

# Design and Evaluation of a Mobile App for Social Exercise.

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**Abstract:** With the popularity of smart mobile devices, people began to rely on the mobile applications (Apps) to manage their own fitness program and record calories consumed. However, most of the sports mobile apps are designed mainly for personal-management, rarely for social use. Therefore, this study aims to develop a social-type mobile app, Social Sport, based on the user-centered design concepts and procedures. First, a thorough competitive analysis of the market was conducted, and then taking principles of interface design into account, we developed Personas and Scenarios for this Social Sport app; secondly, an interactive model was built for evaluation. Finally, participants in different ages or genders were recruited to conduct participant assessment and usability evaluation. According to the evaluation results, participants in all age groups, and both genders, all indicate that operation of the app is quite easy, but they have different interpretations for the icons in the interface, such as “Calorie-calculation” function. Therefore, in design of a single interface for users in multiple user groups, how to make all users agree on the meaning of graphics will be the key issues for modification and further investigation.

**Key words:** *social-type Apps, user-centric, interface design, persona, scenarios*

## 1. Introduction

With the advancement of technology and growing popularity of the Internet, mobile phones gradually become a daily necessity. According to a market research report about smart phones conducted by InsightXplorer in May 2012, about 50% of online users have a smart phone [1]. The value of a smart phone lies not in the device itself, but in mobile applications, or Apps. The scope of Apps is not just limited to games and entertainment, but has been extended to such purposes as education, food searches, and medicine. etc. making a mobile phone more than just a handset for voice communications, but an important tool to facilitate life. As mobile communications are extremely convenient and the public has started to emphasize health and fitness in recent years, the focus on weight control has become the center of media attention and a number of exercise related and calorie control Apps continue to be introduced. However, these types of Apps are mostly focused on management of personal health and only a few of them are designed to encourage users to keep their fitness habit by utilizing the features of social interaction and group conformity. To encourage more people to work out and keep their exercise habits, sports psychologists suggested that group exercises should be considered, as social interactions and comradeship

will encourage willingness to work out and reduce the inertia of individuals [2]. Simply speaking, group exercises are very helpful to encourage the thoughts of workout and keep the fitness habit.

How exactly can an App be designed based on group exercises for its users to keep their exercise habit? In this study, the strength of group conformity, as commonly found in group purchases, is adopted, and a calorie calculation feature is incorporated as the incentive for workout habit to design a social and group based App. However, this type of App tends to be complicated and a lot of tradeoff needs to be made about smart phone interfaces, as the small screen on a smart phone is not suitable to display too much information like a PC monitor. Also, Norman pointed out that a product with excessive features is always difficult to learn and use [3]. Thus, to prevent the design of a mobile App from overwhelming its users, its user interface design is particularly important.

Thus, the purpose of this study is to develop Social Exercise App, an App designed to encourage group exercises, using Persona and Scenarios, both user-centric design methods, to design the flow and user interface of this App. The usability assessment approach is adopted to gather user feedback about the features and interface designs of this App, identify modifications and develop recommendations for this app.

Meanwhile, it is the goal of this study to launch this App as the marketing platform for brand name sports goods suppliers, since the level of brand recognition and identification will also determine the preference of users to use this virtual platform. Thus, for users to rapidly familiarize and understand a brand, it is imperative to adopt effective advertisement strategies to enhance a brand [4]. Line and We Chat are examples of products promoted with this kind of strategy. Celebrities are invited as their spokespeople and their advertisements are massively broadcasted on TV to deepen the impressions in the heart of users and they are motivated to invite their friends to use the apps.

## **2. Literature Review**

### **2.1 User-Centered Design**

Norman pointed out that product designs adopted in the past were machine-centric [5] and users needed to work with the machines and follow complicated procedures. However, unlike machines, human beings are easily distracted and tend to make mistakes or feel confused about the interfaces as they operate the machines. Thus, Norman championed the idea of user-centered design [3]. Fulton Suri and Marsh also agreed with Norman and proposed that in order to gain an insight into how products are used, the Scenario, a powerful discovery tool, can be adopted to assess the ergonomic usability development during the product design phase and to probe into the scenarios in which products are used. In the early phase of product development, IDEO also adopted Scenario to refine their product designs [6]. Additionally, to explore users' needs, the user consultation and observation approaches can be considered and users invited to take part in the usability tests or even to participate in the entire design process as partners. Thus, the scope of user-centered design has been extended to cover usability testing, usability engineering, heuristic evaluation, discount evaluation and participatory design [7]. The purpose of this type of designs is to incorporate users' mindsets and knowledge into product designs, and so, they do not need to put too much effort into learning the products before they can get their hands around the products.

## 2.2 UI Design Principle

In the past, a number of different design principles have been proposed for interfaces designers of human-machine systems. Shneiderman analyzed popular principles and proposed the Eight Golden Rules of Interface Design. These eight rules are respected in the designer community and include [8]:

- (1) Strive for consistency;
- (2) Enable frequent users to use shortcuts;
- (3) Offer informative feedback;
- (4) Design dialog to yield closure;
- (5) Offer simple error handling;
- (6) Permit easy reversal of actions;
- (7) Support internal locus of control; and
- (8) Reduce short-term memory load.

Those rules not only focus on simplicity of UI designs as the main design principles, but take the psychological and physical status of users into consideration and help designers to quickly understand what kind of UI designs can truly facilitate the use of product.

## 3. Experiment Method, Step and Analysis

The purpose of this study is to design an APP UI that will encourage users to engage in group based exercises. Thus, the design process of the Social Exercise App can be divided into three phases: case study, persona definition, and scenario design.

### 3.1 Case Study

In this study, two Android based Apps are reviewed as benchmarks for the feature and UI designs of Social Exercise App: Noom Weight Loss Coach and Cardio Trainer. They both are related to workouts and personal health.

#### (1) Noom Weight Loss Coach

This App is designed for users who cannot keep up with their workout schedule. Through this App, users can set up their own exercise schedule, set goals based on their pace and share their result to interact with their community members. The advantage of this App is on its user interface – simple, easy to understand, and refreshing, and Noom Weight Loss Coach can track your GPS records and log your weight loss journey to provide users the most straightforward information. However, as weight details are directly revealed, the effect of social feature is hindered as sensitive users try to protect their privacy. Additionally, although healthy and diet information is provided, Noom Weight Loss Coach is unable to record details of different workouts (Figure 1).

#### (2) Cardio Trainer

This App can use GPS to log the route of your workout, calculate calories burnt during exercise and share the process on Facebook. For its advantage, this App not only tracks the route of user exercise and calories burnt, but also allows users to publish their results on social networks and interact with their social circles. Additionally, users can play music during workout and set up voice reminders on this complete workout assistant. However, its weakness is that it is too complicated with all unorganized data and users are easily confused (Figure 2).

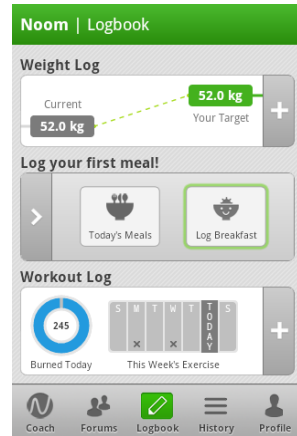


Figure 1. Noom Weight

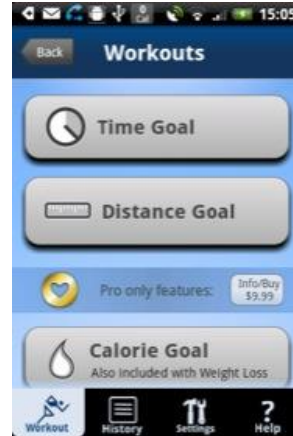


Figure 2. Cardio Trainer Loss Coach

Both of them are intended for management of personal workout habits. Although they both are powerful and allow users to interact on their social networks, they are short of incentives that motivate users to exercise. So, both of them are not ideal for users who prefer group exercises. After reviews on both Apps, the following features are identified for the Social Exercise App: logs and reports on calories burnt, a number of exercise options are available, workout reminder settings, the amount of calories burnt is presented with food icons and is designed to encourage group workout, instead of personal workout management as the main directions of App designs. main directions.

### 3.2 Persona Definition

In this study, four users' groups are defined for the Social Exercise App: housewife, middle aged and senior citizen, university student and regular 9-to-5ers and four persona models are established accordingly (Table 1). Those four groups share the same trait: prefer group exercises to social with their friends and less likely to keep up their workout schedule by themselves.

Table 1. Persona

Group	Name	Description
Housewife	Marry	Marry stays at home taking care of house chores most of the time. She sometimes rides a bike with her husband or hikes in the mountains during holidays to enrich her life.
Middle aged and senior citizen	Bob	As Bob is getting older, he is interested in nourishment and sports and has some understanding about consumer electronic products (ex. smart phone).
Regular 9-to-5ers	Betty	Betty sits in office all day long and does not workout, causing a steady increase in her waistline. She is weak-willed and likely to fail for any attempt on weight loss.
University student	Jack	As a university student, Jack dines out a lot and under a lot of stress in for his class works. His body shape is out of control. He prefers to work out and loss weight with two or more people.

### 3.3 Scenarios

To design user scenarios, this study first clearly defined the relationship between those four groups. Starting out from Marry, the relationship between the four is described as follows: Jack is the son of Marry, Marry is a neighbor of Bob, and Marry is Betty's auntie. Four scenarios were developed accordingly.

#### (1) Scenario 1

Marry ran into her neighbor Rose at the supermarket on Friday. In their conversation, Rose mentioned that her husband Bob does not work out much. So, Marry proposed to Rose about the Social Exercise App that her son introduced to her and that they can all workout together using this App. Upon her return to her home, Rose and her husband used this App to join the workout group that Marry started.

#### (2) Scenario 2

It occurred to Bob that he has not been working out for a very long time when he was watching TV at the living room. So, he used the Social Exercise App that Marry recommended to his wife Rose to start a workout group and hoped that he can go mountain hiking with his neighbors and friends. The next day he checked on Social Exercise, he found that five users have also signed up to join the mountain hiking group that Bob started and he felt great.

#### (3) Scenario 3

Betty is a female worker who has been sitting in her office all day long and very upset about her big fat belly. Each time she runs on the treadmill at home alone, she just gives up half way. Thus, Betty launched Social Exercise and checked to see if there is any suitable workout group for her. She discovered the mountain hiking group that her boss Bob started and was very interested. So, Betty decided to join this group and make a good impression on her boss.

#### (4) Scenario 4

Jack is a university student and because he dines out all the time, his body shape is out of control. Thus, he decided to start exercising again to stay lean. Couple days ago, he started to use Social Exercise and joined her favorite badminton group, but he was too occupied by his school work. So, he forgot about the group. Fortunately, the reminder in Social Exercise jogged his memory and Jack felt very sweet about it. After his workout, he discovered he can find new workout buddies through this app and they made a pact to exercise together again.

### 3.4 UI Design of Social Exercise App

After case studies, persona definition and scenario development, the prototype of Social Exercise was designed. The four major features in this app include: Choice, Creation, Record and Option (Figure 3).

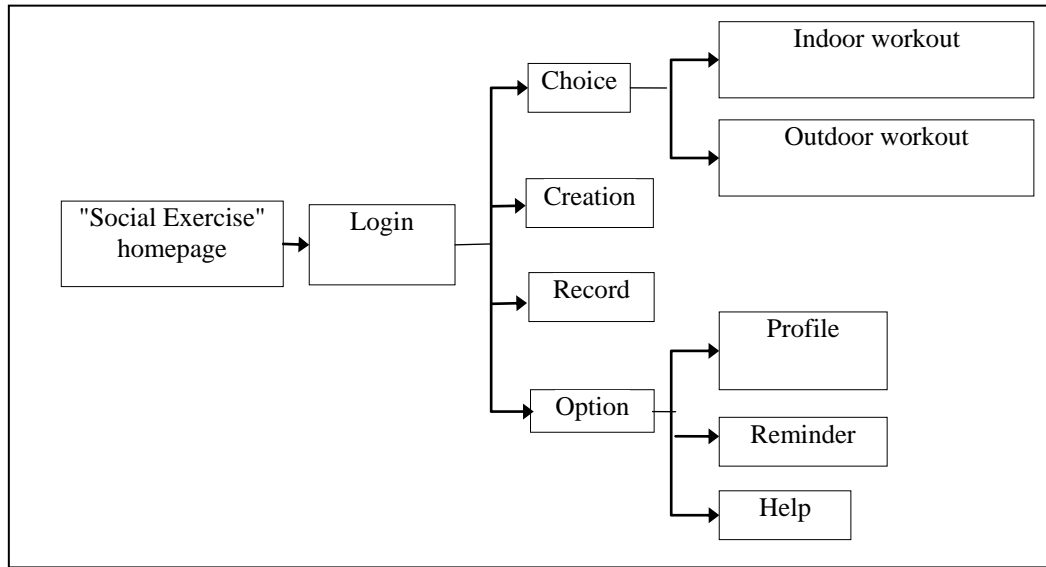


Figure 3. Structure of Social Exercise App

#### (1) Choice

As there are lots of workouts available, they are classified into indoor and outdoor workouts(Figure 4), as well-thought out classification will help users to comprehend messages more effectively. Each workout group can be set and displayed as a button and is only used to provide important information:

A leader who starts a workout group, workout duration, and icons reflecting the level of calorie burnt. As the interface may be crowded if all information is crammed into one page, thus it is designed to display details after this workout group button is tapped (Figure 5).

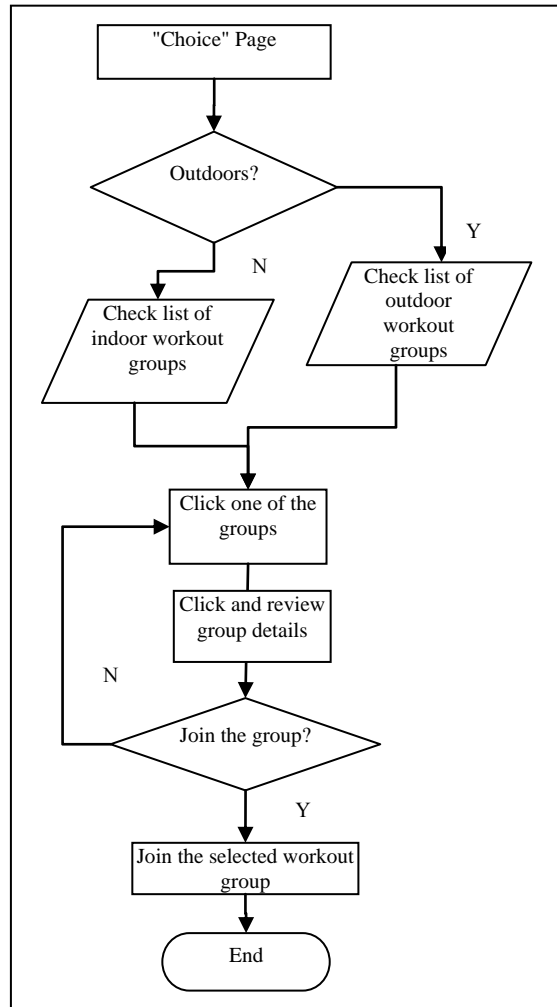


Figure 4. Flow Chart of Choice



Figure 5. Choice Page (English version)

(2) Creation

This page is basically a form for user input and the fields in this page include “Space”, “Type of Exercise”, “Child field of workout”, “Workout time”, “Workout duration” and “location” (Figure 6).

The figure displays two versions of the 'Creation' page. The left version is the initial form with fields for 'Space' (dropdown), 'Sort' (dropdown), a text input, 'Date' (text), 'Hour' (dropdown), 'Number' (text), 'Place' (text), and an 'OK' button. The right version shows the form populated with 'Indoor', 'Swimming', '220 Cal', '2013/10/14 PM 01:00', '2 hour', '5 people', and 'XXX Swimming pool', also with an 'OK' button. Both pages feature a bottom navigation bar with icons for 'Choice', 'Creation' (highlighted), 'Record', and 'Option'.

Figure 6. Creation Page (English version)

(3) Record

For the record page, details of the workout and app history, including workout group appointments that have not been carried out, lengths the App has been used (including number of days users have not worked out and this is to inform users about the amount of calories burnt over the last few days), and accumulated amount of calories burnt. The number of days and the amount of calories burnt are both displayed in red and the purpose is for users to see their progresses and stay motivated (Figure 7).

The 'Record' page displays a summary of '25 days' and '32422 Cal'. It lists four workout entries, each with a progress bar and a close button: 'Tennis' (Convenor: Bob, 3 days remaining), 'Hiking' (Convenor: Jack, Sept 29, 2012), 'Swimming' (Convenor: Mary, May 5, 2012), and 'Swimming' (Convenor: Betty, Mar 7, 2012). The bottom navigation bar includes icons for 'Choice', 'Creation', 'Record' (highlighted), and 'Option'.

Figure 7. Record Page (English version)



#### (4) Option

The option page is used to set personal profiles, set up reminders or display help descriptions. Users can click on the blue buttons to configure the features. When users enter the option pages by mistake, they can click on their desired option directly here without going back to the previous page just to open the option page they prefer (Figure 8).



Figure 8. Option Page (English version)

## 4. Usability Assessment and Discussion

In order to verify if the UIs of Social Exercise are easily comprehensible to users, usability assessment on the UI needs to be conducted and the goal of assessment, test method, participant selection and the result of the test are detailed in this Chapter.

### (1) Goal of Assessment

There are two goals of this usability assessment: 1) verify if the UIs of Social Exercise are easily comprehensible and simple enough for users to easily locate the settings they need; and 2) assess if the icons are chosen correctly for participants to understand what they represent.

### (2) Testing Method

A Sony Ericsson's Xperia Neo V MT11i smart phone was used in this usability assessment as the testing platform for Social Exercise and was provided for the participants during the assessment and they were assigned to use Social Exercise by the test administrator. Two types of information were collected in the process: sequences in which participants go through all the UIs and their perceptions toward icons chosen in the App. The conversations between the test administrator and participant during assessment were recorded in detail using a pen recorder (Figure 9 and 10).



Figure 9. Test 1 (Participant No. 2)



Figure 10. Test 2 (Participant No. 4)

### (3) Participant Selection

Participants were chosen based on the persona proposed in this study (Table 1) and five Participants were recruited (three males and two females; two students, one 9 to 5er, one retiree and one housewife.) All five of them have experiences using mobile Apps and keep the habit of exercise (Table 2).

Table 2. Participant Profile

ID	Occupation	Gender	Age	Favorite workout
Participant No. 1	University student (undergraduate)	Male	18	Unlimited
Participant No. 2	University student (graduate school)	Male	22	Basketball
Participant No. 3	White-collar	Female	28	Yoga
Participant No. 4	Retiree	Male	63	Tennis
Participant No. 5	Housewife	Female	43	Fitness walking

### (4) Test Result

After the usability tests and follow-up interviews with the five participants, it has been verified that participants have no questions about the operations of Choice, Creation, Record, and Option pages and feel they are simple and intuitive, but some of them were confused about the icons chosen for the app. Thus, the interview details are analyzed to interpret their comments about Social Exercise. Their comments are discussed below:

A. The time information recorded in the red bar is originally designed to mean the number of days Social Exercise is used after users start using this App (including days that users do not exercise) and inform users about how many calories are burnt during this period. However, most participants mistook them as the frequency each exercise is performed and Participant No. 5 even thought that this information refers to how many calories are consumed in a month. Participant No. 1 pointed out that the choice of workout in the Creation page is far too limited, and he believes that the design will be better if users can set their own exercise.

B. The number of cakes shown corresponds to the level calories are burnt. However, some participants learned about this after they went to the next page. For example, Participant No. 3 thought that the number of cakes represents the level of appetites and Participant No. 5 identified the cake icon as rewards. Both Participant No. 3 and No. 5 are female.

C. Participant No. 3 proposed that in the Creation page, the duration of workout should not be calculated in hours. The starting and ending times of Creation should be used instead. So, users do not need to calculate for the ending time themselves.

D. Participant No. 3 pointed out that the message of successful group creation shown after the Creation page is set up does not confirm that a group has been started successfully for users. Users need to be directed to

the Choice page and the groups they started should be displayed on top of the Choice page. This process can remind users that their groups are created successfully.

#### (5) App Modification Directions

Some insights about the Social Exercise UI designs that the developers overlooked can be obtained from participant s' feedback and the usability assessment. Although the use of this App is straightforward and intuitive, users were unable to link features and icons successfully. Thus, through the comments provided by participant s, the following five points are summarized for UI improvement.

A. On the Record page, the number of days (including the days users did not exercise) should be changed to the workout frequency instead of days that users work out to inform users about their workout frequency.

B. As it is virtually impossible to include all workouts in the selection, there might be times that users are unable to find their preferred workout in the Creation page. The solution to that problem is that the "Other" item can be added for users to enter their preferred workout and start their workout group for.

C. The cake icon is mistaken as rewards and even misperceived as the calories consumed, instead of calories burnt as the original intention. Thus, in the future, this study will collect all symbols that represent calories to choose as the calorie icon in Social Exercise.

D. The Workout Ending Time option should be added to the Creation page to save the trouble for users to calculate the ending time.

E. After a group is created, users should be directed to the Choice page to remind users that their workout group has been started successfully.

### 5. Conclusion

(1) The design elements of Social Exercise, derived from participant s' feedback covered in Chapter 4, are described in the following paragraphs. Because Social Exercise is not age restricted, unnecessary features need to be eliminated and (2) the design needs to be simple and easy to use. (3) Since there are far too many workouts to include them all and to ensure that this App is suitable for all users, the "Other" option needs to be added for them to add their preferred exercise and work out with others. (4) In order to reduce the effort of users in using this App, opinions and thoughts about phrases and sentences that are harder to be expressed through graphics and (5) icons need to be collected from users across different age groups and genders and analyzed before the intuitive and universal symbols can be adopted for this app. (6) For users to confirm that their friends have been notified about their workout groups, the message about their workout group need to be displayed on the common page shared by all their friend circles to acquire feedback from them.

Through usability assessment and the testing result, this study discovered that users across different age groups and of all genders feel that Social Exercise is very easy to use. However, disagreement about the icons was identified.

For example, the icon representing calories burnt was interpreted differently by users of different age groups and genders. Thus, how to ensure that all user groups can easily comprehend the meanings of each icon will be the emphasis for design modification and studies in the future.

Additionally, in the future, we will contact related sports goods suppliers for their sponsorship on this App because as the number of users continue to grow, it will be extremely beneficial for the suppliers to market their

products and launch related promotional campaigns, such as jogging or basketball games, can all be launched on this platform to promote the use of this App and attain the goal of sustainable development.

## ACKnowledgments

This study was in part funded by the National Science Council of Taiwan under the grant NSC 101-2221-E-025-002. We sincerely appreciate their support and thereby acknowledge it for the successful completion of this study.

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