

Concept Proposal

by

Witness the Fitness

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Introduction

As a team, we've chosen to work on how to improve collaboration between new and experienced gym-goers. Through on-site observations, interviews, questionnaires and background research, we are aiming to find a digital solution that increases collaboration between new and experienced gym members. Based on initial research and surveys, the team identified that gym-goers tend to use headphones to isolate themselves from newcomers during exercise. Thus, it's hard for newcomers to integrate into the group and make friends. Consequently, there can be negative impacts that lead to newcomers being deterred from the gym. The digital solution is preferably a mobile application that targets gym members to make new friends, to learn new things and be able to collaborate based on gym activities. Not only is the team trying to find a digital solution, but we are also trying to gain a deeper and wider understanding of the chosen domain. This will ideally lead to improved user experience by making comparisons based on existing solutions in the market and interviewing stakeholders to improve the experience of gym members.

Domain & Problem Space

The domain the team will be working in is the way members of gyms communicate and collaborate with one another. Specifically, the team is interested in people who use the gym in a non-social or competitive manner, and how technology has the potential to influence their interactions. The problem space within this domain that has been identified is the dynamic between newcomers and experienced gym-goers. In particular, the team will explore how the connection between these groups can be enhanced by technology to promote a more open and collaborative environment in the gym.

Based on the team's personal experience and collected research, it was found that a large portion of gym-goers isolate themselves from other people when working out. Often, people in gyms will use non-social technologies like noise cancelling headphones to avoid interactions (O'Neil, 2018). Furthermore, gyms often feel intimidating for newcomers given that people tend to avoid unnecessary interactions, instead choosing to workout in cliques of existing friends. This dilemma can often have negative impacts on the motivation of newcomers, as they feel awkward and isolated when training (Berry, 2020). Additionally, it often leads to negative connotations surrounding the gym and exercise, and people instead choose to stay at home to avoid any awkward interactions (Ketchell, 2021). This is further explicated by the fact that 27% of Australians have a gym membership they don't use (Ross, 2021). Whilst there are many other contributing factors to this figure, the author of this study highlights that a large contributing factor comes down to their dislike of the social gym environment.

The identified problem space has been explored by the team using interviews and observation methods to gather more information about whether it is an appropriate area to explore. The results from these methods confirm that the problem space is one where technology has the potential to improve collaboration. One interviewee responded to a question about why they don't approach newcomers by saying that they lacked the confidence as opposed to the intent (Jackson, 2021). Similarly, a separate respondent said that they would often feel like talking to new people but did not know whether they wanted to be spoken to, so would instead ignore them (Clarke, 2021). Furthermore, observations confirmed this feeling, as gym-members very clearly avoided eye contact or actions that may result in conversation with unfamiliar faces. During our initial interview phase, a subject who had only been at

their gym for three weeks was asked about their social experiences thus far. The participant responded by saying that they were confused how people could be so friendly with one another but so blatantly quiet and uninterested in them (Kelly, 2021). This very clearly shows that there is an opportunity to enhance the communication between these two groups of people. From the small sample size used in initial research, we have identified that both newcomers and experienced gym-goers are often keen to meet new people but avoid doing so. Thus, we have identified that technology has the potential to play a vital role in bridging this gap by making communication easier and providing certainty to a person that there is mutual intent to meet someone.

Design Opportunity, Concept & Justification

During the research, the team found specific design opportunities that might be applicable to the domain and problem space.

Firstly, a mobile application would be our first-choice selection as it can install on the phone which is convenient to every target audience. Then we must think about the major function of the application. Due to the research so far, the social application would be the major element of the platform. To increase the collaboration and communication to the target users in the gym, the non-social media application is not accepted for our domain purpose. Eikey, (2016) stated that social media can affect a person's ideal body image and their activity. Thus, determining how to use social media correctly is our first purpose.

Secondly, sharing, competitiveness, learning, collaboration, and validation are the elements that we are focusing our design on. Competition can increase people's exercise performance (Jensen, 2014). According to Toscos et. al (2006), Mental health is an important factor that influences the target audience's activities so we need to build a positive and functional concept to help users succeed in their goal.

Whilst brainstorming ideas, the team identified a few potential applications that could address the problem space we have identified. Whilst these are not our final product, they do act as a useful base that can be modified based on user feedback and further research.

The gym collaboration system: This concept is an application connected to the gym room and its customers. The gym owner would be the organizer and organize the events and arrange the timetable during the application. People can participate in the event on the apps and create more chances to meet new people. For example, the owner can organize some competitions such as weightlifting and there are some rewards for the winner. This activity can increase the chances that people have more time at their gym and increase people's communication and interaction with strangers. There are more functions that can be added into the application such as finding some users to share their training experience. There is a daily quest for every member such as collaborating to do some exercises, users can use the team forming function to find the user near him and complete the quest together. There are some points when they finish the quest, the points can be used to exchange some supplement or membership of the gym.

Workout together: This concept is similar to the previous, but with some slight differences. The application is focusing on communicating or collaborating with other people in the gym. Users can select their location and preferred gym. What they are good at or who they are. They can pick their identity as a

beginner or professional trainer. Then, users can match with other users based on their preference such as area, type of exercise. Once they match, they can workout together. The apps also include a function called team, where users would autorally join a team when they sign up, the team helps them have more a sense of belonging to other strangers. As stated previously, whilst these features may be included in our final product, they are mainly designed to provide the opportunity to collect useful data related to the problem space.

With the domain being increased social collaboration in the gym environment, research conducted and synthesised provided valuable insights and directions for the aim and goals of this project. Drawing upon studies conducted, it is evident that there exists a gap for development in the area of collaboration in the gym environment, with over 57% of individuals admitting to exercising in motivation (Runrepeat, 2021). Elaborating on this, over 90% of individuals quit going to the gym after their first 3 months. Leaving the gym can be explained by a lack of motivation to do so. By drawing these two concepts of isolation and lack of motivation, the two can be reciprocal of each other. As evident in the study “Chick clique: persuasive technology to motivate teenage girls to exercise”, which found improvements in the area of physical and mental health, when exercising participants received moivatory support from a humanoid robot. This study provided a valuable insight into the effect of how motivation in a collaboration or social context can positively reinforce an individual to stay motivated to be in the gym.

The integration of digital technologies within the gym environment was also supported by domain research conducted. Key findings from the paper “Contextual influences on the use and non-use of digital technology while exercising at the gym.” included such that individuals had a wide variance preference with regards to information presented towards them with regards to privacy, physical parameters and personal progress. In terms of design implications the research pointed towards being cautious with how and when information is displayed to users, with some instances when an individual underperforms this could be interpreted as demotivatory. This directs towards development of some digital technology as per the description could possibly be mobile based that illuminates a personalised environment.

In relation to social collaboration for gym goers within digital technology, the research conducted highlighted two key areas including heuristics evaluation and gamification. In terms of heuristics evaluation from the paper “Applying the heuristic evaluation method in the evaluation of social aspects of an exercise community” this included design criteria and components for collaboration which included that of discussion boards, forums, group chats, direct messaging, grouping by similar interests/personality and user profiles. The reason for these components promotes social collaboration for individuals to share exercise routines, share interests, and give/share advice.

The second area for social collaboration in the gym environment for working together as per the description, from research conducted highlighted the integration of gamification. This included the impact of leaderboards, when part of a team can evoke discussion and socialization in the form of motivation both inside and outside of the gym. As drawn from the study “Gamification in fitness apps: How do leaderboards influence exercise?”, the gym can contain sparsity in terms of individuals abilities, motives, values and goals in the gym including general fitness, weight loss, injury physiotherapy, professional athlete, social media or social outing. Hence matching users together to collaborate in a workout to achieve points in the leaderboard would need to consider their abilities, motives, values and goals. To

understand whether gym goers prefer working out together to achieve leaderboard points based on interests, ability, motives, goals or values will further need to be determined through data collection and analysis methods.

Project Aim and Target Audience

The target audience our solution is aimed at is casual gym-goers who use the gym on a semi-regular basis. In particular, we believe that our technology will be most suited for young adults, as research has indicated they have the most issues socially in the gym (Berry, 2020). Within this group of people, our target system will have to consider both the newcomers to gyms as well as the established gym members. This is because we cannot expect to have a successful solution if it is only designed for one part of our problem space. Furthermore, our design will need to consider the wants and expectations of both groups to ensure collaboration is seamless. The risks of only targeting one of these user groups is substantial. If only newcomers are considered, then having this technology would further ostracise them from other gym-goers as it may act as a sign of their inexperience. Additionally, if only experienced gym members are considered then this may further the wedge between social groups as it could enhance pre-existing relationships amongst peers.

How Our System Differs

The main difference between these existing systems and what we are designing is that we target users specifically to gym members. Also, not only do we provide a collaborative environment within the gym users like other systems, our main focus is also to provide a welcoming atmosphere for new users who may feel awkward and isolated to the new gym. Our system will only be providing information and track activities that can be done in the gym. Unlike systems such as ‘Work out buddies’, our system will be linking the users to existing members of the specific gym that the user is attending. This will give more certainty as the user is not meeting a whole new random person, but a member of the gym who is somewhat verified. Similarly, a common trend amongst existing solutions is that the collaboration around exercise occurs digitally. For example, apps such as Strava and Nike Run Club encourage users to message online, but at no point assist or suggest in-person collaboration. We believe that this feature is an essential part of exercise, and that by focussing on in-person collaboration we can better address the defined problem space.

Concept Approach with Papers

The article (Berry, A. 2021) explains results from research where large numbers of gym users experienced worry and awkwardness when they first entered the gym. This shows our problem space and the reason behind our concept. The paper (Li, J. 2019) shows the reason why there is a market for social fitness tracking systems and why a large number of people use the system. This article explains that by socializing and sharing the results of the workout results, users get more competitive, and their exercise performance improves. The social aspect of sharing and competing gives users to be more motivated and try harder than training by themselves. As our concept provides social connection to peer gym members, it will help users improve their exercise performance if the user’s workout together with peers instead of

doing it alone. The paper (Gui, X, 2017) explains the connection between health fitness and social networks. This also shows being social improves the general fitness and health of people compared to those who don't. Not only social aspects have been proven to be helpful to fitness, most of the social networks and tracking are done by mobile devices. Smart wearable devices such as smart watches are linked with smartphones to track records and these records are shared through the smartphone. This shows that being mobile is also important. These researched papers support our concept idea of providing sociality to gym users on a mobile system.

Existing systems in the market

For recent years, there have been many popular and trendy fitness communities which help the newcomers not only improve their health and body shape but also change their mindset about personal lifestyle. To decide which design concept our team should focus on and how we can develop the product, we have done some research on existing systems and analysed their pros and cons. Some of the popular fitness communities will be listed below.

a. Nike Run Club

Nike Run Club is one of most used social fitness applications around the world. This system focuses on running exercise by tracking and giving challenges to the user to encourage them to improve their performance. This application allows users to share their achievements and completion of running activities to social media as a showoff and other peer users can cheer up once their activities have been uploaded.

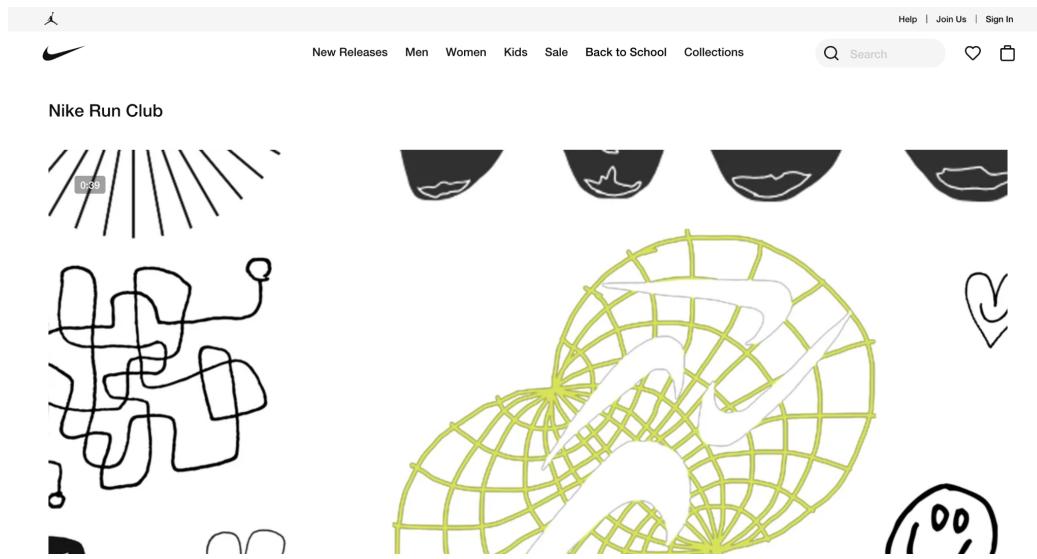


Figure 1: Nike Run Club

b. PumpUp

This system's target audience is female users who love uploading their exercise activities on their social media. This application is quite like a social network service where after completion of fitness activities

users can upload the photo of their activity and share it to their followers. This resembles Instagram in the way it works. Also, this application provides guidance to some workouts and activities users can try out.

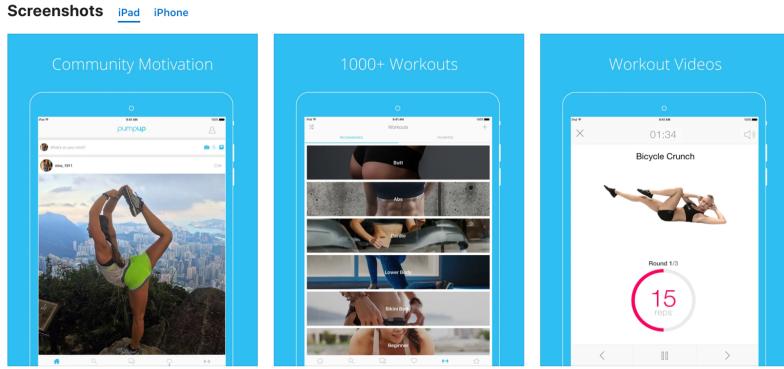


Figure 2: PumpUp

c. Work Out Buddies

This system would be most similar to what our system is trying to provide. This application allows users to find random people in the local area who have the same fitness or activity interests. Users can create a session or a group and post it on the system and other users who are interested can join that group. This application resembles a dating app, but in a fitness area. This kind of matching with random people style systems may have some trouble for users.

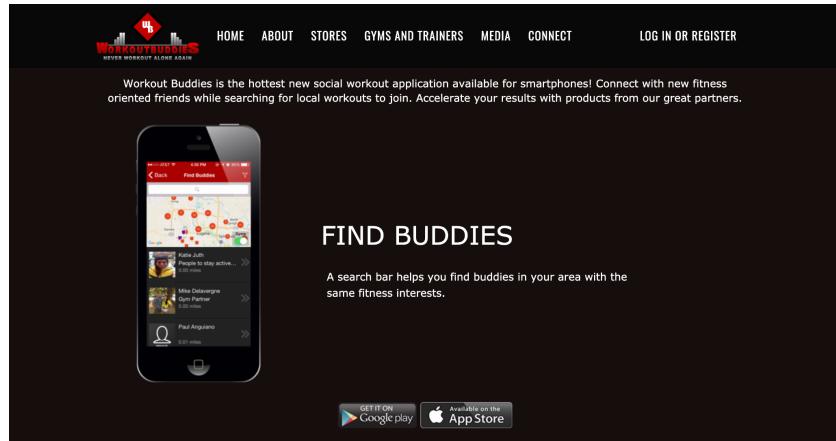


Figure 3: Work Out Buddies

d. NerdFitness

NerdFitness was developed in 2009 by Steve Kamb and aimed to provide a community for nerds to live healthier and improve the connection among people by chatting about games and comics. As stated on the official website, the current team has 45 supportive members and is offering certified training programs for everyone, especially the ones who are busy working. The outstanding core value of NerdFitness, on one hand, is the active staff and their enthusiasm with the target audience. On the other hand, even though

the given purpose of the community can be seen clearly and interestingly, there are some negative reviews about NerdFitness. For example, Carrie, a reviewer on Top Workout Program, did not suggest NerdFitness because she thought that the fitness tips were vague and personal trainers there were not fitness experts.

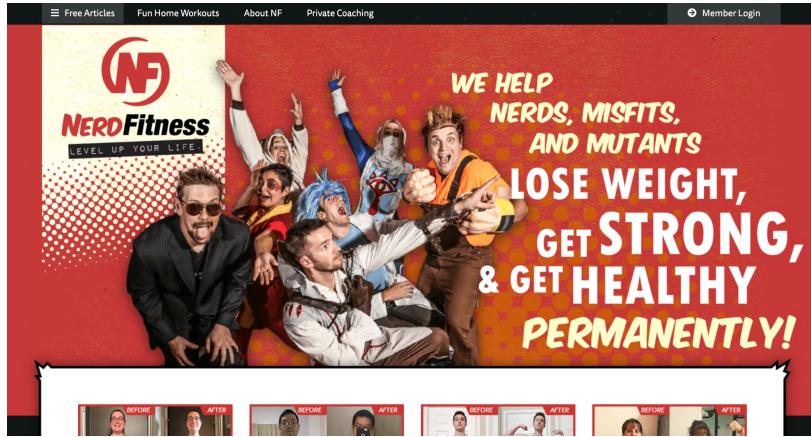


Figure 4: NerdFitness

e. Body Space

Bodybuilding.com is well-known for scientific and professional fitness articles and workout instructions. It also provides a social networking space for everyone to share their own fitness experience and get inspired from experienced weight lifters to improve workout performance and body shape. Body Space can be considered as a good starting point for anyone who is new in fitness and looking for a certified source of workout information. Users have various choices to select appropriate fitness plans on Body Space to follow and receive the instructions from trainers.

The advantages of this community are the activeness and all time support as well as its free-to-use features on both iOS and Android platform. However, some professional plans from celebrity trainers may require users to buy additional supplements to receive full training programs.

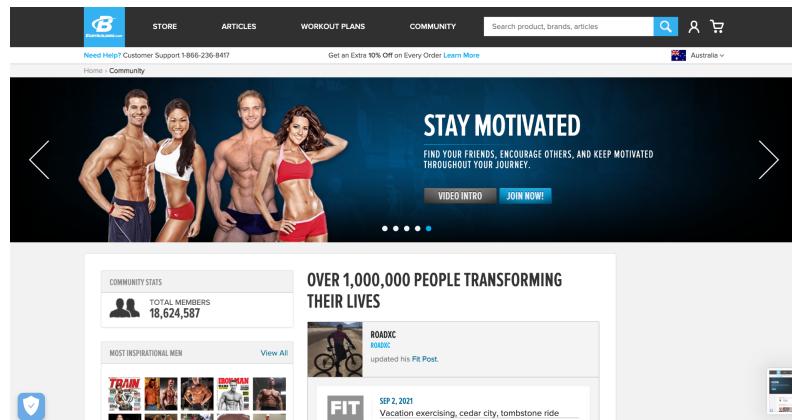


Figure 5: Body Space

f. Fitbit

Fitbit is a popular health tracking tool and collaborates with many other fitness platforms to improve the user experience. They also provide their community a social space to make friends, form teams to achieve the same goals and practice together. Fitbit helps bring people from different backgrounds in various places in the world to one place to learn from each other and join community challenges. Jono Bacon (2021) mentioned the number of people in Fitbit community, which is 1.122.022, as a point to prove how this fitness community influences many people.

Fitbit community has four core features including newsfeed about fitness, local activities, connecting with friends, and discovering new groups. In general, our team has learned some advantageous points from Fitbit and is motivated by following this community, which contributes to our product development later.

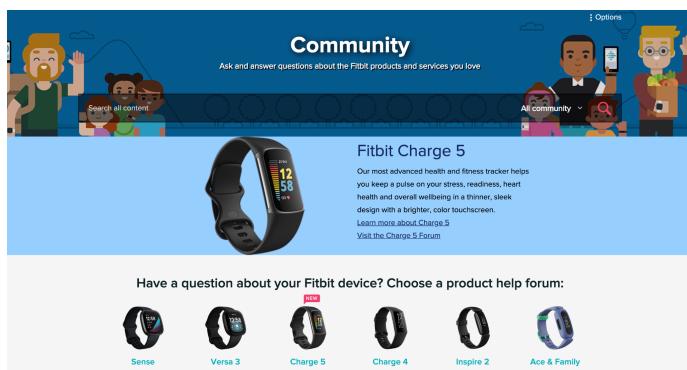


Figure 6: Fitbit

g. Strava

Strava is a social network for runners and cyclists to record their personal health and workout data as well as follow other people's running and cycling routes. Strava is developed on multi-platforms including mobile and websites and incorporates the interactions of other social media platforms such as Instagram and Twitter. It has become massively popular since 2009 after official launching because of providing a beneficial place for athletes to keep track of their own workout progress and follow other ones' progress. The novelty of Strava is presenting the routes of other users in a local area so that everyone can take those routes as examples to train themselves.

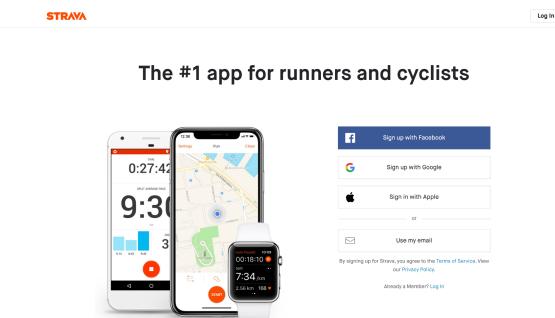


Figure 7: Strava

At this point, we have come up with several design concepts that focus on our goals and target audience. However, to decide which design concept we should develop to deliver a complete product, we may need several beginning evaluations with users to understand which of the design concepts they prefer. We can start with some evaluation methods such as Focus Group Discussion and User Interviews to understand how users think of the product ideas and their further suggestions for the core features. Besides, we need to think of the feasibility and viability of a product as well as the technical ability of each team member. As a team, we will discuss and recommend some technologies which may be used in development and consider if everyone can adapt with them.

Plan of Work

In order to achieve the project aims, the project will be broken down into smaller, more manageable sized pieces that are evenly distributed amongst the team according to their skills and preferences. The below outline will identify the break up of work and methods we will employ to ensure each task is completed to the best of our ability.

Initial Requirements and Design (Week 7)

Within this phase the team will look to draft up basic domain requirements that are required to develop a solution and complete up a design that we will look to follow for the initial prototype. To scope out the requirements for this system, our team will undertake a number of interviews with our desired demographic of both frequent and new gym go-ers to better understand the mentality around why people go to the gym and what affects their decision making around social grouping. This will help to ensure we are able to best narrow in on a domain and make any tweaks that may be necessary. By interviewing potential users, we can also better understand a potential design that will best suit their needs and serve the purpose of social collaboration within the gym going space.

Prototype & Initial Evaluation (Week 9)

Within this phase, the team will look to get a first initial prototyping front end up and running with basic functionality to ensure that users can perform basic actions within the system. This will ideally be built by our team of developers through the collaborative source in Github, with work being distributed through trello to best assign functionality and design work between the team

To evaluate the first prototyping system, we will look to get some end users to test the program as a simple program review. This program review will be designed to ensure that the application is simple to use with a cohesive workflow and understandable outcome. We will be looking for ways to improve the system from these points to be looked at within the next phase of the plan of work.

Iteration & Formal Evaluation (Week 11)

Within the next phase of the design, we will iterate on the previous phase from the feedback we received from the initial evaluation. From this data, we expect that there will be changes to be made to the system,

from both the point of functionality to design. Factoring in these changes will improve the systems ability to function within its workflow and allow for a better user experience.

Once these changes have been iterated on we will look to implement a program trial of the system with a small test group. This will look to see how well our application functions in a real life environment and ensure that our goal to fix our domain problem is achieved.

Final Prototype (Week 12)

By this point in the prototyping system, we will intend to be ironing out any major bugs in the system to ensure maximum functionality for the end users. All of our front end functionality and design will be polished up and this will be the phase we will look to implement any further changes that are found from the program trial in the previous phase.

Team Members

I'm Lachlan Wardropper and I am a final year software engineering student. I have experience in previous design and HCI courses and have found the design process to be something I both enjoy and do well at. Additionally, I have experience programming and implementing the designs put forward to me by my team members. A weakness of mine would be my hesitance to go out into the field and talk to people about my relevant space. Instead, I will often choose techniques that require less social interaction despite the quality of data being less useful. Thus, my goal for this course is to improve on this and challenge myself to conduct more interviews and questionnaires with people in the fitness space. I would also like to learn more about how my research can translate into a meaningful design. I sometimes find that I design a product that neglects parts of my research, and thus I would like to better understand how I can ensure I am making the most suitable product.

My name is Nikhil Naik and I'm a 4th year student in the Software Engineering program. In terms of my previous experience pertaining towards design and HCI this includes courses such as DECO2500, DEC03800, DEC03801, DECO6500 and DECO1400. In doing so, I feel as though I have adequate experience to contribute towards the design/HCI components of this project. In relation to prototyping and software development my strengths include python, java, C, html, css, javascript, solidity and static analysis tools for code. Combining both HCI design experience and programming experience, I feel as if I can proactively act in both areas of designing and building the prototype from iterative designs. With regards to weakness this would most likely be integrating the backend into the front end of a product developed by different members of a team. The goals and aspirations for this project for myself is to improve upon communication with the development stage, as well as keeping code quality to a high standard. I would also lean towards learning more about how prior to implementation, a user centered product requires sufficient research and data collection and user participation to produce a product that is usable and has longevity with that product.

My name is Fuxin Lu and I am a third year student from information technology. I have experiences with both HCI and the design process and found myself comfortable with the design process taught in various DECO classes. I've also experienced some programming languages like PHP and Linux, and I am familiar with the process of conducting interviews and questionnaires. Apart from that, my weak points would be not good at other programming languages and UI design (e.g.,using AI to draw user interfaces of applications). My goal for this project is to be able to work well together with every team member, to gain a better understanding of our domain by doing adequate researches, to learn the basic of how to write programming language especially back-end coding by online documentation and tutorials, and how to make connection between front-end codes and back-end, also to learn the basic design guidelines for mobile application from other team members as well as online tools.

My name is Kwan Ho YIP, I am a third year student and studying information technology. During the past years, I have tried so many projects and prototypes such as building unity combined with physical prototype, website, game development and mobile application. I am good at UI design and UX, I usually do the design aspect to the project. Programming is my worst skill but I am not afraid to learn it. The purpose and goals of this project is to build an idea and concept to solve the problem space successfully. Also, building a concept is not easy and I want to learn how to create a concept and prototype based on

the HCI skills. The hardest part in the course I would say is how to properly improve the prototype based on the resources that we have. Therefore, to achieve the goals, time management, research, team working, communication, testing are all necessary.

My name is Connor Ryan, I am hopefully a final year IT/Business student. I have relatively extensive experience working on many different IT projects throughout my years as a student/software developer and have found that working through problems and building out functionality are my strong points. I have worked in many different systems from C# winforms desktop applications to Flask Web applications all the way to smaller bots and Docker systems. I love to wrangle system problems and build out full stack applications occasionally within my spare time and would ideally like to use this project to improve my ability to scope out problems to a finer degree as I have noted that one of my key weaknesses when starting a project/problem.

My name is Trieu Pham and I am studying for a Master of Interaction Design. I have been working in user interface design for four years and continue to have a deep dive research on user experience design. Based on what I have gained from my program and work experience, I confidently deliver vivid, professional and aesthetic design as well as understand how to approach and collect data from target users in product development. Besides, I have several years working in the startup environment so I am familiar with not only the process of preparation and officially launching a product into the market but also Agile methodology. However, I am not good at programming so I can consider this personal point as a shortcoming. In this course, I aim to practice teamwork skills more and comprehend the definition of “Social and Mobile Computing”. I hope to have an opportunity to learn from my teammates and get inspired from other teams’ ideas.

This is Hyun Jeon studying for a Bachelor of IT at the University of Queensland and currently in the last year. I have been interested in user interface and user experience along with human computer interaction. As a designer or developer who provides a system to users, it is always important to think of the users' wants and needs and develop the system to fit that. I enjoy surveying or interviewing users to find out their interest and gain insights from those. I also have strength in data analysis with Python and web/mobile development. For this project, I would like to find out how potential users feel about the problem currently and what they would like from our system, so we can solve the problem. I am generally well communicated and sometimes take leadership roles where needed to solve problems. I hope to finish this project well as a team by helping each other with weaknesses each team member may have.

References

- Bacon, J. (2021, May 12). *Six key lessons from the Fitbit community*. Retrieved from:
<https://www.jonobacon.com/2021/05/12/community-building-strategies/>
- Berry, A. (2021, February 5). *I'm Scared Of Going To The Gym For The First Time..* . Retrieved from: <https://www.thegymstarter.com/blog/2020/2/4/im-scared-of-going-to-the-gym-for-the-first-time>
- BodySpace FREE Online Fitness Community. (2021). Retrieved from
<https://bodyspace.bodybuilding.com/>
- Carrie. (n.d.). *Thinking About Joining The Nerd Fitness Academy?* Retrieved from
<https://topworkoutprograms.com/workout-reviews/nerd-fitness-review/>
- Eikey, Elizabeth. (2016). *The Use of Weight Loss Apps by Women with Eating Disorders*. 3-4. 10.1145/2890602.2906187.
- Fitbit Community (2021). *Community*. Retrieved from:
<https://community.fitbit.com/t5/Community/ct-p/EN>
- Gui, X., Chen, Y., Caldeira, C., Xiao, D. (2017, May). *When Fitness Meets Social Networks: Investigating Fitness Tracking and Social Practices on WeRun*. In Conference: Proc. of the SIGCHI Conference on Human Factors in Computing Systems (CHI) 2017
- Ketchell, M. (2020, May 27). *Working out at home works for women – so well they might not go back to gyms*. Retrieved from:
<https://theconversation.com/working-out-at-home-works-for-women-so-well-they-might-not-go-back-to-gyms-138111>
- Li, J., Liu, X., Ma, L., Zhang, W. (2019, September). Users' intention to continue using social fitness-tracking apps: expectation confirmation theory and social comparison theory perspective. In *Inform Health Soc Care. 2019 Sep; (pp. 44(3):298-312)*.
- Malinen, S., & Ojala, J. (2011, June). Applying the heuristic evaluation method in the evaluation of social aspects of an exercise community. In *Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces* (pp. 1-8).
- Nerd Fitness. (2021). Retrieved from: <https://www.nerdfitness.com/>
- O'Neil, L. (2018, April 17). *No One Is at the Gym to Talk to You*. Retrieved from:
<https://www.esquire.com/lifestyle/health/a19721204/how-to-talk-to-people-at-the-gym/>
- Patel, M., & O'kane, A. A. (2015, April). Contextual influences on the use and non-use of digital technology while exercising at the gym. In *Proceedings of the 33rd annual acm conference on human factors in computing systems* (pp. 2923-2932).
- Ross, D. (September 23, 2018). *Lazy Aussies wasting \$1.8 billion on unused gym memberships*. Retrieved from:

<https://www.news.com.au/finance/money/costs/lazy-aussies-wasting-18-billion-on-unused-gym-memberships/newsstory/6243cf35a8424a8dfa212ea17c1a0208>

Rizzo, N.(2021, August 18). *77 Gym Membership Statistics, Facts, and Trends*. Retrieved from: <https://runrepeat.com/gym-membership-statistics>

Sonne, T., & Jensen, M. M. (2014, October). Race by hearts. In *International Conference on Entertainment Computing* (pp. 125-132). Springer, Berlin, Heidelberg

Strava. (2021). *Run and Cycling Tracking on the Social Network for Athletes*. Retrieved from <https://www.strava.com>

Toscos, T., Faber, A., An, S., & Gandhi, M. P. (2006, April). Chick clique: persuasive technology to motivate teenage girls to exercise. In *CHI'06 extended abstracts on Human factors in computing systems* (pp. 1873-1878).

Appendix A

Jackson, D. (2021). An interview about collaboration in the gym [In person]. Brisbane.

Clarke, B. (2021). An interview about collaboration in the gym [In person]. Brisbane.

Kelly, L. (2021). An interview about collaboration in the gym [In person]. Brisbane.