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### Internet-based Weight Control Intervention in “Bi’Kilo” Mobile App: A Qualitative Analysis of Usability, Acceptability, and User Experiences

“Bi’Kilo” Mobil Uygulamasında İnternet Tabanlı Kilo Kontrolü Müdahalesi: Kullanılabilirlik, Kabul Edilebilirlik ve Kullanıcı Deneyimlerine İlişkin Nitel Bir Analiz

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**Abstract:** The study aimed to evaluate the usability, acceptability, and user experiences of the "Bi'Kilo" mobile app, which is designed to facilitate weight management and encourage healthy lifestyle choices among its users. Employing a qualitative research design, the investigation involved in-depth interviews with eight users of the "Bi'Kilo" app. This approach gave a comprehensive understanding of participants' perceptions, experiences, and interactions with the application. Data from the interviews were meticulously analyzed to identify themes related to the app's usability, its impact on users' weight management efforts, and the overall user experience. This analysis was pivotal in understanding the strengths and weaknesses of the "Bi'Kilo" app from the perspective of its users. The findings revealed that users appreciated the app's role in promoting weight control and a healthy lifestyle, particularly highlighting personalized feedback and including multimedia content as beneficial features. Nonetheless, challenges were identified, including technical difficulties and a preference for more actionable advice over theoretical content. The study suggests several avenues for future research, including further refinement of the app to enhance its flexibility, integration of professional insights, and improvement in personalization to meet users' needs and preferences better. These components collectively provide a thorough examination of the "Bi'Kilo" app, offering valuable insights into its development and the broader health informatics field.

**Keywords:** Mobile Health Applications, Weight Management, User Experience, Usability, Acceptability

**Özet:** Bu çalışma, kullanıcılarının kilo kontrolünü kolaylaştırmak ve sağlıklı yaşam tarzı tercihlerini teşvik etmek amacıyla tasarlanan “Bi’Kilo” mobil uygulamasının kullanılabilirliğini, kabul edilebilirliğini ve kullanıcı deneyimlerini değerlendirmeyi amaçlamıştır. Nitel bir araştırma deseninin kullanıldığı araştırmada, “Bi’Kilo” uygulamasının sekiz kullanıcısı ile görüşmeler yapılmıştır. Bu yaklaşım, katılımcıların algılarının, deneyimlerinin ve uygulama ile etkileşimlerinin kapsamlı bir şekilde anlaşılmasını sağlamıştır. Görüşmelerden elde edilen veriler, uygulamanın kullanılabilirliği, kullanıcıların kilo kontrolü çabaları üzerindeki etkisi ve genel kullanıcı deneyimi ile ilgili temaları belirlemek için titizlikle analiz edilmiştir. Bu analiz, kullanıcıların bakış açısından “Bi’Kilo” uygulamasının güçlü ve zayıf yönlerini anlamada çok önemlidir. Bulgular, kullanıcıların uygulamayı kilo kontrolünü ve sağlıklı bir yaşam tarzını teşvik etmedeki rolü nedeniyle takdir ettiklerini, özellikle kişiselleştirilmiş geri bildirim ve multimedya içeriğinin faydalı özellikler olarak vurgulandığını ortaya koymuştur. Bununla birlikte, teknik aksaklıklar ve teorik içerik yerine daha çok uygulamaya dönük içeriklerin tercih edilmesi gibi konularda çeşitli güçlükler belirlenmiştir. Çalışma, uygulamanın daha da geliştirilerek işlevselliğinin artırılması, profesyonel görüşlerin entegrasyonu ve kullanıcıların gereksinim ve tercihlerinin daha iyi karşılanması için kişiselleştirmenin iyileştirilmesi gibi gelecekteki araştırmalar için çeşitli önerileri bildirmektedir. Bu bileşenler “Bi’Kilo” uygulamasının kapsamlı bir incelemesini sunmakta, uygulamanın geliştirilmesi ve daha geniş sağlık bilişim alanı için önemli görüşler sağlamaktadır.

**Anahtar Kelimeler:** Mobil Sağlık Uygulamaları, Kilo Kontrolü, Kullanıcı Deneyimi, Kullanılabilirlik, Kabul Edilebilirlik

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## 1. Introduction

Mobile health-mHealth software programs run on mobile devices and offer various health-related services (1). These services include collecting and sharing health data, providing health information and education, monitoring and managing health conditions, remote care and consultation, and promoting health and fitness (2). mHealth applications have revolutionized the delivery and management of health services, leveraging mobile technologies to provide accessible and cost-effective health services (3). These applications have increased the accessibility of health services by providing functionalities such as access to health information, self-monitoring, behavior tracking, and the delivery of interventions (4). mHealth applications offer effective interventions for health behaviors such as weight control, smoking cessation, and adherence to medication regimens (5). This is particularly important in managing chronic diseases such as diabetes, cardiovascular diseases, and certain types of cancer (6). Through features like personalized feedback, goal setting, motivational tips, and social support, they can personalize intervention strategies and contribute to improved health outcomes (7). The prevalence of smartphones and advancements in mobile technologies have facilitated the development of these applications and led to a paradigm shift in the delivery of health services (8). mHealth applications are becoming increasingly popular, offering innovative solutions in health services and covering a wide range of functionalities, including disease monitoring, health education, and lifestyle management (9). The use of applications indicates a significant change in health service delivery and patient engagement, particularly effective in weight control interventions (10).

The use of mHealth applications for self-care among special populations, such as pregnant women, has been extensively studied, showing effectiveness in weight control, providing educational information, and offering reminders and assessments related to services (3). Integrating applications into weight control interventions aligns with the broader trend of digital health solutions, offering functionalities ranging from tracking dietary intake and physical activity to providing personalized feedback and support. This facilitates self-monitoring, a key component in behavior change theories such as the Self-Determination Theory and the Theory of Planned Behavior (11, 12). As significant tools in weight control and management, these applications enable users to track dietary intake, physical activity, and body weight with capabilities like real-time

feedback, personalized goal setting, and motivational support (13-15). mHealth applications in weight control promise to assist individuals in managing their weight by tracking physical activity and dietary intake and providing behavioral interventions. Studies have shown that mHealth interventions can effectively promote participation in physical activities and self-management of weight (13). As indicated by behavior change theories, mHealth applications in weight control offer effective opportunities for interventions in lifestyle changes, dietary habits, and physical activity (16). The popularity of applications in weight control is critically important in preventing and managing excessive weight and obesity, major risk factors for chronic diseases such as cardiovascular diseases, diabetes, and some cancers. According to the World Health Organization, in 2016, more than 1.9 billion adults were overweight, with 650 million being obese (17). Mobile applications for weight control can offer various advantages over traditional methods, including personalized feedback, special recommendations, real-time support, gamification, social networking, and rewards to increase user engagement and motivation (14).

Considering the prevalence and diversity of mHealth applications, as of October 2023, the Google Play Store contains over 30 million applications, approximately 10% of which, or 3 million, cover health topics and conditions (Google Play Store). A meta-analysis comparing these applications to traditional methods showed that users of weight control applications exhibited higher engagement and better outcomes than those using traditional diet and exercise diaries and were equally effective as traditional paper-pencil weight loss interventions (1). The effectiveness of applications suggests that mHealth applications can be as or more effective due to their convenience, real-time feedback, and interactive features (18). A 2021 meta-analysis found that mobile health technology interventions significantly reduced BMI in specific ethnic groups (2). When examining the advantages of mHealth applications over traditional interventions, it is observed that weight control applications demonstrate greater adherence to dietary and physical activity guidelines compared to users in traditional programs (19).

mHealth applications can enhance user engagement and motivation by providing personalized feedback, special recommendations, real-time support, gamification, social networking, and rewards (1,

20). Additionally, mobile applications benefit from the convenience of data collection and analysis by utilizing the built-in sensors and functionalities of mobile devices, such as cameras, GPS, accelerometers, and barcode scanners (21). One of the most significant conveniences of mobile applications is the ability to offer access and diversity to a broad and varied user base, regardless of location, time, and availability (22). Furthermore, a systematic review and meta-analysis of 17 randomized controlled trials indicate that mobile applications for weight loss are more effective than minimal interventions or usual care regarding efficacy and sustainability. However, the quality of evidence is low to moderate, highlighting the need for more rigorous and long-term studies (23).

Dennison et al. have highlighted that personalization enhances applications' relevance and effectiveness by addressing individual user needs and preferences, stating that personalized feedback and content are significant motivational factors for continuous use of the application (24). Users' adherence to the prescribed or recommended use of the application is important for engagement and critical for the success of any behavioral intervention (25). However, adherence to mobile applications can decrease over time, and users may encounter various barriers (26). The personalized support provided by mHealth applications, especially including specific diet and exercise recommendations, has the potential to increase user adherence significantly (27). Reminders and notifications in applications help maintain user engagement and encourage consistency in health behaviors. These features have improved body composition and adherence to health interventions (28). A user-friendly design of applications is seen as a critical factor for long-term commitment to mHealth interventions (29). An intuitive interface and easy navigation are among the key factors influencing the user's experience and continued application use (30).

Furthermore, the customization of the application interface and content according to the user's preferences, needs, and goals is a fundamental feature of personalization (31). This feature could enhance user satisfaction, adherence, and loyalty (29). Features such as personalization and user-friendly design are key factors in the success of mHealth applications in weight control (13, 32). These features are significant for encouraging user engagement and adherence.

## Aim of the Study

This study emphasizes the growing importance of digital mental health services in today's world. In this context, it aims to evaluate the usability and acceptability of the mobile application named "*Bi'Kilo*", developed by researchers for individuals who want to lose or control their weight. Conducted with a qualitative approach, this research seeks to gather information about the advantages, disadvantages, adaptability to life, expectations, suggestions and needs concerning the application. Based on this aim, the research seeks to answer the following central question: "How do users experience the usability and acceptability of the "*Bi'Kilo*" mobile application designed for weight control?"

## 1.2. "*Bi'Kilo*" Mobile Application

The "*Bi'Kilo*" mobile application is a self-guided, Turkish-language intervention designed to support weight control through educational and behavioral modules. It promotes healthy lifestyle changes through progressive, module-based learning. Users must engage with video animations and written content, answer related questions, and complete practice-based tasks to unlock subsequent modules.

The app comprises seven modules:

1. **Nutritional Education** – Covers energy balance, eating habits, goal setting, and dietary planning.
2. **Physical Activity** – Focuses on increasing activity levels, understanding benefits, and setting step goals.
3. **Mindful Eating** – Introduces principles and techniques of mindful eating.
4. **Emotional Eating** – Focuses on distinguishing between physical and emotional hunger.
5. **Cognitive Interventions** – Addresses sabotaging thoughts and environmental triggers.
6. **Thought Cards** – Encourages cognitive restructuring through alternative thinking strategies.
7. **Follow-up Phase** – Reinforces continued practice of acquired skills for maintaining weight control.

Each module includes structured self-monitoring practices (e.g., food logs, step counts, hunger scales), which must be completed to advance. The app also features a user profile with a weight progress graph, instructional mindful eating guidance, and technical support access.

## 2. Materials and Methods

### 2.1. Research Design

The research aims to qualitatively evaluate the usability and acceptability of the “*Bi’Kilo*” mobile application for individuals aiming for weight loss or weight control. The primary purpose of the study is to gain in-depth knowledge about the application’s advantages and disadvantages, how it adapts to life, user expectations, suggestions, and needs. The research design is based on the qualitative research method, which Creswell and Poth describe as advantageous for collecting in-depth information about phenomena (33). These methods are designed to capture an individual’s perspective and the meanings they attribute to their experiences, aiming to produce rich and nuanced data. The research methodology employs the phenomenological pattern defined by Patton (34). Phenomenology focuses on how people understand, describe, feel, judge, recall, make sense of, and talk about a particular phenomenon. Dağhan and Akkoyunlu define phenomenology as a method aimed at revealing the experiences, perceptions, and meanings individuals assign to a specific phenomenon (35). The research intensely focuses on the usability and acceptability of the “*Bi’Kilo*” application, user feedback, necessary adjustments, and innovations while examining the experiences and opinions of eight participants in detail. By adopting the phenomenological pattern, an ideal approach to comprehensively understand and interpret user experiences and perceptions, the study aims to provide significant information about the usability and acceptability of the “*Bi’Kilo*” application, illuminating its effectiveness and areas that need development.

### 2.2. Participants

The study’s participants were carefully selected using criteria-based and maximum variation sampling methodologies. The purposive sampling approach, also known as intentional sampling, was used to intentionally select individuals with extensive expertise on a specific subject, thereby facilitating comprehensive research on the said subject. This method is widely accepted and suitable for qualitative research, especially phenomenological studies. Purposive sampling, categorized as a non-probability sampling technique, is designed to identify participants with significant and relevant firsthand experiences related to the phenomenon under investigation (34). As Yıldırım and Simsek state, criterion sampling requires selecting individuals based on precisely defined criteria (36). The selection criteria included being literate and possessing above-average technological literacy. Following the determination of eligibility criteria, invitations were sent to individuals who met the necessary prerequisites for participation. These invitations were distributed following notifications published on the researchers’ official websites ([www.bikilo.ogu.edu.tr](http://www.bikilo.ogu.edu.tr)), through private Instagram accounts (@bi.kilo), and other relevant social media profiles.

The principle of saturation, commonly used in qualitative research to determine sample size, was followed. Saturation is achieved when no new information or theme emerges from data collection and analysis (37). We conducted semi-structured interviews with participants and analyzed their responses using content analysis. After eight interviews, we reached saturation as no new insights or patterns were identified. Therefore, we concluded the interviews, deciding that the sample size provided rich and meaningful data to answer our research question. The participant group consisted of 8 women aged 22-32 years. Participants were informed about the scope of the research, assisted in installing the “*Bi’Kilo*” application on their smartphones, and explained how to use it. Table 1 presents participants’ demographic characteristics.



**Table 1.** Participants' demographic characteristics

Participants	Age	Gender	Education Level
Participant 1	28	Female	PhD student
Participant 2	24	Female	Graduate student
Participant 3	26	Female	PhD student
Participant 4	32	Female	PhD student
Participant 5	23	Female	PhD student
Participant 6	25	Female	PhD student
Participant 7	22	Female	PhD student
Participant 8	24	Female	PhD student

### 2.3. Data Collection Tools

This research uses qualitative data to examine the usability and acceptability of the “*Bi’Kilo*” mobile application for weight loss and weight control goals. Phenomenological studies aim to explore the essence of participants' lived experiences; hence, this study preferred the qualitative interview method (36, 38). This approach allows us to deeply understand participants' meanings, interpretations, and experiences using the “*Bi’Kilo*” application, thus better comprehending the application's advantages, disadvantages, and alignment with user needs (39). The advantages of qualitative interviews include enabling the researcher to gain a more profound and holistic understanding of the studied phenomenon (33). Additionally, phenomenological research aims to reveal the essence or fundamental meaning of a phenomenon as experienced by an individual in a specific situation (40). Interviews were conducted by presenting standard questions to participants and using probing questions. Probing questions is important for better understanding the responses given by participants and exploring the reasons behind those responses (34). Data obtained from audio recordings and transcripts, after review and approval by participants, were used for analysis. This method ensured a rich and detailed understanding of participants' experiences, achieving a holistic understanding of the research.

The research sought answers to the following questions:

- Can you describe your experiences while using the “*Bi’Kilo*” mobile application?
- What can you say about the visual and technical aspects of the “*Bi’Kilo*” application?
- What parts/sections of the “*Bi’Kilo*” mobile application did you find useful?
- What parts/sections of the “*Bi’Kilo*” mobile application did you find useless?

- What do you think about the usability of the “*Bi’Kilo*” application?
- Do you think mobile application usage can be an alternative to face-to-face support? If not, why?

### 2.4. Data Collection Process

Following the 10-week usage period of the “*Bi’Kilo*” mobile application, qualitative data were collected through semi-structured interviews conducted online via *Zoom* and *Google Meet*. These interviews were conducted within a two-month period after participants completed the intervention. All interviews were audio-recorded and transcribed verbatim for analysis.

### 2.5. Data Analysis

Data were analyzed using inductive content analysis with *NVivo 11*. Coding was conducted based on the participants' verbatim responses, supported by in-vivo coding practices to preserve the authentic language used by participants. The resulting codes were organized into six overarching themes: Content, Useful Features, Technical-Application Issues, User Experience, Improvements, and Suggestions.

This analytic approach aimed to capture the diversity and complexity of users' lived experiences with the “*Bi’Kilo*” application and to ensure a grounded understanding of their feedback and suggestions.

### 3. Results

Codes obtained from interviews with participants were consolidated under the themes of Content, Useful Features, Technical-Application Issues, User Experience, Improvements, and Suggestions. Table 2 presents themes and their explanation.

**Table 2.** Themes and their explanation

Themes	Explanation of Themes
<b>Content</b>	The general structure and presentation of the “ <i>Bi’Kilo</i> ” application
<b>Useful Features</b>	Positive feedback from participants trying to lose weight with the “ <i>Bi’Kilo</i> ” application and the application’s effective components and benefits to users
<b>Technical-Application Issues</b>	Criticisms related to the operation and content of the “ <i>Bi’Kilo</i> ” application, ranging from technical performance to content quality
<b>User Experience</b>	Practical usability and impact of the “ <i>Bi’Kilo</i> ” app through participants’ experience
<b>Improvements</b>	Participants’ encountered difficulties with the “ <i>Bi’Kilo</i> ” application and their suggested enhancements
<b>Suggestions</b>	Participants’ feedback aimed at enhancing the development of the “ <i>Bi’Kilo</i> ” application

The Content theme addresses the general structure and presentation of the “*Bi’Kilo*” application based on participants' views. The theme highlights the "Visual and Technical Features" of the application, emphasizing its user-friendly and engaging qualities. Participants mentioned the smooth module sequence and how videos in each module increased user interest. Regarding "Content Being Good, Efficient, Clear" they appreciated the clarity and efficiency of information, though it sometimes remained theoretical. In "Information and Emotional Hunger"

informative videos and texts, especially regarding emotional hunger, were found beneficial. Under "Comprehensiveness" the application's approach to not just being an eating log but addressing cognitive, physical, and emotional aspects of the user is emphasized. "Professionalism of Design" highlights the application's professional approach and ability to engage users. Table 3 presents the codes related to the Content theme and indicates from which participants they were obtained.

**Table 3.** Codes and participants related to the content theme

Code	Participant
<i>Visual and technical features</i> "The flow of the modules is generally very good. I think it is also very good that there is a video at the beginning of each module because reading a text alone can be boring.", "I think it is very good that visual and schematic expression is together.", "The design of the application is also good in generally", "I also liked that there was a text after the video."	1
<i>Content is good, efficient, clear</i> "I think it was good, it was productive. The messages were very clear, but they may remain too theoretical. If everyone is going to use it, I think it should be reduced to a theoretical language that everyone can understand."	1
<i>Information, emotional hunger</i> "As I said, the informative videos and articles were good. The fact that there was a survey afterwards was actually good in the sense of "Did I really understand?" It was also useful for me. I especially liked the informative parts, as I said." "Of course, some of it I had heard or read somewhere, some of it I didn't know at all. It was good for me to remind me, there were things I didn't know at all, especially in the parts about emotional hunger, for example, learning what triggers my eating attacks, these parts were very instructive for me." "Mostly the videos and what is written underneath like the description of the videos, I think I liked that part the most."	3

<p><i>Comprehensiveness</i></p> <p>"I think it is very comprehensive, i mean, from the eating plan to physical activity, cognitive parts, thought cards, motivation, mindful eating"</p> <p>"So it's not a 'save and exit' app."</p> <p>"So it's just a self-monitoring app where the user keeps track of themselves and doesn't have to search and find out, 'Okay, I took this many steps today, but what does that mean, how many steps should I have taken?' or 'I recorded these meals, but what happens, I ate this much, but what happens?'" "It is an application that also provides a really good education"</p>	2
<p><i>Professionalism of design</i></p> <p>"First of all, the program is very professionally designed. Whether it is video recordings, voice-overs, texts, questions that we can provide our feedback on what we listen to... I honestly believe it is very sufficient in this respect. In the same way, I think the fact that it asked us to participate actively, not just passively, and that we made some data entries and kept our records during the day were also positive features in this respect."</p>	8

The "Useful Features" theme encompasses positive feedback from participants trying to lose weight with the "Bi'Kilo" application, covering the application's effective components and benefits to users. Under "Benefits to Weight Loss-Control" participants indicated that those with issues related to emotional eating might find the application more beneficial. The "Mindful Eating" section reflected that eating habits became more conscious and unnecessary eating was prevented. In "Applying What Was Learned" participants shared that they could integrate knowledge from the application into their

daily lives, improving exercise and eating behaviors. "Integration into Daily Life and Awareness" emphasized the application's impact on their lives and how it increased their awareness. "Transcripts of Videos" showed that participants found the written content alongside videos useful. "Finding the Application Beneficial" stated that the application was effective in weight control and awareness and deemed professional and helpful by users. Table 4 presents codes related to the Useful Features theme and indicates from which participants they were obtained.

**Table 4.** The codes and participants related to the theme of useful features

Code	Participant
<p>Benefit for weight loss-control</p> <p>"Definitely, I think people who have problems with emotional eating will benefit more. It is a good learning and tracking tool. I think it is passive in terms of awareness. If I have a control problem with eating, I don't log it, so notifications are important in this respect."</p>	1
<p><i>Mindful eating</i></p> <p>"I think especially the "Mindful eating" part is a nice part."</p> <p>"When I ate, I just ate. When I combined it with mindful eating, I stopped eating as soon as I was full and didn't eat unnecessarily."</p>	4
<p><i>Practice what was learned</i></p> <p>"I was able to integrate the information I learned in the application into my daily life. Yes, for example, there was a section on mindful eating, like watching something while eating. I pay more attention to it now, focusing only on eating."</p> <p>"When I started Bi'Kilo, I mean, when I started using the application, I was already doing sports, but I can say that it made it a little easier to track it. Because there was also the sports part"</p>	7
<p><i>Integration into daily life and awareness</i></p> <p>"I tried to increase my hiking."</p> <p>"I integrated it because I already downloaded this app for that purpose."</p> <p>"Some of it is still ongoing. Watching the same TV show while eating reminded me of eating later. When I saw that TV show, I became aware of that."</p>	5
<p><i>Transcripts of videos</i></p> <p>"Useful parts; first of all, the information parts, the videos, the transcripts given to us were very good, but when I was watching the videos, after a certain point I got bored and stopped and continued to read the transcript. But the information was very good, it was very good to read the transcript."</p>	6

<p><i>Considering the app useful</i></p> <p>"It is something that everyone will have when we say let's do an application about weight control, but what is really different for me and what the person can say "Oh, I am doing something different"; eating with awareness."</p> <p>"I think the thought cards and feedback are really good, thank you."</p> <p>"It is definitely a very useful and professional application, which is evident from the modules."</p> <p>"I think it can definitely be useful. Maybe, I guess it would definitely be useful, but it depends on the individual."</p>	2
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The "Technical-Application Issues" theme covers criticisms related to the operation and content of the "Bi'Kilo" application, ranging from technical performance to content quality. Issues like "Application Slowness and Crashing" caused discomfort due to unexpected shutdowns and errors, negatively affecting user experience. "Inability to Speed Up Videos" indicated limited information intake due to fixed video speeds. "Considering Thought Cards Redundant" and criticisms like "The

Videos Were Kind of Boring" pointed to the content being unengaging or insufficient, with some participants already familiar with the information. "Questions Easily Answered" raised concerns about the instructional quality of the content, suggesting improvements to prevent misinformation. Table 5 presents codes related to the Technical-Application Issues theme and indicates from which participants they were obtained.

**Table 5.** The codes and participants related to the theme of technical-practical issues

Code	Participant
<p><i>Application Slowness and Crashing</i></p> <p>"A couple of times I got an error notification while using the app. I took a screenshot but lost it. 3-4 times the app closed but I never experienced it afterwards."</p>	1
<p><i>Inability to speed up videos</i></p> <p>"The videos could have a faster narration."</p>	1
<p><i>Considering thought cards redundant</i></p> <p>"I couldn't reconcile the title with the content in the thought cards module. I thought I was going to be presented with mottoes that would increase my motivation or food intake. Other than that, there is no module that I would call unnecessary."</p>	1
<p><i>The videos were kind of boring</i></p> <p>"Another point is that the content of the videos seemed boring to me. It seemed very simple, I didn't learn anything new. Perhaps I think like that because I am interested in nutrition, but I didn't feel that I learned."</p>	4
<p><i>Questions answered easily</i></p> <p>"Also, I could answer questions without even watching the videos. I think you should be able to tell from those questions who watched the video"</p>	4
<p><i>Demotivation</i></p> <p>"It was a reminder for me when I wasn't paying attention, but my motivation dropped during the follow-up phase"</p> <p>"Technical issues were time-consuming and not moving on to the next module without doing what I disliked was demotivating."</p>	4



"I thought, OK, I have learned it now, there is no need."	
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The "User Experience" theme delves into participants' experiences using the "Bi'Kilo" application, emphasizing its practical usability and impact. Under the heading "Availability and willingness to use" it's mentioned that the application can be easily integrated into daily life and offers a unique approach. Participants highlighted the focus on not just weight loss but also increasing awareness about emotional eating. The "Preference Assessment" suggests the application could be an alternative to therapy, though face-to-face therapeutic support might still be necessary. In the "Experience - Reasons for Discontinuation" section, participants shared challenges related to continuous use, such as lack of time or forgetfulness. "Distinctive Aspect" underscores the comprehensive

approach of the application and its features that enhance awareness of eating behaviors. Under "Data Entry Problems" some participants noted that data entry could be complex and repetitive. "Reasons for Using" emphasizes the application as an economic alternative to therapy access. Lastly, "Easy Time Allocation for Use" indicates that while the application does not require much time, some challenges were encountered. The "Improvement" theme has been developed to represent the difficulties encountered by participants with the "Bi'Kilo" application and their suggestions for its enhancement. Table 6 presents codes related to the User Experience Issues theme and indicates from which participants they were obtained.

**Table 6.** Codes and participants related to user experience theme

Code	Participant
<p><i>Availability and willingness to use</i></p> <p>"It's nice to have an app like this at our fingertips, it can be used in daily life."</p> <p>"Yes, because I have already used a lot of such apps before and they were just "calorie tracking and recipes", but there are not many apps that aim to raise awareness like BiKilo. I think emotional eating will also attract people's attention."</p> <p>"People who want to lose weight immediately do not want to use it because this application is an application that is based on awareness and requires a long process."</p>	5
<p><i>Preferability assessment</i></p> <p>"I think it can be. I think that having at least one point in the day to focus on and being able to see them retrospectively, to see them collectively, can be useful for people who have a need in this regard."</p> <p>"For those who have difficulties or reservations about reaching a therapist, maybe the application may be a more attractive alternative, while those who may have difficulty in maintaining it on their own may be more interested in working with someone and progressing under someone's control, face to face with the therapist."</p>	8
<p><i>Experience - Reasons for Discontinuation</i></p> <p>"I don't follow it at the moment, I don't have much time."</p> <p>"Well, at first it was tempting, it was easy to enter it after every meal, but then I started to forget, I didn't have time at that moment, or I was out, I was meeting a friend, I couldn't enter it. When I couldn't enter it a few times like that, it didn't follow up."</p>	3
<p><i>Distinctive Aspect</i></p> <p>"I think it is different and meaningful and I think the thought cards are also useful, but they can be integrated more, so as I said, I think it is meaningful for the person in terms of providing motivation."</p> <p>"Oh, I'm doing something different"; eating with awareness. I think this will have an additional benefit and the thought cards are also useful."</p> <p>"I think it is very comprehensive, that is, from the eating plan to physical activity, cognitive parts, thought cards, motivation, eating with awareness, which is very important, I think it is useful to address them separately"</p>	2

<p><i>Dislike, data entry</i></p> <p>"The only thing that was challenging for me was this; we log in every day, you know, the parts we eat and drink, entering it over and over again after everything, because it asks for the same days over and over again, I forget, for example, "Did I write the same thing again?" It was a question mark. Actually, it can be easy to enter day by day, but it was challenging to enter the same days again after each tab."</p> <p>"No, I didn't have any difficulties, except for the part of re-entering them all one by one."</p> <p>"I will say it again, but as I said, it would be more comfortable if the data entry parts were just a separate tab."</p> <p>"Also, for example, if I want to write dinner, I can only write one thing there."</p> <p>"I think it would be better if; for example, these tabs could be in a separate thing, when I want to benefit from it, I should be able to enter these parts and listen to them, I should be able to read that part, but I think it would be better if the diary entry part was separate, that is, unconnected to each other."</p>	3
<p><i>Reasons for Using</i></p> <p>"They may prefer the application because it is free, I don't know if it will be free now, but it will be much more economical in every sense."</p> <p>"Apart from that, I think people have a little bit of difficulty in finding a psychiatrist or psychologist who is suitable for them and with whom they can really establish a telepathic relationship. Therefore, it is also good for them to progress on their own, they may prefer to apply it in that respect, and it is a process that spreads over a little more time, that is, it is something that they can use on the road during the day, not at certain hours with 1 or 2 checks a week, but "OK, let me see what I have done now"."</p>	2
<p><i>Easy Time Allocation for Use</i></p> <p>"But I don't think it's challenging or impossible for me not to make time for it."</p>	8

The "Improvement" theme represented participants' encountered difficulties with the "*Bi'Kilo*" application and their suggested enhancements. "Notification and Planning Features" are needed to facilitate adaptation and include personalized exercise and eating plans, with weekly motivational messages also mentioned. "Progress Flexibility Within Modules" suggested that allowing users to

proceed at their own pace could increase motivation and improve the experience. "Question-Answer Feedback" lack of feedback on right or wrong answers after animations hindered the learning process, necessitating development for accurate knowledge acquisition. The specific codes related to this theme and from which participants they were obtained will be detailed in Table 7.

**Table 7.** Codes and participants related to improvement theme

Code	Participant
<p><i>Notification and planning features</i></p> <p>"There should be a stimulus so that the adaptation process is easier. If it is an application that everyone can use, there should be a plan for everyone. For the exercise plan, the weekly-monthly plan I mentioned in the meal plan can be made.",</p> <p>"Notification, exercise plan, eating plan-meal record comparison",</p> <p>"There can be a pool where people can enter their motivational phrases on a weekly basis, or a pool can be created and that motivational phrase can be added as the first notification of the day."</p>	1
<p><i>Progress flexibility within modules</i></p> <p>"It would have been more logical to complete this practice on a certain day. But as I said, as I don't have this motivation, maybe I need to finish it a little faster right now, because it is important for me to be able to complete it within a period of time and be able to make feedbacks, so the one-week periods restricted me a little bit, in that sense, I could have finished the application faster, in terms of being able to make these feedbacks."</p>	8
<p><i>Question-answer feedback</i></p> <p>"I will also say this about it; when I answered the questions in that section, I could not see what the correct answer was, this has been improved. I was saying "A" but I was saying "is it really A, did I do it right or wrong", this section can be looked at in order not to learn wrong information."</p>	7

The "Suggestions" theme is predicated on participants' feedback to enhance the development of the "*Bi'Kilo*" application. The "Meal Plan-Record Comparison" suggests that participants find an integrated comparison between the meal plan and food record beneficial. Moreover, they indicate the possibility of having multiple entries for mindful eating, suggesting that separate entries could be made for each meal, necessitating the customization of the application according to the user's habits and the inclusion of reminders. The "Transition Between Sections" reveals participants' perception of the restriction in progressing to subsequent sections without entering specific records as a limitation, advocating for flexibility in this feature. The "Expert Feedback" underscores the need to enrich the application with feedback from dietitians or experts, enabling users to act more accurately and consciously. "Motivational Sentences" convey participants' belief in the potential of these sentences to boost morale and encourage users. "Areas or Features Requiring Improvement" reflect feedback on specific technical aspects of the application, such as video durations, notification frequency, activity

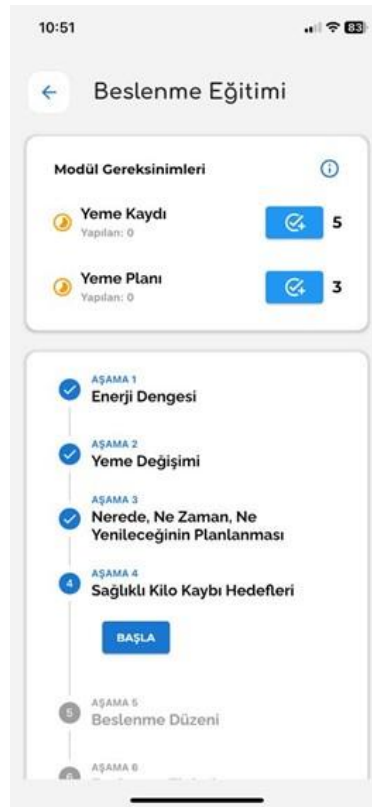
suggestions, and other visual and functional features. In the "Recommending to Others" theme, while participants express a positive view of the application, this approval notably hinges on the user-friendliness of the application. The "Alternative to Face-to-Face Support" theme elucidates participants' views that mobile applications cannot fully replace face-to-face support. However, such applications offer advantages in terms of accessibility and convenience. The "Alternatives for Use" theme emphasizes the potential for mobile applications and face-to-face support to complement each other. The "Useless Parts of the "*Bi'Kilo*" Application" theme critiques technical issues and the lack of personalization within the application. The "Notifications, Increasing the Number of Records, Integrating a Pedometer" theme suggests that additional interactive features, recording options, and integration of a pedometer would be beneficial. Participants' feedback contains valuable suggestions for making the application more practical both technically and content-wise. Table 8 presents the codes related to the Suggestions theme and indicates from which participants they were obtained.

**Table 8.** Codes and participants related to the theme of suggestions

Code	Participant
<p><i>Meal plan-record Comparison</i></p> <p>"I didn't like the design of the meal plan in the application. When entering each meal, you have to enter them one by one, but I think a person should be able to create their own scheme and have basic headings according to how many meals they consume (weekly/monthly) or be able to change these headings. There should also be times for these, and if there's no entry at those times, there should be a reminder. People might forget, it's not suitable for the sustainability of the application.",</p> <p>"I would also like a scheme where the meal plan and food record could be viewed more parallel. I have a meal plan and a separate food record that can be viewed from different channels, whereas I should be able to compare these two so I can see what I've planned, what I've eaten, how much I've eaten, and how much I'm sticking to the plan.",</p> <p>"There's only one entry for mindful eating in a day, yet a person can practice mindful eating at every meal.", "Weight tracking should also be added, and after entering the starting weight, a new entry can only be made after a certain period (like 15 days)."</p>	1
<p><i>Transition between sections</i></p> <p>"What I didn't like, well not that I didn't like but maybe it could be done differently, we couldn't proceed to the next section without entering a certain number of records. That feels a bit like a task to me, I might actually be more interested in the content of the next section and could benefit more from it, but if I don't enter my diet for five days, I can't proceed, which I think could change."</p> <p>"Actually, I was entering it every day, but as I said, especially after I started not being able to pass the section, I began entering it 2-3 times a day for meals. Normally, I would enter it every day, I mean if there wasn't such a restriction."</p>	7
<p><i>Expert feedback</i></p> <p>"Instead of the tracking phase being the same, there could be current changes, a dietitian could give me feedback."</p> <p>"It could be possible if there is proper expert control because otherwise, I may not be aware of my own mistakes."</p> <p>"If you don't want to go to a dietitian, there's an app that allows you to control and become aware of it on your own."</p>	4

<p><i>Motivational sentences</i></p> <p>"There could be a pool where people can enter their motivational sentences weekly, or a pool could be created and the first notification of the day could add that motivational sentence, like 'You can do it'."</p>	1
<p><i>Areas or Features Requiring Improvement</i></p> <p>"Definitely would be a plus. Especially reminders at times like 5 PM and 10 PM for eating-sleeping hours are very important."</p> <p>"Some videos are too long, it would be better if they didn't exceed 7-8 minutes."</p> <p>"At the beginning, the app was lagging, I was having trouble logging in, but then the content seemed to improve and it was smooth."</p> <p>"I didn't know this information, maybe it would be nice if such information was given right when you log into the app."</p> <p>"1) Setting the scale entry at the beginning 2) Shortening the video duration 3) Increasing the frequency of notifications"</p> <p>"I would suggest a small daily activity, like 10 minutes of 3 sets x movement per day."</p>	5
<p><i>Recommending to others</i></p> <p>"I would and I did because it's an application that will provide long-term benefits for us, it makes a person reflect on themselves. The content is good." P5</p> <p>"I would. Generally, I would, even I mentioned it to my family. 'I participated in such a pilot study, there's this app, it's good.' My mom is trying to lose weight, sometimes she follows wrong diets, especially I would like to recommend it to my mom for her to get the right information." P7</p>	5, 7
<p><i>Alternative to face-to-face support (1, 5, 7)</i></p> <p>"It could be, but I don't know if it would be sufficient. I think people always need authority when making such a radical change in their lives or when they set a goal and want to achieve it. The app tells me what to do, but if I don't want to do it or can't, how will the app convince or force me? Also, the app only gives me information but doesn't understand my feelings or problems. Sometimes talking face to face and seeing the reactions of the person in front of me can be more effective." P1</p> <p>"It could be because it saves time for people. It's easy to enter, and since it's aimed at my goal, it could be an option."</p> <p>"People who generally wouldn't prefer face-to-face might be those with high work pressure, who don't have or want to spare time... Those who want to use a mobile app might be people who need detailed conversations, motivation." P5</p> <p>"Using a mobile app can definitely be an alternative. In terms of accessibility, I can't always reach a dietician or psychologist at any moment, but I can access a mobile app. I find it beneficial in this regard."</p> <p>"But since every person is individual and their needs are individual, I can't generalize it, 'This is the case for everyone,' but it could be an alternative for most." P7</p>	1, 5, 7
<p><i>Suggestions for improving the app</i></p> <p>"I think these new notifications are good. Because now every app is using it and it's definitely motivating."</p> <p>"Maybe there could be a separate graph for each day?"</p> <p>"The apps could be made bigger for easier access, etc."</p> <p>"Such as the hunger fullness scale, etc. Apart from that, thought cards, feedbacks were really on point, well done. Apart from that, the modules were pretty good, by the way. Regarding videos and content, definitely no feedback, everything is amazing in that part, I think no change is needed. Just a visual change could be made, in terms of colors, the design could be changed, apart from that, I don't think I have any feedback." P2</p> <p>"Recipes suggested by a dietician could be added."</p> <p>"I thought about adding calories but it could be very triggering."</p> <p>"Alternative physical activities could be included. A notification could come with a new task. 'Do yoga, walk for 1 hour'"</p> <p>"Increasing notifications, giving daily tasks." P4</p>	2, 4
<p><i>Alternatives to use</i></p> <p>"I think the use of a mobile app and face-to-face support shouldn't be alternatives but could complement each other."</p> <p>"A person might have difficulty finding a suitable expert, obtaining an appointment or reaching them, might not afford the session fees, or might have trouble conforming to session times."</p> <p>"For obesity, for instance, 'I have weight issues but I actually have such a problem that I can't solve.' they might come in that way. From that perspective, face-to-face support might be preferred more and although it has been provided by a professional team, some people might want to see a professional in front of them, ask them a question because this can vary from person to person so I'm giving different answers."</p>	2

<p><i>Useless parts of the Bi'Kilo app</i></p> <p>"The useless parts; as I said, the record-keeping parts were very limited. Also, the app sometimes gave errors, lagged, or shut down. That was annoying."</p> <p>"Also, it could have been a bit more personalized. For example, I could enter my weight, height, age, etc., and it could offer me a program suitable for that. Or it could ask about my goals. For instance, I want to lose weight, maintain my weight, or eat healthily."</p>	6
<p><i>Notifications, increasing the number of records, integrating a pedometer</i></p> <p>"Some of the feedback I actually gave at the beginning, maybe the number of records we couldn't make more than once a day could be increased."</p> <p>"I don't know how possible it is, but could a pedometer or something similar be implemented into the program regarding exercise? It would have been nice to enter it because when we enter it now, we enter the approximate steps we do in exercise, but maybe a pedometer could be integrated into the program?"</p>	8



**Figure 1.** Screenshot from the App-1, Nutrition Education Module Main Screen





**Figure 2.** Screenshot from the App-2, Practices Main Screen



**Figure 3.** Screenshot from the App-3, Hunger Fullness Scale

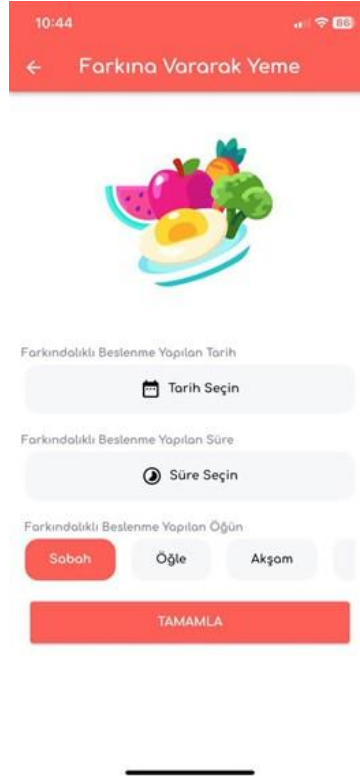


Figure 4. Screenshot from the App-4, Mindful Eating Module



Figure 5. Screenshot from the App-5, User's Page

#### 4. Discussion

The findings from the “*Bi’Kilo*” mobile application study demonstrate that integrating visual and technical features, comprehensive content, and a focus on user interaction and engagement is consistent with current literature emphasizing the importance of these elements in digital health interventions (41). Particularly, the application’s visual and technical features, the efficiency and clarity of content, and the sections addressing knowledge and emotional hunger have received positive user feedback. This corresponds with literature emphasizing the importance of clear information presentation and visual richness in health applications, supporting “*Bi’Kilo’s*” success. Additionally, users’ appreciation of the application’s comprehensive and professional design underscores the necessity for such applications to be extensive and user-friendly. The findings provide significant insights into user perceptions and experiences with the “*Bi’Kilo*” mobile application for weight control. Overall, qualitative feedback indicates moderate to high usability, acceptability, and a positive impact on promoting healthy behaviors. Consistent with previous mHealth research, incorporating an interactive, self-monitoring approach has enhanced engagement with the application’s design and content (41, 42). Features facilitating self-monitoring, such as food diaries and activity tracking, have been consistently highlighted as beneficial. The application’s focus on mindful eating reflects evidence suggesting mindfulness techniques can improve eating behaviors and weight loss outcomes (43). However, some users have highlighted the content’s theoretical nature, echoing Olson and Emery’s findings on the need for user-centered content design in health applications, indicating a demand for more practical and relatable materials (43).

Specifically, adding interactive modules and video content is understood to enhance user engagement and learning outcomes in digital health platforms, as indicated in Hutchesson et al. research in 2015 (19). The content and design of the application have significantly influenced user experience and engagement. Participants reported satisfaction with the orderly arrangement of modules and the presence of videos and texts that captured users’ interest and effectively presented information. However, some technical issues and content criticisms have negatively impacted user motivation, leading to the discontinuation of the application. This underscores

the importance of content and functionality in maintaining user engagement over time.

User feedback has highlighted various areas for improvement in the “*Bi’Kilo*” application. Technical issues like application crashes and the inability to adjust video speed were common concerns, similarly discussed by Payne et al. regarding the importance of technical reliability for user engagement (41). Users have also suggested personalizing content and enhancing interactive features. In line with the findings of Peng et al., specific content and interactive elements are emphasized as crucial for sustaining user engagement in digital health interventions (42). User feedback has revealed some critical limitations and areas needing improvement within the application. In particular, occasional slow performance and technical glitches negatively affected the user experience. Some users found the content monotonous or insufficient and requested more interactive elements in videos. Enhancements such as flexibility in module progression, displaying correct answers after animations, and more personalized content are necessary to increase user engagement and provide a more effective learning experience.

Additionally, offering more motivational messages and personalized feedback could further enhance the application’s effectiveness. However, certain design limitations have impacted sustainable engagement. The requirement to complete a specific number of logs before progressing between modules was demotivating for some users. Increasing speed and content access flexibility could enhance engagement (41). Streamlining data entry systems is another recommended improvement. Further personalization based on user data, automatic feedback, and integration of expert input will assist in optimizing long-term efficacy (19). Features enabling comparison between diet plans and actual intakes could also enhance accountability. While promising for facilitating self-intervention, blending with human support where possible will ease progress and overcome barriers (43). The findings from the “*Bi’Kilo*” application present elements consistent with existing literature, highlighting how it can be improved based on user experiences and feedback. The results confirm the strengths of the “*Bi’Kilo*” application in providing a suitable, accessible platform for enhancing awareness and motivation, critical initial steps for lifestyle change. Maximizing flexibility and personalized support will further

reveal the potential for sustainable improvements in weight management behaviors. However, a notable limitation of the study is the small sample size, as it included only eight female participants, thereby limiting the generalizability of the results to broader populations.

The qualitative feedback from users of the “*Bi’Kilo*” mobile application demonstrates its promise in offering an accessible, versatile intervention for weight control. Principal findings indicate that participants perceive the application as moderately to highly usable and acceptable. The application’s interactive components have enhanced awareness, knowledge, and motivation concerning dietary, activity, and mindful eating habits. Integrating tracking features and informative multimedia content has been particularly effective in facilitating initial behavior changes. The “*Bi’Kilo*” mobile application provides a comprehensive approach to weight control by integrating modules that address not only nutritional habits but also physical activity and cognitive-behavioral aspects. Users have appreciated the multimedia approach of the application, especially the use of videos and reflective exercises. However, some reported experiencing technical issues and desired more practical, less theoretical content. The application’s design, professional layout, and encouragement of active user participation were generally well-received. Nonetheless, some limitations regarding sustained engagement and personalization have been recorded. Future iterations of the application should focus on enhancements that maximize content access and speed flexibility. Simplifying data entry systems and integrating additional expert input tailored to individual progress data could promote

ongoing engagement. Further, including more reminders, integration with activity trackers, the ability to enter motivational statements, and the capability to make comparisons between diet plans and actual intakes are recommended. Adding social features for interaction with other users could facilitate accountability and motivation. Applications like “*Bi’Kilo*” play a significant role in modern health management, particularly in weight control, offering accessible and user-friendly platforms for individuals aiming to improve health behaviors. The effectiveness of applications relies on continuous improvement based on user feedback, technological advancements, and developments in health management practices. In applications, flexibility, personalized content, and behavioral science principles can significantly contribute to effective weight control and overall health. Insights from the “*Bi’Kilo*” application highlight the potential of mHealth solutions to empower individuals to take holistic and sustainable responsibility for their health. “*Bi’Kilo*” and mHealth applications are crucial in reducing barriers to accessing weight management interventions while optimizing mHealth tools with continuous user input and evidence-based behavioral design principles, critical for effective self-managed lifestyle change.

Furthermore, such mHealth tools can broadly impact a non-clinical sample level by expanding access to face-to-face programs. However, this impact depends on aligning content and features with user needs and preferences. Conclusions and recommendations emphasizing the need for ongoing development and adaptation underscore the potential and challenges of mHealth applications in the health sector.

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