Concept A4: 10 out of 10 = 100% mastery
 - Concept A5: 9 out of 9 = 100% mastery
 - Concept A6: 10 out of 10 = 100% mastery
 - Concept A7: 6 out of 6 = 100% mastery
 - Skill B:
 - Concept B1: 9 out of 11 = 81%
 - Concept B2: 8 out of 14 = 57%
 - Concept B3: 9 out of 14 = 64%
 - Concept B4: 5 out of 9 = 55%
 - Skill C:
 - Concept C1: 12 out of 16 = 75% mastery
 - Concept C2: 14 out of 16 = 87.5% mastery

The Topic "Z" Mastery will be an average of all concepts in the topic, which is:

$$\frac{100\% + 100\% + 100\% + 100\% + 100\% + 100\% + 100\% + 81\% + 57\% + 64\% + 55\% + 75\% + 87.5\%}{13 \text{ concepts}} \cong 86\%$$

8. Given the skill, how will questions be selected for a session?

- a. When the mastery of the concepts are all equal
 - i. The platform will choose a set of questions of all concepts for a session, trying to balance the number of skills in the same proportion. So, if the chosen skill has
 - 1. > 10 concepts (e.g. Concepts 1-15), the practice session should have 1 question for each concept
 - a. it would only cover concepts 1-10, and the remaining should be covered in another session
 - b. In the next session, the platform should prioritize concepts that haven't been covered (11-15)
 - 2. 10 concepts, the practice session should have 1 question for each concept
 - 3. 5 concepts, the session should have 2 questions for each concept
 - 4. 3 concepts, the session should have 3 questions for 2 skills, and 4 questions for 1 concept.
 - 5. 2 concepts, the session should have 5 questions for each concept
 - b. Otherwise, the platform should prioritize choosing questions of the concepts with the lowest mastery, including concepts that they haven't answered any question yet and their mastery is 0% while excluding the concepts that already have 100% mastery.

Worked example for (b):

Suppose a skill has 5 concept, and the learner's mastery for each concept is:

- i. Concept 1 - 80%
- ii. Concept 2 - 100%
- iii. Concept 3 - 50%
- iv. Concept 4 - 90%
- v. Concept 5 - 90%

Steps:

- For $N(\%)$ = how much mastery is missing for achieving 100% mastery in the concept
- Calculate the value of $N(\%)$ for each concept ($100\% - \text{skill mastery}$).

- Calculate the Sum of N (%) of All Concepts (excluding those with 100% mastery).
- Calculate the number of questions allocated for each concept using the formula:
 - $\text{Questions_for_concept} = \text{Round}((N(\%) / \text{Sum_of_N}(\%)_{\text{of_All_Concepts}}) * \text{Total_Questions})$
 - In this context, you can round to the nearest value so that the sum of the questions equals 10.

Here's the approximate distribution of the 10 questions for each concept:

Concept 1:

$$N(\%) = 100\% - 80\% = 20\%$$

$$\text{Sum of } N(\%) \text{ of All Concepts} = 10\% + 50\% + 10\% + 10\% = 80\%$$

$$\text{Questions_for_Concept} = \text{Round}((20\% / 80\%) * 10) = 2 \text{ questions}$$

Concept 2:

$$N(\%) = 0\% \text{ (already 100\%)}$$

$$\text{Sum of } N(\%) \text{ of All Concepts} = 10\% + 50\% + 10\% + 10\% = 80\%$$

$$\text{Questions_for_Concept} = \text{Round}((0\% / 80\%) * 10) = 0 \text{ questions}$$

Concept 3:

$$N(\%) = 100\% - 50\% = 50\%$$

$$\text{Sum of } N(\%) \text{ of All Concepts} = 10\% + 10\% + 10\% + 10\% = 40\%$$

$$\text{Questions_for_Concept} = \text{Round}((50\% / 40\%) * 10) = 6 \text{ questions}$$

Concept 4:

$$N(\%) = 100\% - 90\% = 10\%$$

$$\text{Sum of } N(\%) \text{ of All Concepts} = 10\% + 50\% + 10\% + 10\% = 80\%$$

$$\text{Questions_for_Concept} = \text{Round}((10\% / 80\%) * 10) = 1 \text{ question}$$

Concept 5:

$$N(\%) = 100\% - 90\% = 10\%$$

$$\text{Sum of } N(\%) \text{ of All Concepts} = 10\% + 50\% + 10\% + 10\% = 80\%$$

$$\text{Questions_for_Concept} = \text{Round}((10\% / 80\%) * 10) = 1 \text{ question}$$

Therefore, the approximate distribution of the 10 questions for each concept would be:

Concept 1: 2 questions

Concept 2: 0 questions (already 100%)

Concept 3: 6 questions

Concept 4: 1 question

Concept 5: 1 question

9. Gamifying the user experience and recognizing users' efforts around the learning experience

- With each answered question, the student will gain or lose points based on the context.
- This is not related to their mastery. The goal of this section is to describe a way to reward the students for their efforts in answering the questions, even when they have answered correctly on the second attempt, or after using a hint.
- Instead of not giving them any rewards in such cases (which is what we do for when measuring their mastery, since we only consider questions answered correctly without the use of additional resources), in this case, we would give the students a score for their effort of answering a question correctly.
- Additionally, we now give the learner a star for when they get an answer right on their first try without viewing any hints.
- Questions continue to be categorized as easy, medium and hard, as it's being done currently in the platform (Regardless of whether the "behind the scenes" skill is "trivial, simple or regular", the subcategory of the skill is not taken into account here)
 - **Easy questions** are simpler than the skill and include outside help (e.g. multiple choice options might artificially constrain the answers).
 - **Medium questions** are the "standard" case, and test exactly what the skill asks for.

- **Hard questions** generally require the learner to combine a couple of skills together.

The logic is as follows:

- For each correct answer:
 - Easy: +8 points
 - Medium: +10 points
 - Hard: +12 points
- After seeing solution: doesn't earn any score for that question
- After skipping question: doesn't earn any score for that question
- For a correct answer on their first try without seeing any hints: earn a star

10. **Are there other ways for the student to increase their score?**

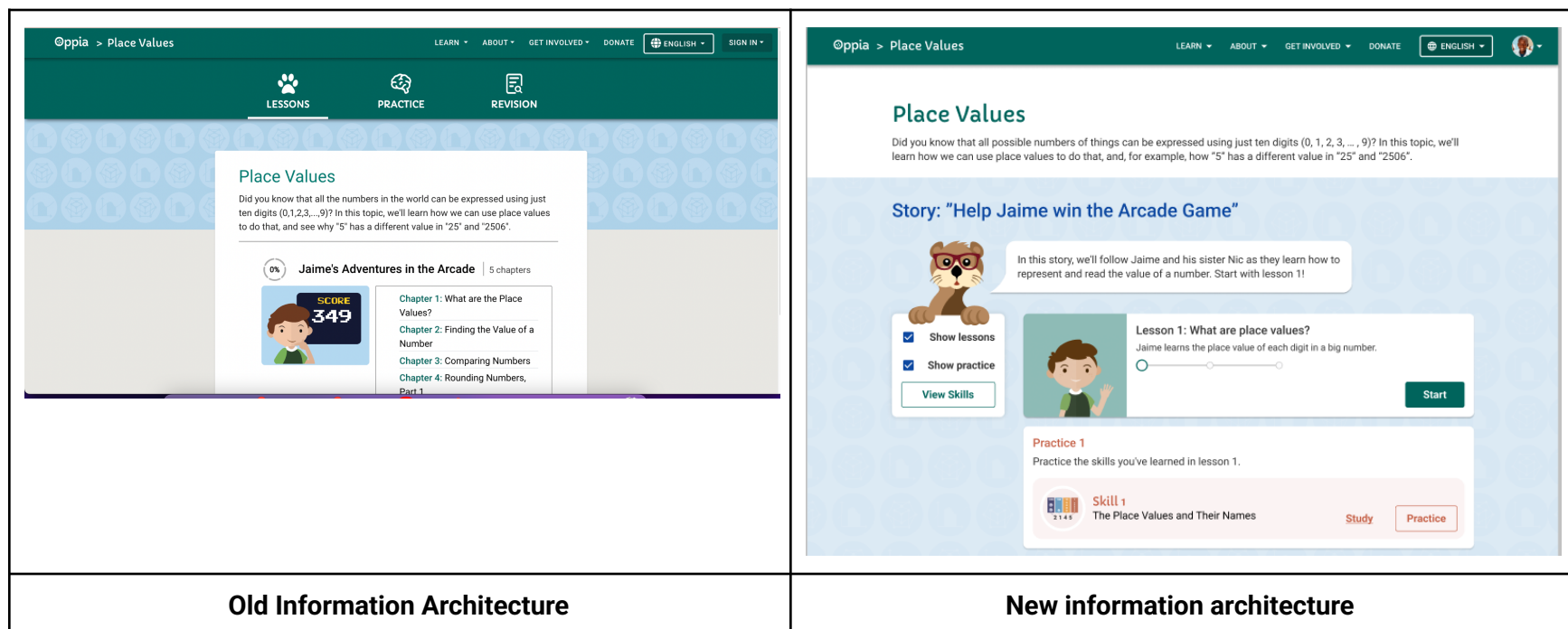
We won't cover this in this solution, but here are some ideas that can be developed in the future:

- By completing a lesson or set of lessons that fully introduced a skill, the student earns +10 XP
- By achieving 100% mastery in a skill +30XP
- By achieving 100% mastery in a topic +50XP
- By inviting other students to play +10XP
- By doing challenges
- By getting more than 15 questions correct for a skill (of the last 20) – this may be done based on a “streak” of correct answers.

11. **New architecture information of the Topic Page**

For this project, we are eliminating the top tab that separates content into lessons, reviews, and practice, as these were underutilized or entirely overlooked by users. Additionally, these tabs did not allow students to correlate practices and skills with available lessons, making it unclear when they should review or practice these skills.

For the new page information architecture, it was proposed that each skill be presented after completing the necessary "N" lessons to fully introduce that skill. This way, in one place, students could study and practice the newly learned skill from the lesson.



This new information architecture allowed students to understand which skills were related to which lessons, and when would be the appropriate way to study that skill or practice it, which would be after doing the lesson(s) that fully introduce that specific skill. This was validated by UX Research, and the results of the test can be viewed [here](#), under tab "Results Tests 3".

However, towards the end of the design project, some stakeholders raised concerns about the need for an intuitive way to study the entire topic material. This would involve adding a user story such as "As a learner, I need an easy link to the whole study material so that I can easily study this entire subject." Since this story was not initially covered in the PRD, it was decided to address it in a separate project. This allows for validation of whether this story is indeed a requirement for students and the design of a solution that can be properly validated by users.

Overview of the proposed solution: High-level user flows
1- Discovery of Oppia to end-of-first session user flow.
2- User flow for repeat usage
3 - Practice Session experience user flow (logged-in learners)
3 - Practice Session experience user flow (logged-out learners)

Pros/Cons of the solution

Pros:

- Increased Motivation: Game principles boost user motivation and engagement, making learning enjoyable and encouraging repeated practice for skill mastery.
- Personalization: Personalized recommendations and skill visualization cater to individual learners, leading to more effective and engaging learning experiences.
- Improved User Experience: Redesigned interface and easy lesson initiation enhance user satisfaction and retention.

Cons

- Content Quality: Success also depends on high-quality content, that is, well-designed and accurate practice questions, that effectively assess previously-introduced concepts in the lessons, so that they can have a meaningful practice that actually enhances their proficiency.
- This solution doesn't cover what learners will do with the experience points they have earned.

[Web projects only] Impact on the Android app

Summary	• This can be implemented later in the Android app if desired.
Details	• The Android app can update the practice experience, incorporating gamification elements and new entry points to view reviews and initiate practice sessions. Additionally, it may also incorporate the new design of the topic page, linking reviews and skills to the available lessons.

Assumptions made

- All learners have Internet connectivity.
- Learners will have some familiarity with technology (i.e. using a mouse, keyboard)

Non-Goals

- Change the content of the practice questions, or the name of skills, chapters or topics - we just should focus on the User Experience, and not educational content.

Remaining Open Questions

1. From the [Foundational Research](#), we know that Gamification motivates learners, while text interpretation, boring teaching methods and not understanding a topic hurts them from the educational perspective. The remaining question now is: **how can gamification be incorporated into the Practice Experience? Which features really motivate the learners?** Here are some options:
 - Mastery Levels and Badges: Create mastery levels from Novice to Master, with badges as virtual rewards for learners' achievements.
 - Experience Points (XP) and Leveling Up: Award XP for correct answers, allowing learners to level up and unlock new challenges.
 - Streaks and Daily Rewards: Encourage daily practice with streaks and offer small rewards for consecutive sessions.
 - Leaderboards and Social Competition: Implement leaderboards to foster healthy competition among learners.
 - Mini-Games and Power-Ups: Introduce occasional mini-games that grant power-ups like hints and boosts.
 - Visual Progress Indicators: Use skill trees or progress bars to help learners visualize their journey to mastery.
 - Feedback and Coaching: Provide virtual coaches or mascots to offer positive feedback and constructive guidance.
 - Daily Random Rewards: Surprise learners with random rewards to add excitement and motivation.

In progress: This is being tackled in the [game preferences study](#) conducted by the Learner Feedback Team.

Updated 23, August : The [Consolidated Reports: Game Preferences Research](#) show that leveling up and points/coins/ badges are the most common features of the learners' preferred games.

2. Is “practice questions” the correct term?

Note that there are two use cases:

- 2.1. Students use these to learn on their own
- 2.2. Teachers assign them to students to do (e.g. as part of the “learner groups” functionality) – maybe in that context they are considered to be “tests” or “quizzes”?

This will be covered in the next Research Plan.

Update 2: Yes, we can continue using it as practice questions, since the students can understand this concept.

3. What's the correct term: subtopic or skills?

Subtopics are confused as skills - (this is not necessarily an issue for learners. Learners won't know what "subtopics" are but will know what "skills" are. That's why we originally chose to call these "skills" in the UI. The main issue here is for lesson creators, developers and members of the Oppia team (since, when they say "skills", it's unclear what is being referred to). This might be something we can live with for a while, since the main thing is for learners to have a good experience. But if we decide to continue using the word "skills" for the learner-facing UI, then maybe renaming subtopics to skills and skills to something else in the future makes sense.

Maybe subtopics->skills and skills-> concepts?

This will be covered in the next Research Plan.

Update 1: As discussed with the UXW team, we are replacing the terms "subtopic" with "skill" and "skill" with "concept." This change is being made to ensure consistency in the terminology used by lesson creators and learners, while also ensuring that the terminology is easily understandable for the learners. As follows:

Section 2: WHAT

Note: Once a developer is assigned to your project, please include their name and the corresponding TDD link at the [top of the document](#). Please also support them by promptly helping to unblock any issues that arise during the TDD-writing and implementation process.

Key User Stories, Goals, and Tasks

#	Title	User Story Description (role, goal, benefit-to-user)	Story Success	Priorit y ²	List of tasks needed to achieve the goal (this is the "User Flow")	Links to mocks / prototypes, and/or sections	Task success criterion	Tested
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² Use the **MoSCow** system ("Must have", "Should have", "Could have"). You can read more [here](#).

		<i>"As a ..., I need ..., so that"</i>				spec'ing ³ out the task's user flows and product requirements. ⁴		
1.	Understanding Topic Page	As a learner who has accessed a page of a Topic for the first time, I need to understand what that topic is about, so that I can decide if that topic is right for me.	Learner reads relevant information on Topic Page	Must have	Access Topic Page Read introduction about the topic Decide if the topic is right for them	High-Fi	Read relevant information about topic	Yes, validated
2.	Starting first lesson	As a learner who has already decided which Math topic I want to study, I need to check the lessons that Oppia offers for that topic, so that I can choose a lesson and start learning/improving my skills in Math.	Learner starts a lesson from the Topic Page	Must have	Access Topic Page See list of available chapters/lessons Choose a chapter See a clear CTA to start the lesson Start a lesson	High-Fi	Click on "start" to start lesson	Yes, validated
3.	Lesson unavailability in the website language	As a learner who has chosen a language other than English for the website, I want to know if the lesson's not available in my language so that I don't waste time doing it.	Learner is aware that the lesson is not available in the preferred language in advance	Must have	Access oppia.org Select preferred language (e.g. Brazilian Portuguese or PT-BR) Access Topic Page See the list of	Requirements High-Fi	View unavailability of the lesson in the preferred language (voice over)	Yes, updated

³ Specs are important if the user journey has multiple cases (e.g. error types for wrong answers; different choices a user can make; etc.) and these need detailed enumeration.

⁴ If mocks/prototypes have been validated by e.g. user studies, please provide details. This can help increase confidence in the solution, though it's typically only needed in cases when we're unsure about key assumptions, or there are risks that the solution won't resonate well with users.

					chapters/lessons		and text)	
					See that the lesson is not available in the preferred language (e.g. PT-BR)			
4.	Secondary language selection	As a learner who has identified that a lesson is not available in my preferred language and is familiar with another language, I need to be able to choose another language for that lesson, so that I can start learning in a language that I understand.	Learner selects a secondary language for the lesson	Must have	- Access Topic Page - See the list of chapters/lessons - See that the lesson is not available in the preferred language (e.g. PT-BR) - Select a secondary language (e.g. Spanish) - Start the lesson in the secondary language	Requirements High-Fi	Select secondary language	Yes, updated
5.	See status of previously started lessons	As a logged-in learner who has previously started a lesson, but hasn't finished it, and now is returning to the topic page, I want to see the status of progress, so that I can identify which lesson is in-progress and resume it.	The learner views the progress and clicks on "Resume"	Must have	- Access Topic Page - See the list of chapters/lessons - Click to start lesson - View dialog box - Select a secondary language (e.g. Spanish) - Start the lesson in the secondary language	High-Fi	View progress bar	Yes, validated
6.	Resuming	As a logged-in learner	Learner views	Must	See uncompleted progress bar	High-Fi	Click on	Yes,

	a lesson	who has identified an uncompleted lesson in the topic page, I want to resume that lesson, so that I can complete it.	the previously started lesson and resumes it.	have	Click on "Resume"		"Resume" to resume the previously started lesson	validated through Ning's Research
7.	Viewing and reviewing completed lesson	As a logged-in learner who has identified a completed lesson in the topic page, I want to review the story together with the correct answers, so that I can remember what I've learned in the lesson.	The learner sees the story and the correct submitted answers.	Could Have	See completed progress bar Click on CTA to view the lesson See dialog asking to confirm if they would like to start over the lesson or review Confirm that want to review the lesson Review the lesson/story with correct answers	High-Fi	Click to review the lesson	Yes, validated
8.	Starting over a previously completed lesson	As a logged-in learner who has completed a lesson a long time ago and forgot everything about it, I want to retake the lesson from the beginning, so that I can be reintroduced to the Math concepts.	Learner retakes a previously done lesson	Could have	Access Topic Page See the list of chapters/lessons See completed progress bar Click on CTA to view the lesson See dialog asking to confirm if they would like to start over the lesson or review Confirm that want to start over the lesson Start over the lesson	Github issue High-Fi	Click to start over the lesson	Yes, validated
9.	Representa	As a learner, I want to	Learner	Could	- View list of 'coming soon'	Requirements	Completes	No

	tion of Chapter Availability	identify available chapters, so that I'm aware how far I can progress in learning this topic currently and how much more content can I anticipate in the future	completes all available chapters, does not waste time attempting to open/click on unavailable chapters and anticipates further chapter launches in the future	have	chapters in Story Card - Attempt all available chapters - Optionally, subscribes to email notifications for future chapter launches	High-Fi	all available chapters and does not waste time attempting to open/click on unavailable chapters	
10.	Reviewing skill at the end of a set of lessons	As a learner who has just completed a set of lessons, I need to review the skills I've just learned, so that I can solidify this knowledge before practicing.	Learner checks review card of the skills introduced in the previous "N" lessons	Should have	Start lessons Complete a set of "N" lessons that fully introduce new skills At the end of the practice session, see a screen with the information that they have finished learning a new skill Check review card of the introduced skills	High-Fi Note: It might need more than 1 lesson to introduce a group of skills within a skill, that's why the suggestion to check the review card will be after a set of "N" lessons, and not after the end of every lesson.	Click on CTA to check review card of introduced skills	Yes, validated
11.	Practice a skill at the end of a set of lessons	As a learner who has just completed a set of lessons, I need to practice the skills I've just learned, so that I can solidify this knowledge.	Learner starts a practice session of the skills introduced in the previous "N" lessons	Should have	Start lessons Complete a set of "N" lessons that fully introduce new skills At the end of the practice session, see a screen with the	Mock Note: It might need more than 1 lesson to introduce a group of skills	Click on CTA to practice introduced skills	Yes, validated

					information that they have finished learning a new skill	within a skill, that's why the suggestion to practice will be after a set of "N"lessons, and not after the end of every lesson.		
					View skill introduced in the "N" previous lessons			
					Start a practice session of the skill			
12.	Review in another study session	As a learner who has completed one or more lessons previously, and now is returning to the platform for another study session, I want to review the previously learned skill, so that I remember what I've learned previously.	Learner checks the review card of a previously learned skill	Must have	Access Topic Page	High-Fi	Check study card/review card	Yes, validated
					See the list of chapters/lessons			
					See skills related to the lessons			
					Click on CTA study the skill			
13.	Practice in another study session	As a learner who has completed one or more lessons previously, and now is returning to the platform for another study session, I want to practice the previously learned skill, so that I can solidify this knowledge.	Learner starts a practice session of the skill introduced in the previously done lessons	Must have	Access Topic Page	High-Fi Skills names are at most 64 characters.	Click on review card	Yes, validated
					See the list of chapters/lessons			
					See skills related to the lessons			
					See option to practice			
					Click on CTA to practice the skill			
14.	Seeing concepts within a	As a learner who wants to start a practice session, I need to know	Learner checks details of the skill	Could have	Access Topic Page	High-Fi Concept names	Click on CTA to view skills	Yes, validated
					See list of skills			

	skill	more details of the skill, so that I am aware of what I'm learning.			See CTA to know more	are at most 100 characters.	within the skill.	
					See list of concepts within a skill			
15.	Starting practice session for the first time	As a learner who is starting their first practice session for the first time, I need to understand how it works, so that I can make the most out of my practice.	Learner see an onboarding dialog box introducing the practice session	Should have	Access the practice session player	Mock	Clicks on "start" after reading the onboarding	Yes, updated
					See a dialog box welcoming to the first practice session	Easy questions: 8 points Medium questions: 10 points Hard questions: 12 points		
					See explanation that a practice session will always be a quiz with 10 questions of a skill			
					See an explanation that the questions have different points			
					Click to start			
16.	Understanding how performance affects points	As a learner who is doing a practice session, I need to understand how performance affects my points.	Learner see a dialog showing that viewing the solution not give points	Should have	- See solution offering - Click on view solution - See dialog explaining that viewing solution will make them not get any points out of that question		See dialog with information	Yes, but it was updated
			Learner see a dialog showing that skipping the lesson will not give points	Should have	- See skip button - Click on hint button - See dialog explaining that viewing hint will make them not get any points out of that question	Offer the option to "don't show this again"		
			Learner see the earned point for each correct	Should have	- Submit a correct answer - See the earned points e.g "+12 points!"			

			submitted question					
17.	Viewing wrong answers at the end of a practice session	As a learner who has completed a practice session, I want to review my incorrectly submitted answers, so that I can see which questions I got wrong.	Learner views their incorrectly submitted answers	Could have	Start a practice session	Hi-Fi	Click on CTA to view answers	Yes, but it was updated
					Complete the practice session	N/A		
					See results of the practice session			
					Click to view answers			
					See incorrectly submitted answers			
18.	Understanding score results	As a learner who has finished a session, I need to see the logic behind my score, so that I can understand my results.	Learner views rules for scores	Could have	Start practice	Hi-Fi	View dialog box with rules for the scores	No
					See score	N/A		
					Click on "view answers"			
					View the earned points and stars for each question according to the level of difficulty			
19.	Viewing practice session results	As a learner who has just completed a practice session, I need to see my results, so that I can practice more and improve on my weakest areas.	Learner views weakest areas at the end of a practice session	Should have	Start a practice session	Hi-Fi	View practice results	Yes, validated
					Complete the practice session	Requirements		
					See results of the practice session			
20.	Reviewing weakest areas	As a learner who has just completed a practice session, I need	Learner view review card for skill	Should have	See results of the practice session	Hi-Fi N/A	Click to see review concept	Yes, validated

		to review the concept of my wrong answers, so that I can understand it better and eliminate possible doubts.			See option to check answers		card of weakest skills	
					See option to check concept card of wrong answers			
					Check concept card			
21.	Retaking a lesson for very weak areas	As a learner who has just completed a practice session and earned 3 or less stars, I need to be reintroduced to the content of that skill, so that I can revisit the concepts that are still not clear for me.	Learner view weakest areas at the end of a practice and retake the relevant lesson for those skills	Should have	See results of the practice session, earning 3 or less stars	Hi-Fi Less than 40 points + Less than 3 stars	Click to see the relevant lesson for that skill	No
					Learner is invited to retake lessons that covers those skills			
					Learner retakes the relevant lessons			
22.	Checking study card	As a learner who has just completed a practice session and earned 6, 5 or 4 stars, I need to review the content of that skill, so that I can revisit the concepts that are still not clear for me.	Learner review the review card for that skill	Should have	See results of the practice session, earning 6,5 or 4 stars	Mock	Click to see the study card	No
					Learner is invited to review the study card			
					Learner checks the study card			
23.	Start over uncompleted lesson	As a learner who started a lesson some time ago and doesn't remember the lesson story, I need to be able to start over the lesson, so that I see the story from the beginning.	Learner starts over previously completed lesson	Should have	Access Topic Page	High-Fi	Click to start over previously completed lesson	No
					View previously completed lesson			
					Click on resume			
					View dialog box			
					Click on "start over"			

					Star over lesson			
24.	Review weakest skills	As a logged-in learner who has viewed my skill mastery, I need to review the content of that skill, so that I can understand it better and eliminate possible doubts.	Learner views review card for skill with low mastery	Should have	See skills mastery on the LD Click to study the desired skill	High-Fi	See review card for weakest skill	Yes, validated
25.	Practice weakest skills	As a logged-in learner who has viewed my skill mastery, I need to start a new practice session on my lowest areas, so that I can improve my skill mastery.	Learner starts practice for skill with low mastery	Should have	See skills mastery on the LD Click to practice the desired skill	High-Fi	Start a practice session on weakest skill	Yes, validated
26.	View skill progress	As a logged-in learner who is doing practice sessions, I need to view my progress in the skill, so that I'm aware if I'm learning that content or not.	View skill mastery	Should have	Access Learner Dashboard See skill mastery Or Access Topic Page View skill View skill mastery	High-Fi	View skill mastery	Yes, validated
27.	Showing hint after a period of time	As a learner who doesn't know how to answer a question, I need to be offered a hint, so that I can get help to answer the question correctly.	Learner can view hint after x seconds of not submitting an answer	Must have	Start practice session Don't submit an answer for a question See that hint is being offered after x seconds	High-Fi Use the same logic from the lesson player	Click to view the hint	Yes, validated

					View that viewing the hint will remove 2XP from their question score			
					Choose to view the hint			
28.	Showing hint after a wrong answer	As a learner who is submitting a wrong answer to the question, I want to be offered a hint, so that I can get help to answer the question correctly.	Learner views hint to help them answer the question	Must have	Start practice session	High-Fi Use the same logic from the lesson player	Click to view the hint	Yes, validated
					Submit x incorrect answers			
					See that hint is being offered			
					Choose to view the hint			
29.	Showing solution	As a learner who doesn't know the answer to a question and has seen all available hints, I want to be offered to see the solution, so that I can answer the question and move forward.	Learner view solution after viewing all hints	Must have	Start lesson	High-Fi Use the same logic from the lesson player	Click to view the solution	Yes, validated
					Don't know how to answer			
					See that hints are being offered			
					Choose to see all hints			
					See that solution is being offered			
					See dialog asking to confirm (wil lose all score for that question)			
					Choose to see solution			
30.	Showing skip	As a learner who doesn't know how to answer a question, I want to be able to skip the question, so that I don't get stuck.	Learner skip to the next question	Should have	Start lesson	High-Fi Skip a question will not give them a score for that question	Click to skip	No
					Don't know how to answer			
					Decide to skip the lesson			
					See dialog asking to confirm			
					Confirm that wants to skip			

31.	Exiting a lesson	As a learner who is mid-way through a practice season, I need to have a canonical way to end the session if I want, so that I don't get frustrated.	Learner exit the lesson	Must have	Start lesson	High-Fi	Click to exit	No
					Want to leave the session	Github Issue		
					Click on X	Check with UXW the copies for this feedback		
					See dialog			
					Confirm that wants to leave			
					See results of the session			
32.	Feedback for good performance during the lesson	As a learner who is practicing skills, I want to get friendly feedback about my good performance during a lesson, so that I get motivated to continue.	Learner gets friendly feedback to motivate them during the lesson	Could have	Start practice session	Requirements Check with UXW the copies for this feedback	View friendly feedback after getting 5 answers correct first time in a row	Yes, it was updated
					Get 5 answers correct first-time in a row			
					See feedback (e.g."Great Job! 5 correct answers in a row. Excellent work!")			
					Continue practice			
33.	Feedback for good results at the end of a practice	As a learner who has just finished practicing skills and had a good score, I want to get friendly feedback about my performance at the end of a lesson, so that I get motivated to continue practicing.	Learner gets friendly feedback about their good performance at the end of a practice session	Could have	Start practice session	High-Fi	View friendly feedback at the end of a practice session with good scores	Yes, validated
					Complete session	Requirements		
					View lesson results	Check with UXW the copies for this feedback		
					See feedback (e.g. "Good job! Continue practicing")	>70points or >7stars		
34.	Feedback for bad results at the end of a practice	As a learner who has just finished practicing skills and had a bad score, I want to get friendly feedback about my good performance,	Learner gets friendly feedback about their bad performance	Could have	Start practice session	High-Fi	View friendly feedback at the end of a practice	No
					Complete session	Requirements		
					View lesson results	Check with UXW the copies for this feedback		

		so that I get motivated to continue practicing.	at the end of a practice session		See feedback		session with bad scores	
35.	Unlocking levels of mastery	As a learner who is improving my mastery in a skill, I need to be able to unlock levels of mastery, so that I get motivated to continuously enhance my learning.	Learner view their progress in the levels of mastery after completing a lesson	Could have	Finish a practice session	High-Fi Mastery Levels: Level 1: < 50% Level 2: 51% - 99% Level 3: 100%	View their progress leveling up	No
					See session results			
					Improve mastery			
					See that have progressed their level mastery			
36.	Acknowledge of existing levels	As a logged-in learner who is unlocking levels of mastery, I need to know the existing levels in the platform, so that I can know how far I can get.	Learner view progress bar showing levels of mastery	Could have	Access Learner Dashboard Access Skills Tab See a progress bar of the topic levels	High-Fi N/A	View progress bar of levels	Yes, validated
					Finish a practice session View practice results View progress bar of the topic levels			
37.	Viewing mastery progress after a session	As a logged-in learner who has completed a practice session, I need to know how much my results have improved my mastery in the skills, so that I'm aware if I'm mastering it or not.	Learner views level progress bar increasing	Should have	Finish a practice session	High-Fi	View their progress bar increasing	Yes, validated
					See session results			
					See earned stars increasing the progress towards the next level			
38.	Viewing total of points and stars	As a logged-in learner who has earned points and stars after multiple practice sessions, I need to see the total of earned points and stars, so that I know how many points and	Learner views total points and stars in the learner dashboard	Should have	Access Learner Dashboard	High-Fi	View total of points	Yes, validated
					Access Skills tab			
					View total of earned points and stars			

		stars I have earned in total.						
39.	Earn a star	As a learner who has submitted a correct answer without viewing any hints, I need to earn a star for it, so that I get compensated for my exceptional performance.	Learner earns a star after submitting a correct answer on their first try	Must have	Start a practice session Submit a correct question in their first try View earned star	High-Fi	View earned star	Yes, validated
40.	View session progress	As a learner who is doing a practice session, I need to view the progress of the session, so that I'm aware of how many questions are left.	Learner view the progress bar showing how many questions are left	Must have	Star a practice session View the progress bar	High-Fi	View progress bar	Yes, validated
41.	View only lessons	As a learner who doesn't want to practice skills, I need to view the list of lessons separated from the skills, so that I can find the lessons more easily.	Learner view the list of lesson cards	Could have	Access Topic Page Uncheck the checkbox for practice cards View the list of lesson cards	High-Fi	View list of lesson cards	Yes, validated

User stories that are out of scope

#	User Story Description (role, goal, motivation)	Why aren't we addressing it?	Slated for future PRD? (Yes/No)
1	As a learner, I want to see the skills my	We don't want to expand the scope too much	Yes

	teachers assigned me to practice in my Learner Group, so I can achieve mastery on it		
2	User sees skill mastery within the goal feature of the learner dashboard	The core user flows work without this, and we don't want to expand the scope too much	Yes
3	As a learner who has completed lessons but hasn't accessed the platform for a long period of time and now it's returning to it, I want to review the previously learned content, so that I can remember what I've learned.	This might need additional UXR to determine what should be the appropriate time to invite the learner to a revision, and also to guide them to different options of revisions (seeing a review card, concept card or even retaking the lesson)	Yes
4	As a learner who has earned points in a practice session, I need to be able to unlock rewards based on my achievements, so that I stay motivated to earn more points. Ideas of rewards: - Unlocking bonus lessons teaching more advanced material - Unlocking additional short stories about the characters in the lesson - Turning on profile/avatar/lesson-player customization options (e.g. background) - Badges on user's profile page	Need to develop additional features that are not a priority right now	Yes
5	As a learner, I need to set a challenge for a practice frequency, so that I commit to practicing regularly.	According to the survey conducted by the Learner Feedback Team, setting challenges of practice is not a priority for the students, although it can be added in the future.	No
6	As a learner who needs to set a practice frequency challenge, I need to be able to choose the frequency that works for me, so that I can commit to something that aligns with my reality.	According to the survey conducted by the Learner Feedback Team, setting challenges of practice is not a priority for the students, although it can be added in the future.	No

7	As a learner who has established a practice frequency challenge, I need to receive notifications for my challenges, so that I don't forget to complete them.	According to the survey conducted by the Learner Feedback Team, setting challenges of practice is not a priority for the students, although it can be added in the future.	No
8	As a learner who has completed a challenge, I want to be recognized for my accomplishment, so that I feel a sense of pride and motivation to tackle more challenges in the future. Ideas of challenges: - Do "X" practice sessions in a period of time - Earn "X" points in practice session	According to the survey conducted by the Learner Feedback Team, setting challenges is not a priority for the students, although it can be added in the future.	No
9	As a learner who has participated in practice sessions and achieved mastery scores, I want to view a ranking of both other learners and myself, so that I can assess my progress and compare my performance with theirs.	According to the survey conducted by the Learner Feedback Team, having a ranking is not a priority for students, although it can be added in the future.	No
10	As a learner, I want to invite my friends to practice with me, so that I can engage in a social competition with people I know.	According to the survey conducted by the Learner Feedback Team, having a ranking is not a priority for students, although it can be added in the future.	No
11	Check with UXW and educators the relevant information that we should include in the description of the topic within the Topic Page.	This would require reviewing all the descriptions for all topics, which should be an effort made by an interdisciplinary team of educators, curriculum admin and UX writers.	No
12	Allow users to reset their lesson and practice session progress	This should be tackled in a different PRD, since it should evaluate under which circumstances the user would want to reset their progress and why, while designing a proper user flow for it.	No
13	Allow users to select more than one skill to start a practice session	As we are reviewing the entire experience of the practice session, and creating levels of mastery, we	No

		are removing the possibility of allowing users to do practice sessions in more than one skill at the same time. However, additional research can be conducted to identify if selecting more than one skill is something really valuable to the users, and if necessary, should be tackled in a different PRD.	
14	As a learner who has just finished a practice session and achieved 100% mastery in a skill, I want to share my accomplishment with my friends, so that I can motivate them to learn as well		No
15	As a learner who has just finished a practice session and achieved 100% mastery in a skill, I want to share my accomplishment with my family, so that they can be proud of me.		No
16	As a logged-in learner who has completed one or more lessons previously, and now is returning to the platform for another study session, I want to review the previously learned skill, so that I remember what I've learned previously.		
17	As a logged-in learner who has completed one or more lessons previously, and now is returning to the platform for another study session, I want to practice the previously learned skill, so that I can solidify this knowledge.		
18	"As a learner, I need an easy link to the whole study material so that I can easily study this entire subject."		

Product Flows and Requirements for Specific User Journeys

3. Lesson unavailability in the website language

"As a learner who has chosen a language other than English for the website, I want to know if the lesson's not available in my language so that I don't waste time doing it."

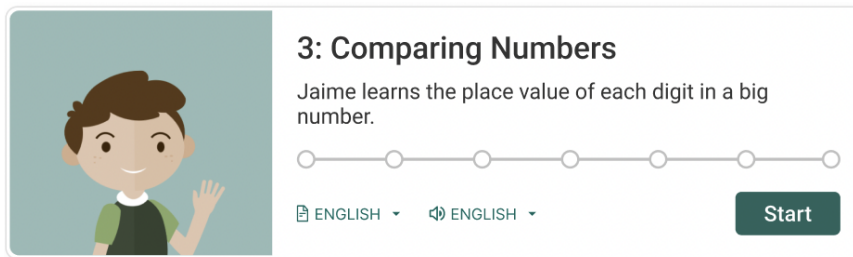
This was addressed as part of the [PRD Localization for Oppia](#). In this scenario, the learner, a non-native English speaker, had selected a different language website upon their initial visit to Oppia. When they enter the Topic page, the lesson card should show language availability for the lesson for text and voiceover.

4. Secondary language selection

"As a learner who has identified that a lesson is not available in my preferred language and is familiar with another language, I need to be able to choose another language for that lesson, so that I can start learning in a language that I understand"

This was addressed as part of the [PRD Localization for Oppia](#). In this scenario, the learner, a non-native English speaker, had selected a different language website upon their initial visit to Oppia and has identified that their preferred language is not available in the lesson in question, we should provide an alternative to choose a secondary language.

This can be done through specific dropdowns for text and voiceover. An alternative for this solution has been developed recently (check [Figma File](#) by Ning Zhang) and can be used as a reference:



9. Representation of Chapter Availability - Story Tab in Topic Page

Source: [\[PRD\] Serial Chapter Launch](#)

- **Available vs Coming Soon chapters** (Mock 7): When there are Ready-to-Publish chapters added to a Story, the Chapter list should be split into two sections 'Available' and 'Coming Soon'. Ready-to-Publish chapters names should be shown in the 'Coming Soon' section. These chapters should be grayed-out, unclickable and have a wrench icon next to them to indicate they are currently being developed.
- **Chapter Count field** (Mock 7): In addition to the total chapter count, the count of available and count of coming soon chapters should be displayed. The count of available and coming-soon chapters should be displayed next to their respective section headers.
- **Progress Score:** The progress score (for signed-in learners only) should be calculated based on chapters available at the time. As per Mock 7, this would mean 67% progress since the Learner has 2 completed chapters out of the 3 that are available. Once new chapters are launched, the progress should be adjusted/regressed accordingly. So for example as per Mock 7 if all 'coming soon' chapters are made available but the Learner does not progress further, the progression score should be adjusted to 33% (i.e. 2 complete out of 6 available)
 - Potential Research Topic: A research study may be conducted to understand more about how Learners would perceive such changes to their progress scores. If we find that our initial solution has unfavorable results in the experiment, we could rectify this in the next version
- **Email notifications:** For partially published topics, Learners should be provided with the option to enroll for email notifications of new chapter launches (Mock 7, 7.1a, 7.1b). The experience will be based on the sign-in status of the Learner
 - **Signed-in:** A signed-in learner should be shown a prompt with the message *"You will be notified by email when new chapters are available on the following email address"* along with the email address that they are signed-in with. They

should confirm the subscription by clicking on the “Ok” button. A “No, thanks” button should also be provided in case they pressed on the button by mistake.

- **Not signed-in:** For not signed-in Learners, the message “*Create an account to be notified by email when new chapters are launched*”. The users should be provided two buttons on this prompt as options “Create Account” and “No thanks”
- **Unsubscribe:** Once the Learner has subscribed to email notifications for new chapter launches, the “Subscribe” button on the Topic page should be changed to “Unsubscribe” and allow the Learner to unsubscribe from receiving further notifications.
- Further details on how the email notifications work and their content is provided in [Section 4.4](#)
- **Unpublished Chapters:** When chapters are unpublished Learners should be informed of this via a message. [Section 1.1.6](#) provides details on the specific cases when unpublishing should be allowed and the corresponding actions for the Learner experience - informing Learners via an informational message and adjustment of their progression score. [Mock 7.2](#) depicts one such scenarios

20. Viewing Practice Session Results

The results of the practice session should be:

- The total of earned stars
- Their total of points
- Their overall mastery of the skills (show visibly that session has improved their mastery)
- CTA to view their answers

22. See skill mastery

"As a logged-in learner who has completed one or more practice sessions and now is returning to the platform for another study session, I need to know how much is my skill mastery so that I'm aware of which skill I need to improve."

In the Learner Dashboard, the learner should able to:

- View all topics and skill they've started mastering and the level of mastery

- View CTA to start practice session with that skill
- View CTA to access relevant review card for that skill

35, 36 and 37 Get feedback

The feedback should be surfaced with the UXW team. Here are some examples of possible feedback:

- Good results: Great Job! Excellent work! Keep up with the fantastic effort and
- Not so good results: Don't give up, keep practicing, keep going, etc)
- If the learner seems to be struggling/stagnant, consider suggesting taking a break, e.g.:
 - "Hey, do you want to keep practicing? It looks like your strength meter is kinda low. Do you want to maybe take a break and review the lesson? [Review & Exit] Keep Practicing – OR:
 - "Hey, do you want to keep practicing? It looks like you have been doing this for a while. You can keep practicing, but you may want to take a break and try another lesson. [Review & Exit] Keep Practicing"

Risks/concerns and mitigations

Risk/Concern	Mitigation
We are still not sure which game principles are more important to learners	• Conduct user research to get feedback from learners about their game preferences - Done
The concept, and specially the math behind "achieving mastery" can be tricky for students	• Provide clear and concise explanations of mastery criteria • Develop intuitive visualizations that explain the mastery concept, like progress bars or skill trees to depict mastery levels. • Conduct user testing and gather feedback

We are still not sure if showing the skill is relevant, or if only the skill is enough, since showing all skills within a topic can be overwhelming for students. Also, showing all skills only at the end of a practice session as a "result" and not show it anywhere else can be confusing	• Implement an option for learners to access the detail of the skills, so they can visualize the skills, giving them control over the level of detail they want to explore. • Conduct user testing and gather feedback
We are still not sure of what is a satisfactory result of a practice session. For how long should the learner practice a skill and get the right answers to make sure they fully understand the concept?	• Get feedback from educators (e.g. Rita) on what they think the boundaries should be in terms of scores • Conduct user research to check if the required effort around achieving the necessary score is engaging or can become boring

Internationalization/Localization

All user-facing flows that are changed here should be translatable and look correct in R2L and L2R languages.

Success Criteria

Key Outcomes

- Students exclusively initiate lessons in languages they comprehend.
- Students grasp when to start practice sessions (post introduction to skills), resulting in increased utilization.
- Students exhibit a clear understanding of mastery and practice session scores.
- Students are driven to sustain their practice efforts, resulting in heightened user retention and consistent return to the platform.

Automatically-collected metrics

Outcome	Metric (numeric)	Event	Event parameters (what specific data is collected when the event happens)	What to report (for the metric) and how to calculate each item from the event data
Students exclusively initiate lessons in languages they comprehend.	Percentage of students who initiate a lesson in an unfamiliar language and subsequently abandon the lesson	Learner clicks to start a lesson.	(L1) Number of learners who started a lesson in a different language from their preferred language.	- L2/L1, expressed as percentage - L1 (so we know if the dataset is big enough to be statistically representative)
		Learner doesn't move to the second card and clicks on "X" to exit a lesson.	(L2) Number of learners who started a lesson in a different language from their preferred language and exit the lesson without moving forward to the second card.	
Students grasp when to start practice sessions (post introduction to skills), resulting in increased utilization.	Percentage of started practice sessions after skill exposure.	Learner finishes a lesson/set of lessons that fully introduced a skill	(L1) Number of learners who completed the lessons/set of lessons that fully introduced a skill.	- L2/L1, expressed as percentage - L1 (so we know if the dataset is big enough to be statistically representative)
		Learner begins a practice session in the introduced skill	(L2) Number of learners who started a practice session in the introduced skill.	
Students are driven to sustain their practice efforts, resulting in heightened user	Percentage of the number of returning learners engaging in practice sessions.	Learner begins a practice session in the introduced skill	(L2) Number of learners who started a practice session in the introduced skill.	- L3/L2 expressed as a percentage - L4/L2 expressed as a percentage

retention and consistent return to the platform.		Learner returns to the platform and starts the second practice session.	(L3) Number of learners who started their second practice session.	• L5/L2 expressed as a percentage • L6/L2 expressed as a percentage • L2 (so we know if the dataset is big enough to be statistically representative)
		Learner returns to the platform and starts the third practice session.	(L4) Number of learners who started their third practice session.	
		Learner returns to the platform and starts the fourth practice session.	(L5) Number of learners who started their fourth practice session.	
		Learner returns to the platform and starts the fifth or more practice session.	(L6) Number of learners who started their fifth or more practice session.	

Manually-collected metrics

Outcome	Metric	Steps for Measuring	What to report
Students exhibit a clear understanding of mastery and practice session scores.	Percentage of students who can accurately explain the concept of mastery and how practice session scores are computed.	Conduct user research.	Percentage of learners who understand what is mastery and score and how it is calculated.

Privacy Considerations

What data are we storing?

We are storing information about their:

- Effort Scores
- Lesson progress
- Mastery Progress

Who can see this data?

This is personal to the learners, and they should be the only one to view it. (Note that in the future we might want to create a ranking among learners, and then they might be able to allow other learners to see their points and mastery progress, but this is not covered in this PRD).

How long should we store the information?

We should store this information as long as they have an account in Oppia. If they decide to delete their account, this information will be deleted as well. We would not provide the option to reset their progress (if we decide to do so in the future, this should be tackled in a different PRD, which also considers the option to reset their lesson progress).

Other considerations

What are the product-level launch/marketing milestones? (In particular, can this feature be broken into multiple meaningful incremental launches?)	The Practice Session experience can be launched separately from its points of contact with the rest of the website (learner dashboard, redesign of topic page, etc).
Is there anything that depends on the existing status quo that we should be careful not to break?	All other pages outside of those noted here should remain the same.

Are there any teams which need to change how they work due to this feature's release? (Not just Web + Android, but also PM, dev workflow, language accessibility, GTM, partnerships, lesson development, etc.)	No, we will only need assistance from the teams to give feedback, and Learner Feedback Team to conduct user studies.
Are we taking up any new dependencies? (E.g., an app showing travel routes might have a dependency on Google Maps.) If so, what is our plan if this dependency fails under us?	N/A
Are there any potential security threats? How will they be mitigated?	N/A
Are there any legal considerations that aren't already covered in the privacy section above? (E.g. child transparency requirements, EU laws, etc.)	N/A