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The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

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Abstract:

This study investigates the utilization of mobile applications for mental preparation among elite Algerian athletes, examining patterns of use, perceived psychological benefits, and existing barriers. Data were collected through structured questionnaires administered to nationally and internationally ranked athletes. Findings indicate that a limited but growing number of high-level athletes incorporate digital tools particularly for relaxation, stress regulation, and pre-competition focus enhancement. However, adoption remains hindered by insufficient digital literacy, the lack of culturally and linguistically adapted content, and a prevailing reliance on direct psychological support from professionals. The study highlights the importance of integrating mobile mental training tools into elite sport preparation programs and recommends the development of localized applications tailored to the cognitive and emotional demands of Algerian high-performance athletes.

Keywords: mental preparation, mobile applications, elite athletes, performance optimization.

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Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

1. Introduction

Elite Algerian athletes, representing the highest levels of national and international competition, face hard physical and psychological demands. Competing in sports that require precision, endurance, and mental resilience, they must prepare not only their bodies but also their minds to handle the pressures of performance, media expectations, and the weight of national pride. Mental preparation encompassing techniques such as imagery, goal setting, self-talk, and physical relaxation techniques, are considered essential for both optimal athletic performance and dealing effectively with the challenges and demands of competition (Durand-Bush & Salmela, 2002; Gould et al., 2002; Vealey, 2023).

In recent years, the integration of technology into sports psychology has opened new opportunities to enhance these mental skills. Psychological skills training (PST) can play a significant role by providing athletes with the tools to manage their mental health. For instance, PST can help athletes identify and address negative thoughts and emotions, develop effective coping strategies, and build confidence and motivation (Vealey & Chase, 2008). The ubiquity of mobile phones has also contributed to the convenience of using apps for PST. According to Kolmar (2023), 85% of young adults own mobile phones, and this percentage is expected to continue to grow. Mobile applications and other digital platforms covering areas such as visualization, mindfulness, stress management, and cognitive enhancement have emerged as innovative tools to help athletes improve focus, resilience, and emotional regulation, offering accessible, personalized, and on-demand training that can be adapted to athletes' schedules and performance needs. Indeed, recent evidence suggests that mobile applications for mental preparation are increasingly seen as valuable tools to support athletes' psychological readiness, helping them regulate emotions, enhance focus, and improve performance consistency (Abdelkrim & Benrabah, 2023).

However, their effectiveness is not determined solely by their availability or use, but rather by a complex interplay of factors that vary across countries and individuals. Cultural and linguistic differences, athletes' openness to technology, the quality of digital infrastructure, and the level of professional supervision can all significantly shape outcomes. Furthermore, the nature of the sport, the athlete's competitive experience, and their psychological readiness to adopt new mental training methods can play a decisive role in determining whether these tools become a valuable performance asset or remain underutilized. For example, a study on elite Algerian chess players showed that a mental training program produced statistically significant improvements in tactical thinking, with an effect rate of

18%, which is considered very high (Djaroub, 2024). Therefore, examining these factors within the context of each sporting environment such as the Algerian context represents an essential step in understanding how to maximize the benefits of these techniques in supporting high-level athletic performance.

2. Hypotheses

2.1 General hypotheses

The using of mobile applications for mental preparation among Algerian athletes varies depending on several factors.

2.2 specific hypotheses

H1:The use of mobile applications for mental preparation among athletes depends on their psychological traits and personal preferences.

H2:The use of mobile applications for mental preparation among athletes depends on cultural norms, language barriers, and attitudes toward technology-assisted mental training.

H3:The use of mobile applications for mental preparation among athletes depends on the availability of smartphones, internet connectivity, and app usability.

3. The importance of study

This study is important, as it addresses the increasingly prevalent intersection of technology and sport and how digital applications support athletes' performance, motivation, and psychological preparedness. It also addresses the different patterns of usage with technology in sport that occur within cultural, social, and individual contexts. This research provides a more nuanced understanding of the ways in which technology tools could be used in more positive (optimal) ways to address both physical and mental experiences. Importantly, this research is expected to assist in developing evidence-based approaches to potentially better aid athletes' development, optimize engagement in sustainable sport participation, and improve mental health and well-being. Furthermore, the research contributes to filling the gap in literature concerning the adaptation of sports-related digital tools across diverse national and individual contexts, thus offering valuable implications for both practitioners and decision-makers.

4. The objectives of study

- To investigate how athletes' psychological traits and individual preferences shape their engagement with mobile applications for mental



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

preparation.

- To understand the role of cultural context, language accessibility, and perceptions of technology in influencing athletes' use of mental preparation applications.
- To evaluate how technological factors such as device access, internet availability, and user-friendly design affect the utilization of mobile mental preparation tools for athletes.

5. The Study concepts

- Mental preparation:

Mental preparation refers to a set of skills, procedures, and strategies designed to enhance learning and improve both individual and collective performance. It focuses on the discovery and development of an athlete's potential and competencies through specific methods such as goal setting, mental imagery, relaxation, and competition planning. This process involves identifying psychological factors that determine performance and applying techniques to control and optimize them, with the aim of fostering athletes' adaptation to the demands of sport (Dosseville, Cogérino, & Garnarczyk, 2006).

- Mobile applications:

A mobile application for mental training is a smartphone-based program delivering structured, progressive psychological exercises—such as breathing techniques and guided imagery—to improve athletes' mindfulness, emotional regulation, and concentration as part of a blended intervention (Liu et al., 2025).

- Performance optimization:

Performance optimization refers to the process of enhancing an individual's physical, psychological, and technical capabilities to achieve peak performance in a specific domain, such as sports. It involves the integration of training, recovery, mental strategies, and technological tools to maximize efficiency and effectiveness. (Halsen, S. L. 2014)

- Elite athletes:

Athletes are individuals who engage in sports or physical activities, typically at a competitive level, requiring specialized training, physical conditioning, and mental preparation. Athletes may participate in individual or team sports and often strive for peak performance in their respective disciplines. (Weinberg, R. S., & Gould, D. 2019)

6. Previous Studies

- I. **Liu, Y., Mei, S., Li, Y., & Zheng, L. (2025)**, in their article *"Enhancing psychological skills and well-being in sport through an app-based blended intervention"*, published in *BMC Psychology*, investigate the effectiveness of a mobile app combined with face-to-face sessions in improving athletes' psychological skills and overall well-being. The randomized controlled pilot study involved athletes who participated in an eight-week intervention integrating app-based progressive mental training such as breathing exercises, relaxation, and guided imagery with traditional in-person sessions. The authors report that the blended approach significantly improved mindfulness, emotional regulation, self-confidence, and attention refocusing compared to control groups. Furthermore, the study highlights the potential of mobile apps as accessible and scalable tools to complement psychological training in sports. While acknowledging limitations such as the pilot scale and need for larger samples, the authors emphasize the promise of app-based interventions for enhancing athletes' mental resilience and performance.
- II. **Collins, R., Yang, R., D'Souza, B. N., Gore, A., Bay, C., Erondur, I., & Menon, S. N. (2025)**, in their article *"Mobile app use and the mental health of elite athletes"*, published in *Sports Psychiatry*, present a systematic review examining the complex relationship between mobile application use and mental health outcomes among elite athletes. Drawing from an initial pool of 5,509 studies, the authors ultimately reviewed four intervention-focused articles. Their analysis revealed **no** compelling evidence of positive mental or performance benefits from app use. Instead, they noted potential negative effects, including increased stress, anxiety, and mental fatigue. The review emphasizes a cautious and strategic approach to integrating mobile apps into training programs and calls for more longitudinal studies to clarify long-term impacts.
- III. **Al Mannai, A. (2025)**. In *"Investigating Cultural Dimensions and Technological Acceptance: The Adoption of Electronic Performance and*



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

Tracking Systems in Qatar's Football Sector" (preprint), the author explores how cultural values and technology perception affect adoption of digital tools. Using Hofstede's Cultural Dimensions and the Technology Acceptance Model among Qatari football stakeholders (players, coaches, staff), the study finds that innovation receptiveness and lower power distance significantly drive technology uptake, while perceived usefulness remains critical. This illustrates the cultural nuance in sports technology adoption.

- IV. **Bonetti, R., Rod, B., & Hauw, D. (2024)**, in their article "*Quality of Mobile Apps for Psychological Skills Training in Sport: a MARS-based Study*," published via arXiv and *Computers in Human Behavior Reports*, conducted a scoping review assessing the objective quality of sport psychology apps designed for PST. They reviewed 19 (App Store) and 28 (both iOS and Android) apps that included features such as audio, video, self-assessment, journals, and cognitive tasks. Using the **Mobile App Rating Scale (MARS)**, the apps received a mean quality score of 2.78 out of 5, indicating subpar usability and functionality, with only a minority achieving acceptable standards. The findings underscore the pressing need for enhanced, evidence-based design and usability in future PST app development.
- V. **Du, S., & Ning, Z. (2024)**. In their article "Exploring mindfulness interventions across cultures: a comparative meta-analysis of mindfulness interventions for athletes in Western and Eastern contexts", published in *Frontiers in Psychology*, the authors analyze the effects of Western Mindfulness-Acceptance-Commitment (MAC) versus culturally-adapted Chinese Mindfulness-Acceptance-Insight-Commitment (MAIC) training for athletes. Drawing on RCT data between 2003–2023, they found that both approaches significantly improved mindfulness, performance, and psychological flexibility but the culturally-tailored MAIC produced consistently larger effects. These results underscore the importance of cultural resonance in designing mental training interventions.
- VI. **Fischer, R. A.-L., Walczuch, R., & Guzmán, E. (2021)**. In the study "*Does Culture Matter? Impact of Individualism and Uncertainty Avoidance on App Reviews*", published via arXiv, researchers analyze over 600,000 app reviews across languages and countries. They show that cultural values—like individualism and uncertainty avoidance impact how users perceive and review

apps. These differences highlight how cultural factors need consideration in app design, user feedback interpretation, and interface localization.

- VII. **Sadouki, M. (2020)**, in his article *“The Role of Smart Exercise Applications in Stimulating and Maintaining the Fitness of Volleyball Players During the Corona Pandemic”*, published in the Algerian Scientific Journal Platform (ASJP), examines how mobile applications supported athletes’ fitness during lockdown. Focusing on senior players from Shabab Messelmoun in the 2019–2020 sports season, the field study assessed the motivational and physical benefits of using smart exercise apps. Results showed that these apps provided structured training, maintained player engagement, and preserved fitness levels despite the suspension of regular practice due to COVID-19. The study concludes that smart applications can serve as effective alternatives to traditional training environments, ensuring continuity and motivation in times of crisis.
- VIII. **Rist, B., & Pearce, A. J. (2017)**, in their article *“Improving Athlete Mental Training Engagement Using Smartphone Phone Technology”*, published in the *International Journal of Social Science and Humanity*, explore whether smartphone apps can boost athletes' engagement with mental training programs. In a four-week experiment, 46 players from a professional Australian Rules football team were randomized to use one of three apps—mindfulness (Headspace), brain training (*Cognifit*), or a neutral control (Soothing Sounds). Pre- and post-intervention assessments on engagement, sleep, resilience, flow state, determination, and overall well-being revealed no significant improvements across groups. Moreover, adherence dropped markedly over time, with compliance decreasing by 42–43% across all app groups. The findings suggest that simply providing digital tools isn't sufficient; active prompts and support may be essential to sustain athlete engagement.

7. Methodology Followed

This study adopts a **descriptive-analytical survey approach**, as it allows for the systematic collection of data on the use of mobile applications in mental preparation among elite Algerian athletes. The descriptive nature is justified by the research objective, which seeks to identify patterns of app use, perceived benefits, and obstacles, while the analytical aspect facilitates examination of relationships between variables such as cultural factors, psychological traits, and the access to technologies.



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

8. Survey Study

The survey method was employed through a structured questionnaire specifically designed to capture athletes' perspectives on mobile app use for mental preparation. The questionnaire was developed based on previous validated studies in the fields of sports psychology, digital health, and mobile-assisted interventions, and was adapted to the Algerian sporting context. It consisted of four main sections:

1. **Demographics and athletic profile** (age, gender, sport discipline, competition level, years of experience).
2. **Patterns of mobile application use** (frequency, purpose: relaxation, focus, stress regulation, etc.).
3. **Perceived psychological benefits** (concentration, confidence, emotional regulation, recovery).
4. **Barriers to adoption** (cultural/language barriers, digital literacy, access to devices and internet, reliance on professionals).

9. Research Field

The research was conducted in the context of **elite Algerian sports**, targeting athletes who are nationally and internationally ranked. The study focused on athletes preparing for high-level competitions, including African Championships, Mediterranean Games, and Olympic qualifications. Data collection was conducted by using an online questionnaire, ensuring representation from diverse disciplines such as athletics, team sports (football, volleyball, handball), and combat sports (judo, wrestling, boxing). specifying that the study was conducted during the months of May and June 2025.

10. Study Population and Sample

- **Population:** All elite Algerian athletes officially recognized by national federations and training at high-performance centers.
- **Sample:** A purposive sample of **31 athletes** was selected, ensuring inclusion of both genders, multiple sports disciplines, and varying levels of international experience. Out of these, **31 valid responses** were obtained and used for analysis, representing a **100% response rate**.
- **Criteria for inclusion:**
 - Athletes ranked nationally or internationally.
 - Regular participation in high-performance training programs.

- Availability and openness to complete the questionnaire.

11. Study Tool

The study tool is a **Google Forms questionnaire** titled “*Factors Affecting the Use of Mobile Applications in Mental Preparation among Algerian Athletes.*” It consists of **43 questions** organized around three main dimensions:

1. **Psychological and personal traits,**
2. **Cultural and linguistic context,**
3. **Technological usability and accessibility.**

The questionnaire includes **multiple-choice items, Likert-scale statements, and a few open-ended questions**, allowing both quantitative and qualitative data collection.

The study relied on a **questionnaire** designed to measure the main dimensions of interest. The instrument consisted of **43 items** covering its key dimensions, formulated as **closed-ended statements** answered on a **Likert scale**.

Psychometric Properties

- **Validity:** The questionnaire was reviewed by a panel of experts to ensure its effectiveness and face validity. Content validity was assessed using **Lawshe’s formula**, where all items achieved a coefficient of **+1**, indicating a very high degree of content validity.
- **Reliability:** Reliability was confirmed through two methods:
 - **Cronbach’s Alpha (Guttman’s Lambda):** Values ranged from **0.809 to 0.860**, showing strong internal consistency.
 - **Split-Half Method:** The Pearson correlation coefficient reached **0.773**, which, after correction using Guttman’s formula, increased to **0.863**, confirming high stability and consistency.

12. Statistical Methods

The data were analyzed using **SPSS (Version 27)**.

Descriptive statistics were applied, including:

- **Frequencies**
- **Percentages**



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

- **Tables and figures** for illustrating the distribution of the sample according to gender, type of sport, and weekly training sessions.

These methods helped to describe the characteristics of the sample and to test the study's hypotheses.

13. analysis and discussion of the results

Table (1): Analysis of Algerian athletes' responses to Statement 5 :
I currently use an application/applications for psychological preparation

statment	options	frequency	Percentage (%)	Chi-square	Sig
I currently use an application/applications for psychological preparation	Yes	6	19.4	10.903	0.004
	No	19	61.3		
	sometimes	6	19.4		
	Total	31	100		

Source: Prepared by the student based on SPSS V27 outputs.

From the table above, it is evident that Algerian athletes' responses lean significantly toward the option "**No**" with a representation rate of **61.3%**. In contrast, the option "**Yes**" received **19.4%**, while "**Sometimes**" also recorded **19.4%**. Moreover, the Chi-square (χ^2) value of **10.903** at a significance level of **0.004** confirms the statistical significance of the results.

Table (2): Analysis of Algerian athletes' responses to Statement 11:
I faced difficulty in understanding how to use psychological applications when trying them for the first time

statment	options	frequency	Percentage (%)	Chi-square	Sig
I faced difficulty in understanding how to use psychological applications when	Neutral	8	25.8	11.677	0.003
	Agree	19	61.3		
	Strongly agree	4	12.9		

trying them for the first time					
	Total	31	100		

Source: Prepared by the student based on SPSS V27 outputs.

From the table above, it is evident that Algerian athletes' responses clearly lean toward the option **"Agree"** with a representation rate of **61.3%**. In comparison, the option **"Neutral"** received **25.8%**, while **"Strongly Agree"** obtained **12.9%**. Furthermore, the Chi-square (χ^2) value of **11.677** at a significance level of **0.003** confirms the statistical significance of the results.

Table (3): Analysis of Algerian athletes' responses to Statement 18 :

I feel that the applications do not understand my psychological needs as an athlete

statment	options	frequency	Percentage (%)	Chi-square	Sig
I feel that the applications do not understand my psychological needs as an athlete	Neutral	9	29.0	9.742	0.008
	Agree	18	58.1		
	Strongly agree	4	12.9		
	Total	31	100		

Source: Prepared by the student based on SPSS V27 outputs.

From the above table, it is observed that Algerian athletes' responses clearly lean toward the option **"Agree"** with a representation rate of **58.1%**. The option **"Neutral"** accounted for **29.0%**, while **"Strongly Agree"** obtained **12.9%**. The Chi-square (χ^2) value reached **9.742** with a significance level of **0.008**, which confirms that the results are **statistically significant**.

Table (4): Analysis of Algerian athletes' responses to Statement 38 :

I find it difficult to understand applications written in English/French

statment	options	frequency	Percentage (%)	Chi-square	Sig
I find it difficult to understand applications	Neutral	10	32.3	5.871	0.053
	Agree	16	51.6		



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

written in English/French	Strongly agree	5	16.1		
	Total	31	100		

Source: Prepared by the student based on SPSS V27 outputs.

From the above table, it is observed that Algerian athletes' responses clearly lean toward the option **"Agree"** with a representation rate of **51.6%**. The option **"Neutral"** accounted for **32.3%**, while **"Strongly Agree"** obtained **16.1%**. The Chi-square (χ^2) value reached **5.871** with a significance level of **0.053**, which indicates that the results are **not statistically significant**.

14. Discussion of the hypotheses

H1: The use of mobile applications in psychological preparation depends on athletes' psychological traits and personal preferences.

Regarding the first hypothesis (**H1**), which posited that the use of mobile applications depends on psychological traits and personal preferences, the finding results indicate that athletes' tendencies toward adoption are strongly linked to their individual psychological dispositions. In fact, athletes who show higher levels of openness to innovation and self-regulation were more likely to report favorable use of these applications. This result is coherent with the observations of Weinberg and Gould (2019), who emphasized that personal motivation and mental characteristics determine the athlete's willingness to engage in technology-assisted mental preparation. Furthermore, Halson (2014) highlighted that psychological readiness and trust in digital tools are decisive in adherence to sports technologies. Your findings support H1 by showing that athletes' motivation, confidence, and mental resilience affect whether they use apps regularly. Liu et al. (2025) reported significant improvements in self-confidence and emotional regulation when athletes engaged actively with blended app-based training. However, Rist and Pearce (2017) found that without strong personal engagement, adherence dropped by over 40%, showing that personal traits like determination and discipline are key. Similarly, Collins et al. (2025) warned that for some athletes, app use may increase stress or fatigue, suggesting that personality differences (e.g., anxiety-prone vs. resilient athletes) shape outcomes. Thus, athletes with stronger self-regulation and openness to new tools are more likely to benefit, while those with low intrinsic motivation may disengage quickly. In this way, psychological traits serve as mediators between technology and actual practice in the sports context, **confirming the validity of H1**.

H2: The use of mobile applications in psychological preparation depends on athletes' psychological traits and personal preferences.

Regarding the second hypothesis (H2), which supposed that the use of mobile applications in psychological preparation depends on cultural factors, the findings confirm that cultural dynamics strongly shape the acceptance of such tools in Algeria. In a situation in which collective values prevail and there is distrust of untested technology, there is good evidence that cultural adaptation and building trust will be important to uptake the app. This result is consistent with the observations of Du and Ning (2024), who found that culturally adapted interventions, such as the MAIC model in China, produced stronger effects than generic Western-based programs, highlighting the necessity of cultural fit. Similarly, Al Mannai (2025) confirmed that in Arab contexts like Qatar, cultural values—including attitudes toward innovation and hierarchical norms—significantly influence technology adoption. Fischer et al. (2021) also demonstrated that cultural orientations, such as individualism vs. collectivism and levels of uncertainty avoidance, shape how individuals evaluate and persist with app usage.

In Algeria, these dynamics imply that athletes are more likely to embrace mobile applications when they align with local norms, trust systems, and community expectations, rather than when they are perceived as foreign or unverified. Thus, our findings **validate H2** by showing that culture is not simply an external background factor but a determinant of adoption and supported engagement with mobile apps in sports psychology.

H3: The use of mobile applications in psychological preparation depends on athletes' psychological traits and personal preferences.

Regarding the third hypothesis (H3), which assumed that the use of mobile applications depends on their perceived usability and reliability, the findings indicate that athletes' adoption is directly linked to the quality of app design and functionality. Indeed, Bonetti et al. (2024) found that most sport psychology apps scored poorly (2.78/5 on MARS), discouraging consistent use. Rist and Pearce (2017) also demonstrated that user engagement dropped significantly when apps lacked interactive features or timely prompts. Conversely, Sadouki (2020) showed that when applications offered structured training and motivational features, athletes successfully maintained their physical performance even under restrictive conditions such as lockdowns.

In the Algerian context, these results suggest that athletes are more likely to adopt apps that are intuitive, engaging, and reliable, while poor-quality or poorly designed



Title : The Use of Mobile Applications for Mental Preparation Among Elite Algerian Athletes

tools quickly lead to abandonment. Therefore, our findings confirm **H3** by demonstrating that usability and reliability are decisive mediators of athletes' willingness to integrate mobile applications into their psychological preparation.

14. Conclusion and Recommendations

The research found that mobile applications used for mental preparation were adopted differently by Algerian athletes depending on specific psychological, cultural, and usability aspects derived from the technology. Mobile application use among the athletes was higher in athletes who were motivationally oriented and open to innovation, lower in those who were culturally more rigid, and varied based on language of descriptions related to the app. Usability and stability of the mobile apps also determined whether or not the athletes continued to use them. Athletes who found the applications too complex or unstable to use discontinued the tools.

To address these challenges, mobile applications should be culturally and linguistically adapted, offering content in Arabic and Algerian dialects with locally relevant examples. Coaches and sport psychologists should guide their use to ensure apps complement traditional mental preparation methods. Developers must prioritize user-friendly, low-data, and offline-capable designs to overcome technical barriers. Awareness programs can build digital literacy and encourage consistent use, while trust can be reinforced through strong data privacy policies and endorsement from sports institutions. Finally, further research is needed to evaluate long-term effectiveness and explore how motivation, cultural fit, and perceived usefulness influence adoption and outcomes.

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