# Review and assessment of the quality of applications related to diet management using the Mobile App Rating Scale (MARS)

# Przegląd i ocena jakości aplikacji związanych z zarządzaniem dietą przy pomocy Mobile App Rating Scale (MARS)

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**Abstract**

This article presents an evaluation of mobile applications for diet management using the Mobile App Rating Scale. The study identifies key factors influencing app quality, analyzes user engagement and satisfaction, and explores the impact of these apps on dietary behavior change. Four popular applications: Fitatu, Dine4Fit, FIT-WORLD, and Foodvisor - were assessed based on their features, functionality, aesthetics, and information quality. The results highlight that Foodvisor stands out with the highest overall ratings, particularly in user engagement and aesthetics. Conversely, Fit-World scored the lowest in several categories, emphasizing the need for improvement in functionality and user-specific features. These findings provide insights into enhancing app design to improve user experience and effectiveness in diet management.

*Keywords*: mobile apps; diet management; Mobile App Rating Scale; user evaluation

**Streszczenie**

W artykule przedstawiono ocenę aplikacji mobilnych do zarządzania dietą z wykorzystaniem Mobile App Rating Scale. Badanie identyfikuje kluczowe czynniki wpływające na jakość aplikacji, analizuje zaangażowanie i satysfakcję użytkowników oraz bada wpływ tych aplikacji na zmianę zachowań żywieniowych. Oceniono cztery popularne aplikacje: Fitatu, Dine4Fit, FIT-WORLD i Foodvisor, pod kątem cech, funkcjonalności, estetyki oraz jakości informacji. Wyniki wskazują, że Foodvisor osiągnęła najwyższe wyniki ogólne, szczególnie w kategoriach zaangażowania i estetyki, natomiast Fit-World uzyskała najniższe oceny w zakresie funkcjonalności i specyficznych funkcji. Uzyskane rezultaty dostarczają wskazówek dla twórców aplikacji, jak również dla użytkowników poszukujących narzędzi wspierających zarządzanie dietą.

*Słowa kluczowe*: aplikacje mobilne; zarządzanie dietą; Mobile App Rating Scale; ocena użytkownika

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## 1. Introduction

Diet management is a key component of a healthy lifestyle that has gained significant attention due to the development of mobile technologies. Mobile applications for diet management enable users to plan meals, track calorie intake, and monitor other health parameters. The increasing number of such applications available in digital marketplaces highlights the need for a standardized approach to evaluate their quality and effectiveness.

While many applications claim to provide comprehensive support for dietary management, their actual impact on user behavior and health outcomes varies. Previous studies indicate that features such as personalization, ease of use, and evidence-based dietary recommendations significantly influence user satisfaction and engagement. However, a lack of rigorous quality assessments may lead to misinformation, ineffective functionalities, and poor user retention.

This study aims to assess the quality of popular diet-related mobile applications using the standardized Mobile App Rating Scale (MARS). The evaluation focuses on key app characteristics, including user interface, functionality, aesthetics, and the reliability of information provided. By applying this structured assessment tool, this research seeks to identify both the strengths and weaknesses of existing applications and offer recommendations for their improvement. Additionally, this study explores how specific features contribute to long-term user adherence and dietary behavior changes, which remains an underexplored aspect in prior evaluations.

## 2. Literature review

The Mobile App Rating Scale (MARS) has been widely recognized as a reliable and structured tool for evaluating mobile applications, particularly in health and wellness domains. Developed to ensure consistency in mobile health application assessments, MARS evaluates applications across four primary dimensions: engagement, functionality, aesthetics, and information quality. Several studies have validated the scale's reliability, demonstrating its applicability in different health-related app categories [1-2].

MARS has been extensively used in evaluating diet and nutrition-related applications, emphasizing the role of user engagement in app effectiveness. Research suggests that applications with higher scores in aesthetics

and interactivity tend to achieve better user retention and behavioral adherence. For example, studies analyzing weight-loss applications found that interactive features, such as progress tracking and personalized meal suggestions, positively influence user motivation [3]. Additionally, research indicates that clear and visually appealing interfaces significantly impact the perceived usability of diet management applications [4].

Another critical aspect of app evaluation involves the credibility of dietary information. MARS includes an assessment of the scientific accuracy and reliability of information provided by the applications. Previous studies highlight that many diet-related applications fail to offer evidence-based nutritional guidance, which can mislead users and potentially result in unhealthy dietary practices. This underlines the necessity of integrating validated dietary guidelines into app functionalities to ensure safe and effective dietary interventions [5].

Moreover, the importance of customization and adaptability in diet management applications has been emphasized in multiple studies. Users with specific dietary needs—such as individuals with diabetes, food allergies, or restrictive diets—benefit most from applications that offer tailored recommendations based on their health status and goals. The integration of artificial intelligence (AI) in mobile health applications has further enhanced the personalization aspect, allowing for adaptive meal planning and real-time dietary advice [6].

Recent studies have also investigated the role of mobile applications in addressing broader health concerns, such as cardiovascular diseases and obesity management [7]. The effectiveness of MARS in evaluating health-related applications has been demonstrated across multiple domains, including mental health support and chronic disease management [6]. Additionally, research has highlighted the importance of ensuring mobile health applications comply with data security regulations, such as the General Data Protection Regulation (GDPR), to protect user privacy and trust [8].

Despite the advancements in diet management applications, several gaps remain in their quality and effectiveness. Research suggests that many applications lack proper adherence to usability guidelines and do not fully leverage user feedback for iterative improvements. Additionally, the role of gamification and community support in sustaining long-term engagement has not been fully explored in many existing solutions. By applying MARS to popular diet-related applications, this study seeks to address these gaps and provide actionable insights for developers aiming to enhance their applications' impact and usability.

## 3. Materials and research methodology

### 3.1. Selected applications

The study focused on four mobile applications available on Google Play:
1. Fitatu (rating: 4.7; downloads: 5M+).
2. Dine4Fit (rating: 4.1; downloads: 5M+).
3. FIT-WORLD (rating: 4.6; downloads: 100K+).
4. Foodvisor (rating: 4.1; downloads: 1M+).

These applications were selected based on popularity, user ratings, and functionality related to diet management. Additionally, they were chosen due to their availability in multiple languages, frequent updates, and presence of features supporting dietary tracking, goal setting, and nutrition analysis.

All applications were tested on smartphones running the Android operating system to ensure consistency in evaluation. This platform was chosen due to its widespread availability and the large number of diet-related applications accessible through Google Play. Each application underwent an in-depth analysis of its user interface, core functionalities, and additional features such as meal recommendations, barcode scanning for food items, and synchronization with external health-tracking devices. The selection process aimed to include a diverse range of applications, covering both highly rated and moderately rated apps to ensure a comprehensive assessment of different quality levels available on the market.

### 3.2. Research methodology

MARS was used to evaluate the applications across five key categories:
- Engagement: Personalization, interactivity, and user target alignment.
- Functionality: Performance, usability, and accessibility.
- Aesthetics: Interface clarity and design.
- Information: Data reliability and usefulness.
- Subjective Quality: User satisfaction.

The Mobile App Rating Scale consists of a standardized 23-item questionnaire divided across these five domains, where each item is rated on a 5-point Likert scale (1 = inadequate, 5 = excellent). This structured approach ensures objective and reproducible results, allowing for a detailed assessment of different applications.

The study involved 32 second-year computer science students who tested each application according to predefined scenarios. These scenarios were designed to evaluate key functionalities, including meal logging, calorie tracking, and data visualization. Participants provided ratings for each category after using the applications for a specified period, ensuring that their assessments reflected actual user experience rather than initial impressions.

To make the test process more realistic, students used the applications in conditions similar to everyday use. They were encouraged to explore all available features and report any problems or limitations they encountered. This helped capture not only the strengths of each app, but also practical challenges users might face during regular use.

To minimize bias, the evaluation process was conducted in a controlled environment, and students were instructed to complete an anonymous survey based on their interactions with the applications. The collected data were then statistically analyzed using descriptive statistics and correlation analysis to identify trends, assess reliability, and compare overall app quality across the different domains.

## 4. Results

The average ratings of the applications in each MARS category are summarized in Table 1.

Table 1: Average application scores for individual Mobile App Rating Scale sections

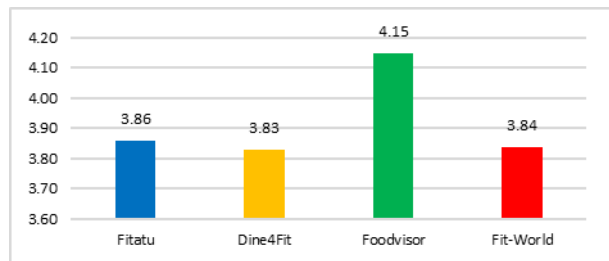| Average scores | Fitatu | Dine4Fit | Foodvi-sor | Fit-World |
|---|---|---|---|---|
| Engagement | 3.70 | 3.97 | 4.03 | 3.37 |
| Functional-ity | 3.94 | 3.82 | 4.25 | 3.96 |
| Aesthetics | 4.00 | 3.72 | 4.57 | 3.94 |
| Information | 3.80 | 3.81 | 4.13 | 4.04 |
| Subjective quality | 3.61 | 3.50 | 3.61 | 2.75 |
| Application specificity | 3.69 | 4.15 | 4.13 | 2.46 |



Figure 1: Total average results for all sections.

The assessment using MARS revealed variations in app quality across different evaluation criteria. The majority of scores across all evaluated applications fell within the range of 2.5 to 4.5 on the MARS scale as we can see on Table 1 and Figure 1. The highest-rated application, Foodvisor, consistently scored above 4.0 in most categories, particularly in engagement, aesthetics, and information quality. Dine4Fit and Fitatu followed, with moderate scores across categories, maintaining relatively stable ratings. Fit-World received the lowest ratings, with its scores concentrated around 2.5–3.0, especially in subjective quality and specificity of features.

When analyzing engagement scores, Foodvisor and Dine4Fit performed the best, with ratings exceeding 4.0, while Fit-World trailed with values around 3.3. In terms of functionality, Foodvisor achieved the highest rating (4.25), while the other applications fluctuated between 3.8 and 4.0. Aesthetics scores showed a clear distinction between Foodvisor (4.57) and Dine4Fit (3.72), suggesting a considerable gap in interface design and visual appeal.

The information quality category presented similar patterns, with Foodvisor and Dine4Fit scoring above 4.0, Fitatu slightly below, and Fit-World receiving the lowest rating (4.04). Subjective quality ratings showed the greatest variation, with Fit-World obtaining the lowest score (2.75), while Foodvisor and Fitatu maintained balanced ratings around 3.6.

The results indicate a pattern where applications with stronger aesthetics and higher engagement scores also tend to have higher functionality and information quality ratings. Across the tested Android devices, performance remained consistent, with minimal impact from hardware differences such as screen size and processing power. This suggests that all applications were sufficiently optimized for the Android platform, ensuring usability across a broad range of smartphones.

## 5. Conclusions

The analysis of the results indicates that applications characterized by a clear interface and aesthetic design, such as Foodvisor, achieve higher ratings in categories like user engagement and functionality. In Figure 2 we can see a strong correlation emerges between the visual quality of an application and its ability to engage users.
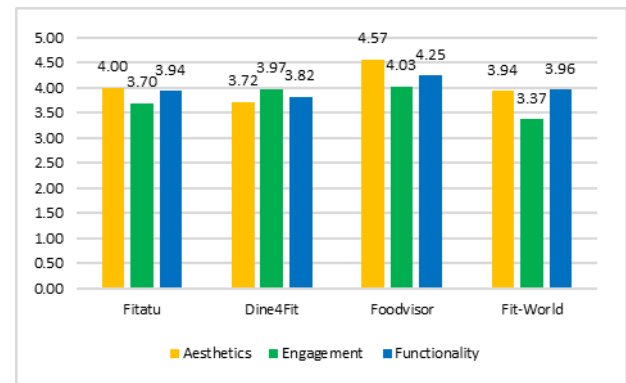


Figure 2: Dependence of the results of the aesthetics section compared to the engagement and functionality sections.

Furthermore, we can see in Figure 3 that the functionality of an application appears to be closely linked to the quality of information provided—applications offering reliable and detailed dietary data gain greater user recognition. On the other hand, the low rating of specific features in applications like FIT-WORLD highlights the need for more innovative solutions to increase their appeal and effectiveness.
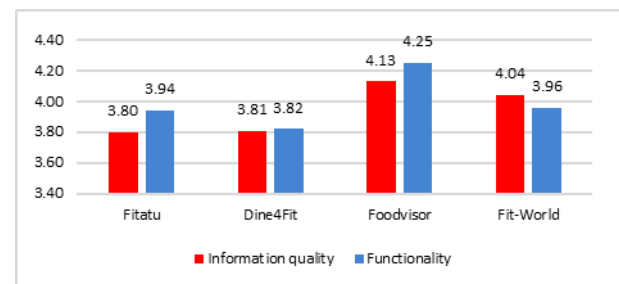


Figure 3: Dependence of the results of the information quality section compared to the functionality section.

Based on the conducted study, it can be concluded that the MARS scale is an effective tool for a comprehensive analysis of the quality of mobile applications. The study's results provide valuable guidance for developers of diet-related applications, who should pay particular attention to the aesthetic and functional aspects of their products.

In the future, it would be beneficial to expand the research to include a larger number of applications and more diverse demographic groups of users, which would

allow for an even more complete picture of the quality of diet management applications available on the market.

## 6. Recommendations for developers

Applications that feature clear interfaces and aesthetic designs, such as Foodvisor, consistently achieve higher user engagement. Developers should prioritize visual and interactive elements, as these aspects significantly enhance user experience. Additionally, reliable and detailed dietary information is critical for fostering user trust and satisfaction. Features like customizable meal plans and AI-driven suggestions could provide a competitive edge.

Furthermore, expanding demographic research and tailoring applications to diverse user groups, including age-specific or culturally relevant dietary preferences, would increase their market appeal. Effective marketing strategies, such as emphasizing unique features and incorporating user feedback, can also drive downloads and improve user perceptions. By addressing these areas, developers can enhance both the functionality and attractiveness of their diet management applications.

To ensure long-term engagement, developers should also integrate social and community-based features. Encouraging user interaction through forums, shared meal plans, or group challenges can foster a sense of community and motivation. Additionally, real-time support through AI chatbots or human nutritionists can enhance user experience and retention. The inclusion of push notifications for meal tracking reminders, progress updates, and new feature announcements can further reinforce app usage.

### 6.1. Future opportunities and challenges

The field of diet management applications presents numerous opportunities for innovation. Emerging technologies, such as AI and machine learning, can be leveraged to deliver predictive dietary analytics and adaptive recommendations. Expanding research to include diverse demographic groups, such as older adults or those with specific dietary needs, can help tailor applications to a broader audience. Data security remains a critical challenge, and ensuring compliance with regulations like GDPR can significantly enhance user trust. Gamified features, such as rewards and challenges, can further maintain user engagement and improve long-term retention.

One of the key areas for future development is the integration of wearable technology and IoT (Internet of Things) devices. Connecting diet management applications with smartwatches, fitness bands, or connected kitchen appliances can enable seamless data synchronization and real-time nutritional insights. For instance, smart scales or glucose monitors can provide users with personalized dietary adjustments based on their real-time health data.

Another promising direction is the use of augmented reality (AR) and virtual reality (VR) for enhanced user experience. AR can help users visually assess portion sizes or scan food products to receive instant nutritional information, while VR could be used for immersive dietary education and training sessions.

A major challenge remains in balancing monetization strategies with user satisfaction. While subscription-based models or in-app purchases can generate revenue, developers must ensure that essential features remain accessible in free versions to retain users. Transparency regarding data privacy policies and ethical AI-driven recommendations is also crucial in maintaining credibility and trust.

Addressing these opportunities and challenges will enable developers to create more effective and appealing applications, meeting evolving user expectations and market demands. By integrating advanced technologies, prioritizing user engagement, and maintaining ethical standards, diet management applications can become powerful tools for promoting long-term health and wellness.

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