Mediterranean Kids: A Bilingual Learn–Quiz–Game App for Teaching the Mediterranean Diet

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Abstract—

We present a kid-friendly mobile application that teaches the Mediterranean Food Pyramid to children aged 4–7 via a short Learn–Quiz–Game loop. The app is bilingual (English/Greek), offline-first for the Learn content, and emphasizes legibility and touch accuracy. A fairness-by-design quiz delays correctness cues until submission and offers a post-quiz Review screen for formative feedback. Built with Expo SDK 54 and React Native 0.81.5, the app persists progress locally (AsyncStorage) and embeds a lightweight external web game. We outline design principles, architecture, implementation, and a practical evaluation on real devices, then discuss limitations, ethics, and future work.

1. Introduction

Healthy eating habits form early, yet nutrition concepts can be abstract for young learners. Short, visual, and interactive activities—supported by local language—improve engagement and recall. Our objective is to deliver a concise, age-appropriate mobile app that communicates the Mediterranean Food Pyramid and reinforces the message with a fair quiz and a short game.

This paper contributes: (i) a bilingual Learn–Quiz–Game flow tuned for ages 4–7; (ii) an offline-first Learn section with Greek examples for familiarity; (iii) a fairness-by-design quiz that prevents pre-reveal of correctness and includes a Review screen; (iv) a privacy-preserving architecture with no backend server.

2. Background & Related Work

Educational apps for children often emphasize gamification but rely on constant connectivity or dense text. Serious games for health show promise, yet many target older children or collect analytics that complicate privacy for minors. We adopt age-appropriate design: large type, high contrast, minimal on-screen choices, and clear iconography. To support classrooms in Cyprus, the entire experience is bilingual (English/Greek) with offline Learn content to reduce failure points.

3. Requirements

Functional requirements:

• Learn: four levels mirroring the Pyramid; examples and kid-notes per level; video link.

• Quiz: 10 multiple-choice questions; neutral selection before submission; progress bar; high score; Review screen.

• Game: embedded external web game (WebView on mobile; iframe on web).

• Localization: EN⇄GR toggle; persistence across sessions.

Non-functional requirements:

• Offline-first Learn content; fast startup.

• Usability: large touch targets (≥44 px), minimal steps, and accessible color contrast.

• Privacy by design: no accounts, no analytics, no PII.

4. System Design & Architecture

Navigation uses a Bottom Tab (Learn | Quiz | Game); Learn is a Stack with Level 1–4. Local persistence (AsyncStorage) stores unlocked levels, language, and high score. A LocaleProvider exposes translated UI strings and example lists in both English and Greek. The game is integrated via WebView (iOS/Android) and an iframe fallback for the web build.

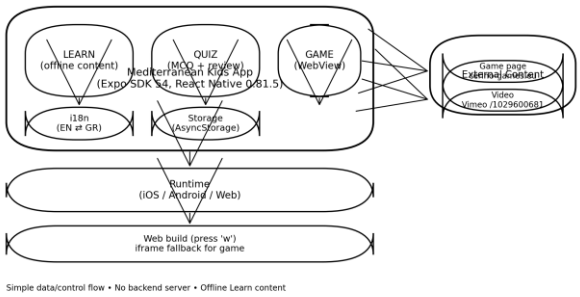


Fig. 1. Overall architecture of the Mediterranean Kids app (Expo SDK 54).

5. Implementation

Learn content is encoded as static constants, including titles, summaries, hints, kid-notes, and examples for each level. A simple progression marks each level as learned and unlocks the next. The video button opens a short Mediterranean-diet clip.

The LocaleProvider persists language choice and provides helper functions (t, trGroupName, trExamples) to translate UI text and examples. This avoids runtime network calls and ensures instant switching.

The quiz enforces fairness by delaying correctness cues: options only highlight selection in a neutral style; scoring occurs on 'Next'. At the end, a Review screen displays all questions with green/red cues and an option to filter to only wrong answers.

On mobile, the game loads in a sandboxed WebView; on the web build, an iframe is used. No native permissions or accounts are required, which simplifies deployment and privacy.

6. Screen Flow

The primary path is Learn → Level → Quiz → Review; the Game can be opened at any time from the bottom tab.

7. Evaluation

Methodology: we performed hands-on tests on Expo Go (Android/iOS) and the web build. Tested scenarios included level progression, quiz scoring, review correctness cues, language persistence, and the game embedding. We also considered usability heuristics: readability at arm's length, target sizes ≥44 px, and one-tap actions.

ID	Scenario	Expected	Result
T1	Unlock flow	Finish L1 → L2 unlocks	Pass
T2	Quiz scoring	Points only on Next	Pass
T3	Review cues	Green=correct; Red=chosen wrong	Pass
T4	Language persist	GR survives reload	Pass
T5	Game loading	WebView/iframe visible	Pass

Compatibility: the app ran smoothly on a recent Android device and on iOS via Expo Go; on the web, the iframe fallback rendered the game correctly. Cold-start time was acceptable for classroom use; Learn screens are available offline.

8. Ethics, Privacy & Accessibility

The app follows data-minimization: no sign-in, no analytics, and no collection of personal data. External content (video/game) is clearly separated and loaded on demand. For accessibility, the design uses large, high-contrast text, big buttons, and short sentences. Future work includes screen-reader labels and optional audio narration in English and Greek.

9. Discussion & Limitations

The design meets core goals—bilingual access, offline Learn content, and fair assessment—while avoiding complexity that could hinder adoption in schools. Limitations include dependency on external hosting for the game and the absence of telemetry to quantify learning outcomes. These were deliberate choices to respect privacy and reduce integration overhead.

10. Conclusion & Future Work

Mediterranean Kids demonstrates a compact Learn–Quiz–Game approach for early nutrition education. Future enhancements include audio narration, more mini-games and characters, a teacher/parent dashboard with exportable progress, and optional nutrition APIs if a calorie tracker is reintroduced.

References

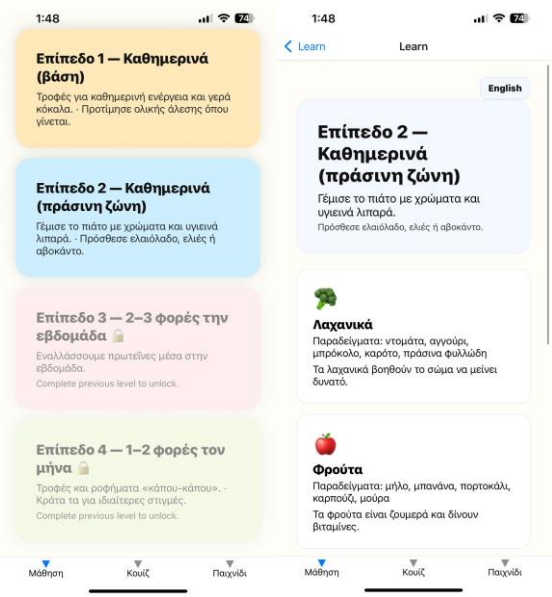
[1] Expo (React Native), https://expo.dev/ (accessed Dec. 2025).

[2] React Navigation v6, https://reactnavigation.org/ (accessed Dec. 2025).

[3] Mediterranean Diet educational resources (general).

Appendix A – Screenshots

Learn



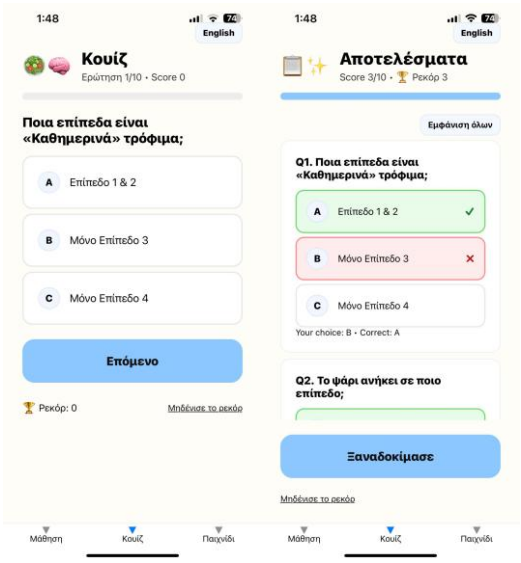

1:48
Επίπεδο 1 — Καθημερινά (βάση)
Τροφές για καθημερινή ενέργεια και γερά κόκαλα. · Προτίμησε ολικής άλεσης όπου γίνεται.
Επίπεδο 2 — Καθημερινά (πράσινη ζώνη)
Γέμισε το πιάτο με χρώματα και υγιεινά λιπαρά. · Πρόσθεσε ελαιόλαδο, ελιές ή αβοκάντο.
Μπράβο!
Ξεκλείδωσες το επόμενο επίπεδο ✅
OK
Εναλλάσσουμε πρωτεΐνες μέσα στην εβδομάδα.
Επίπεδο 4 — 1–2 φορές τον μήνα
Τροφές και ροφήματα «κάπου-κάπου». · Κράτα τα για ιδιαίτερες στιγμές.
Complete previous level to unlock.
Μάθηση
Κουίζ
Παιχνίδι

Game


Μάθηση
Κουίζ
Παιχνίδι


Μάθηση
Κουίζ
Παιχνίδι

QUIZ


1:48
English
Κουίζ
Ερώτηση 1/10 • Score 0
Ποια επίπεδα είναι «Καθημερινά» τρόφιμα;
A Επίπεδο 1 & 2
B Μόνο Επίπεδο 3
C Μόνο Επίπεδο 4
Επόμενο
Ρεκόρ: 0
Μηδένισε το ρεκόρ
1:48
English
Αποτελέσματα
Score 3/10 • Ρεκόρ 3
Εμφάνιση όλων
Q1. Ποια επίπεδα είναι «Καθημερινά» τρόφιμα;
A Επίπεδο 1 & 2
B Μόνο Επίπεδο 3
C Μόνο Επίπεδο 4
Your choice: B • Correct: A
Q2. Το ψάρι ανήκει σε ποιο επίπεδο;
Ξαναδοκίμασε
Μηδένισε το ρεκόρ
Μάθηση
Κουίζ
Παιχνίδι
Μάθηση
Κουίζ
Παιχνίδι