

Research Document

Research in various topics related to health and fitness

Online fitness classes

The study introduced a technology-based physical intervention to enable older adults with different physical abilities to participate in group exercises from home. This intervention aimed to deliver tailored exercise programs while maintaining a sense of group training. Key findings include the effectiveness of technology-supported group exercise in motivating individuals of varying fitness levels and reducing the impact of physical skill differences on adherence. The study also highlights the feasibility of inclusive group training despite differences in physical abilities, emphasizing the importance of inclusivity in such programs.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5384569/>

Participants in an online physical fitness training program reported positive experiences and outcomes. They found that their expectations were met, and motivation led to improvements in flexibility and strength. The training helped them learn new exercises, which they could repeat for effective learning. Supervision by a trainer increased motivation and saved time and money. Additionally, participants experienced benefits such as increased flexibility, maintained body strength, and even fat loss. They appreciated the convenience of training at home and found the provided materials effective and educative. Overall, participants felt that their training education was complete and enjoyed the fun and innovative nature of the program. They suggested incorporating outdoor training for a more varied experience.

<https://mail.rpd-online.com/index.php/rpd/article/view/224/49>

The study suggests that structured dance fitness interventions, such as Zumba Fitness classes, hold promise for improving health related quality of life and reducing health risks associated with sedentary behavior in middle-aged women.

<https://www.mdpi.com/1660-4601/17/11/3771>

While participation in the online fitness and wellness course led to improvements in certain aspects of physical health, there were limitations in areas such as strength training, eating behaviors, and changes in body composition, highlighting the need for further research and interventions in these areas.

https://csuepress.columbusstate.edu/theses_dissertations/311/

Two key takeaways from the 4 studies.

Convenience and Accessibility: Participants appreciate the convenience and accessibility of the programs, as they can be done from home or remotely, saving time and money.

Inclusivity: The studies highlight the importance of inclusivity, catering to individuals with varying physical abilities or preferences, and providing options for all participants to engage in physical activity.

Fitness apps

the gain framed message should be recommended for a preventive persuasive technology, such as fitness app

<https://www.sciencedirect.com/science/article/pii/S0747563217305320>

Diet and PA apps positively influence users' actions, awareness, and education about nutrition and exercise, while enhancing social lives.

<https://mhealth.jmir.org/2016/2/e33>

Fitness technology, such as fitness apps and wearable devices, has the potential to play a significant role in improving health and fitness by incorporating motivational features.

Among the fitness apps and wearable devices evaluated, Zombie Run and Garmin Vivofit received top rankings for their motivational features.

<https://opus.lib.uts.edu.au/handle/10453/119606>

Positive

The consensus on gamification in fitness is mostly positive. I will leave out the most obvious here. There are some positive effects listed in this study that are especially interesting to us.

Such as the promoting of intrinsic motivation and the counteracting of long-term motivation problems. It can also develop the practical knowledge of users in addition to developing patterns.[1]

Gamification has shown greater efficacy in increasing exercise than nongamified apps.

gamification may not only be efficient in young healthy individuals but can also target any kind of population regardless of their age or health status.

The potential of gamification for physical activity increases in the long term, even minimal, is particularly important and promising in physical activity interventions. [2]

Negative

Some negative effects that are useful for us to keep in mind.

Some users find the competitive nature (i.e. leaderboards) of some of these app's demotivating or stressful.

It may also lead to a focus on short-term goals rather than habits. It may also cause an overreliance on extrinsic motivators. [1]

The possible challenges we will face

Making a concept that is appealing to both male and female users will prove challenging.

They may not be usable for all people due to physical limitations.

Some people will not comply in the intended way.

We need to understand the motivators and needs of the users.

And we need to figure out a way to maintain user engagement after the initial motivation. [1]

These are data studies based on a host of other studies.

<https://www.mdpi.com/2254-9625/13/8/103> [1] (2023) (based on 2010-2020)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8767479/> [2] (2022) (based on 2013-2023)

AI personal trainer

There are no hard studies to be found that give definite data on this subject. All anecdotal evidence I've found suggests that AI-powered software and algorithms can't generate a workout routine for you based on your thoughts and desires -- and it might not be precise in accommodating injuries.

<https://www.cnet.com/tech/can-an-ai-powered-fitness-app-outperform-a-human-trainer/>

Benefits of AI Fitness Assistants:

The integration of Artificial Intelligence (AI) into personal training revolutionizes fitness accessibility, affordability, and convenience. By offering on-demand workouts, AI platforms cater to diverse needs, enhancing scalability and inclusivity. Real-time form checks ensure safety and efficiency, yet concerns persist regarding data privacy, limited social interaction, over-reliance on technology, and equipment accessibility. Balancing innovation with user-centric solutions remains pivotal in shaping the future of AI-driven fitness.

Accessibility and Affordability: Provides personal training at a fraction of the cost of a human trainer, making it accessible to a wider audience.

Convenience: Offers on-demand workouts anytime, anywhere, without needing to travel to a gym.

Scalability: AI trainers can cater to diverse needs and goals, providing a more inclusive fitness experience.

Safety and Efficiency: Real-time form checks and personalized plans can help users avoid injuries and optimize workouts.

Challenges and Considerations:

Data Privacy: Security of user data collected through wearables and apps is a concern.

Limited Social Interaction: AI assistants lack the social interaction and emotional support a human trainer can provide.

Over-reliance on Technology: Dependence on AI might discourage users from learning proper form and exercise techniques.

Accessibility of Equipment: AI features requiring wearables or specific equipment might limit accessibility for some users.

Research on reward systems

The reward system is a group of neural structures responsible for incentive salience, associative learning, particularly ones involving pleasure as a core component, and consummatory behavior. A rewarding stimulus has been described as "any stimulus, object, event, activity, or situation that has the potential to make us approach and consume it is by definition a reward". In operant conditioning, rewarding stimuli function as positive reinforcers; however, the converse statement also holds true: positive reinforcers are rewarding.

The reward system motivates animals to approach stimuli or engage in behavior that increases fitness. Survival for most animal species depends upon maximizing contact with beneficial stimuli and minimizing contact with harmful stimuli. Reward cognition serves to increase the likelihood of survival and reproduction by causing associative learning, eliciting approach and consummatory behavior, and triggering positively-valenced emotions. Thus, reward is a mechanism that evolved to help increase the adaptive fitness of animals. In drug addiction, certain substances over-activate the reward circuit, leading to compulsive substance-seeking behavior resulting from synaptic plasticity in the circuit.

<https://www.frontiersin.org/articles/10.3389/neuro.09.006.2010/full>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7565481/>

How to Motivate someone

Motivation is an internal state that propels individuals to engage in goal-directed behaviour. It is often understood as a force that explains why people or animals initiate, continue, or terminate a certain behaviour at a particular time. It is a complex phenomenon, and its precise definition is disputed. It contrasts with amotivation, which is a state of apathy or listlessness. Motivation is studied in fields like psychology, motivation science, and philosophy.

Motivation is divided into two types, intrinsic and extrinsic. The distinction between intrinsic and extrinsic motivation is based on the source or origin of the motivation.

Intrinsic motivation comes from within the individual and is driven by internal factors, like enjoyment, curiosity, or a sense of fulfilment. It occurs when people pursue an activity for its own sake. It can be due to affective factors, when the person engages in the behaviour because it feels good, or cognitive factors, when they see it as something good or meaningful. An example of intrinsic motivation is a person who plays basketball during lunch break only because they enjoy it.

Extrinsic motivation arises from external factors, such as rewards, punishments, or recognition from others. This occurs when people engage in an activity because they are interested in the effects or the outcome of the activity rather than in the activity itself. For instance, if a student does their homework because they are afraid of being punished by their parents then extrinsic motivation is responsible.

Personalization helps motivate people. People when things go smoothly and that motivates them.

<https://www.wikihow.com/Motivate-Someone>

Confidence Boosting

Confidence is the feeling of belief or trust that a person or thing is reliable. Self-confidence is trust in oneself. Self-confidence involves a positive belief that one can generally accomplish what one wishes to do in the future. Self-confidence is not the same as self-esteem, which is an evaluation of one's worth. Self-confidence is related to self-efficacy—belief in one's ability to accomplish a specific task or goal. Confidence can be a self-fulfilling prophecy, as those without it may fail because they lack it, and those with it may succeed because they have it rather than because of an innate ability or skill.

Confidence can be boosted through positive reaffirmation. Confidence helps raise motivation as well.

<https://www.cmu.edu/epp/files/jep-hlm-koriat-reason-for-confidence-1980.pdf>

Reward Systems

The reward is somehow tangible and easily processed by the brain it is bound to be effective. Also, if it has great impact, like food for someone who is hungry, it is shown to be more effective. Using personalized rewards that cater to the persons needs is the best way to help keep motivation and confidence up.

Pleasure is a component of reward, but not all rewards are pleasurable (e.g., money does not elicit pleasure unless this response is conditioned). Stimuli that are naturally pleasurable, and therefore attractive, are known as intrinsic rewards, whereas stimuli that are attractive and motivate approach behaviour, but are not inherently pleasurable, are termed extrinsic rewards. Extrinsic rewards (e.g., money) are rewarding as a result of a learned association with an intrinsic reward.[1] In other words, extrinsic rewards function as motivational magnets that elicit "wanting", but not "liking" reactions once they have been acquired.

<https://link.springer.com/article/10.1007/s40279-018-0898-0>

Incentive systems

Incentive systems are structures designed to motivate individuals within an organization to act in the organization's best interest. They often include performance-based compensation methods such as piecework, production, bonuses, commissions, and recognition tactics to improve employee motivation and productivity.

Certain things that can be used as incentives:

Educational Incentives:

- Scholarships
- Grades
- Certificates/Diplomas

Health and Wellness Incentives:

- Fitness challenges
- Quit smoking programs
- Personal physical health

Consumer Incentives:

- Loyalty programs
- Discounts/Coupons
- Free Samples

Environmental Incentives:

- Recycling Programs
- Solar energy ROI
- Deposit refund systems

As you can see there are a lot of different kind of incentives that work for different kinds of subjects and almost anything can be used as an incentive for certain people.

Sources:

Incentive systems: incentives, motivation and development performance - UNDP

[Microsoft Word - CP08-Incentive Systems.doc \(undp.org\)](#)

Incentive System – The Empuls Glossary

[Incentive System - Importance, Process, And Challenges \(empuls.io\)](#)

Youth programs

Youth programs consist of a wide range of initiatives designed to engage, educate, and empower young people. These programs can vary significantly in scope, focus, and objectives, but they often aim to support the development of youth, addressing their physical, emotional and social.

As such youth programs can be good incentives for youth to earn things like:

Skill development

Many youth programs offer opportunities for skill development in various areas such as leadership, communication, teamwork, problem-solving, and technical skills. Highlighting these opportunities can incentivize participation among young people who are eager to enhance their capabilities and improve their prospects for the future.

Personal growth

Youth programs often provide a supportive environment for personal growth and self-discovery. By promoting personal development and offering tools for self-improvement, these programs can attract participants who are motivated to learn more about themselves and develop a stronger sense of identity and purpose.

Community engagement

Programs that involve community service like volunteering can serve as incentives for young people who are passionate about making a positive difference in their communities. By offering opportunities to contribute to meaningful causes and connect with others who share similar values, these programs can motivate participation and foster a sense of belonging and fulfilment.

Social opportunities

Youth programs frequently create spaces for young people to socialize, build friendships, and form supportive networks. By organizing fun and engaging activities, events, and outings, these programs can attract participants who are seeking opportunities to connect with peers and expand their social circles.

Recognition and rewards:

Recognizing and rewarding participants for their achievements and contributions can serve as powerful incentives for continued involvement and motivation. This could include certificates, awards, scholarships, or other tangible forms of recognition that acknowledge the efforts and accomplishments of young people involved in the program.

Access to resources

Providing access to resources such as mentors, educational materials, facilities, or equipment can incentivize participation by offering valuable opportunities for learning, exploration, and growth that may not be readily available elsewhere.

By effectively communicating the benefits and value of participation, program organizers can motivate young people to get involved and stay engaged in activities that support their development and well-being.

Sources:

Youth Programmes & Initiatives - UNEP

[Youth Programmes & Initiatives \(unep.org\)](https://www.unep.org/youth)

Youth development – YMCA

<https://www.ymca.org/what-we-do/youth-development>

VR Exercising

Virtual reality (VR) exercising involves using VR technology to engage in physical activities and workouts within a simulated digital environment. Users wear VR headsets that immerse them in virtual worlds where they can participate in various forms of exercise, ranging from cardio workouts to strength training and yoga.

These come in different kinds of apps and ways they work like:

Fitness games

VR offers a wide range of fitness games that simulate various activities such as boxing, dancing, tennis, or even climbing. These games often incorporate motion tracking technology to monitor your movements and provide real-time feedback, making workouts more engaging and enjoyable.

Exercise apps and platforms

There are VR apps and platforms dedicated to providing guided workouts and fitness programs. These apps offer structured exercise routines, including cardio, strength training, yoga, some are even led by virtual instructors or trainers. Users can follow along with the workouts from the comfort of their own homes.

Environments for cardio

VR can transport users to immersive virtual environments where they can engage in cardio activities such as walking, running, or cycling. Whether it's exploring scenic landscapes or navigating through virtual cities, these environments make cardio workouts more interesting and enjoyable.

Virtual fitness classes

Like traditional fitness classes, VR enables users to participate in virtual fitness classes led by instructors. These classes can range from high-intensity interval training to yoga and meditation. Users can interact with the instructor and other participants, fostering a sense of community and motivation.

Multiplayer experiences

VR allows users to engage in multiplayer experiences where they can compete or collaborate with friends and other users in physical activities and challenges. Whether it's team sports, obstacle courses, or cooperative workouts, multiplayer VR experiences add a social dimension to exercising.

Rehabilitation and physical therapy

VR is increasingly used in rehabilitation and physical therapy settings to facilitate recovery and improve mobility. Virtual environments and interactive exercises can help patients regain strength, coordination, and range of motion while providing a safe and controlled setting for rehabilitation.

Overall, VR exercising offers a compelling alternative to traditional fitness methods, with its immersive technology enhancing engagement, motivation, and enjoyment while providing convenient and accessible options for physical activity.

Break a sweat with inspiring fitness – Meta

<https://www.meta.com/nl/en/quest/fitness/>

VR Fitness Insider

<https://www.vrfitnessinsider.com/>

Short workout

Federal guidelines say U.S. adults should get at least 75 minutes of vigorous physical activity, or 150 minutes of less-intense activity, each week. But over the past few years, a slew of studies has promoted the benefits of getting much, much less exercise than that. One 2022 study found that squeezing in just three one-minute bursts of vigorous activity each day could lead to a longer life.

<https://time.com/6242876/short-workouts-health-benefits/>

Think again. Are shorter workouts more effective? Yes! When it comes to exercise, it's all about quality, not quantity, according to recent research. It's much more productive to exercise for short periods of time each day rather than performing long workouts scattered throughout your weekly schedule. This is especially true when it comes to muscle strengthening. Now, let's delve into the research.

<https://www.eatthis.com/shorter-workouts-more-effective-science-says/>

Low weight high rep, feels like doing a lot

Strength-training workouts that employ low weights and high reps are good for your heart, lungs, and building muscles. This includes high-intensity interval training (HIIT) workouts, which entail alternating between pushing your body hard and taking short breaks.

Workouts that use low weight with higher reps are also safer. If you try to lift weights that are too heavy, you are more likely to cause a muscle tear or strain.

https://www.hss.edu/article_low-weight-high-reps.asp#:~:text=Strength%2Dtraining%20workouts%20that%20employ,hard%20and%20taking%20short%20breaks.

High rep low weight training similar results as low rep high weight. High weight training increases risk of injury and friction on the joints. The proper form is easier to maintain with lower weights. The best method is using high and low weight reps. But starting off with lighter weights is improving the start of the habit.

Gaining strength is harder with lighter weights.

<https://www.youtube.com/watch?v=ZFiAq6QQRqA>

Teams sports or individual

Team sports promote cooperation, no matter the individual talents of the players, you must work together and rely on your teammates in order to succeed.

<https://northernspinal.com.au/team-vs-individual-sport/>

Team sport can improve discipline, teamwork and goal setting skills. Furthermore, it gives you the feeling of participation, responsibility not doing it just for yourself and increases social relations. Individual sports are good for relaxation, concentration and flexibility. Each method has their own pros and cons, but team sports improves motivational aspects.

Motivational speakers

There are many motivational exercise speakers who encourage people to get up and go exercising. alone in the Netherlands we have many like Joël Beukers, Mo bicep or Mees Dix. They all want to motivate you to exercise and work on your body. They work by telling you a story to what you can relate to get moving. They make their money selling supplements to people which help them build a better posture. And help them perform on the gym floor.

<https://www.eaglestalent.com/top-10-motivational-fitness-keynote-speakers/>

https://cleannutrition.nl/?utm_source=google&utm_medium=cpc&utm_campaign=branded&utm_term=joel_beukers&gad_source=1&gclid=Cj0KCQjw_qexBhCoARIsAFgBleuiDBNAsdPKMdcSSxiTqPsB2-QLaPq3rLaQZ_cObPwz5y0fUsm_sQUaAm5NEALw_wcB

<https://open.spotify.com/show/4rOoJ6Egrf8K2lrywzwOMk>

Tools to motivate people

There are many ways to motivate people, most of the tools used in the workplace can also work on people to motivate them to go exercise. So I have included some links to some motivational tools as well as tools for in the gym as for I the workspace. We can combine More tools to make an effective approach to get people motivated to exercise more.

<https://screencloud.com/fitness/ways-to-motivate-gym-members>

<https://www.indeed.com/career-advice/career-development/motivation-techniques-for-the-workplace>

<https://www.onepeloton.com/blog/workout-motivation-tips/>

<https://gulfnews.com/lifestyle/health-fitness/9-motivational-fitness-tools-1.1186891>

Gadgets and techniques

There are many gadgets to help people to exercise. You have smartwatches, massage guns, sleep trainers, boxing machines and don't even get me started on machines stationed in the gym. There are many ways technique is helping people to reach their targets. The smartwatch seems like the most used one because it is very versatile and affordable.

<https://www.slashgear.com/1295832/things-stop-doing-android-phone-immediately/>

<https://www.gq-magazine.co.uk/gallery/top-fitness-gadgets>

https://www.bol.com/nl/nl/p/smart-music-boxing-machine-met-bluetooth-bokszak-boksbal-digitale-boksmachine-intelligente-training-boksmachine-met-muziek-fitness-zomer-geluid-boksen/9300000167238513/?Referrer=ADVNLGOO002037-S--9300000167238513&gad_source=1&gclid=Cj0KCQjw_qexBhCoARIsAFgBletZzjjKgWxNLRPvC42XSdVZXas_mwZVs2SXH5nJQCaUULZRN2EDKswaAuGEEALw_wcB

Target audience

Based on the statistics from the link below we decided to go for the demographic 12-18 years of age. This is a demographic that routinely does not get enough exercise, only 33% reaches the movement guidelines. This is also a demographic that we believe we could make a difference in using technology. Since teenagers are already used to games and gamification.

<https://www.loketgezondleven.nl/gezondheidsthema/sport-en-bewegen/cijfers-en-feiten-sport-en-bewegen>

https://cdn.who.int/media/docs/librariesprovider2/country-sites/physical-activity-factsheet---netherlands-2021.pdf?sfvrsn=babe061f_1&download=true

Loneliness

A 2020 report that examined loneliness found that 79 % of the teenagers from the current generation considered themselves lonely. If you would compare this to the 50% that people with the age of 55 – 65 you can see that is a 29% increase.

The new generation is comfortable with not having physical interactions and to express themselves through social media. This could amplify the feeling of being alone. With a good old fashion face to face interaction you get a better sense of who people are. Furthermore social media tries to satisfy the craving to feel connected. But seeing people have fun without you may do the exact opposite.

Research from “Jantje Beton” shows that the new generation of children shifted habits. Whereas previously children would primarily play outside 57% of the new generation 13-15 year olds prefer to play online. Such as Tik Tok or videogames.

<https://www.cedars-sinai.org/blog/why-loneliness-affects-young-people.html>

<https://jantjebeton.nl/uploads/downloads/onderzoek-buitenspelen-2022-62a06183eb380.pdf>

Playing outside

According to the same research of “Jantje Beton” children are willing to play more outside. Reasons for them not to do so vary. Some children say that homework and the shortage of children to play with is the reason for them to stay inside. Others say there are too little safe playgrounds around.

Playing outside is important for the education of children. It promotes curiosity, creativity and critical thinking. Studies have found that children who spent more time in nature had improved learning outcomes. Children who spend time in nature are more likely to become good stewards of the planet when they are grown-ups.

<https://jantjebeton.nl/uploads/downloads/onderzoek-buitenspelen-2022-62a06183eb380.pdf>

<https://www.healthychildren.org/English/family-life/power-of-play/Pages/playing-outside-why-its-important-for-kids.aspx#:~:text=Playing%20outside%20promotes%20curiosity%2C%20creativity,had%20less%20anger%20and%20aggression.>

Neighborhood

We want to help the population of Oud-Woensel. The people here are comparatively young and their population has a lot of non-western immigrants. This demographic even more in need of being active than teenagers in general. So this is the ideal neighborhood to try and make a difference. More than 75% of the children are happy when they have played outside. Underneath we will go into the details of why we chose this neighborhood

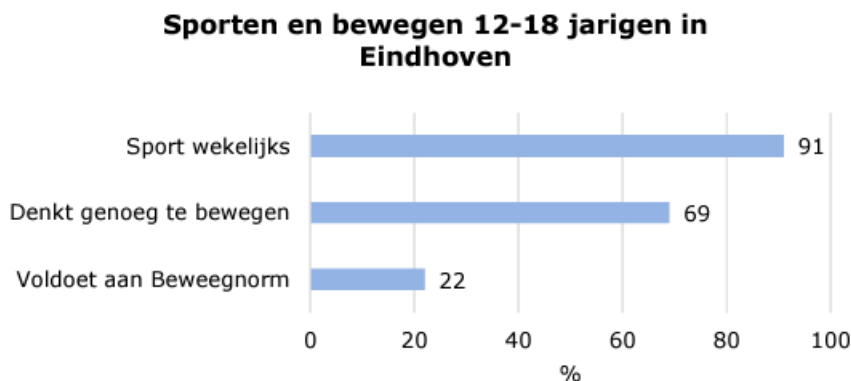
<https://allecijfers.nl/gemeente/eindhoven/>

<https://allecijfers.nl/wijk/oud-woensel-eindhoven/>

Based on our target audience, we are going to filter our neighbourhoods down to where families with teenagers of this age are living. Neighbourhoods that remain are

- Meerhoven
- Doornakkers
- Oud Woensel

Because Oud Woensel is in our top three and does not have a lot of playground or activities. In Oud Woensel there are more foreigners compared to other neighbourhoods. Statistically these groups get less exercise. For that reason we think that Oud Woensel is the area that is the most interesting for us to focus on.



Bron: GGD Jeugdmonitor 2015

► De meeste jongeren in Eindhoven geven aan wekelijks te sporten en denken zelf dat ze voldoende bewegen. Volgens de Beweegnorm is dit echter slechts bij ongeveer 20% van de jongeren het geval. Dat wil zeggen dat veel jongeren niet dagelijks minimaal één uur matig intensief bewegen. Een betere bewustwording van een gezond beweegpatroon is van belang voor de (toekomstige) gezondheid van jongeren.

Conclusion

We've found that there are a multitude of ways to motivate people to start being active again. The biggest reason why teenagers are not exercising, socializing or going outside is that the entertainment available in their homes is more exciting. Entertainment in this case being inside behind a screen. This has a negative impact on physical and mental health.

Gamification is something we want to apply to our future ideas. Because we think it will be able to bring the same excitement as the entertainment they have available in their homes. Further research into the neighborhood and the needs of the people there is still necessary.