



# GAMIFICATION OF FITNESS AND ITS IMPACT ON PERFORMANCE

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## Abstract:

We live in a period in which fitness is becoming increasingly sidelined as we face a health crisis. However, this could be due to it being overly complicated and inaccessible to the average individual. Many different factors contribute to the issue, the main one being that in the current world we live in we are all overstimulated, especially the younger generations as they have been exposed to high dopamine content since they were very young, due to this factor, they largely might find fitness rather boring. After all, why spend months working on something that isn't instantly visible when you can just boot up your phone and have borderline infinite entertainment without leaving the comfort of your bed? That's where we have developed a solution that merges both worlds of fitness and instant gratification. With this, the newer generations will find fitness more entertaining and accessible.

## Keywords:

Fitness, Mobile Applications, Digital Age, Gamification.

## INTRODUCTION

In the United States, 77% of high schoolers don't get enough physical activity [1]. This is due to many different factors, but the lack of intrigue the youth has with fitness is obvious. According to the American National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), lack of physical activity can lead to many health complications, including Heart Disease, Type 2 Diabetes, and even Cancer.

Meanwhile, they declare the benefits of physical activity to be the following: improved sleep, improved ability to perform everyday tasks, improved cognitive function, and improved musculoskeletal and bone health. A study from 2005 [2] projected that a total of 2.16 billion would be overweight and 1.12 billion would be obese individuals. However, recent trends have painted a much grimmer picture. According to the World Health Organization [3] the obesity rate in the world in 2022 was 1 in 8, or approximately a billion people almost reaching the projections for 2030, a whole 8 years before they projected it. They have also found 2.5 billion adults to be overweight, already eclipsing the 2030 projections.

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These statistics show that for all nations fitness and reducing this growing demographic is of imperative importance. In order to ensure the individual continues exercising after the initial burst of motivation is depleted, gamification is needed to keep the continuity of their activity going. Typically, the applications which utilize gamification incorporate aspects of games or ideas from games into other contexts that are initially unrelated to each other. This can prove quite beneficial as competition has been found to provide a large benefit to performance [4]. Gamification has already proven to be an invaluable aspect of the fitness industry and according to researchers, the gamification elements ensure the continuity of active participation. For these reasons, more research into the topic is required.

## 2. HOW GAMIFICATION IS CHANGING THE FITNESS INDUSTRY

It is of great importance to understand the situation we find ourselves in inside the fitness industry. If our solution is to be competitive enough to make a change in the industry and bring innovation a large amount of research needs to be done beforehand.

### 2.1. RESEARCH METHODOLOGY

Research will be conducted with the following methodology: we will start out by using the PRIMSA methodology, Figure 1.

This methodology stands for Preferred Reporting Items for Systemic Reviews and Meta-Analysis, it is conducted by reviewing research articles with its 27-point checklist.

The authors have searched the internet for many articles filtering them by keywords so we could narrow down the selection to the articles that include all the relevant information to our research. Using various keyword combinations along with logic operators we were able to scan the internet more effectively in pursuit of articles. We used the following keywords: fitness, game, gamification, gamified, game component, game mechanic, gym, activity, training. Utilizing AND and OR operators we divided our keyword search like the following:

((“game” OR “gamification” OR “gamified” OR “game component” OR “game mechanic”) AND (“fitness” OR “gym” OR “activity” OR “training”))

Taking a look at what types of applications are currently trending on the Google Play Store in the category “Health and Fitness” that are relevant to the topic we are researching, we can see that most of the top apps fall into several categories, those being:

W – Walking; WL – Weight loss; HW – Home workout; C – Cardio; G – Gym workout.

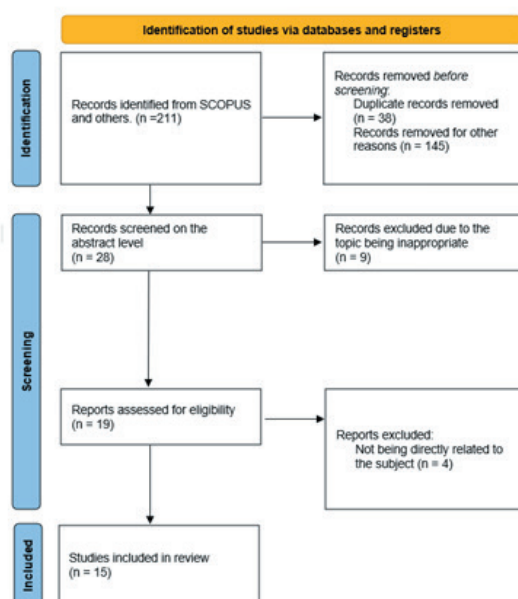


Figure 1. Article Selection Process With PRISMA [5].

**Table 1.** Android Mobile Applications with Gamification Elements, as of April 2024.

#	Application name	Topic	Number of Installations	User rating
1	Step Counter - Pedometer	W, WL	10M+	4.8
2	Step Counter - Pedometer	W, WL	50M+	4.9
3	Pedometer – Step Counter App	W, WL	50M+	4.8
4	Weight Loss for Women: Workout	WL, HW, C	10M+	5.0
5	Step Tracker - Pedometer	W, WL	10M+	4.9
6	Buttocks Workout – Fitness App	HW	50M+	5.0
7	Lose Weight at Home in 30 Days	HW, WL, C	100M+	4.9
8	JustFit – Lazy Workout	HW, WL, C	1M+	4.7
9	Home Workout – No Equipment	HW, WL, C	100M+	4.9
10	Yoga for Beginners   Pilates	HW, WL	1M+	4.9
11	90 Day Challenge	HW, WL, C	100k+	4.2
12	Strava: Run, Bike, Hike	C	50M+	4.6
13	Lose Weight App for Women	WL, HW, C	100M+	4.9
14	Lose Weight App for Men	WL, HW, C	100M+	5.0
15	Workout Planner Muscle Booster	G, WL, HW, C	10M+	4.5

The results show 4 apps had a focus on walking, 13 had a focus on weight loss, 10 focused on home workouts, 9 on cardio, and only 1 focused on the gym aspect.

As we can observe from this table of gathered data, a gamified app focusing on the gym itself is only 15th on the list, and even it doesn't have it as a main focus. It can be argued that this data shows the unpopularity of fitness applications in the demographic of gymgoers, however, this is disproven by a recent meteoric rise of this exact type of application. One app, in particular, has gained large traction among the younger audiences on TikTok, the same demographic we seek to target. This app is called Levels [6], and they have used guerrilla marketing on TikTok utilizing popular memes and spreading the idea of gamification to a younger audience that is interested in such a form of activity. Their TikTok account already has over 118.7K followers and over 4.4M likes, proving that there is in fact a market for gamification in fitness.

### 3. WHY IS GAMIFICATION IN FITNESS IMPORTANT?

Our research shows that gamification in fitness is important due to it tapping into the psychology of the younger demographics, this is mainly due to their need for instant gratification and rewards. Traditional fitness applications have solutions that ultimately lack instant

gratification and it is much more difficult for them to retain the attention of younger people. By integrating various gamification elements into these applications such as levels, experience, and many more similar mechanics, they can turn it into a much more engaging and interesting experience.

The environments that these younger users are surrounded by such as social media are hyperresponsive to them, bombarding them with rewards like likes, comments, shares, saves, stories, short-form content, and many more. In addition to that gamification can foster a feeling of community among users, encouraging friendly competition and achieving collective progress as a result of that competition.

### 4. OUR SOLUTION

The approach we took to develop a solution to this problem is quite unorthodox, mainly because neither of us had any major coding experience before taking on this project. The first problem we encountered was not knowing what platform to use, we looked at our options and eventually chose Android for its versatility and untapped market.

Once the platform was chosen, we searched for an IDE and a programming language, for this an obvious choice was Android Studio and Kotlin, mainly due to



the abundance of documentation and information regarding it [7], [8]. To enable the functionality of the application, we had to implement a database, and from the available options we chose Firebase [9] as it is certainly the most versatile and not overly complicated.

Learning all these tools and the programming language was quite difficult and took a decently large amount of time to get used to. As we also had to design the app since we were doing pretty much everything on our own, we used Figma for that and came up with some designs.

We implemented many features from popular applications in the fitness gamification sphere, however, we took it a step further as we added levels that act as singular workouts, in which you earn experience for the muscle which can lead to rewards upon reaching certain milestones. Making the design eye-catching and unique was also a major focus for us, Figure 2. There's an energy bar that makes sure that the user will not be able to abuse the system and can maximize the value of the workouts instead of doing 50 a day for example. This minimizes the chance of cheating as the user will gain only a capped amount of experience a day, which encourages them to perform the task, rather than just cheat their way through.

Along with the fitness app we also created a game that links the user's account to the app, they share one ID in the database and affect each other. This game is a roguelite that has many different levels, it is quite similar to the popular video game Survivor.io [10].

The game is quite unique due to the mechanic in which you quite literally play as yourself, due to the character being linked to your training app the more levels you pass in the training, the more experience you accumulate, the stronger your character becomes. This mechanic encourages the player to be regularly active as their in-game progress depends on their activity level. It also solves the problem of users quitting as they need to work out to progress. The game also features a friend system so we can utilize the social aspect of it, along with leaderboards and other competitive features.

As for how the application and the game will generate profit, we've decided that it would be best to use a "Season Pass" mechanic for monetization. Such a mechanic would by its nature be a monthly subscription which would grant the user benefits during the month, the more they work out and use the app, the more they will earn, causing them to be more disciplined so they can get more value out of their purchase.

## 5. DISCUSSION

The integration of gamification into fitness shows a massive shift in how different generations interact with physical activity, especially the younger generations which are more used to instant gratification. By analyzing the successful aspects of existing applications, this study suggests that gamification is not merely a gimmick but an actual step in the evolution of fitness.

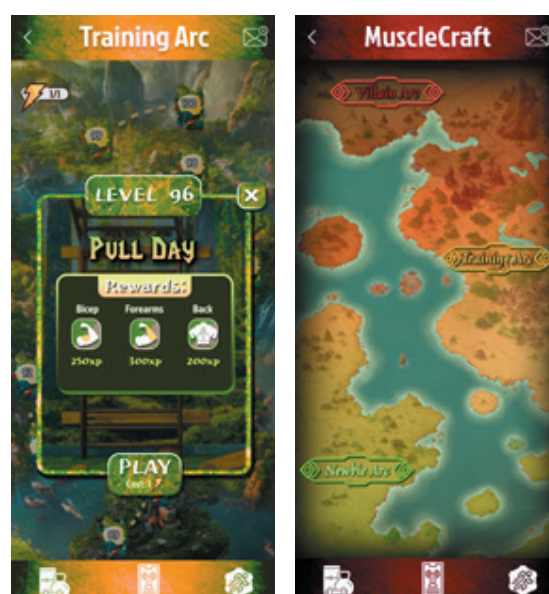


Figure 2. The Application's design as of right now.



Compared to similar fitness applications our solution does not really align with any already existing application or approach to fitness gamification. We instead created something rather different which combines many different elements into a comprehensive whole that is unique enough to make an impact but familiar enough to not scare away users with unnecessary complexity.

While gamification may initially seem really important it is necessary to look at it from an objective perspective and notice the issues that it may come with. The people who use it need to be truthful to themselves and comply with the rules, otherwise the whole concept starts falling apart, while mechanics can be made that take into account the potential cheating that users may attempt, the positive effects of physical well-being are only there if the users do follow through with the workouts given to them, and not just pretend to do so, but this is more of an issue with any fitness app rather than specifically gamification. Many problems have to be overcome before gamification becomes mainstream and much more research needs to be conducted on it.

## 6. CONCLUSION

In conclusion, we see that gamification has major positive impacts society and helps us become healthier as a whole. Data and research have shown that gamification as a relatively new concept has already shaken up the fitness industry, as the benefits are obvious it becomes only a matter of time before stakeholders in the fitness industry realize its true potential.

Our solution takes what the others before us have made and builds upon it to create something never really done before. The gap between reality and virtual reality is shrinking each day, and as major new technologies are launched this will be integrated even further. Apple Vision Pro [11] has recently launched and it has already sent massive shockwaves in many fields. Currently, it is only a matter of time before major players take this concept and apply it to their applications or software.

It is certainly possible that AI can be integrated into this sort of application, as it found its uses in many different fields in diagnosis of coronavirus [12]. The new technologies that are evolving in the medical field like the diabetes prediction algorithms [13], may also find use for the data gathered from gamified fitness applications. The effect it could have in case of a pandemic is substantial, as many forms of teaching were endangered by the pandemic [14], this also includes fitness teaching.

The research clearly shows that the developers who utilize the behavioral theories about gamification and its psychological impact will on average get better results than the developers who won't.

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