

Lab Evaluation - 2

Course Details

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GITHUB PRODUCT PAGE DETAILS

- **Product Name:** Interactive Math game, Logical reasoning with Daily schedule planner for autism kids
- **GitHub URL:** <https://github.com/Meerajvaishnav/Visual-Schedule-Trainer-for-autistic-kids>
- **Tech Stack :** React JS, MongoDB, SVG, react animations

PRODUCT DESCRIPTION PAGE

About the Project

The project added a math game and logical reasoning to add with different levels with each level allowing the kid to attain a badge in the end stars and coin along the way.

Math Garden – Interactive Educational Game

Overview:

Math Garden is an interactive, multi-level educational game designed to teach foundational math concepts through a virtual garden journey. The game features a vibrant, high-contrast, and accessibility-focused design, making it engaging for all kids, including those with autism. Players solve math problems to earn stars and coins, and grow new plants in their garden every 3 correct answers, providing a visual representation of progress and success.

1. Game Theme

Virtual Garden: Players cultivate a garden by solving math problems.

Rewards: Correct answers trigger plant growth, stars, and coins.

Visual Feedback: Green highlights for correct answers, gentle red pulses for incorrect answers.

Celebration Effects: Emoji confetti for "Master Gardener" achievements, rain-drop animation when watering plants.

2. Educational Levels

Level	Name	Concept	Interaction
1	Counting	Count objects	Tap/click
2	Visual Addition	Add two groups of items	Tap/click

3	Size Comparison	Choose "larger" or "smaller"	Tap/click
4	Number Matching	Identify a number from options	Tap/click
5	Garden Add-on	Themed addition with flowers	Tap/click
6	Birdy Subtraction	Story-based subtraction with bird	Tap/click
7	Bee Count (Mini-Game)	Count flying bees	Tap/click
8	Watering Time (Mini-Game)	Drag water bucket onto plants	Drag-and-drop

3. Key Interactive Features

Drag-and-Drop Mechanics: Level 8 uses physics-based watering for plants.

Text-to-Speech (Voice On/Off): Questions are read aloud to aid reading and comprehension.

Dynamic Visual Feedback: Correct answers grow plants and highlight in green; wrong answers show a soft red pulse.

Confetti & Rain Effects: Celebrations and plant watering animations enhance engagement.

4. Rewards & Progression

Coins & Stars: Earned for successful level completion.

Level Sidebar: Persistent sidebar displays progress and allows jumping between unlocked levels.

Master Gardener Badge: Large animated trophy with a celebratory summary of stars and coins upon completing all levels.

Level Modal: Completion screen options – "Continue to Next Level," "Redo Level," or return to "Dashboard."

5. Technical Design Details

Aesthetics: Glassmorphism style with blurred backgrounds, soft blue-to-green gradients, and rounded, friendly shapes.

Responsiveness: Layout adapts for tablets and mobile devices; the sidebar moves to the bottom for smaller screens.

REACTJS AND NODEJS

ReactJS (Frontend)

- Builds a **responsive and dynamic UI** for children.
- Uses **functional components** for modularity and maintainability.
- Implements **animations** and interactive game logic for visualization.
- Provides **instant feedback** to improve confidence and learning retention.
- Vocal reciting of the question makes it easy for the kids to comprehend the questions easily and understand it better

NodeJS (Backend)

- Handles **leveling system and user progress tracking**, storing user scores and performance in the database.
- Dynamically serves randomized problems via API endpoints for games like Addition, Subtraction, number counting and identification etc.
- Ensures **data persistence** so children can resume where they left off, reinforcing repetition and practice.
- Stores the kids information and also their scheduled tasks for easy coming back to where they left off.
- The score in the game is also stored it left off last time at an intermediate level.

The **leveling system** allows gradual increase in difficulty based on the child's performance, improving **cognitive skills and confidence over time**.

ABOUT THE USE CASE

The autism daily schedule planner is added on with math and logical reasoning game with 8 different level where children will be able to play counting, size comparison, number matching, Garden add-ons, birds subtraction game, bee counting, watering game.

1. Counting
2. Visual Additon
3. Size comparison
4. Garden addition for flowers
5. Birdy Subtraction
6. Bee counting
7. Watering time
8. Number matching

AUTISM LEARNING GAME(MATH GARDEN) AND DAILY SCEDULING

Why is this portal required for autism children?

Children with Autism Spectrum Disorder (ASD) often face challenges such as:

- Difficulty in abstract thinking
- Sensory sensitivity
- Short attention span

- Difficulty in working memory
- Need for repetitive structured learning
- Difficulty understanding symbolic representations

Traditional learning methods may not always suit their cognitive style. Math garden provides a predictable, structured and visually supportive environment.

Challenges in Autism Addressed

- 1. Abstract Number Understanding**
→ Solved using visual objects (bananas, apples, grapes, stars etc)
- 2. Short Attention Span**
→ Short interactive activities with instant feedback
- 3. Sensory Overload**
→ Calm color palette and minimal distractions
- 4. Need for Repetition**
→ Random problem generation allows unlimited practice
- 5. Working Memory Difficulty**
→ Visual cues reduce memory load

Highlights and Novelty of the Portal

- Fully built using ReactJS functional components
- SVG-based custom garden-themed animations
- Randomized but controlled problem generation. The shuffling of questions is also an option of this kid.
- Immediate visual, sound and textual feedback

- Autism-friendly UI (soft colors, structured layout)
- Modular architecture for easy scalability

Importance of Visualization

Visualization is critical for autism learners because:

- Concrete visuals improve number comprehension.

IMPROVEMENTS

1. Memory Improvement

Repeated exposure strengthens retention.

2. Contextual Learning

Concepts are taught in visual jungle context.

3. Attention Stabilization

Controlled animations hold focus without overstimulation.

4. Logical Thinking Development

Step-by-step arithmetic reasoning improves cognitive structure.

5. Confidence Building

Immediate positive reinforcement builds self-confidence.

Articles:

- <https://theautismhelper.com/teaching-counting/>
- <https://asatonline.org/research-treatment/clinical-corner/teaching-game-playing/>

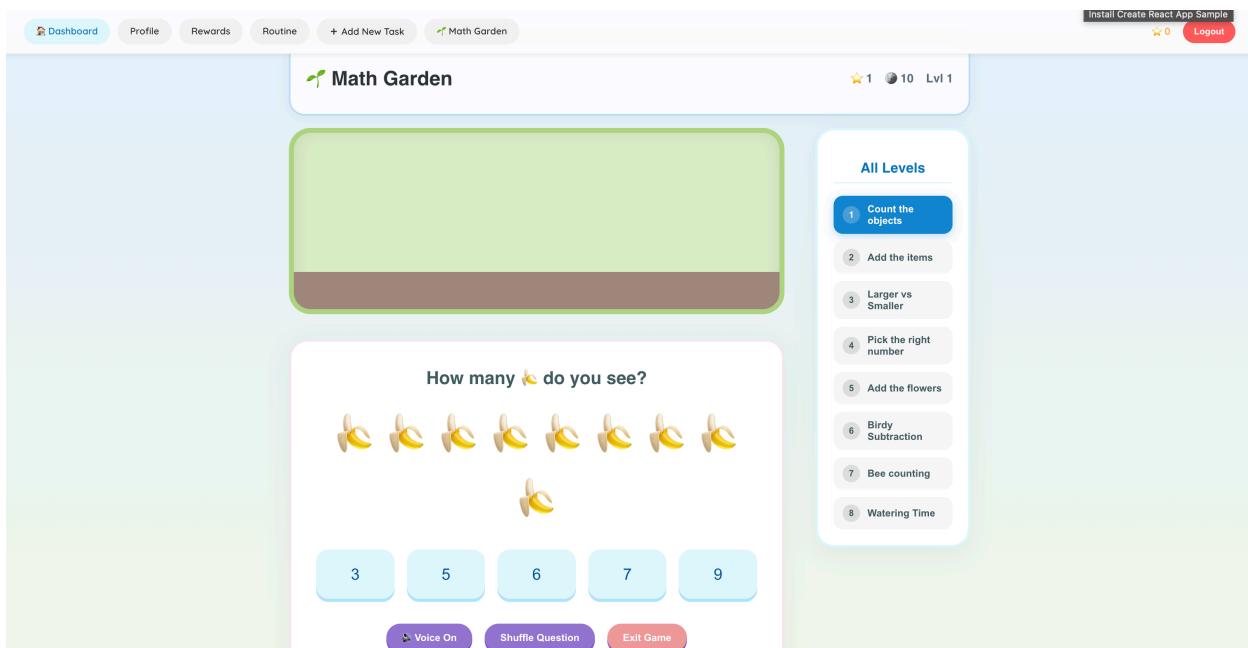
LIST OF OPERATIONS IN THE PORTAL

Mouse Events : The children can drag and drop buckets of water according to number of withered plants to save the withering plants.

Sound Events : The kids will be able to hear the question that is asked. The question will be read to the kid for his/ her better understanding.. The audio come with an option to be turned on/off.

Screen capturing:

- In the app, when kids water the withered plants water droplets come and fall on the soil.
- Each right answer as the kids go on with the game a plant will be grown in the garden
- After finishing all the levels of the math game the kid will get a Master Gardener badge with graffiti popping up.
- Kid can turn the audio on/off according to their wish. Also they can shuffle the questions in a level



The screenshot shows the 'Math Garden' game interface. At the top, there are navigation links: Dashboard, Profile, Rewards, Routine, + Add New Task, and Math Garden. On the right, there are icons for a star rating (4), a profile picture (40), and Logout.

The main area features a large green box containing a strawberry icon. Below it is a white box with the question "How many 🍉 do you see?" and two banana icons. Below the question are five blue buttons labeled 0, 1, 2, 3, and 4. At the bottom of this box are three purple buttons: 'Voice On', 'Shuffle Question', and 'Exit Game'.

To the right of the main area is a sidebar titled "All Levels" which lists eight tasks:

- 1 Count the objects
- 2 Add the items
- 3 Larger vs Smaller
- 4 Pick the right number
- 5 Add the flowers
- 6 Birdy Subtraction
- 7 Bee counting
- 8 Watering Time

A modal dialog box is centered on the screen, displaying the message "Level 1 Complete! 🌟". Below the message is a large yellow star icon with the number 5 next to it. A smaller text below says "You're doing great!". At the bottom of the dialog are three buttons: a green button for "Continue to Level 2 🚀", a yellow button for "Redo Level 1 🔄", and a grey button for "Back to Dashboard 🏠".

Dashboard Profile Rewards Routine + Add New Task Math Garden

Logout

Math Garden

9 90 Lvl 2

Add them together!

1 5 6 7 9

Voice On Shuffle Question Exit Game

All Levels

- 1 Count the objects
- 2 Add the items
- 3 Larger vs Smaller
- 4 Pick the right number
- 5 Add the flowers
- 6 Birdy Subtraction
- 7 Bee counting
- 8 Watering Time

Which 🚗 is larger?

Voice On Shuffle Question Exit Game

All Levels

- 1 Count the objects
- 2 Add the items
- 3 Larger vs Smaller
- 4 Pick the right number
- 5 Add the flowers
- 6 Birdy Subtraction
- 7 Bee counting
- 8 Watering Time

Dashboard Profile Rewards Routine + Add New Task Math Garden

15 150 Lvl 4

All Levels

- 1 Count the objects ✓
- 2 Add the items ✓
- 3 Larger vs Smaller ✓
- 4 Pick the right number
- 5 Add the flowers
- 6 Birdy Subtraction
- 7 Bee counting
- 8 Watering Time

Find the number 4

?

1 4 7 8 9

Voice On Shuffle Question Exit Game

Click to go back, hold to see history

This screenshot shows a math game titled "Math Garden". At the top, there's a navigation bar with links for Dashboard, Profile, Rewards, Routine, Add New Task, and Math Garden. The Math Garden tab is active. A progress bar indicates 15 stars, 150 rewards, and Level 4. To the right is a sidebar titled "All Levels" containing a list of tasks: Count the objects, Add the items, Larger vs Smaller, Pick the right number, Add the flowers, Birdy Subtraction, Bee counting, and Watering Time. The main area displays a question: "Find the number 4" with a large red question mark. Below it are five numbered buttons: 1, 4, 7, 8, and 9. At the bottom are three buttons: Voice On, Shuffle Question, and Exit Game. A small note at the bottom right says "Click to go back, hold to see history".

Dashboard Profile Rewards Routine + Add New Task Math Garden

20 200 Lvl 5

All Levels

- 1 Count the objects ✓
- 2 Add the items ✓
- 3 Larger vs Smaller ✓
- 4 Pick the right number ✓
- 5 Add the flowers
- 6 Birdy Subtraction
- 7 Bee counting
- 8 Watering Time

How many flowers in total?

+

3 4 7 8 9

Voice On Shuffle Question Exit Game

This screenshot shows the same math game "Math Garden" but at Level 5. The progress bar now shows 20 stars, 200 rewards, and Level 5. The sidebar "All Levels" has the "Add the flowers" task highlighted. The main area now asks "How many flowers in total?" and shows two groups of flowers (one group of 5 pink flowers and one group of 5 pink flowers with a plus sign between them). Below the groups are five numbered buttons: 3, 4, 7, 8, and 9. The bottom buttons are the same: Voice On, Shuffle Question, and Exit Game.

Dashboard Profile Rewards Routine + Add New Task Math Garden

Logout ★ 0 30 300 Lvl 7

Math Garden

How many bees are flying?

2 6 7 8 9

Voice On Shuffle Question Exit Game

All Levels

- 1 Count the objects ✓
- 2 Add the items ✓
- 3 Larger vs Smaller ✓
- 4 Pick the right number ✓
- 5 Add the flowers ✓
- 6 Birdy Subtraction ✓
- 7 Bee counting
- 8 Watering Time

Dashboard Profile Rewards Routine + Add New Task Math Garden

Logout ★ 0 30 300 Lvl 8

Math Garden

Water the plants!

Voice On Shuffle Question Exit Game

All Levels

- 1 Count the objects ✓
- 2 Add the items ✓
- 3 Larger vs Smaller ✓
- 4 Pick the right number ✓
- 5 Add the flowers ✓
- 6 Birdy Subtraction ✓
- 7 Bee counting
- 8 Watering Time

