Seminar Nasional Prodi Magister dan Doktoral Pendidikan Olahraga FIK UNNES
Vol. 1 No. 1 (2025)

Lensing the Experiences of University Students and Athletes Using Fitness Applications: A Qualitative Systematic Review and Thematic Synthesis

Johnlenon Aliser[1abcde], Didik Cahyono[2bcde], Hadi[3cde], Jet Longakit[4de], Joseph Lobo[5de] Sri Sumartiningsih[6acde]

Universitas Negeri Semarang, Indonesia[1236]
Mindanao State University- Iligan Institute of Technology, Philippines[4]
Bulacan State University, Philippines[5]

ABSTRACT

Fitness applications (FAs) are becoming increasingly popular; however, their effectiveness depends not only on their features but also on how they are being experienced. Hence, this paper aims to provide a synthesis consolidating the experiences of university students and athletes using FAs. Researchers searched studies through databases and screened them with the inclusion criteria. Six studies were appraised using the Critical Appraisal Skills Programme (CASP) and Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) checklists. Three analytical themes emerged from the reviewed studies: 1) Self and Social Dynamics in Application Use; 2) Motivation and Behavior Support; and 3) Fitness Application Design. This highlights that FAs have impacted the personal and social lives of university students and athletes. It has essential features that promote health behavior change, goal setting, reflection, emotional support, and rehabilitation. Despite its usability features, FAs also have their limitations (e.g., time constraints, unnecessary app notifications, a lack of personalization and contextualization, and complex features). Researchers suggest that FAs developers should focus on developing an improved and simplified monitoring and feedback system, providing users with personalized and context-aware support for physical activity. FAs should incorporate interventions that address these limitations for sustained physical activity participation.

Keywords: University students; athletes; fitness applications; experiences; physical activity participation

Author Contributions: a – Study Design; b – Data Collection; c – Data Analysis; d – Manuscript Preparation; e – Funding Acquisition

INTRODUCTION

FAs are designed to promote behavior modification, supporting users to keep motivated, engaging in physical activity and exercise (Southcott & Jooste, 2023). Its popularity has increased over the years due to its ability to meet their exercise needs (Asfari & Handayani, 2023). Some of its features include tracking and recording fitness activities with personalized and detailed instructions (Zhang & Xu, 2020). Additionally, the American College of Sports Medicine (ACSM) predicts that trends in 2025 for the fitness industry will involve a significant change in exercise programming, utilizing digital tools like FAs to monitor and provide feedback to improve physical activity participation (Newsome et al., 2024). However, it is not clear which factors and features of FAx are the reasons why they are being

downloaded, with the intention of actively participating in physical activity and sports.

In a university context, the number of students using fitness software is considerably large (Wang et al., 2022). Research shows that using fitness applications has helped students increase their physical activity and motivation (Figueroa et al., 2023; Ibragimova et al., 2025; Basto & Ferreira, 2025). Physical activity participation is strongly associated with the continuous use of FAs (Basto & Ferreira, 2025). It sustains healthy exercise routines (Southcott & Jooste, 2023), which boost regular physical activity (Basto & Ferreira, 2025). Thus, the development of FAs should focus more on goal achievement and monitoring features for the high-performance expectancy of FAs intended usage (Yang & Koenigstorfer, 2021). One study suggests focusing on the entertainment and sociability value of FAs (Wang et al., 2022). On the contrary, one study reported that university students can still pursue achieving their fitness goals without getting entertainment value from FAs (Zhang & Xu, 2020). Other findings also revealed that using FAs can only lead to comparing one's physical activity performance to others (Russel et al., 2023). As such, the effectiveness of using FAs depends not only on the features it provides but also on how university students and athletes experience and engage with them in actual physical activity participation.

Various studies highlight different experiences of people using FA (Southcott & Jooste, 2023; Asfari & Handayani, 2023). While quantitative studies related to the topic are evident on multiple databases, qualitative research, particularly in university and sports contexts, is limited (Lieffers et al., 2021; Russel et al., 2023; Ringberg et al., 2023). Therefore, there is a lack of consolidated qualitative evidence that must be examined through systematic review and thematic synthesis. To address this gap, this qualitative systematic review aims to synthesize these existing qualitative studies and explore how university students and athletes perceive and experience fitness applications. This method enables researchers to identify common themes that could provide valuable insights into the motivational, social, and design-related impacts. This systematic review is guided by the research question, " What are the experiences of university students and athletes using FAs within their physical activity participation?"

METHODS

This qualitative systematic review was registered under the registration number CRD420251153882 in the International Prospective Register of Systematic Reviews (PROSPERO). This protocol registration ensures transparency and reduces duplication of similar reviews. Moreover, this review adhered to Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines for reporting systematic reviews (Page et al., 2021). On the other hand, the quality of the selected qualitative studies for the review was appraised using the CASP checklist (Long et al., 2020). The researchers also considered using the ENTREQ statements to increase transparency in reporting qualitative synthesis (Tong et al., 2012).

Eligibility Criteria

To guide the researchers in answering the research question, eligibility criteria were developed using the Population, Phenomenon of Interest, and Context

(PICo) framework (Porrit et al., 2024). This technique ensured that the selection criteria were appropriate for qualitative evidence synthesis. Additionally, part of the inclusion criteria was the selection of studies that explore the motivation, perceptions, and experiences of university students and athletes in the use of FAs. Due to the limited qualitative research on the preferred PICo, mixed-method studies with qualitative content were considered. Therefore, quantitative studies with no qualitative or experiential data were excluded from the selection. The researchers regraded that all selected studies for this review are peer-reviewed, written in the English language, and published from 2020 to 2025. Opinion papers, editorials, commentaries, conference proceedings, theses, and dissertations were part of the researchers' exclusion criteria

Table 1. ***Criteria Inclusion and Exclusion for Qualitative Systematic Review using the PICo Framework***

	Inclusion Criteria	Exclusion Criteria
***Population* (P)**	University students and athletes who are actively participating in physical activity (both male and female)	Non-university students and athletes (e.g. recreational exercisers, employees, adults)
***Phenomenon of Interest* (I)**	Studies exploring the use of fitness applications (e.g. smartphone and web-based fitness applications)	Studies that do not focus on use of fitness applications (e.g. wearable technology, virtual technology, e-learning/online learning)
***Context* (Co)**	Studies conducted in the context of physical activity participation (e.g. sports, exercise, recreation)	Studies conducted om context of non-physical activity participation (e.g. classroom learning)

Search Strategy

The researchers used Scopus as the primary database for this qualitative systematic review. This database provides comprehensive coverage of various research journals, including education, psychology, health sciences, and sports. To strengthen the soundness of the search and minimize the risk of omitting relevant studies, the researchers considered using Google Scholar as a supplemental source. This strategy was perceived as justifiable, provided the scope of the review and the emphasis on synthesizing qualitative evidence are within a manageable body of literature. Guided by the PICo framework, the search strategy utilized keywords and Boolean operators (e.g., OR) to maximize the retrieval of related studies (MacFarlane et al., 2022). Search keywords included variations as shown in Table 2.

Table 2. ***Search Keywords Based on PICo Framework***

Concept (PICo)	Keywords/ Variation
***Population* (P)**	(student athletes* OR university athletes* OR athletes* OR university students*)
***Phenomenon of Interest* (I)**	(fitness applications* OR mobile applications* OR exercise applications* OR fitness apps* OR mobile apps* OR exercise apps* OR digital fitness apps*)
***Context* (Co)**	(physical activity* OR physical activity participation* OR sports participation* OR physical activity engagement*)
Qualitative Focus	(experiences* OR motivation* OR attitude* OR lived experiences*)

Study Selection

The researchers adhered to the PRISMA 2020 guidelines during the study selection process. Database searching in Scopus identified 255 records, with an additional 16,800 records accessed from Google Scholar. Subsequently, the researchers used Mendeley as a reference manager, removing duplicates from Scopus. On the other hand, due to the large number of studies found on Google Scholar, researchers perceived that it was not feasible to screen all records. Instead, the first 300 studies ranked by their relevance to the topic were selected for screening. During the screening process, a systematic review artificial intelligence (AI) tool called Rayyan AI was used, which carefully screened the studies (Ouzzani et al., 2016). Of these, 486 records did not meet the inclusion criteria (e.g., non-university students and athletes, non-FAs related, no qualitative component, etc.) Following full-text review, six articles were excluded due to their unclear population (n=1), inaccessible full-texts (n=2), lack of qualitative component (n=1), and unacceptable publication type (n=2). Researchers identified six studies that met the inclusion criteria and were used for review and synthesis. This selection process is illustrated in Figure 1.

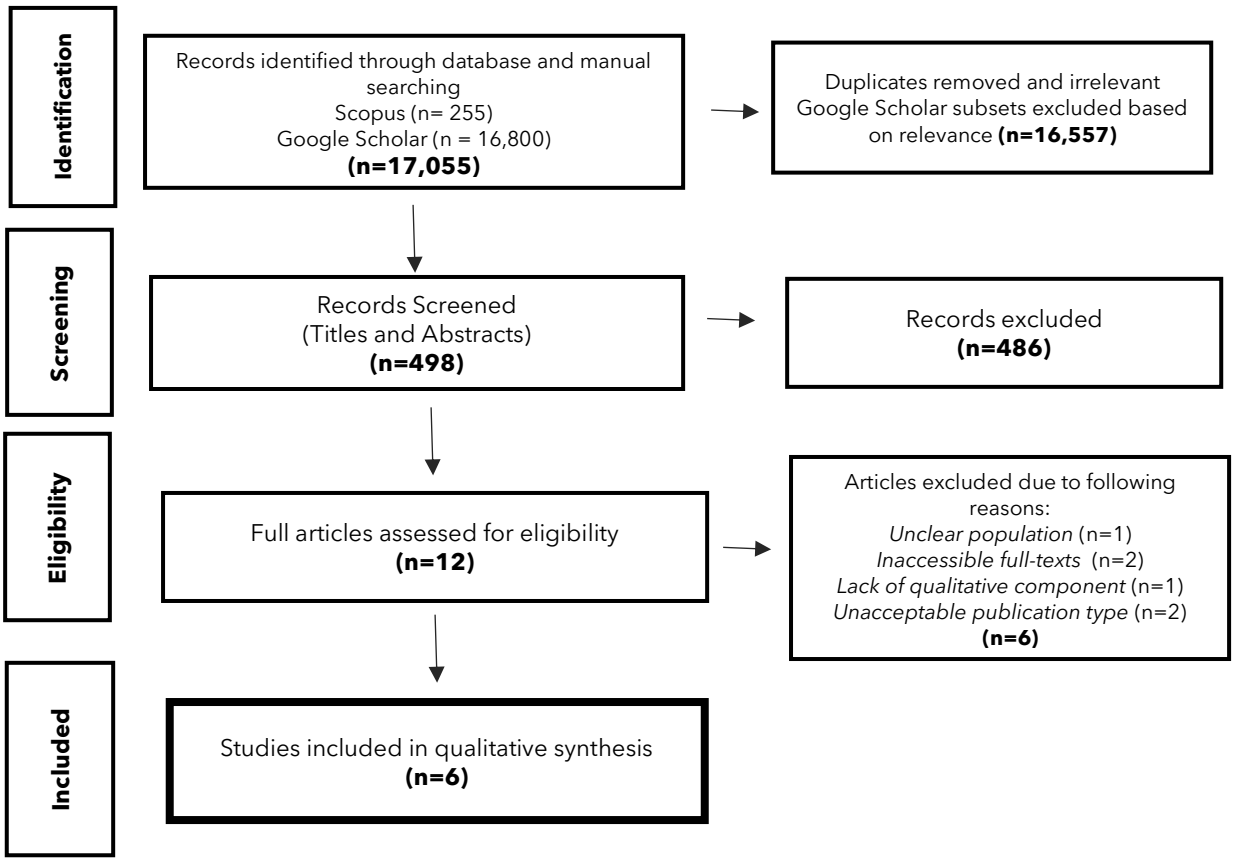

Figure 1. ***Flow Diagram of Study Selection Process***

Quality Appraisal

The included studies in this qualitative systematic review were assessed using the CASP checklist. This tool enabled the researchers to organize the synthesis of the studies based on their quality (Long et al., 2020). It evaluates the clarity of the study aims, the appropriateness of the qualitative methodology, the recruitment strategy, reflexivity, ethical considerations, the trustworthiness of data analysis, and

the value of the findings (CASP, n.d.). Researchers carefully appraised and rated each item as "Yes", "No", or "Can't Tell". Annotations were also written to explain the strengths and weaknesses of each qualitative study

Data Extraction and Synthesis

Key information from each study was collected through standardized data extraction. Data extraction was performed independently by the researchers and examined for accuracy. Extracted data included bibliographic details, research design, participants' characteristics, and key qualitative findings (Imperial College London, n.d.). Then, these qualitative findings were synthesized using the thematic synthesis (Jowsey et al., 2021). Researchers engaged in line-by-line coding of relevant texts from the findings, developing descriptive themes, and creating analytical themes that showed meanings and patterns (Thomas & Harden, 2008). Codes were compared from each study to identify similarities, differences, and overarching concepts (Thomas & Harden, 2008). Manual coding with Microsoft Excel was utilized to support the systematization of the codes. A new set of themes and sub-themes that reflected university students' and athletes' experiences of using FAs.

RESULTS

Characteristics of Included Studies

The six included articles, as shown in Figure 1, were examined independently by the researchers for a qualitative systematic review and thematic synthesis. The extraction of the details for each study was guided by using ENTREQ to ensure the completeness of the review. Included studies were published between 2020 and 2023 and were conducted in different countries, including the United States, Canada, China, and Malaysia. Sample sizes from these studies ranged from 10 to 103 participants drawn from university students and athletes who are using FAs. Three studies were pure qualitative research, while three were mixed-method research. All studies employed qualitative approaches, including in-depth and semi-structured interviews, qualitative content analysis, qualitative checklist, and text messaging. Table 3 shows the characteristics of the included studies with their themes and sample supporting codes

Table 3. *Study Details from Data Extraction*

Authors (Year)	Methodology	Participants	Fitness App Studied	Themes	Sample Supporting Codes
Russel et al. (2023)	Phenomenology	18 collegiate club runners across the USA	Strava	Self-Presentation	"And so I guess I feel like… more able to just kind of be honest and myself on Strava and it's less about, like, photos and image and more just about my own running"
				Social Comparison	"I thinkit [Strava] can be really fun and I think it can also have negative impacts because it can be a tool for comparison really easily"
				Motivation	"There's times when I won't really feel like getting out for a run, and then I'll go on there and see that one of my friends got out and did it, so I'll be like cool, I'll go out and do it too."
Ringberg et al., (2023)	Qualitative Content Analysis	19 athletes who had ACLR with the goal to return sports	BAck iN the Game (BANG)	Interacting with the App	"It was great to have a psychological support. In the app menu I was able to choose based on my own needs"
				Challenging Experiences with the app	"Early in my rehabilitation I was really struggling. I couldn't get anywhere with my physical exercises; that was a difficult time for me to use the app."
				Supportive Experiences with the app	"Setting goals has helped me to stay focused on what's most important in my rehabilitation"
	Explanatory mixed method design	41 students from higher institute of	Virtual Fitness		"The trainer taught combat movement

Mokmin & Jamiat (2020)	(employed interview for qualitative data collection)	learning in northern part in Malaysia	Trainer App called TRAINIME	No theme reported	specifically and is very good"
					"the movements are easy to follow and are enjoyable"
Zhang et al. (2020)	Explanatory mixed method (employs semi-structured interviews)	10 Chinese college students	Not specified	Fitness achievements come from self-efficacy	"I use keep (a fitness app) three times a week. I use it for losing weight …Losing weight is a painful thing, but I still persevered …lost almost 20 kg. I should thank myself. I mean if I choose to go to the gym, I can still lose 20 kg in three months. So, I'm not going to increase my satisfaction with fitness apps just because I have lost weight"
				Negative opinion of entertainment	"… entertainment is not the main function of fitness apps. Some entertainment functions like leading boards, points, badges, they don't increase my level of satisfaction with fitness apps. In fact, I rarely notice games in fitness apps."
				Incompatible views on social connections	"I'd like to share my exercise status.… If someone gives me a thumbs-up, I will be very happy and it will improve my exercise efficiency"
Figueroa et al. (2023)	Mixed Method Design (employed text messaging, phone interview and exit interview)	Total N = 103 students of University of California (baseline).	DIAMANTE and Health SMS	Helpful, positive messages	"It is a positive opportunity, because it shows that you can beneficially impact your health just by walking. I keep it on my mind and it has

				Negative, annoying messages	lead to more walking." "I don't like those discouraging ones, such as 'you walked less than your goal,' 'you did not achieve your goal'. I probably set a goal which was hard to achieve, so I did not achieve the goal most of the days. And it has been kind of annoying and stressed to receive such messages frequently."
Lieffers et al. (2021)	Qualitative Research Checklist	32 First Year students of University of Alberta, Canada	My Viva Plan (MVP)	Behavior	"It [MVP] did have a little bit of an impact. When I was on it–it wasn't super specific. It would just be like, 'Did you eat a balanced meal?' So, if I logged on in the middle of the day and I answered, 'Um, my breakfast was kind of balanced, my lunch was not' and then I was like, 'Oh yeah. I need to eat a balanced supper.' So that's cool. Yeah."
				Emotions	I think it actually helped me a lot. It's been really beneficial just because it actually forces me to think about my day, and I find just when I have to write down what I did that day and write down if I ate healthy, it kind of makes me more motivated to eat healthy and work out just because it's like, I always do

		this—because I'm like, I'll put it in. Even if nobody sees it, I can see it. It helps me.
	Situation	"I feel like the mind-related component of the My Viva was pretty helpful for me because I was able to do reflections and always keep a mind on my goals; however, I didn't really delve deep into the other two probably due to lack of time."
	Thinking	"I remember when I would go on to the website, it would be like, 'you can work on nutrition. You can work on fitness. You can work on emotional goals and stuff,' so I thought that for me, that was a little encouraging to see all those sections and there's just resources that are available for you to work on any aspect you want to work on."

Summary of CASP Ratings

Six studies included in this systematic review consist of three qualitative studies (e.g., phenomenology, qualitative content analysis, qualitative checklist) and three mixed-method research (e.g., explanatory sequential research). The quality of methodology utilized in these studies was assessed by the researchers using the CASP Qualitative Checklist. Generally, most of these studies demonstrated methodological soundness meeting some CASP criteria, such as clarity of aims, appropriateness of qualitative methodology, alignment of design and aims, rigorous data analysis, clarity of findings, and value of the research.

On the contrary, reviewed studies revealed prevalent methodological and ethical limitations that compromise trustworthiness. Researchers identified no member checking and triangulation, with most studies relying on semi-structured interviews, which weakened the credibility of qualitative findings. Additionally,

respondent validation and feedback were not evident, which further limits the rigor of the studies. Reflexivity and researcher positionality were not mentioned, with minimal acknowledgment of how their assumptions may influence the data collection process. Similarly, some studies lack detailed participant selection criteria and recruitment strategies. Researchers' annotations also include limited discussion of data saturation. Overall, these limitations emphasize a questionable pattern of inadequate reflexivity and analytical depth across the studies. However, all studies provided valuable insights and contributions for development of thematic synthesis. Table 4 shows the summary of CASP ratings across six studies.

Table 4
Critical Appraisal of Included Studies Using CASP Qualitative Checklist

		Authors (Year)					
	CASP Checklist	**Russel et al. (2023)**	**Ringberg et al. (2023**	**Mokmin & Jamiat (2020)**	**Zhang et al. (2020)**	**Figueroa et al. (2023)**	**Lieffers et al. (2021)**
1	Clarity of Aims	Yes	Yes	Yes	Yes	Yes	Yes
2	Appropriateness of Qualitative Methodology	Yes	Yes	Yes	Yes	Yes	Yes
3	Alignment of Design and Aims	Yes	Yes	Yes	Yes	Yes	Yes
4	Recruitment Strategy	Yes	Yes	Can't Tell	Yes	Can't Tell	Yes
5	Appropriateness of Data Collection	Yes	Yes	Can't Tell	Yes	Yes	Yes
6	Researcher-Participant Relationship	Yes	Can't Tell	No	Can't Tell	No	Can't Tell
7	Ethical Considerations	Can't Tell	Yes	No	Yes	Yes	Yes
8	Rigorous Data Analysis	Yes	Yes	No	Yes	Yes	Yes
9	Clarity of Findings	Yes	Yes	Can't Tell	Yes	Yes	Yes
10	Value of Research	Yes	Yes	Yes	Yes	Yes	Yes

Thematic Synthesis

This subsection presents the qualitative findings from the reviewed studies, identifying common patterns and insights. Researchers were guided by the research question, " What are the experiences of university students and athletes using FAs within their physical activity participation?" Through manual coding and clustering related ideas, broader themes emerged that capture both shared experiences of university students and athletes. The synthesis highlights a structured understanding of the phenomenon while recognizing limitations of these studies. Figure 2 shows the themes and sub-themes developed by the researchers.

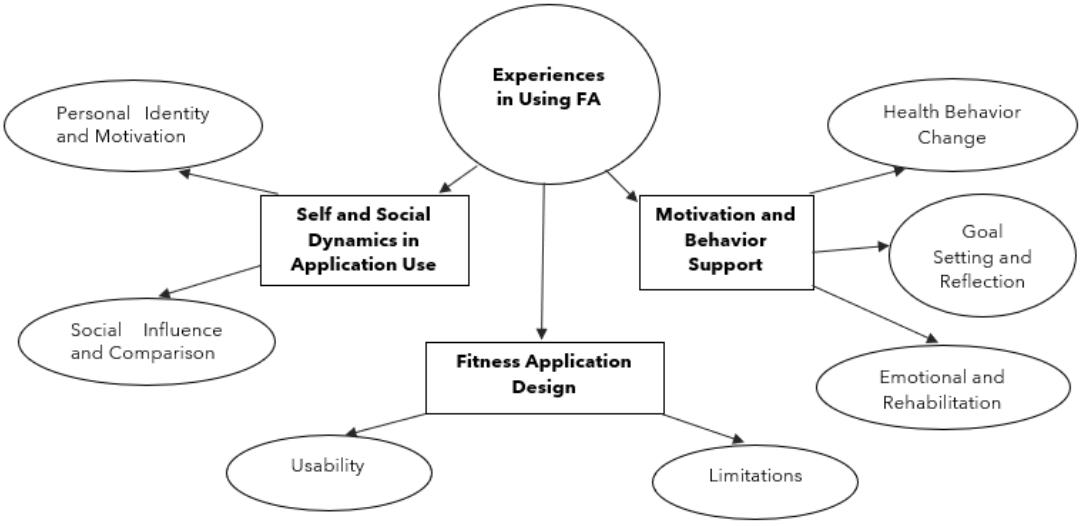

Figure 2. ***Emergent Themes and Sub-Themes Across Included Studies***

Self and Social Dynamics in Application Use

The analytical theme of *self and social dynamics in application use* was derived from the descriptive themes of included studies (e.g., self-presentation, social-comparison, social connection, internal dedication and motivation). Self and social dynamics in application use pertain to the direct experiences of university students and athletes in FAs, influencing their personal and social lives.

Personal Identity and Self-Motivation

Participants openly shared perceptions and experiences in using FAs. Researchers highlighted that some participants modified their behavior to present a more desirable image by selecting activity posts that looked good (Russel et al, 2023). In other words, participants are more careful about how they present themselves on social platforms. However, participants perceive using FAs as a space for honesty and self-expression: "And so I guess I feel like… more able to just kind of be honest and myself on Strava and it's less about, like, photos and image and more just about my own running" (Russel et al, 2023). Despite the usability of FAs in physical activity participation, the continued use of such relies on internal dedication and motivation: "Fitness app is so well designed and perfect, and the service quality is so high, if people don't want to use it, then all these advantages are meaningless" (Zhang & Xu, 2020). In this regard, motivation plays a crucial role in physical activity (Zhang & Xu, 2020).

Social Influence and Comparison

Studies reported that using FAs positively influences the social lives of the participants (Zhang & Xu, 2020; Russel et al., 2023). FAs are perceived as motivating to connect with others and get inspired by the performances shared within their social platforms: "There's times when I won't really feel like getting out for a run and then I'll go on there and see that one of my friends got out and did it, so I'll be like cool, I'll go out and do it too" (Russel et al, 2023). Additionally, using FAs has allowed them to share activity updates and receive feedback from others (Zhang &

Xu, 2020). Researchers highlight that participants' building connection is a way to feel more motivated towards physical activity: "If someone gives me a thumbs-up, I will be very happy and it will improve my exercise efficiency" (Zhang & Xu, 2020). On the other hand, it was reported that participants compared their achievements and activities to those of peers of similar levels. While social comparison can sometimes be motivating, some participants feel anxious, pressured, and discouraged (Russel et al, 2023). This negative effect influences the person to engage in physical activity: "I had a really bad run or workout one day, and I see others having better runs, then that can make me feel worse" (Russel et al, 2023). This only shows that the use of FAs varies from one person's point of view to another.

Motivation and Behavior Support

The analytical theme of *motivation and behavior support* was derived from the descriptive themes of included studies (e.g., progress, interacting with the app, experiences with the app, fitness achievement from self-efficacy, behavior, emotions, thinking). Motivation and behavior support refer to the benefits and values that university students and athletes are getting from using FAs.

Health Behavior Change

Studies show that continuous use of FAs positively alters the participants' behavior (Lieffers et al., 2021; Russel et al., 2023). These positive changes include increased physical activity and improved food choices. Using FAs has developed the participants' accountability, mindfulness, and awareness of health practices (Lieffers et al., 2021). The self-tracking and progress visualization of FAs gives a source of motivation to participants to continue pursuing behavior change: "I wasn't running as consistently or as fast. And so it's really cool to see like, how far I've like, progressed" (Russel et al., 2023). On the contrary, there are situational factors that may influence behavior change while using FAs. This includes pre-existing habits, limited time, academic demands, living arrangements, and financial constraints (Lieffers et al., 2021). Generally, researchers highlight that FAs have a variety of tools which encourage and support individuals to make change. Despite the personal living conditions, using FAs teaches people to be more motivated, take responsibility, and take action for their health: "I think it actually helped me a lot. It's been really beneficial just because it actually forces me to think about my day, and I find just when I have to write down what I did that day and write down if I ate healthy, it kind of makes me more motivated to eat healthy and work out just because it's like, I always do this—because I'm like, I'll put it in" (Lieffers et al., 2021). Likewise, it reinforces individuals to achieve goals and adjust lifestyle habits.

Goal Setting and Reflection

Studies reveal that using FAs among university students and athletes promotes goal setting and reflection (Lieffers et al., 2021; Ringberg et al., 2023). It was reported that the FAs features can support participants by improving their physical activity performance, especially those individuals who are going through rehabilitation: "Setting goals has helped me to stay focused on what's most important in my rehabilitation" (Ringberg et al.,2023). This shows that the use of FAs can support the person's mindfulness towards achieving goals. Additionally, participants' engagement in the reflection exercise encourages them to assess their

feelings about physical activity: "Reflections are helpful; I get a chance to ask myself 'how do I really feel'? " (Lieffers et al., 2021). Like goal setting, it was reported that daily reflections have helped the participants to be more cautious and self-aware to their habit: "Self-reflection is a self-awareness thing, right? So, if an app is telling you to be self-aware and you don't want to, then that's not going to change anything, right?" (Lieffers et al., 2021). Using FAs has helped participants not only engage in physical activities but also to make informed decisions. This highlights that there are such aspects learned from the FAs that can be applied beyond physical activity participation.

Emotional and Rehabilitation Support

Emotional and rehabilitation support are highlighted as one of the important features of FAs. Qualitative findings across studies show that using FAs has provided support to participants ' overall well-being (Lieffers et al., 2021; Ringberg et al., 2023; Figueroa et al., 2023). One study revealed that using FAs has been beneficial to athletes' rehabilitation progress: "I think the app was a good extra support in my rehabilitation, to ensure I got as much out of it as possible" Ringberg et al., 2023. The psychological support it provided motivated athletes to prepare for returning to physical activity and sports. Similarly, another study revealed that using FAs has helped university students reduce their stress and improve their mood; I think My Viva Plan definitely takes into account your mental health as well and how that interacts with your physical health, so I like that, especially being in school, a lot of people are really stressed out. So, I think it's a really good method to use" (Lieffers et al., 2021). Additionally, certain FAs provide a positive-framed message and feedback that will help improve physical activity performance. This concise information gives valuable implications about the next steps to take: "I liked the messages that were more motivational or focused on positive parts of exercising, such as doing it with friends or that I am almost there, and that I should keep pushing" (Figueroa et al., 2023). Therefore, researchers highlight that a well-designed and structured FA can provide a more engaging experience that supports sustainable behavior change.

FAs Design

The analytical theme, *FAs Design*, emerged from the descriptive themes of the included studies (e.g., challenging and supportive experiences within the app, fitness achievements, negative opinions of entertainment). This subsection discusses the usability and limitations of FAs from the experiences of participants across the various studies reviewed.

Usability

Three included studies reported the usability of using FAs in physical activity participation (Zhang et al., 2020; Mokmin & Jamiat, 2020; Ringberg et al., 2023). Participants who engage in physical activity with consistent use of FA have significantly increased their chances of obtaining fitness benefits: "I use fitness apps almost every day. I have used them for over 1200 days. In this process, I became healthier and thinner, and my skin became better. Many thanks to Yue-Dong Quan (a fitness app). I am very satisfied with their services" (Zhang et al., 2020). Apart from

its main function, FAs are uniquely designed to ensure that they provide new and enjoyable experiences. This can be a fun and engaging learning activity: "The movements are easy to follow and are enjoyable" (Mokmin & Jamiat, 2020). The FAs' satisfaction varies among the users' experiences; however, it is important to highlight that using FA can be a good guide for taking steps in achieving fitness: "Besides the information I receive from my doctor and physiotherapist, it's nice to have the extra tutoring [that comes with the app]" (Ringberg et al., 2023). Therefore, FAs are good supplementary guidance to physical activity participation.

Limitations

Studies revealed that using FAs can be frustrating, especially to those individuals who have difficulties managing their personal life and physical activity participation (Lieffers et al., 2021; Ringberg et al., 2023). It was reported that participants lack time engaging with FA (Lieffers et al., 2021; Ringberg et al., 2023). This occurs when they need to meet the demands of university life (Lieffers et al., 2021). Despite some notification features of FAs, participants perceive this experience as disruptive: "I was annoyed when I received notifications and didn't have the time to engage with the app (Ringberg et al., 2023). Moreover, some messages received from FAs are unmotivating and discouraging (Figueroa et al., 2023). Messaging content of FA lacks personalization and contextualization (Figueroa et al., 2023). At times, there are instances when messages are not necessary to read: "I don't like those discouraging ones, such as 'you walked less than your goal,' 'you did not achieve your goal'. I probably set a goal that was hard to achieve, so I did not achieve the goal on most days. And it has been kind of annoying and stressful to receive such messages frequently" (Figueroa et al., 2023). Researchers argue that the messaging feature could have been more effective if users were given the option of when and how frequently to receive messages. Additionally, one feature that participants dislike about FAs is its entertainment feature. One study reported that some FAs with fancy features are not useful or motivating; I still like the original version of Nike training (a fitness app). The revised version has many entertainment functions, such as calorie factory, limited badge, and calorie bank. These features are fancy, but not really useful. I can't find some courses now. I feel that this app has become complicated" (Zhang et al., 2020). Study argues that FAs have their functional capabilities, providing a practical and health-engaging feature (Zhang et al., 2020).

DISCUSSION

This systematic review is guided by the research question, " What are the experiences of university students and athletes using FAs within their physical activity participation?". Researchers synthesized six studies with qualitative findings. Subsequently, three analytical themes emerged from the descriptive themes across the studies: self and social dynamics in application use, motivation and behavior support, and FA design.

Self and social dynamics in application use were the prominent theme that emerged from two reviewed studies (Zhang et al., 2020; Russel et al., 2023). Studies implied that FAs are designed to guide users to engage in physical activity, allowing them to build personal identity and self-motivation. FAs served as an opportunity

for university students to express and present themselves in a way they wanted (Russel et al., 2023). However, it was reported that the intention to participate in physical activity relies on their self-motivation (Zhang et al., 2020). Similarly, one study revealed that the use of FAs provides users a sense of control over their behavior (Southcott & Jooste, 2023). The use of FAs increases their sense of autonomy, allowing users to choose their actions freely (Ryan& Deci, 2017). The study highlighted the influence of FAs on physical activity motivation by increasing one's control over behavior (Southcott & Jooste, 2023).

Results of this review also highlight that using FAs both positively and negatively influence their social lives: social influence and comparison (Zhang et al., 2020; Russel et al., 2023). Participants find FAs as tool to connect with others, which motivates them to engage in physical activity (Zhang et al., 2020). However, using FAs can sometimes lead to social comparison, leading participants to feel more anxious, pressured, and discouraged (Russel et al., 2023). One study states that a social group can influence an individual to behave in the same manner as they do. That is, a person may be influenced by people who are using FAs (Wang et al., 2022). Receiving performance feedback from others is the same as conforming to social norms to obtain social approval (Cooper et al., 2024). Whereas being part of a social group with shared interests only improves one's personal desire to sustain behavior (Beal et al., 2003) and maintain connections through FAs (Southcott & Jooste, 2023). Similar with the findings in this review, the term social comparison is evident in some studies. Social comparison refers to upward and downward comparison, where people compare their abilities and achievements with those of others who are better or worse (Buunk et al., 1990). Other studies revealed that comparing oneself to people with ideal body images decreases self-evaluation, leading to dissatisfaction with one's body image (Hendrickse et al., 2017; Betz et al., 2019). Researchers argue that FAs' design and interventions should moderate apps' social features to promote motivation and connection, while mitigating downward comparisons on users' well-being.

The second analytical theme that emerged from the descriptive themes of reviewed studies was *motivation and behavior support* (Lieffers et al., 2021; Russel et al., 2023; Ringberg et al., 2023; Figueroa et al., 2023). Studies show that using FAs influences awareness of diet, exercise, and overall health behaviors (Liefers et al., 2021; Russel et al., 2023). The mindfulness and accountability through tracking one's progress served as motivation to pursue a health behavior change (Russel et al., 2023). In other words, FAs teach individuals to be more motivated, take responsibility, and take action for their health (Liefers et al., 2021). On the contrary, researchers underscored that situational factors such as pre-existing habits, limited time, academic demands, living arrangements, and financial constraints hinder the health behavior change (Lieffers et al., 2021). Findings from one study confirmed that using FAs is an effective behavior change tool for sustaining a healthy exercise routine (Southcott & Jooste, 2023). However, physical activity participation is associated with continuous use of FAs (Basto & Ferreira, 2025). Researchers contend that continuous use of FAs increases individuals' competence. Competence pertains to being confident in one's capability to accomplish or perform a task (Vansteenkiste & Ryan, 2013). By that means, individuals who continuously use FAs are more health-conscious (e.g, competence), which

positively influences their attitude toward meeting exercise needs (Asfari & Handayani, 2023). However, this review indicates that situational factors (e.g., academic demands, living conditions, time constraints, etc.) may influence a person's mindfulness to engage in physical activity while using FAs. Thus, researchers suggest that FAs' designs should incorporate interventions that will address these barriers for sustained physical activity participation.

Goal setting and reflection are highlighted as part of the second analytical theme. Studies revealed that structured goal-setting and reflective practices improve focus, accountability, and self-awareness (Lieffers et al., 2021; Ringberg et al., 2023). FAs give an opportunity for the participants to set realistic goals (Ringberg et al.,2023) and reflect on their performance (Lieffers et al., 2021). Researchers perceive that goal setting and reflection are important skills that are helpful in making informed decisions. That is, development of FAs should prioritize its goal-achievement and monitoring features for high performance expectancy extent of intend use of FAs (Yang & Koenigstorfer, 2021). Additionally, these features are essential for users to articulate, reflect, and repeat on their fitness strategies, enabling them to maintain their physical activity routines (Xu et al., 2024). Therefore, goal-setting and reflection promotes emotion of competence, autonomy and relatedness (Southcott & Jooste, 2023)

Qualitative findings across the reviewed studies show that FAs also provide emotional and rehabilitation support. Studies show that FAs are helpful for injury recovery, stress management, and giving encouraging-framed messages (Lieffers et al., 2021; Ringberg et al., 2023; Figueroa et al., 2023). As such, a well-designed and more structured FA can provide an opportunity for users to engage in experience, supporting sustainable behavior change and overall well-being. Other study highlights that FAs are important for rehabilitation, physical function, and confidence in physical activity performance (Davergne et al., 2022). Moreover, these emotional features of FAs are useful addressing psychological challenges faced by FA users (Navarro et al., 2024). Researchers highlight that the sub-themes of motivation and behavior support (e.g., health behavior change, goal setting and reflection, and emotional and rehabilitation support) are the essential features of what FAs should provide. These are mechanisms that promote sustained physical activity participation and well-being.

The third analytical theme that emerged from the descriptive themes of the five reviewed studies was usability and limitations of *FAs design* (Zhang et al., 2020; Mokmin & Jamiat, 2020; Lieffers et al., 2021; Ringberg et al.,2023; Figueroa et al.,2023). The review highlights that FAs served as supplementary guidance to physical activity participation, which also provides enjoyable and useful features (Zhang et al., 2020; Mokmin & Jamiat, 2020; Ringberg et al., 2023). On the contrary, using FAs also has its limitations, which include time constraints, unnecessary notifications, lack of personalization and contextualization, and FAs' complex features (Zhang et al., 2020; Lieffers et al., 2021; Ringberg et al.,2023). Similarly, one study shows that FAs can improve users' physical activity participation retention; however, it lacks customization, which was seen as a significant barrier (Razaghizad et al., 2023). Hence, the researchers suggest that FA development must focus on developing an improved monitoring and feedback system, giving the users personalized and context-aware physical activity support. Newsome et al.,2024.

Developing FAs should have a simplified design with its central features, such as health behavior change, goal setting and reflection, and emotional and rehabilitation support. With that, FAs can move beyond being just a supplement physical activity tool, but a sustainable one that supports long-term participation in physical activities.

Strengths and Limitations of the Review

The purpose of this qualitative systematic review and thematic synthesis is to provide consolidated qualitative evidence that explores the experiences of university students and athletes using FAs. Researchers carefully adhered to a rigid methodological process of searching, screening, and selecting studies, enabling them to include six studies for review. Six studies were assessed fairly using CASP and ENTREQ, ensuring that the rigor and quality of synthesis are followed (Long et al., 2020). Researchers highlighted that all studies provided valuable insights and contributions for the development of thematic synthesis. Most studies demonstrated methodological rigor satisfying the CASP assessment criteria (e.g., clarity of aims, appropriateness of qualitative methodology, alignment of design and aims, rigorous data analysis, clarity of findings, and value of the research). On the other hand, researchers observed a recurring lack of use of triangulation, reflexivity, respondent validation, and unclear recruitment strategies in some studies.

Researchers suggest that future qualitative research must adopt rigorous methods, ensuring clear reporting of participant recruitment. Future qualitative studies must employ strategies such as triangulation, which is useful in cross-verifying information from multiple sources (Carter et al., 2014). Additionally, member checking is also encouraged to check the accuracy and resonance of the participants' experiences (Birt et al., 2016). Future researchers must practice reflexivity appropriately so that they can see how positionality statements risk creating false credibility (Sibbald et al., 2025). Therefore, future studies can strengthen methodological quality and provide more significant evidence based on the use of FAs among university students and athletes.

On the other hand, this systematic review has provided a more comprehensible understanding of the experiences of university students and athletes in using FAs. It has developed analytical themes and sub-themes, which enabled the researchers to identify how FAs impact personal and social life. However, these results may have been influenced by a degree of subjectivity, as interpretations were developed by the researchers. Researchers also acknowledge that the primary database used in searching related studies is limited. Researchers suggest expanding the scope of the review by including credible databases (e.g., Web of Science, SPORTDiscus, PubMed, etc.), foreign language journals, and relevant studies from 2015 to 2019.

Generally, this systematic review contributes to a better understanding of how the use of FAs impacts the experiences of university students and athletes, while also underscoring the methodological gaps. Addressing these gaps, therefore, enables researchers to produce more robust qualitative research and systematic reviews in this area of interest.

CONCLUSION

This qualitative systematic review synthesized evidence on the experience of university students and athletes using FAs. Findings revealed three analytical themes that are linked to these experiences, namely: 1) Self and Social Dynamics in Application Use; 2) Motivation and Behavior Support; and 3) Fitness Application Design. This review shows positive and negative experiences in using FAs. By translating these insights into practice, researchers suggest that FAs developers must focus more on developing an improved and simplified monitoring and feedback system, giving the users personalized and context-aware physical activity support. Therefore, FAs can move beyond being just a supplemental physical activity tool to a sustainable platform that supports long-term participation in physical activities.

REFERENCES

1. Amir Razaghizad, McKee, T., Malhamé, I., Friedrich, M. G., Giannetti, N., Coristine, A., Johnson, A., Ashley, E. A., Hershman, S. G., Struck, B., Sekoul Krastev, Pilat, D., & Sharma, A. (2023). Mobile Health Fitness Interventions. *JACC. Advances*, *2*(8), 100613–100613. https://doi.org/10.1016/j.jacadv.2023.100613

2. Asfari, L., & Handayani, P. W. (2023). Analysis of factors influencing user intention to use fitness applications for virtual workouts. *2023 10th International Conference on ICT for Smart Society (ICISS)*, 1–6. IEEE. https://doi.org/10.1109/ICISS59129.2023.10291743

3. Beal, D. J., Cohen, R. R., Burke, M. J., & McLendon, C. L. (2003). Cohesion and Performance in Groups: A Meta-Analytic Clarification of Construct Relations. *Journal of Applied Psychology*, *88*(6), 989–1004. https://doi.org/10.1037/0021-9010.88.6.989

4. Betz, D. E., Sabik, N. J., & Ramsey, L. R. (2019). Ideal comparisons: Body ideals harm women's body image through social comparison. *Body Image*, *29*, 100–109. https://doi.org/10.1016/j.bodyim.2019.03.004

5. Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation? *Qualitative Health Research*, *26*(13), 1802–1811. https://doi.org/10.1177/1049732316654870

6. Buunk, B. P., Collins, R. L., Taylor, S. E., VanYperen, N. W., & Dakof, G. A. (1990). The affective consequences of social comparison: Either direction has its ups and downs. *Journal of Personality and Social Psychology*, *59*(6), 1238–1249. https://doi.org/10.1037/0022-3514.59.6.1238

7. Critical Appraisal Skills Programme (CASP). (2025). *CASP checklist for qualitative studies*. https://casp-uk.net/checklists/casp-qualitative-studies-checklist.pdf

8. Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. (2014). The Use of Triangulation in Qualitative Research. *Oncology Nursing Forum*, *41*(5), 545–547. https://doi.org/10.1188/14.ONF.545-547

9. Cooper, J., Kelly, K. A., & Weaver, K. (2004). Attitudes, Norms, and Social Groups. In M. B. Brewer & M. Hewstone (Eds.), *Social cognition* (pp. 244–267). Blackwell Publishing.

10. Davergne, T., Meidinger, P., Dechertres, A., & Gossec, L. (2022). The effectiveness of digital applications providing personalized exercise videos: a systematic review with meta-analysis (Preprint). *Journal of Medical Internet Research*, *25*. https://doi.org/10.2196/45207

11. Figueroa, C. A., Gomez-Pathak, L., Khan, I., Williams, J. J., Lyles, C. R., & Aguilera, A. (2023). Ratings and experiences in using a mobile application to increase physical activity among university students: implications for future design. *Universal Access in the Information Society*, *23*, 821–830. https://doi.org/10.1007/s10209-022-00962-z

12. Hendrickse, J., Arpan, L. M., Clayton, R. B., & Ridgway, J. L. (2017). Instagram and college women's body image: Investigating the roles of appearance-related comparisons and intrasexual competition. *Computers in Human Behavior*, *74*(9), 92–100. https://doi.org/10.1016/j.chb.2017.04.027

13. Ibragimova, E., Uraimov, S., Baitassov, Y., Yuldasheva, S., Kutlimuratova, D., & Litwinowa, M. (2025). Digital motivation: fitness apps and student physical activity. *Retos*, *67*, 1162–1173. https://doi.org/10.47197/retos.v67.113635

14. Imperial College London. (2025). *Library Guides: Systematic review guide: Home - about this guide*. Imperial.ac.uk. https://library-guides.imperial.ac.uk/systematic-review/introduction

15. Jowsey, T., Deng, C., & Weller, J. (2021). General-purpose Thematic analysis: a Useful Qualitative Method for Anaesthesia Research. *BJA Education*, *21*(12), 472–478. https://pmc.ncbi.nlm.nih.gov/articles/PMC8606608/

16. Lieffers, J. R. L., Quintanilha, M., Trottier, C. F., Johnson, S. T., Mota, J. F., & Prado, C. M. (2021). Experiences with and Perception of a Web-Based Mindfulness, Nutrition, and Fitness Platform Reported by First-Year University

Students: A Qualitative Study. *Journal of the Academy of Nutrition and Dietetics*, *121*(12), 2409–2418. https://doi.org/10.1016/j.jand.2021.04.019

17. Lockwood, C., Porritt, K., Munn, Z., Rittenmeyer, L., Salmond, S., Merete Bjerrum, Loveday, H., Carrier, J., & Stannard, D. (2024). Systematic reviews of qualitative evidence. *JBI EBooks*. https://doi.org/10.46658/jbimes-24-02

18. Long, H. A., French, D. P., & Brooks, J. M. (2020). Optimising the Value of the Critical Appraisal Skills Programme (CASP) Tool for Quality Appraisal in Qualitative Evidence Synthesis. *Research Methods in Medicine & Health Sciences*, *1*(1), 31–42. SAGE Journals. https://doi.org/10.1177/2632084320947559

19. MacFarlane, A., Russell-Rose, T., & Shokraneh, F. (2022). Search Strategy Formulation for Systematic Reviews: Issues, Challenges and Opportunities. *Intelligent Systems with Applications*, *15*(1). sciencedirect. https://doi.org/10.1016/j.iswa.2022.200091

20. Magnus Ringberg, Ann Catrine Eldh, Ardern, C. L., & Kvist, J. (2023). Athletes' experiences of using a self-directed psychological support, the BAck iN the Game (BANG) smartphone application, during rehabilitation for return to sports following anterior cruciate ligament reconstruction. *BMC Sports Science, Medicine and Rehabilitation*, *15*(1). https://doi.org/10.1186/s13102-023-00731-2

21. Mokmin, N. A. M., & Jamiat, N. (2020). The effectiveness of a virtual fitness trainer app in motivating and engaging students for fitness activity by applying motor learning theory. *Education and Information Technologies*, *26*, 1847–1864. https://doi.org/10.1007/s10639-020-10337-7

22. Navarro, N., Cedeno-Moreno, D., Lopez, V., Matus, E., Núñez, I., & Concepción, D. H. (2024). Mobile Recommendation System to Provide Emotional Support and Promote Active Aging for Older Adults in the Republic of Panama. *International Journal of Interactive Mobile Technologies (IJIM)*, *18*(02), 134–156. https://doi.org/10.3991/ijim.v18i02.44623

23. Newsome, A., Batrakoulis, A., Camhi, S., McAvoy, C., Jessica, S., & Reed, R. (2024). 2025 ACSM Worldwide Fitness Trends: Future Directions of... : ACSM's Health & Fitness Journal. *LWW*, *28*(6), 11–25. https://doi.org/10.1249/FIT.0000000000001017

24. Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—a Web and Mobile App for Systematic Reviews. *Systematic Reviews*, *5*(1). https://doi.org/10.1186/s13643-016-0384-4

25. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & McGuinness, L. A. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *British Medical Journal*, *372*(71). https://doi.org/10.1136/bmj.n71

26. Russell, H. C., Potts, C., & Nelson, E. (2022). "If It's not on Strava it Didn't Happen": Perceived Psychosocial Implications of Strava use in Collegiate Club Runners. *Recreational Sports Journal*, *47*(1), 155886612211481. https://doi.org/10.1177/15588661221148170

27. Ryan, R. M., & Deci, E. L. (2017). *Self-Determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press. https://doi.org/10.1521/978.14625/28806

28. Sibbald, K. R., Phelan, S. K., Beagan, B. L., & Pride, T. M. (2025). Positioning Positionality and Reflecting on Reflexivity: Moving From Performance to Practice. *Qualitative Health Research*, *0*(0). https://doi.org/10.1177/10497323241309230

29. Sousa Basto, P., & Ferreira, P. (2025). Mobile applications, physical activity, and health promotion. *BMC Health Services Research*, *25*(1). https://doi.org/10.1186/s12913-025-12489-z

30. Southcott, E., & Jooste, J. (2023). Unveiling the Impact of Mobile Fitness Applications on Motivational Orientation in Sustaining Exercise Behaviors: A Qualitative Investigation. *Physical Culture and Sport Studies and Research*, *103*(1), 1–14. https://doi.org/10.2478/pcssr-2024-0008

31. Thomas, J., & Harden, A. (2008). Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews. *BMC Medical Research Methodology*, *8*(1), 1–10. Biomedcentral. https://doi.org/10.1186/1471-2288-8-45

32. Tong, A., Flemming, K., McInnes, E., Oliver, S., & Craig, J. (2012). Enhancing Transparency in Reporting the Synthesis of Qualitative research: ENTREQ.

BMC Medical Research Methodology, *12*(1), 181. https://doi.org/10.1186/1471-2288-12-181

33. Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280. https://doi.org/10.1037/a0032359

34. Wang, C., Wu, G., Zhou, X., & Lv, Y. (2022). An Empirical Study of the Factors Influencing User Behavior of Fitness Software in College Students Based on UTAUT. *Sustainability*, *14*(15), 9720. https://doi.org/10.3390/su14159720

35. Xu, K., Yan, X., Ryu, M., Newman, M. W., & Arriaga, R. I. (2024). Understanding the effect of reflective iteration on individuals' physical activity planning. *Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24), May 11–16, 2024, Honolulu, HI, USA* (pp. 1–17). ACM. https://doi.org/10.1145/3613904.3641937

36. Yang, Y., & Koenigstorfer, J. (2021). Determinants of Fitness App Usage and Moderating Impacts of Education-, Motivation-, and Gamification-Related App Features on Physical Activity Intentions: Cross-sectional Survey Study. *Journal of Medical Internet Research*, *23*(7), e26063. https://doi.org/10.2196/26063

37. Zhang, X., & Xu, X. (2020). Continuous use of fitness apps and shaping factors among college students: A mixed-method investigation. *International Journal of Nursing Sciences*, *7*, S80–S87. https://doi.org/10.1016/j.ijnss.2020.07.009