Evaluation and Usability of Mobile Dental Apps Using MARS – Mobile App Rating Scale

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Abstract

The rapid growth of mobile health (mHealth) applications has created new opportunities for promoting dental health and self-management of oral hygiene. This study evaluated the quality, usability, and functionality of consumer-focused dental health apps for users aged 12 and older using the Mobile App Rating Scale (MARS) and the IMS Institute for Healthcare Informatics Functionality Score. A systematic review of the Google Play and Apple App Stores identified 21 eligible apps. The median MARS score was 3.3/5, with 57% rated ≥3.0, indicating acceptable quality. Functionality scored highest (≈4.0), while information quality was lowest (≈3.0). Although dental apps show good usability, improvements are needed in personalization, educational content, and clinical integration to enhance user engagement and oral health outcomes.

Introduction

Mobile health (mHealth) applications have become central to self-management in multiple domains, including oral health. Oral diseases such as dental caries and periodontal conditions are largely preventable through consistent behaviors. Mobile tools can reinforce these habits, especially among digitally engaged populations. With more than 1,000 dental-related apps available in major app stores, public interest in mobile oral health interventions is evident. However, the quality and educational rigor of these apps vary substantially. Many emphasize entertainment or timers rather than clinical accuracy. Previous studies across mHealth domains have highlighted similar trends: apps are frequently intuitive and engaging but lack personalization, evidence-based content, and integration with healthcare systems.

In dentistry, identified significant content and usability gaps, particularly regarding interactive feedback and patient education. While tools such as Brush DJ and Quip Companion demonstrate creative engagement, few apps address behavioral reinforcement or long-term oral health tracking.

This study addresses these gaps by systematically evaluating 21 dental apps from the Apple App Store and Google Play Store. Using both MARS and the IMS Functionality framework, it assesses engagement, functionality, aesthetics, and information quality, providing an overview of strengths, weaknesses, and recommendations for improvement.

Methods

A cross-sectional **systematic review** was conducted to evaluate consumer-facing **mobile dental apps** from the **Apple App Store** and **Google Play Store**
• Two tools used:
– **MARS:** Rated Engagement, Functionality, Aesthetics, and Information Quality (1–5).
– **IMS Framework:** Evaluated 11 possible app functions (Inform, Instruct, Record, Display, Guide, Remind, Communicate).

Search & Selection
• Conducted in **March 2025** using keywords (*Oral Health, Dental Care, Tooth Brushing, Flossing*).
Inclusion: Age ≥12, English, ≥2.5★ rating, updated ≤5 years, public access.
• **Exclusion:** Professional, promotional, entertainment-only, or hardware-based apps.
• **21 apps (iOS & Android)** met final eligibility criteria.

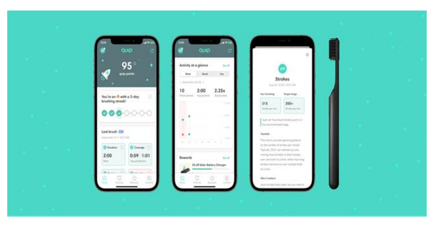
App Evaluation
• **Three trained raters** assessed each app (30–60 min).
• Discrepancies resolved by consensus.
• Apps grouped as: Brushing Timer/Tracker, Interactive/Gamified, Educational/Monitoring.

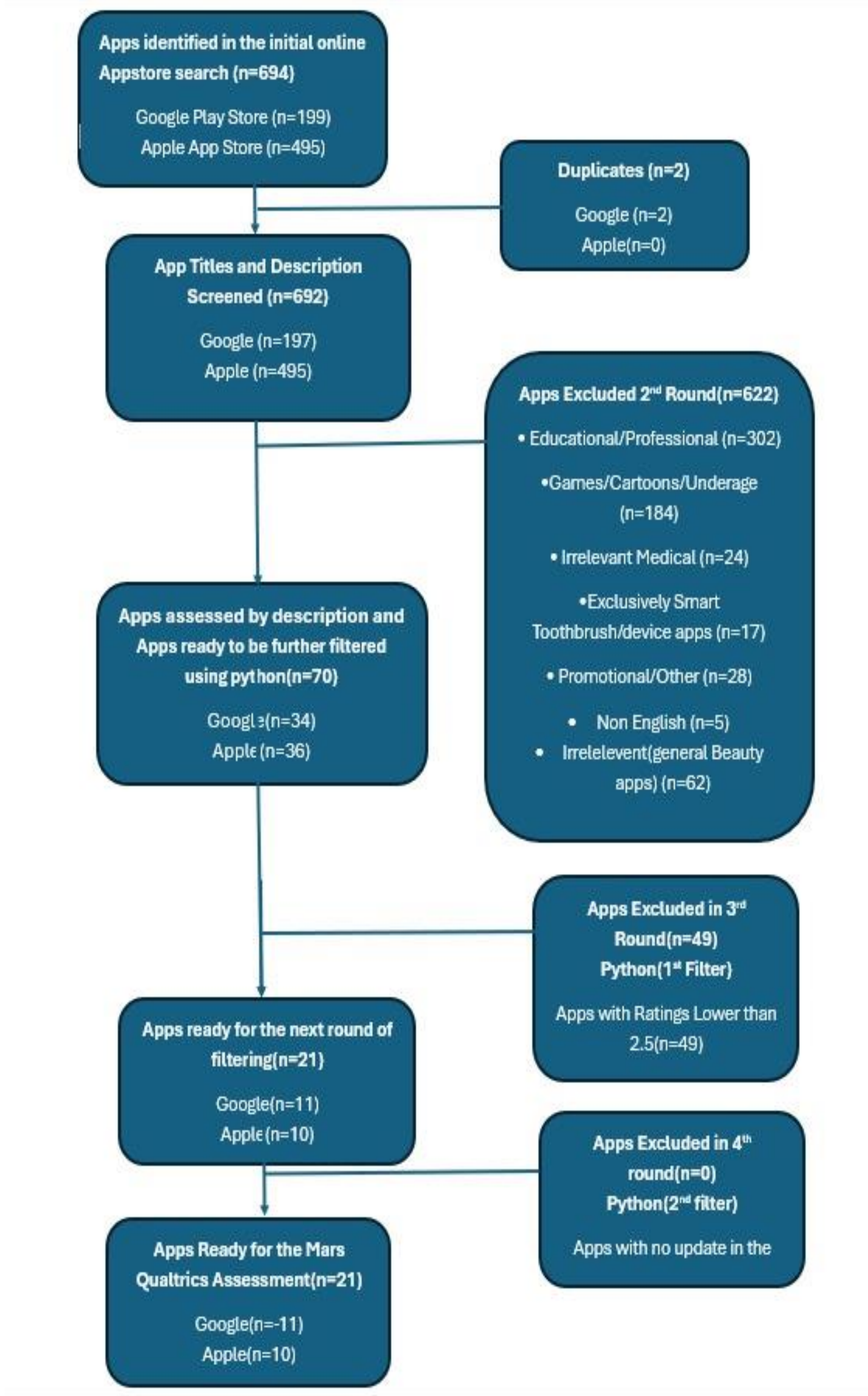
Data Analysis
• Descriptive statistics for **MARS** and **IMS** scores (mean, median, range).
• Frequencies calculated for functionality domains

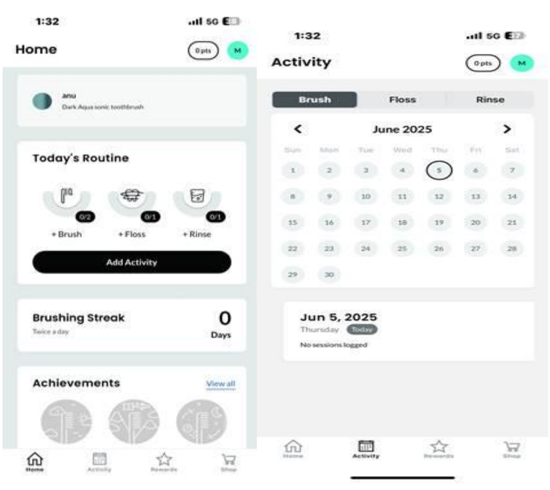
Results

- The median MARS score across 21 apps was 3.3/5, with 57% meeting the acceptability threshold (≥3.0).
- Functionality rated highest (mean ~4.0), while information quality was lowest (~3.0).
- Top 5 apps included Dental 3D Illustrations, Brush DJ, Quip, Oral-B, and Brushout, each combining good design with essential brushing and tracking features.
- Most apps had basic display (100%) and informational (95%) features.
- Advanced features were limited:
- 38% offered personalized feedback
- 19% supported communication

Rank	App Name	Primary App Purpose	Overall Mars Score (±SD)	IMS Functionality Score¹
1	**Dental 3D illustrations**	Patient monitoring with visuals	4.45	7/11
2	**quip: Oral Care**	Oral hygiene tracker with reminders (adult-focused)	4.25	8/11







Conclusion

This systematic evaluation revealed that while most dental apps are functional and user-friendly, they are limited in educational quality, personalization, and clinical connectivity.
The median MARS score (3.3/5) indicates basic acceptability, but improvements are needed for these tools to serve as comprehensive oral health interventions.
Future apps should incorporate evidence-based content, adaptive feedback, and professional integration to bridge the gap between consumer engagement and clinical effectiveness.

Recommendations

- Integrate Evidence-Based Content - Align app material with ADA/CDC clinical guidelines and cite credible sources.
- Enhance Personalization - Include adaptive feedback, data-driven goal setting, and behavior tracking.
- Expand Functionalities - Move beyond timers, add gamified progress dashboards, behavioral summaries, and coaching.
- Enable Communication Features - Allow secure sharing with dentists or family for accountability and follow-up.
- Improve Usability and Inclusive Design - Test with different age groups; optimize interfaces for accessibility.
- Validate Through Research - Collaborate with researchers to evaluate real-world health outcomes such as plaque reduction or brushing frequency.

Acknowledgment

We gratefully acknowledge the **Department of Health Information Management, School of Health and Rehabilitation Sciences, University of Pittsburgh**, and **Dr. Yong K. Choi** for his guidance and support throughout this research.

References

University of Pittsburgh