
Getting children moving using active video games

A report of the GenMove programme



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**World Health
Organization**

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Contents

Acknowledgements	iv
Abbreviations and glossary	v
Background	vi
Introduction	1
Aim of GenMove	3
Development of GenMove.....	4
Assessing GenMove’s success	7
Reach.....	8
Engagement.....	10
Playtime by gamification features.....	14
Retention.....	16
User satisfaction.....	18
Promotion.....	18
Discussion and lessons learned	21
Game development.....	21
Marketing and promotion.....	23
Evaluation.....	24
Conclusions	26
References	28
Annex 1. Criteria for a phone-based physical activity programme aimed at youth	30

Acknowledgements

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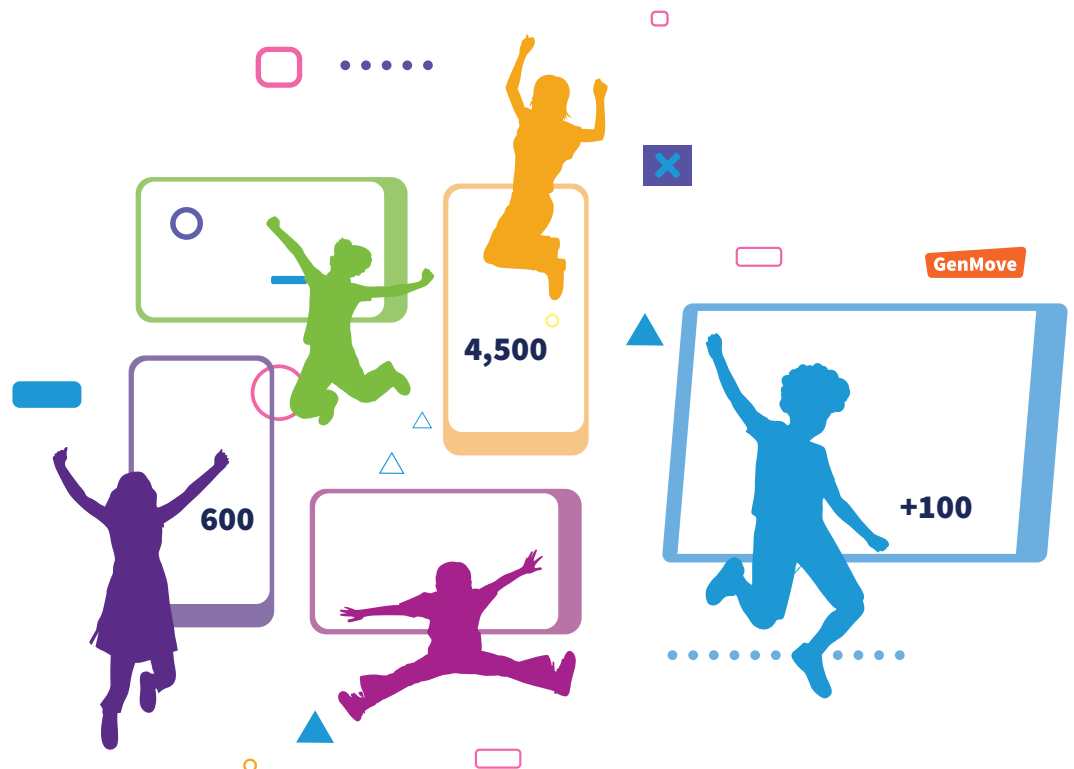
Pilot-testing of beta versions of GenMove was undertaken in partnership with the Department of Sport Science, Exercise and Health at The University of Western Australia and the 3–2–1 Qatar Olympic and Sports Museum. WHO extends its gratitude to all parties involved, including the children and their parents, caregivers and teachers, for their enthusiasm and support in enabling the App to be tested in a way that enabled the final version to meet the needs of children of all abilities.

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This report was written by Dr Fiona Bull and Dr Juana Willumsen from the WHO Unit for physical activity, Department of Health Promotion with support from Dr Michael Rosenberg from the Department of Sport Science, Exercise and Health at The University of Western Australia.

Abbreviations and glossary

- AI** **Artificial intelligence:** a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, make recommendations, and more.
- AR** **Augmented reality:** an interactive experience that enhances the real world with computer-generated perceptual information. Using software, apps, and hardware such as AR glasses, augmented reality overlays digital content onto real-life environments and objects.
- AVG** **Active video games:** games that require physical activity beyond that of a passive game (i.e. conventional hand-held games). Active video games rely on technology that tracks body movement or reaction for the game to progress.
- WHO** World Health Organization



Background

The growing challenge of physical inactivity among children

Regular physical activity is essential for children's health, development, and overall well-being. Yet, globally, over 80% of adolescents fail to meet WHO's recommendation of at least 60 minutes of moderate to vigorous physical activity per day (1). This inactivity is exacerbated by the increasing time children and adolescents spend on digital devices such as phones, tablets, and computers, primarily for entertainment and social interaction – activities that are predominantly sedentary.

Low physical activity levels, coupled with prolonged sedentary behaviour, are associated with a range of health concerns. These include poorer cardiorespiratory and muscular fitness, increased risk of obesity, sleep disturbances, and behavioural issues (2). Conversely, regular physical activity supports the development of stronger bones and muscles, improves cognitive function and academic performance, and reduces the risk of mental health challenges, including anxiety and depression (2).

Shifts in recreational trends

Beyond the disruptions caused by the COVID-19 pandemic (which were estimated in one study to have decreased physical activity in children and adolescents by 20% (3)) recent decades have seen an increase in concerns about the decline in active, unstructured play among children as well as the prevalence of children walking and cycling to school in many countries. Urbanization, unsafe roads, reduced access to safe outdoor spaces, and the increasing availability of screen-based entertainment are transforming how children spend their leisure time (4). Active play and physical exploration are increasingly replaced by sedentary activities, compounding the challenge of encouraging children to move more. Data analysed from 97 countries revealed that 25% of boys and 24% of girls aged 13–15 years reported sitting for more than 3 hours per day in addition to sitting at school and for homework (5). This highlights an urgent need for innovative and accessible solutions to promote physical activity.

Emerging health disparities

The physical inactivity crisis disproportionately affects certain populations, exacerbating health inequities. Children from underserved communities, who may lack access to safe recreational spaces or organized sports, are often the least active. Similarly, children with disabilities face additional barriers to participation in physical activity. Addressing these disparities requires solutions that are inclusive, adaptable, and affordable – an essential consideration in the design of interventions like active video games (AVGs).

Active video games: a digital solution for physical activity

Active video games (AVGs), also known as “exergames”, are digital games that require physical movement to play, such as jumping, dancing, or catching (6). Introduced more than 30 years ago, AVGs are increasingly recognized as a promising tool to address the global challenge of physical inactivity in children and adolescents (5, 7–9). By combining engaging gameplay with physical movement, AVGs might offer a technology-driven alternative or complement to traditional opportunities of sport and exercise.

Box 1 provides a list and short description of some well-known AVGs. Some AVGs, such as Just Dance and Wii Sports, encourage physical activity as a by-product of the primary purpose of entertainment. Others are designed as health-, rehabilitation- or education-focused games, and are specifically designed to achieve health-related goals (9). Interest in AVGs surged during and after the COVID-19 pandemic, with research and development of applications expanding to different population groups and use across homes, schools, workplaces, and health care environments, for young people and adults (6, 10, 11).

Evidence suggests that some AVGs can have a positive impact on children’s fitness outcomes, as well as promising effects on physical activity levels and reducing sedentary time (6, 12, 13). A meta-analysis found that AVGs can enhance physical fitness (such as balance, agility and speed) but noted that for other outcomes the results were mixed (9). For instance, while some games effectively promote whole-body movement and fitness, others only require minimal hand or arm movements, limiting their potential health benefits. Other reviews also conclude that the evidence remains mixed, with studies showing variability in their long-term effectiveness in promoting sustained positive physical activity habits (7). This inconsistency may be the result of various factors, such as the absence of theoretical foundations of behaviour change, differences in study designs, the types of AVGs tested, and the metrics used to measure different behavioural and physical activity outcomes. A consistent call is for more research to build a strong knowledge base.

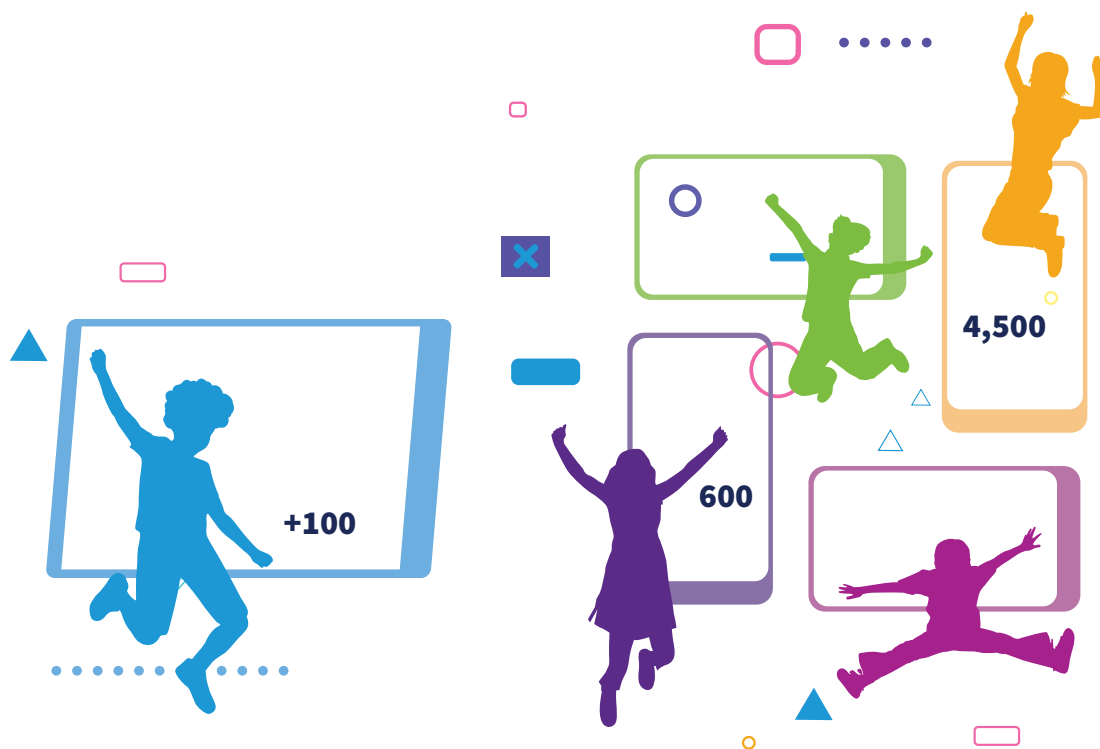
The role of technology: a double-edged sword

Digital technologies have been linked to increased screen use and sedentary behaviour, raising concerns about their potential negative impacts on physical and mental health, particularly among children and adolescents (14–16). Too much screen time is associated with issues such as sleep disturbances (17), overweight and obesity (18), and negative effects on emotional well-being (19). However, these same technologies also have the potential to offer innovative solutions for promoting physical activity and active recreation and play. AVGs could help shift sedentary recreational screen time into active engagement by leveraging children’s interest in technology in a positive and interactive way. While the extent to which AVGs can promote physical activity and improve health outcomes remains unclear, further research is needed to better understand the balance between potential risks and benefits, to guide the development of effective, evidence-based digital tools that prioritize both physical and mental health and well-being.

Designing AVGs for maximum health impact

To maximize health benefits, AVGs should encourage whole-body movements that engage large-muscle groups and align with global physical activity guidelines (2). They should also promote the development of and competence in fundamental motor skills, which are critical for sustaining lifelong physical activity (20). Yet to date, the availability of AVGs that are both engaging and inclusive for less active children and adolescents remains very limited, with many current games appealing primarily to those already interested in sports, exercise or fitness.

Technologies, such as artificial intelligence (AI), augmented reality (AR), and advanced motion sensors, present opportunities to create AVGs that are both enjoyable and effective. These technologies can provide fun, personalized experiences that enhance motor skills and sustain engagement in physical activity. As one industry expert noted, “To connect with this generation [Gen Alpha, born after 2010], it’s essential to embrace and leverage the digital tools and platforms they engage with, whether it’s through interactive apps, games, or social media...” (21).



Box 1.**Examples of AVGs that aim to promote physical activity, sport, dance and exercise**

Pokémon Go: Launched in 2016, Pokémon Go is an augmented reality game that encourages players to explore real-world locations to catch virtual Pokémon. Building on the success of the Pokémon franchise that debuted in 1996, with *Pokémon Red* and *Green* for the Game Boy, Pokémon Go became a global sensation, peaking with 232 million active players. It continues to evolve with new features, expanded Pokémon rosters, and real-time multiplayer events, promoting outdoor exploration and physical activity.

Wii Fit, released in December 2007, is an exergaming video game developed by Nintendo for the Wii console. It utilizes the Wii Balance Board peripheral to offer a variety of exercises, including yoga, strength training, aerobics, and balance games, aiming to make fitness accessible and fun for users of all ages.

Xbox 360 Kinect: Introduced in 2010, Kinect is a motion-sensing device for the Xbox 360 that enables players to interact with games through body movements and gestures, eliminating the need for traditional controllers. It supports a range of fitness and dance games, promoting active gameplay.

PlayStation Move: Launched in 2010 for the PlayStation 3, PlayStation Move is a motion control system that uses handheld controllers equipped with motion sensors and the PlayStation Eye camera to track player movements. It supports various interactive games that encourage physical activity.

Dance Dance Revolution (DDR): First released in 1998 this music video game series challenges players to step on a dance pad in time with on-screen arrows and music. It combines rhythm and physical activity, promoting exercise through an entertaining and interactive platform.

Super Stretch Yoga: Targeted at children, this interactive app uses animated characters to guide users through 12 yoga poses suitable for all skill levels. It combines storytelling with live-action demonstrations by real kids, promoting flexibility, strength, and relaxation. The app also incorporates breathing exercises to teach mindfulness and help children find balance and strength in their lives.

Fitbaw is an interactive app that combines football-related challenges with physical activity, encouraging children to develop real-life football skills and drills while tracking their progress. The app provides feedback and rewards for achieving specific goals and skills, aiming to make physical exercise engaging and enjoyable for young users.

Active Kids Do Better, launched in February 2018, is a programme developed through a partnership between Nike and Discovery Education, with support from Liverpool John Moores University. It offers free resources, games, and activities designed to help teachers and parents integrate movement and play into children's daily routines, both at school and at home. The programme focuses on increasing physical activity among primary school children to promote health and well-being.

Geocaching, introduced in May 2000, is an outdoor recreational activity where participants use GPS-enabled devices to search for hidden containers, known as "geocaches", at specific locations marked by coordinates worldwide. This activity encourages exploration and physical activity, as individuals and families embark on real-world treasure hunts, discovering new places and engaging with the outdoors.

GenMove



4,500



600



+100



Introduction

This report outlines the development and evaluation of the GenMove programme, an innovative AVG-based initiative designed to be an engaging indoor/outdoor digital platform that encourages whole-body movement, fosters enjoyment, and enhances both physical and mental health. By leveraging advances in AI, computer vision, and AR, GenMove was tailored to engage children of all abilities aged 8–15 years, with a particular focus on promoting physical activity among less-active children and those not traditionally interested in sports.

The project aligned with key global public health strategies, including the WHO Global Strategy on Digital Health 2020–2025 (22) (see Box 2 and 3) and the Global Action Plan on Physical Activity 2018–2030 (4), which emphasize the role of technology in supporting healthy behaviours. Developed and tested with support from the State of Qatar Ministry of Health, GenMove was a central feature of the Healthy FIFA World Cup Qatar 2022™ Project. By integrating evidence-based design with cutting-edge technologies, GenMove demonstrated how digital innovations can inspire movement, improve health outcomes, and create enjoyable experiences for children worldwide.

Box 2. Digital health

Digital health is the field of knowledge and practice focused on the development and application of digital technologies to enhance health outcomes. This encompasses the use of smart, connected devices by digital consumers, as well as advanced technologies such as the Internet of Things (IoT), big data analytics, artificial intelligence (including machine learning), robotics, and other innovations driving progress in health care (22).

91% of children aged 11 years in the United Kingdom and children aged 14 years in the United States of America own a smartphone.



81%

of children aged 9–16 years in Europe use a smartphone to go online daily, or almost daily.

<https://www.theguardian.com/lifeandstyle/2024/feb/01/screen-time-phones-kids-limit/>

WHO Global Action Plan on Physical Activity 2018–2030

The WHO Global Action Plan on Physical Activity 2018–2030 (4) provides a roadmap of policy actions to help countries increase physical activity levels among their populations. Its goal is to reduce physical inactivity by 15% worldwide by 2030, contributing to improved health and well-being for people of all ages and abilities.

The plan outlines four key strategic objectives: raising awareness of the benefits of physical activity and fostering supportive social and cultural environments; creating safe and accessible spaces that encourage everyday activity, such as walking and cycling; integrating physical activity into key settings like schools, workplaces, and health care systems; and strengthening policies, partnerships, and systems to promote activity at local, national, and global levels. Additionally, it calls for improved monitoring, research, and collaboration across sectors to track progress and guide interventions.

A key feature of the plan is its focus on equity, emphasizing the need to make physical activity accessible to everyone, including women, children, older adults, and people with disabilities. The use of digital technologies – such as apps, wearables, and other innovations – offers an opportunity to bridge gaps in access, delivering tailored, inclusive solutions that engage individuals across diverse contexts and abilities. By harnessing these tools, the plan highlights how digital innovation can help reduce barriers to participation and ensure equitable opportunities for physical activity worldwide.

Box 3.

WHO Global Strategy on Digital Health 2020–2025

The WHO Global Strategy on Digital Health 2020–2025 (22) aims to accelerate the adoption of accessible, affordable, and sustainable digital health solutions to improve global health and achieve the health-related Sustainable Development Goals. The strategy seeks to foster a shared understanding of digital health's potential while encouraging collaboration, innovation, and the creation of interoperable digital health ecosystems.

Built around four guiding principles and strategic objectives, the strategy emphasizes the importance of using digital technologies as public goods, addressing misinformation, and ensuring equitable access to digital tools. It highlights the need to advance health literacy and prioritizes interoperability as a cornerstone for effective global digital health transformation, enabling systems to work seamlessly across regions and populations.

Key goals include fostering global collaboration, advancing innovative health technologies, and integrating digital health solutions into national health care systems to improve accessibility, health promotion, and disease prevention. The strategy emphasizes that digital health will have the greatest impact when it is inclusive, person-centred, and accessible to all, strengthening efforts to promote equitable, high-quality health services and scale up health promotion and disease prevention globally.

Aim of GenMove

The aim and ambition of the GenMove programme was to create an AVG that would appeal and engage children aged 8–15 years in regular active play. Below is a summary of the key requirements set for the design of the GenMove App.

1

Appeal to all children, regardless of gender, fitness, skills or ability

Provide a choice of active games that leverage the interest in football but are not exclusively football-themed, and which are attractive to both boys and girls. Employ colour and design to appeal to the target age group. Offer diversity in the games to maintain interest and ensure the focus of game design is on play using large-muscle groups (as opposed to small hand-controlled movements) and aim to develop different fundamental physical and motor skills.

2

Inclusive and enjoyable for children of all abilities

Be suitable for children of all abilities, including those living with disability. Design to encourage even the least active children to “have a go” and provide all users with an enjoyable experience and sense of achievement. Ensure options are provided for children using wheelchairs, living with hearing impairment, or who are neurodivergent.

3

Encourage active play by harnessing the positive features of digital technology

Include elements to incentivize participation such as gamification, including adaptability, incentives, provision of feedback, and providing ways to play alone or with friends. Align the features of the game to encourage increased play time (i.e. minutes of active play) as opposed to rewarding the quality of the performance and skill levels (which is often the focus of AVG) so as to encourage more participation by the intended primary audience.

4

Be available on the most-used phones and operating systems

Be available and function on both iOS and Android platforms and on as many smartphones as possible, recognizing that many children do not have access to the newest and more expensive smartphones.

5

Remove or reduce barriers to access and play

Be free to use, and available and function without the need for WiFi or data connection, thereby making it accessible to children without imposing a financial burden. Ensure play can be undertaken either indoors or outdoors, and particularly in small areas, thus reducing the need for large spaces, and barriers due to adverse weather (heat, cold, wet) and risks to personal safety in public areas.

6

Reach a global audience through multiple languages

Be freely available in all six UN languages and provide on-screen text for those with hearing impairment.

Development of GenMove

Programme content

The GenMove programme comprised 50 games grouped into seven “game families”, each designed to engage children in being active through whole-body movements. The creative look and evolution of the games were designed to provide an enjoyable experience so that children played longer and returned more often. Within each game family there were six levels of difficulty. Using AI, the games adapted to each user and increased in speed and complexity according to each user’s skills and competence. This personalized, real-time adaption of the game ensured that progression through the game challenged the player to explore different skills but also allowed them to progress at their own speed.

To engage all children, particularly those with low levels of physical activity, the starting skill level required to play any of the games was set at a low level to enable and reinforce early success and a positive experience by all children. As a player gained confidence and skills, the games adapted and progressed to provide an appropriate level of increasing challenge. In addition, a set of universal games was developed that could be played in a seated position and that were as inclusive as possible.

To help first-time users start playing GenMove, an initial set of games was provided in a 10-minute session. A new 10-minute session was generated each day and promoted on the GenMove home page. Users could repeat the 10-minute session multiple times and/or choose to search the game libraires to select and play the game type they preferred in more depth.

To increase children’s enjoyment, GenMove included popular and recognizable gamification features that aimed to keep them engaged and encourage them to play the games more often and for longer. This would help increase their total level of physical activity. The gamification features included a customizable avatar, collection of points (or “tokens”) in return for time spent (minutes) playing the game. Points were not awarded for achievement of a specific skill or competing with another individual. GenMove was designed to encourage and reward playtime for all levels of ability. The awarded points could be exchanged for avatar accessories.

To further increase engagement, an additional feature in GenMove was an “idle” game. This involved the user “sending” their avatar on a “mission” while the game was not being played (for example overnight), and upon reopening the GenMove game to play, the avatar reported on its mission and presented the player with a few questions in the form of a quiz game. The quiz questions covered different topics relating to health and physical activity and provided fun facts. The player could answer with one of three multiple choice responses and earn points.

The GenMove App was free to download and use for a period of four weeks in November–December 2022 in six UN languages; on-screen text instructions were provided for those with hearing impairment.

Pilot-testing

In addition to ongoing testing within the design studio, specific pilot-testing was carried out to assess children's interaction and experiences with the beta-version. Testing sessions were conducted at The University of Western Australia and at the Qatar 3-2-1 Olympic and Sport Museum. Both locations included children of different ages, and those with different learning abilities and disabilities (hearing impairment, neurodivergence, physical impairments). Children were able to play the games and were observed and asked for feedback on their experience. The pilot-testing provided invaluable feedback that was applied to the final game design. This included, for example, reducing game complexity and providing more information on how to play the games.

Data protection

Protection of children's and other users' data was an overarching consideration. As such, a GenMove micro website was set up to provide parents and carers and other interested entities with background information on the programme and specific details of the data security policy. This information included confirming that the GenMove App did not include any third-party adverts, no user data would be shared with third parties, and no payments were involved as the games were free to use for a four-week period.

Launch, marketing and promotion

WHO saw an opportunity to leverage the FIFA World Cup Qatar 2022™ (which attracts millions of followers and has huge visibility) to provide children from all over the world free access to the App for the duration of this global football event.

GenMove was launched on the opening weekend of the FIFA World Cup Qatar 2022™ (Saturday 19 November). The timing and location leveraged the media interest in both the World Cup and the staging of a mass community walking event ("Walk the Talk Doha"), hosted by the Minister of Health of Qatar in Central Park, Doha.

Subsequent promotional activities included advertising and dissemination of GenMove links through multiple channels, including partners' corporate social media channels, unpaid influencers, other related initiatives such as the FIFA-led "Bring the Moves" campaign, press releases and press interviews. Live demonstration ("activation") sites were installed in and around Doha city and World Cup venues such as exhibition sites and in one FIFA fan zone. To augment the promotion, a paid social media strategy was implemented across Facebook, Instagram and Google networks using a combination of video assets, banner adverts, static visuals and animations.

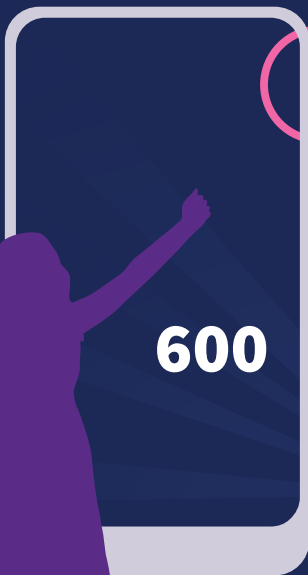
Releases and updates

The first release of GenMove (V1.1.2) took place on 16 November 2022. There were 10 releases across the campaign, focused on either feature introduction or bug fixes.

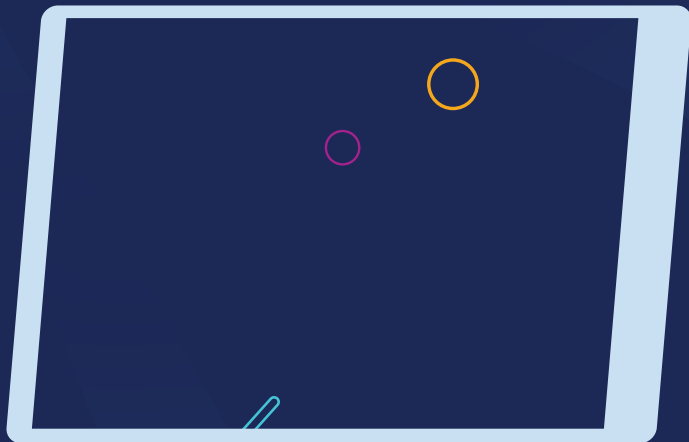
GenMove



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Assessing GenMove's success

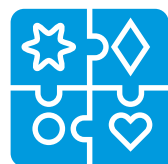
A structured approach was taken to assess GenMove's performance, including key aspects of the user experience and engagement. The results of GenMove are presented across six areas that together describe, showcase and compare different user behaviours, preferences and features that influenced engagement. These six areas are:



Reach



Engagement



Gamification



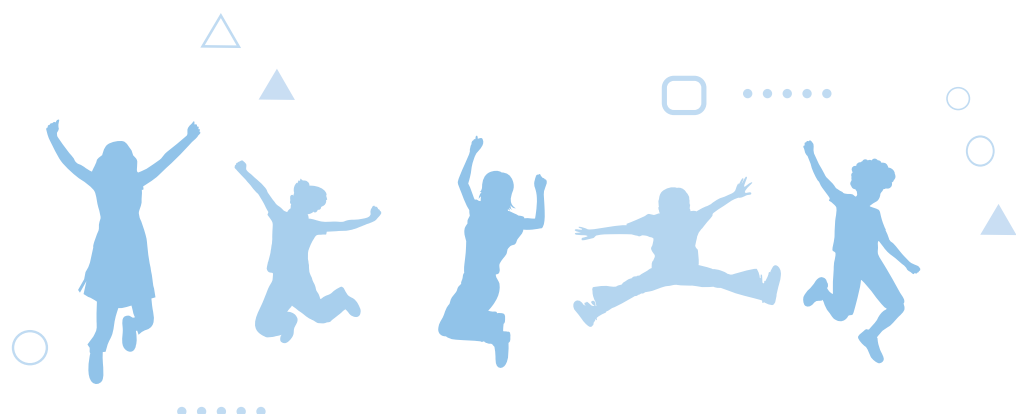
Retention



User satisfaction



Promotion





Reach

In the four weeks between 19 November and 18 December 2022, GenMove reached children in 175 countries, representing 90% of WHO's 194 Members States. The total number of visits to app stores totalled 239 786, with more visits to the Android Play Store (n = 233 533) compared to the Apple App Store (n = 6253). This reflects the bias in the paid marketing strategy conducted by Facebook and Google DV 360. The App was downloaded and opened 30 063 times, with the majority of downloads (92%) on Android devices (Table 1).

Table 2 shows the top countries by reach, as measured by the total number of downloads of the GenMove App being opened at least once on a device. Children in the Netherlands (Kingdom of the), the United States of America, and the United Kingdom of Great Britain and Northern Ireland had the highest downloads on the iOS platform, while children in Egypt, Senegal and Argentina had the highest number of downloads on Android devices. Argentina, Egypt and India also appear in the top 10 countries for downloads across both devices.

Looking at the overall reach of GenMove across both iOS and Android platforms, all WHO regions are represented among the 10 countries with the greatest reach. The Region of the Americas had the most countries (n = 6) in the top 10 listings (Argentina, Brazil, Canada, Mexico, Peru and the United States of America), followed by three countries in the African Region (Algeria, Ghana and Senegal); the European Region (the Netherlands (Kingdom of the), Switzerland, and the United Kingdom of Great Britain and Northern Ireland); and the South-East Asia Region (Bangladesh, Nepal and India). Notably, the national football teams of Argentina, Brazil, the Netherlands (Kingdom of the), and the United Kingdom of Great Britain and Northern Ireland progressed through to the knock-out stage of the World Cup.

Downloads of GenMove were highest on Android devices and the majority of the top 10 countries for downloads on Android are classified by the World Bank as middle-income countries. In contrast, iOS devices recorded more downloads in high-income countries, reflecting the relative distribution of iOS device sales. The total number of Play Store visitors is less than the total number of Android link clicks because of non-compatible devices being unable to open a promotional link or being unable to see the relevant Play Store page (i.e. blocked because of device hardware characteristics).

Table 1. GenMove reach over one month

GenMove	Total	Android devices	iOS devices
Visits to store applications	239 786	233 533	6253
Downloads*	30 063	27 789	2274

*Download required at least one opening of GenMove

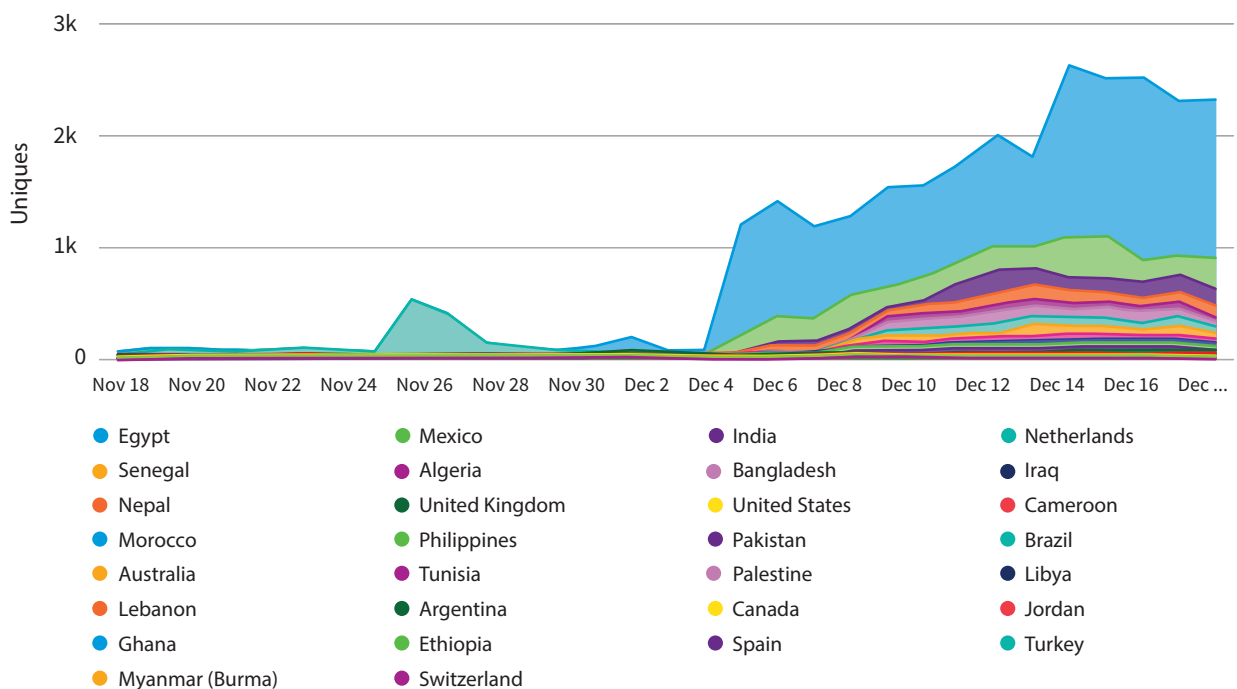
Table 2. Top 10 countries by visitors to store listing* and downloads by device platform

Android devices Top 10 countries* accounted for 193 292 of 233 533 total visitors (83%)	iOS devices Top 10 countries* accounted for 4137 of 6253 total visitors (66%)
Egypt	Kingdom of the Netherlands
Senegal	United States of America
Argentina	United Kingdom of Great Britain and Northern Ireland
Ghana	Australia
Algeria	Argentina
Mexico	India
Bangladesh	Egypt
Nepal	Canada
India	Switzerland
Peru	Brazil

*Listed in descending order of number of downloads

Fig. 1, which illustrates the pattern of unique daily downloads for the top 30 countries during the programme’s one-month duration, reveals two patterns: first, there was a surge in downloads in the second week of the campaign (around 26 November), aligned with the release of mainstream media coverage of GenMove in the Netherlands (Kingdom of the). Secondly, a large surge in downloads commenced in week three of the campaign, coinciding with the start of the paid media marketing campaign and the full operationality of Google DV 360. There was a very clear and large reach into one country (Egypt) as a result of setting the marketing strategy to optimize cost per download.

Fig. 1. Daily downloads by country





Engagement

This section presents the results of engagement and play sessions by different user cohorts, such as by country, operating platform, and gamification mechanisms. Analysing how the play session metrics differ across cohorts with varying activities and user properties provides insight into how different features and demographics influence user engagement with the App. Engagement metrics used for comparison were:

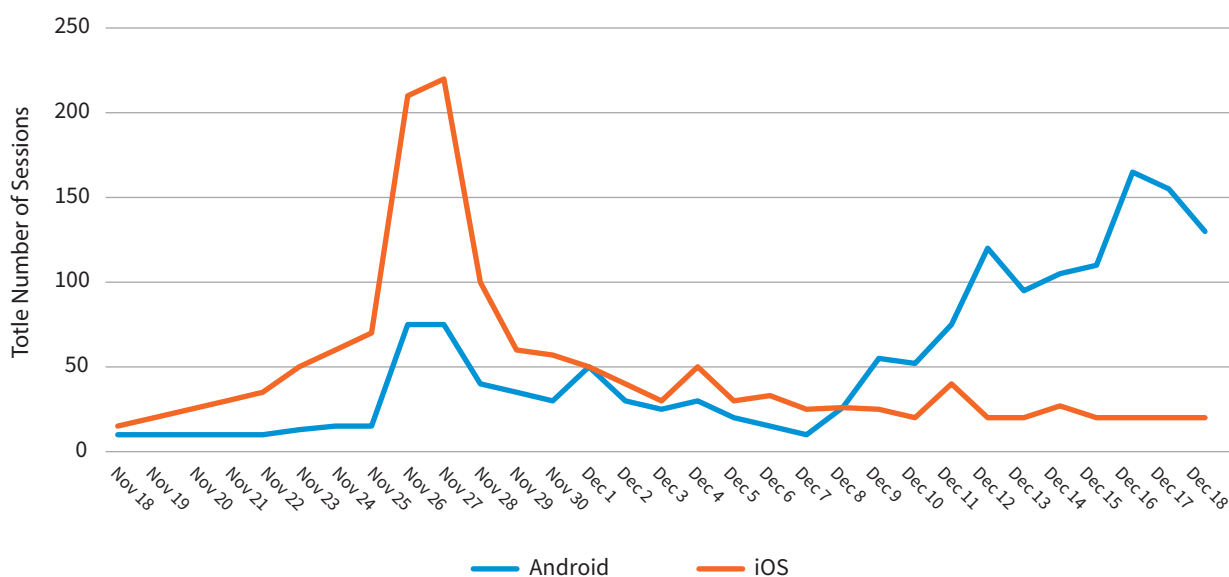
- completion of 10-minute exercise session;
- average length of session;
- average number of sessions;
- average total weekly playtime.

Completion of 10-minute exercise session

A key indicator of success was the ability to generate user engagement in playing the core physical activity games, namely completing the 10-minute game session.

Fig. 2 illustrates the daily completion of 10-minute exercise sessions by device platform. The initial peak in usage from iOS device users around 26 November is attributable to the influx of users following mainstream press coverage in one high-income country. The later peak in players using Android devices is likely attributable to the success of the paid marketing campaign. A closer analysis of the conversion from App download to completion of a 10-minute session revealed that an activation rate (defined as complete exercise sessions per download) ranged from 0.55 on iOS to only 0.07 on Android. The low activation rate for users on Android devices is explained by an apparent mismatch between the required level of functionality and the capability of Android phones, particularly on devices used in low- and middle-income countries.

Fig. 2. Daily completed 10-minute exercise sessions (by platform)



Users who engaged in more 10-minute game sessions had longer average session durations, completed more sessions, and were also active for longer using the App. Table 3 shows the results on number of 10-minute game sessions and average session length, average number of sessions and total playtime.

Table 3. Engagement metrics by numbers of completed 10-minute physical activity sessions

Number of completed 10-minute exercise sessions	Average session length (minutes, rounded)	Average number of sessions	Average time spent per user (minutes)
Everyone (all users combined)	5	1.59	9
1	10	2.04	20
2	11	2.56	29
3	12	2.94	37
4	14	3.35	46
5	13	3.58	46
>5	17	3.81	62

Average length of session

The average length of a GenMove session was 5 minutes and 18 seconds, though this varied by operating system. Users of GenMove on an iOS device spent longer (6 mins and 51 seconds) on the App than those using an Android device (4 mins and 31 seconds).

Average session length (per user) across all countries varied during the campaign (Fig. 3). Notably, early in the campaign, when most of the traffic was iOS-based, the average session length was above 6 minutes. In the last 2 weeks of the campaign, the average session length dropped to below 3 minutes. This is likely due to the large influx of users with Android devices generated by the success of the paid media campaign. However, even though Android devices theoretically had sufficient functionality to run the GenMove App, data analysis shows this may not have been the case in practice. This resulted in a poor gaming experience, causing players to stop using the App.

Although the App was designed to function on both Android and iOS phones and tablets, the levels of engagement varied by device type, as shown in Fig. 4. The average time spent playing GenMove was higher among iPad users than among those using mobile phones. This can be attributed to the better user experience on the iPad, with its 4:3 aspect ratio and much larger screen size enabling a much more immersive, high-performing game experience.

Fig. 3. Weekly average session length of GenMove

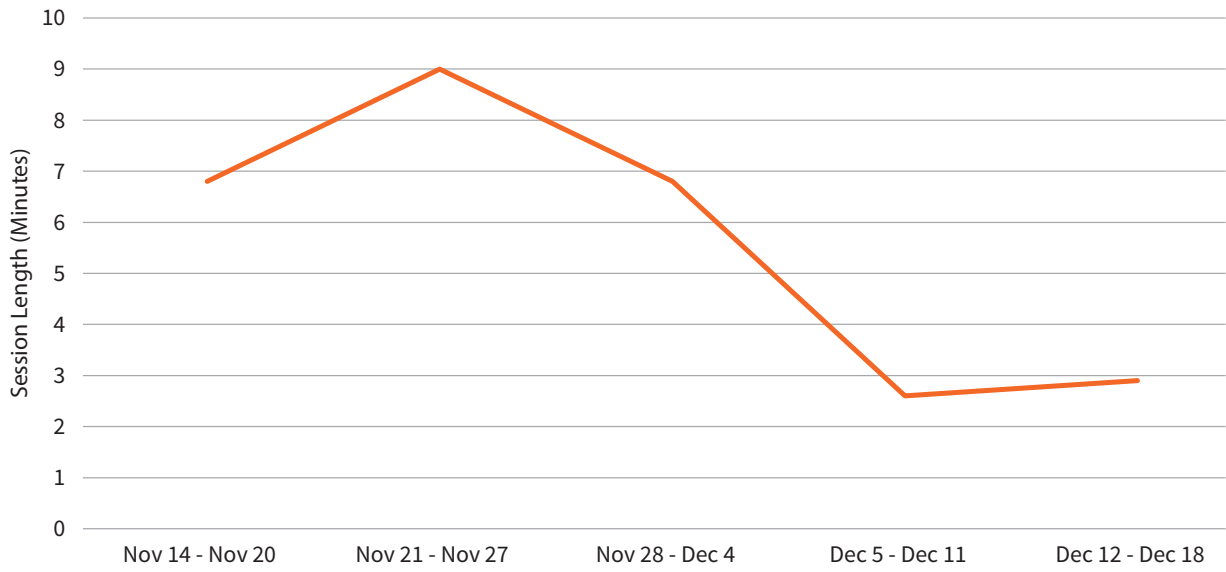
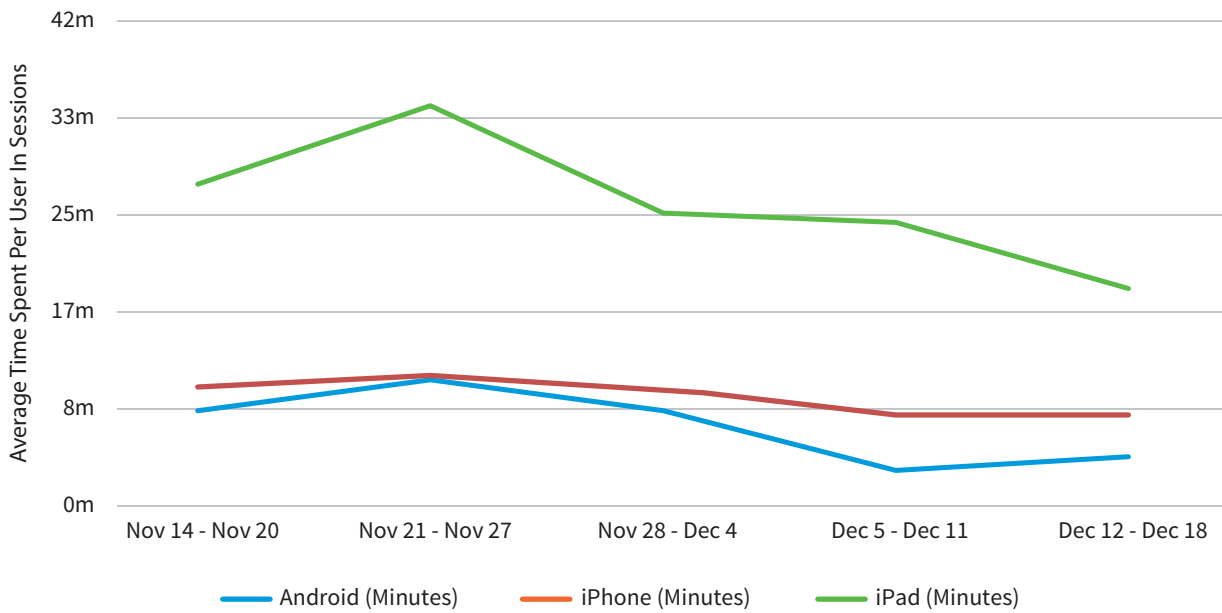


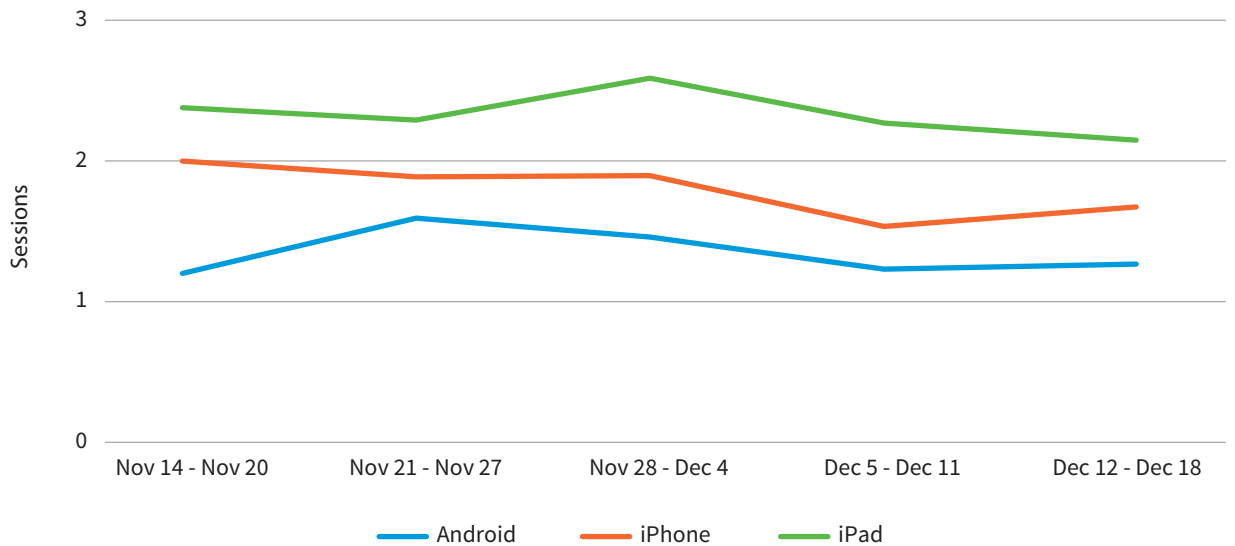
Fig. 4. Average time spent per user per weekly by device platform



Average number of sessions

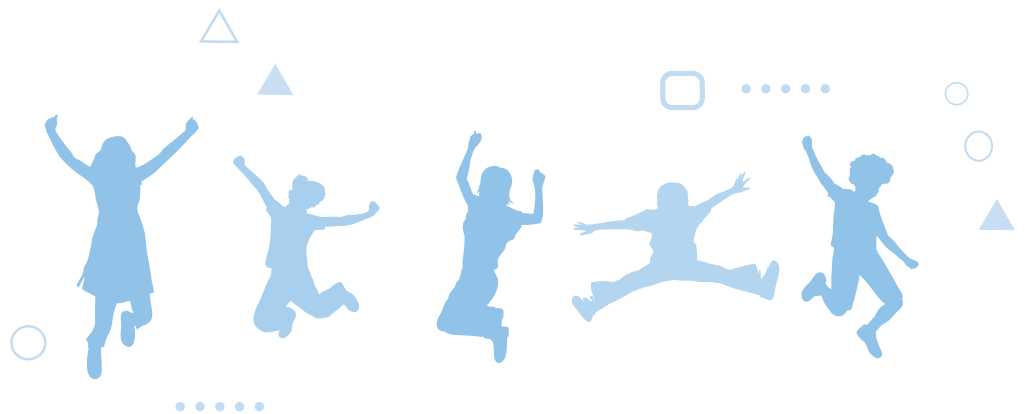
The average number of GenMove sessions per user per week was 1.61, with iOS users engaged in 1.92 sessions compared to 1.42 sessions for Android users (see Fig. 5). The higher average number of sessions on iOS is likely due to better quality user experience, leading to deeper engagement. Users of Android devices tended to have lower-end devices¹ which resulted in a poorer user experience.

Fig. 5. Average number of sessions by operating platform and device



Average total weekly playtime

The average weekly total playtime was 9 minutes and 7 seconds, with iOS device users engaged for twice as long as Android users (13 minutes and 17 seconds vs 6 minutes and 39 seconds respectively). Engagement by iPad users was by far the strongest, again, probably because of the enhanced and more immersive user experience enabled by the 4:3 aspect ratio and much bigger screen. Average weekly time spent by iPad users was 26 minutes.



¹ Results by Android device type are available but not reported here.



Playtime by gamification features

Additional insights are revealed by looking at the differences in user interaction with the gamification features of GenMove. Analysing the level of user interaction with each gamification feature can reveal how the feature modulated engagement. For this analysis, two key gamification features were selected:

1. Completion of idle game missions
2. The number of store items purchased to customize the game avatar

GenMove allowed players to participate in idle game missions, sending their avatars on adventures and checking in after a certain period for a reward token. Table 4 illustrates how playtime metrics varied based on the level of engagement with idle games, defined by the number of idle-game missions. GenMove users could redeem their in-game rewards for avatar clothing items. Table 5 illustrates the how the session engagement metrics varied among user cohorts who redeemed in-game rewards for different numbers of items. Higher levels of engagement with both the idle game and avatar resulted in higher average playtime.

Table 4. Playtime by level of engagement with idle-game missions

Number of completed idle-game missions	Average session length (minutes)	Average number of sessions	Average time spent per user (minutes)
Everyone (all users combined)	5	1.59	9
1	13	2.65	33
2	12	3.27	39
3	10	4.89	46
4	10	3.72	39
>4	10	5.43	54

Table 5. Playtime by level of engagement with avatar store

Number of store items redeemed to customize avatar	Average session length (minutes)	Average number of sessions	Average time spent per user (minutes)
Everyone (all users combined)	5	1.59	9
1	7	1.68	12
2	10	2.52	26
3	10	2.56	26
4	13	2.52	31
>4	14	3.47	49

GenMove interaction

To compare playtime based on different levels and combinations of engagement with gamification features, four levels of engagement categories (or “interaction cohorts”) were created. The criteria for each level are summarized as follows:

All users

- All users who used the GenMove App (this is used as the reference group for comparisons)

Light user / low interaction with gamification

- Completed one 10-minute exercise session
- Less than or equal to 1 completed avatar mission
- Less than or equal to 1 avatar item purchase

Moderate user / moderate interaction with gamification

- Completed between one and three 10-minute exercise sessions
- Completed between one and three avatar missions
- Purchased (with free “coins”) between one and three avatar items

Heavy user / higher interaction with gamification

- Completed at least four 10-minute exercise sessions.
- Completed at least four avatar missions.
- Purchased (with free “coins”) at least four avatar items.

Players classified as heavy users with the gamification features were much more likely to play more sessions per week, play for longer and continue using the App over several weeks (Table 6). These players also spent much longer being active (1 hour, and 1 minute) compared to all other groups, which had 30 minutes or fewer of total active time. Players with moderate or low interaction with gamification features played less frequently and accumulated fewer total minutes of active time. There was also evidence of a dose-response relationship between interaction with gamification and active play.

Table 6. Average session metrics for players in each gamification engagement group

Level of interaction with gamification	Average session lengths (minutes)	Average number of sessions	Average total time spent per user (minutes)
Everyone (all users combined)	5	1.59	9
Light-interaction group	10	1.84	18
Medium-interaction group	10	2.99	30
Heavy-interaction group	14	4.51	61



Retention

Unbounded retention² measures how users return to the App over time. Analysis of the retention profile for Android, iPhone and iPad users during the 4-week campaign reveals that iPhone and iPad users were much more likely to return to GenMove than Android users (Fig. 6). This repeated pattern in the results is likely explained by the impact of the large increase in Android users with low-end devices that occurred toward the end of the campaign. Analysis of retention based on the level of engagement with gamification during the campaign shows a strong relationship between higher levels of gamification engagement and retention (Fig. 7). This indicates that using gamification features with the App can enhance engagement and help achieve higher levels of physical activity.

Fig. 6. Retention during the campaign by type of device used

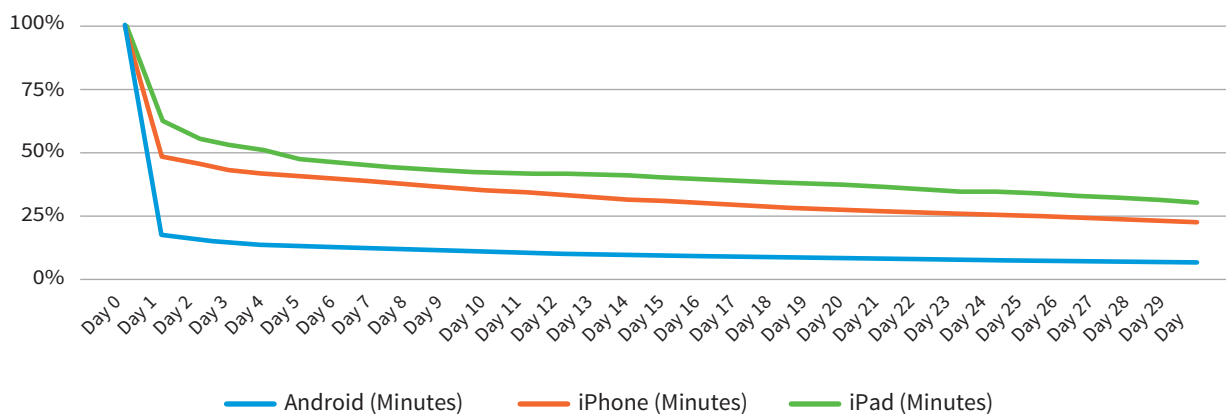
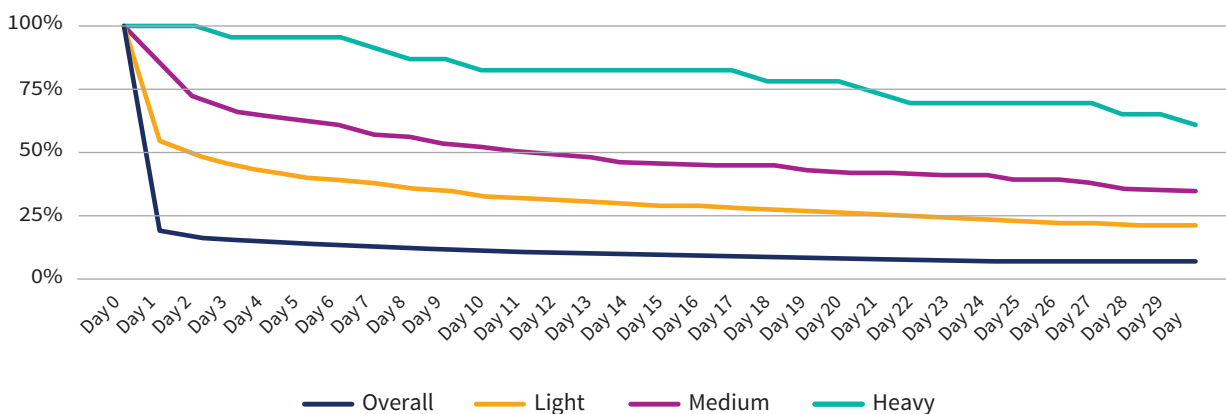
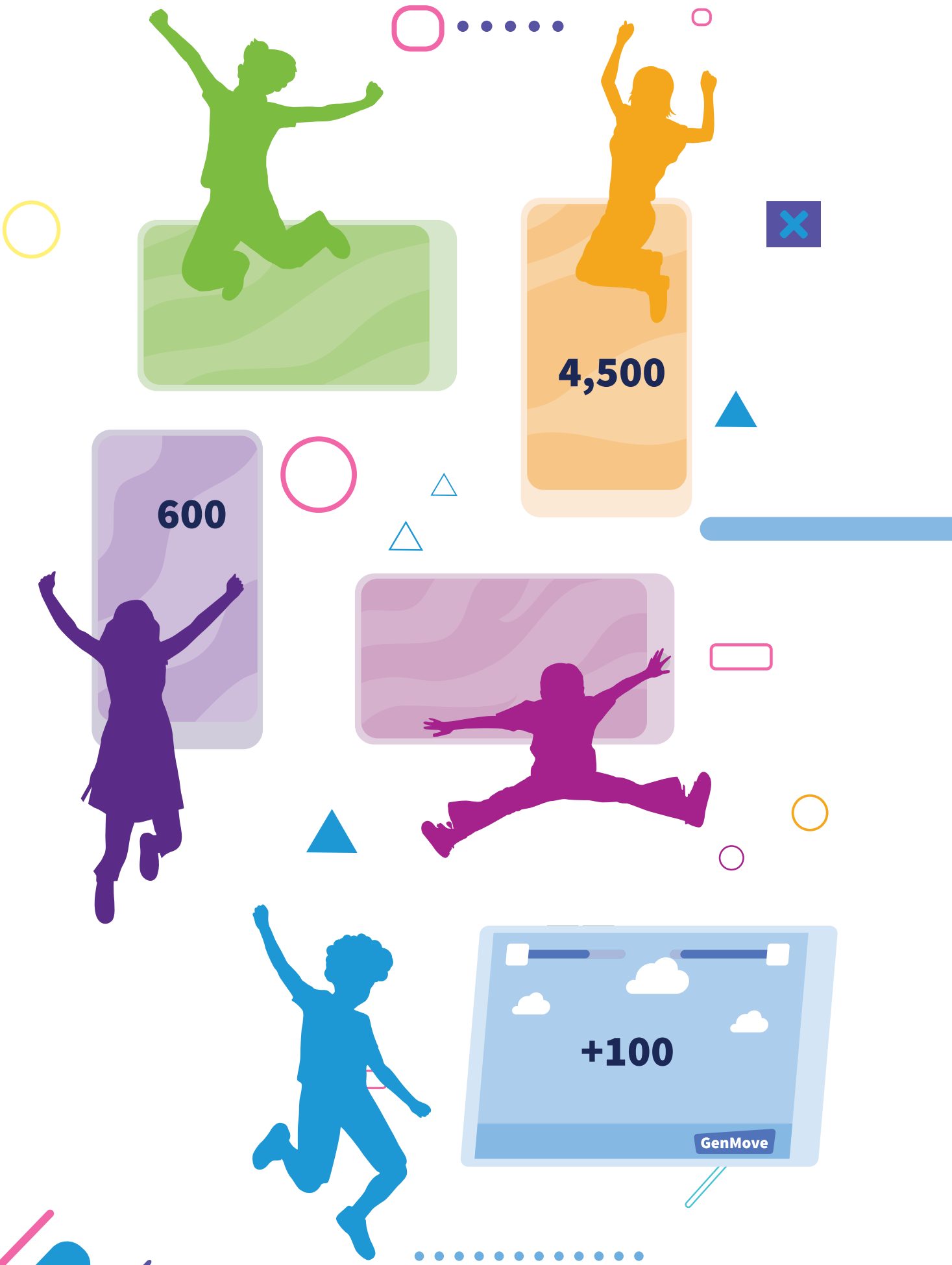


Fig. 7. Retention during the campaign by gamification engagement



² Unbounded retention curves require a smaller cohort of users to converge on the underlying trend and for this reason was chosen for retention analysis in this report.





User satisfaction



User satisfaction is another important performance metric for apps. The average rating on the Play Store (Android) during the 4-week GenMove campaign was 4.4 out of 5 stars. The average App Store (iOS) rating during the campaign was 4.6 out of 5 stars. Android ratings were lower than iOS ratings, possibly due to better device performance in the iOS device portfolio.

Compared to user satisfaction scores for other apps in the “health and fitness” category, the GenMove App performed better than the average Android fitness app rating of 3.91 out of 5 stars (data sourced in February 2023 from <https://www.appbrain.com/stats/android-market-app-categories>), and the average iOS fitness app rating of 4.03 out of 5 stars (data sourced in February 2023 from <https://www.statista.com/statistics/1334004/apple-app-store-average-app-rating-by-category/>).



Promotion

The paid marketing campaign to increase and enhance the global reach of the GenMove programme aimed to deliver maximum coverage on a limited budget, so analytics were used to adjust and redirect efforts towards countries where the marketing campaign had the greatest success. Overall results from Facebook, Instagram, Google and DV360 adverts were as follows:

Facebook and Instagram adverts

- **5134** App installs
- **2 million** people reached
- **US\$ 0.66** cost per install
- **1.62%** click-through rate
- **72.5K Clicks** (+141K clicks with no install optimization)

Google and DV360 adverts

- **22 224** App installs
- **5 million** impressions
- **US\$ 0.56** cost per install
- **13%** install rate
- **2%** click-through rate
- **147 000** clicks

The paid marketing campaign target was to generate at least 54 000 clicks at an average cost per click (CPC) of US\$0.23. The combined Android and iOS campaigns delivered a total of 147,892 clicks at a CPC of US\$0.08, far exceeding the campaign target. The campaign also produced 22,223 App installs at a cost per installation (CPI) of US\$ 0.56, and 5.4 million impressions that resulted in 147 472 clicks. The click-to-install rate showed a high average of 15%.

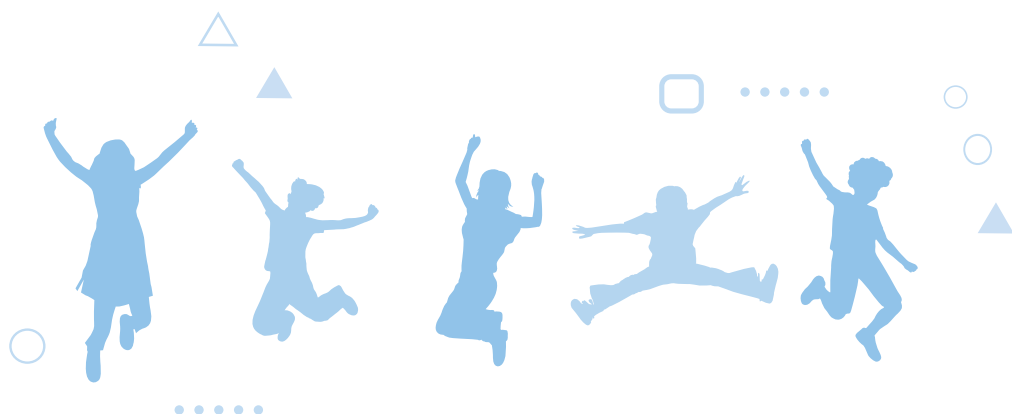
The Android campaign generated the highest volume of installs and was prioritized as the best-performing campaign. Initially, the campaign had a slow start and a high cost per install, averaging US\$ 1.02, because of delays in implementing the Firebase SDK. During the first four days, the campaign managed to generate only 585 installs, but there was a large uptick once the Firebase SDK was implemented, with installs rising to 1322 on the same day. As a result, the advertising budget for the Android campaign was increased to compensate for the under-performing iOS campaign, creating a greater opportunity for install volume in the Android campaign. Egypt was the top-performing targeted country for the Android campaign, with 17 051 installs recorded at a CPI of US\$ 0.53. The creative content “Get moving and have fun. Play GenMove” generated most of the installs.

The iOS paid marketing campaign generated a low number of installs at a CPI of US\$ 1.36. However, the actual number of installs is likely to be higher due to iOS privacy restrictions. The attribution of overall installs recorded in Google Ads for the GenMove campaign is significantly lower than the Android campaign. Despite the higher CPI, the campaign achieved a respectable CPC of US\$ 0.15. Ghana was the top-performing targeted country for the iOS campaign, recording 18 installs at a CPI of US\$ 1.12. The slow performance of the iOS campaign and a lengthy learning phase with limited time results led to much of the marketing budget being redirected to the more successful Android campaign, maximizing the number of installs.

In addition to the paid media campaign, specific links and QR codes were provided to unpaid influencers, WHO and FIFA corporate communications campaigns and installations. This allowed for tracking of clicks, and downloads from each of these dissemination channels (Table 8). A summary of key findings is provided in Box 3.

Table 8. Reach and engagement of marketing and promotion strategies

Cross-promotion within FIFA-led “Bring the Moves” marketing campaign on Facebook	271 000 link clicks (265 000 Android and 6000 iOS) 39 total downloads
Distribution of electronic “press packs” with GenMove introduction, quotes and audio-visual content	1148 QR code scans
WHO corporate communication channels	Social media: 3970 link clicks Chatbot: 2970 link clicks Website and social media: 157 link clicks
GenMove live installations	Doha International Airport: 77 QR code scans Launch day (one day only): 53 QR code scans
Influencer marketing (n = 5)	20 link clicks



Summary of key GenMove results

1

Global reach

Over four weeks, GenMove reached children in 175 countries, accounting for 90% of WHO Member States. The App was downloaded and opened 30 063 times, with the majority of downloads (92%) on Android devices. High-income countries dominated iOS downloads, while middle-income countries led Android downloads, reflecting the global diversity in device accessibility.

2

Engagement metrics

Average session length was approximately 5 minutes, with iOS users spending more time compared to Android users (6 minutes 51 seconds vs 4 minutes 31 seconds respectively). Average total playtime per week was 9 minutes, with iPad users leading at 26 minutes due to a more immersive experience. Users engaged in gamification features (e.g., avatar customization and idle missions) demonstrated higher playtime and retention, with heavy users averaging 61 minutes of active play.

3

Retention and user satisfaction

Retention was highest among iOS and iPad users, likely due to better device performance. Gamification features strongly correlated with increased retention and playtime. User satisfaction ratings exceeded category averages, scoring 4.4 on Android and 4.6 on iOS.

4

Promotion performance

The paid media campaign (across Facebook, Instagram, Google and DV360) collectively achieved 27 358 App installs at an average cost of US\$ 0.61 per install, generating 7 million impressions. Targeted marketing efforts were most successful in Egypt and other middle-income countries. QR codes, press packs, and influencer campaigns saw limited impact compared to paid advertising.

5

Gamification boosts activity

Players engaging with gamification features, such as idle missions and avatar customization, were more likely to return, play longer, and achieve higher total active playtime. Heavy users averaged 14 minutes per session and accumulated over an hour of total playtime.

These findings highlight the potential of digital tools like GenMove to engage children globally in physical activity but underscore the need to address challenges like device compatibility and refine promotion strategies for maximum impact.

Discussion and lessons learned

The GenMove programme set out to create an engaging, interactive active video game experience for children aged 8 to 15 years, aligned with the excitement of the FIFA World Cup Qatar 2022™. Over a four-week period, GenMove successfully reached children in 175 countries, offering them an immersive and enjoyable gaming experience that encouraged physical activity through play. Through an innovative partnership between WHO and a leading sports technology start-up, GenMove provided a demonstration of the potential for linking major sporting events with interactive video games to promote global physical activity and contribute to a healthy sport-event legacy programme.

Using advanced AI and AR technologies, GenMove provided a series of interactive games designed to appeal to both girls and boys in this age range, making physical activity a fun and enjoyable experience. This approach, which combined learning from technologies developed for elite sport training with behavioural theory on accessible digital platforms, aimed to demonstrate the power of digital tools in driving more engagement with fun ways to be active.

Implemented alongside the FIFA World Cup Qatar 2022™, GenMove programme aimed to capitalize on the event's global reach to promote physical activity on a large scale. Lessons learned are outlined across four key areas: game development, user engagement and retention, marketing and promotion, and programme evaluation, offering valuable guidance for future AVG and mHealth innovations.

Game development

Interactive AVGs and smartphone apps are promising tools to increase activity among children. However, integrating AI and AR into mobile phone-based AVGs posed challenges, including the breadth of the device variability and two different operating systems that both impacted user experience. Nonetheless, ensuring GenMove was available on both iOS and Android platforms and on as many of the devices most frequently used by the target age group across different countries was deemed high priority and drove game development and design. Key learnings from game development included:

- **Establishing game objectives** – Clear objectives are essential for guiding game design and development. GenMove aimed to create an inclusive game for children of all fitness levels and abilities, while promoting active play and minimizing access barriers by being accessible on most smartphones and operating systems. Feedback indicated that device compatibility – not gameplay design – was the main barrier to accessibility.
- **Plan enough development time** – Working with new technologies and innovative approaches involves inherent risk and tight timelines. Developing the Android version of GenMove required significantly more resources than anticipated because of the wide variety of Android devices. Collaboration with other event-related initiatives (e.g. FIFA's "Bring the Moves" campaign) required alignment at the early stages of programme development to maximize synergies and functionality.

- **Embrace iteration and flexibility** – Adaptability during development was vital, using feedback to enable modifications. Effective collaboration required trust and communication, especially with shifting timelines and evolving deliverables. These attributes enabled key modifications to the original concept, such as adding an avatar feature and removing the game’s “leader board” and managing shifting timelines.
- **Pilot-testing is vital** – Pilot-testing with diverse users provided vital insights that improved the game, reduced complexity and increased accessibility, ensuring children of different abilities could successfully enjoy the games and stay engaged.

User engagement and retention

The user journey (or user experience) was critical to attracting initial engagement and securing repeated visits and longer playtime (retention). User experience can be assessed at multiple stages, including the number of impressions, visits to store listings, app downloads and openings, and user metrics on playtime. Key lessons were learned about the GenMove user experience.

- **Device type affects user experience** – GenMove was developed to be used globally, especially on devices most likely to be used by children aged 8–15 years in most countries, including and importantly in low- and middle-income countries. A clear lesson learned was that the mobile device’s capability (i.e., functionality and design) affects the quality of the user experience and retention. Larger screens and better functionality, like processing speed, lead to greater engagement and increased frequency and duration of play.
- **Gamification enhances engagement** – For this target age group, adding gamification features such as tokens and missions increased user interaction and active playtime. There was a clear positive association between the total time spent in the App (measured in minutes) and user retention, as well as the level of user interaction with gaming features. This indicates that the gamification of physical activity is more likely to engage users over the long term.
- **Focus on user satisfaction** – High user-satisfaction ratings underscored the importance of ease of use and engaging features. Nonetheless, device capability strongly influenced user experiences and further underscores the importance of optimizing performance across different device ecosystems. Nonetheless, efforts to gather feedback and iterate the game development resulted in high levels of retention amongst players.
- **Device compatibility and app accessibility** – users of GenMove on iOS platforms were much more engaged compared to Android users, probably due to the on-average superior device processing capabilities providing a better user experience. There was a noticeable effect of devices with a low Technology Centurion score, and with less-powerful devices being associated with lower total sessions and session playtime. However, as devices become more powerful and AI technologies improve, there is more opportunity to develop and provide access to AVG apps like GenMove for a broader audience, particularly in underserved areas.

Marketing and promotion

A well-planned and executed marketing and promotion campaign is essential for any new programme to ensure that as many children and adolescents as possible hear about and try the game. Over the four weeks, the total number of children who downloaded and played GenMove at least once was disappointing. This outcome occurred despite an ambitious and wide-ranging set of planned activities using multiple social media platforms, unpaid influencers, marketing through other traditional channels (such as press releases) and on-site activation through a launch event and at other public venues. Key lessons related to paid and unpaid marketing and promotion include:

- **Start paid media campaigns early and strategically**

Paid media campaigns proved effective for reaching children and generating App downloads, but timing and execution are critical. The GenMove campaign launched late, requiring 5–7 days to identify target audiences, and was optimized for the lowest cost-per-download, leading to a bias toward low- and middle-income countries with less capable devices. A key lesson is to launch campaigns only after all technical components are fully functional, allocate 1–2 weeks for machine learning optimization, and ensure App pages are translated for non-English-speaking audiences.

- **Leverage media and influencers effectively**

Traditional and specialist media, along with influencer campaigns, demonstrated potential, but execution required better planning and follow-up. For example, information packs with ready-to-use promotional materials and media interviews led to spikes in downloads in specific countries. However, insufficient human capacity and lack of sustained press engagement limited broader impact. Influencer engagement, such as football players during the World Cup, faced restrictions, underscoring the need for advanced coordination and alignment with stakeholders' schedules.

- **Balance live events with online promotion**

While high-profile events like the 5 km mass participation “Walk the Talk” launch succeeded in attracting media, athletes, and public attention, other live installations at fan zones and airports failed to drive expected engagement. These challenges were the result of logistical complexity, competing entertainment options, and limited activation times. Future campaigns should carefully assess the context and resource demands of live events versus online promotion and prioritize those with greatest potential for sustained impact.

- **Ensure technical coordination across campaigns**

Cross-promotional activities, such as integrating GenMove with FIFA’s “Bring the Moves” campaign, suffered from technical issues, including incompatible links that caused failed downloads. Aligning technical specifications across promotional channels is essential to maximize synergies and ensure seamless user experiences. Early collaboration among technical teams can prevent such issues and scale the impact of integrated campaigns.

- **Invest in resources and planning**

Successful campaigns require adequate resources and early planning. The GenMove campaign lacked sufficient forward planning, budget allocation, and stakeholder coordination, limiting its ability to reach larger audiences. Future efforts must dedicate time, financial resources and technical expertise to execute campaigns effectively, ensuring they can reach and engage target audiences on a global scale.

Evaluation

The GenMove programme was not implemented with a formal research design due to constraints related to timing, practical challenges, legal logistics, and ethical approval requirements. As a result, the evaluation adopted a pragmatic approach, relying on rollout metrics to assess its achievements. While this approach provided useful insights, the absence of a structured research framework limited the scope of the evaluation. Key metrics, such as changes in physical activity levels, fitness outcomes, motor skill development and user preferences were not systematically captured. This lack of baseline and post-intervention data restricts the ability to assess the long-term effectiveness and behavioural impact of AVGs like GenMove. Moreover, the absence of detailed demographic data (e.g., age, gender, socioeconomic background) further constrains understanding of the App's reach and inclusivity.

Despite these limitations, the programme demonstrated proof of concept by leveraging advanced technologies and multi-sector partnerships to promote physical activity to children on a global scale. GenMove's ability to reach children in 175 countries underscores its potential for large-scale implementation, but more robust evaluation frameworks are needed to strengthen the evidence base for its effectiveness.

Recommendations for evaluating future initiatives

- **Design and pilot comprehensive research frameworks**

Future initiatives should incorporate structured research designs, including baseline data collection, pre- and post-intervention assessments, and control groups, where feasible. This will allow for robust evaluation of an app's impact on physical activity levels, fitness outcomes, and behavioural changes.

- **Include standardized metrics for comparative analysis**

Standardized evaluation frameworks should align with global recommendations for assessing physical activity interventions. Metrics such as duration and intensity of physical activity, motor skill development, and psychosocial outcomes (e.g., enjoyment, motivation) should be captured. This will enable comparisons with other AVGs and broader health interventions.

- **Enhance user-feedback mechanisms**

Incorporating in-app surveys or feedback tools can provide valuable insights into user preferences, barriers, and satisfaction. Collecting data on diverse user experiences, particularly from underrepresented groups, will ensure the intervention is inclusive and effective across different populations.

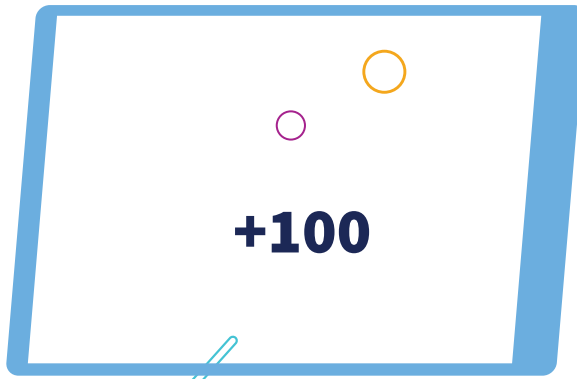
- **Strengthen data collection on reach and inclusivity**

Demographic data, including age, gender, location, and socioeconomic background, should be systematically collected. This will help assess whether the initiative is reaching its intended audience and identify any disparities in accessibility or engagement.

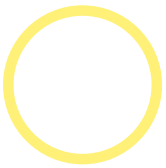
- **Secure ethical approval and long-term monitoring**

Building ethical approval processes into project timelines will enable more comprehensive data collection and evaluation. Long-term follow-up studies can provide insights into the sustainability of behavioural changes and the broader health impact of AVGs.

By addressing these recommendations, future evaluations can contribute to building a stronger evidence base for AVGs as effective tools for promoting physical activity. This will also provide policy-makers and stakeholders with the robust data needed to scale and sustain such interventions globally.



GenMove ○ ●●●●●



Conclusions

The GenMove programme has provided a valuable experience and learning for the growing field of digital health applications aimed at promoting health through physical activity. Based on the lessons learned and reported above, the evaluation of GenMove provides the following four conclusions:

1

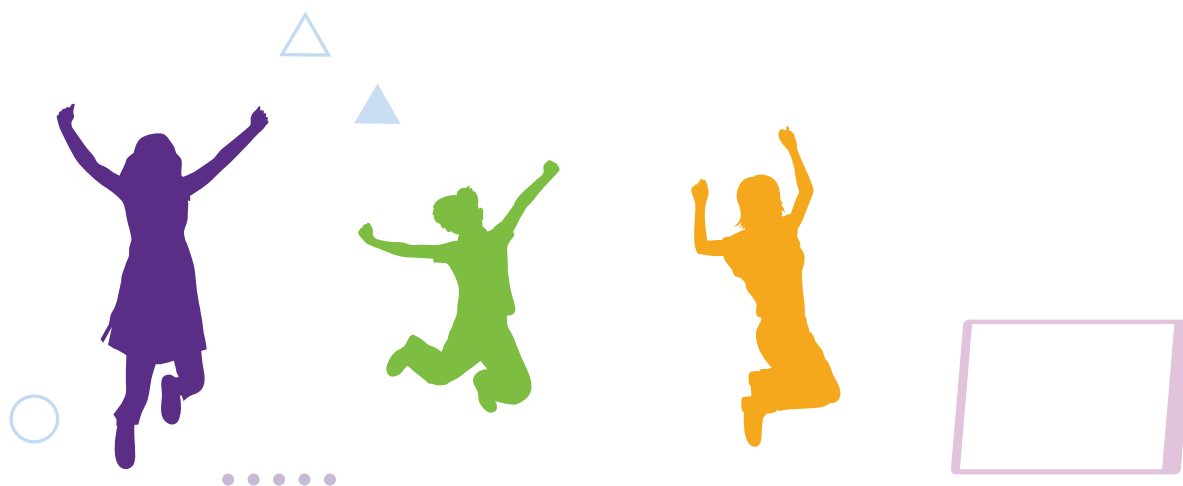
Support and encourage development and innovation in AVG

AVGs that leverage advanced technologies can engage diverse audiences, providing opportunities to promote physical activity. Future initiatives should balance fun, inclusiveness, and physical movement outcomes. AVGs are a rapidly growing area and present opportunities for promoting active play in new ways. AVGs like GenMove, which incorporate the latest technological advances, could provide a valuable platform for enjoyable, whole-body movement experiences and may support development of fundamental movement skills. Future AVG should aim to balance fun, movement, and skill performance, overcoming technical and design challenges to create inclusive, impactful solutions for youth physical activity worldwide.

2

Invest in research and evaluation

Ongoing research is needed to establish evidence on how AVG may increase physical activity, improve health, and reduce inequalities across diverse populations. Research should seek to clarify what works, how, and for whom, ensuring that the field of AVGs and digital tools for health promotion can grow effectively and sustainably. Building this knowledge will require establishing common terminology, strengthening the application of behavioural change theory, and improving methodologies for measuring long-term impacts. These advances will guide the development of future initiatives that support sustained physical activity, health, and well-being across diverse populations.



3

Leverage major sports events to amplify global reach

Major sport events provide a potentially valuable setting for health promotion given their global reach and community engagement³, and as such offer a platform to rapidly scale the impact of initiatives promoting physical activity (such as AVGs). However, the competitive landscape around these events includes many organizations with varied and sometimes conflicting goals. In such environments, it is crucial to ensure that AVGs align closely with clear health-positive messaging, distinguishing them from other initiatives that may not support health promotion. Effective AVG initiatives should, therefore, be integrated with major sport events' planning timelines, allowing for strategic alignment and maximized impact.

4

Foster collaboration and public-private partnerships to attract developers and encourage knowledge sharing and develop sustainable digital health interventions.

Collaboration is essential to ensure that the technical, policy and practical skills and knowledge required to develop new ways to promote physical activity through mobile and digital technologies are harnessed and applied. Governments alone are unlikely to be able to resource the development, management and sustaining of digital interventions such as AVG. Cross-disciplinary collaboration should be encouraged, for example through innovation hubs, collaboration incubators, start-up challenges and open-source platforms, to attract new and established technology developers to create solutions that support more people to engage in physical activity. Knowledge exchange should be supported and encouraged to facilitate rapid advances and wide use of developments and technologies. Development on open-source platforms is encouraged.



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Annex 1. Criteria for a phone-based physical activity programme aimed at youth

The prerequisite requirements and criteria identified for physical activity initiative, included that the final product must be based on the principles and application of scientific evidence from public health and meet the following criteria

1. Free to use.
2. Easy to use – suitable for low literacy and globally applicable.
3. Global reach and accessibility – defined as being provided via mobile phone and available and useable on both Android and iOS.
4. No or very few requirements for space and/or equipment to use/engage.
5. Must aim for maximum inclusivity of target audience and minimize barriers related to sex, race, ethnicity, education or football / sporting ability (including individuals with disability).
6. Attract, engage and secure participation by the primary target audience (i.e. youth aged 8–15 years).
7. Engage participants (here on referred to as “users”) to be physically active through using large-muscle or whole-body movements, and not focus on small hand movement or hand-controlled movements of an object (as is mostly the case with video games).
8. Aim to provide users with a positive and enjoyable experience to encourage repeat engagement over days or weeks to fulfil the overall youth campaign aim, which is to increase levels of physical activity.
9. Provide users with ways to be physically active that can be undertaken alone or with friends – both attributes are important (the former to attract users who are less confident or less skilled or prefer privacy, and the latter to engage users who prefer or enjoy engaging in physical activities with friends and/or family).
10. Use should be possible indoors or outdoors and in small areas to reduce barriers to use (such as need for large space, adverse weather, risks to personal safety in public areas).
11. Include a demonstrable link to football in order to leverage the visibility and interest in the 2022 World Cup and global attraction of football, especially among young people worldwide, and thus establish and reinforce the connection between being regularly active, health, football and sport more generally.
12. Offer users diversity in the types of physical activities in order to gain and maintain interest and thereby increase use (this might include alternatives to activities involving a football such as integration of other sports and/or other non-ball physical activities).
13. Integrate campaign elements to incentivize (reward) user participation such as those elements that gamify participation and which are aligned to encouraging and “rewarding” increasing levels of physical activity through repeated participation (this approach is different to solely rewarding higher skill level, which can deter the intended primary audience from participating).
14. Ability to assess and validate users’ level of physical activity and quantify and store users’ level of physical activity over time (weeks/months) and provide user feedback.

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