

LP 1708297 - Healthfitness app

by Lisa Partridge

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TIME SUBMITTED	01-FEB-2018 11:43AM (UTC+0000)	WORD COUNT	3052
SUBMISSION ID	82655957	CHARACTER COUNT	19325

***University of Wales Trinity Saint
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Unit /Module: L6 Usability
Engineering
Module Code: M6X01110
Lecturer: Sue Maw

*Assignment Title: **Health/fitness Interface
Prototyping***

Submission Date: 02-02-2018

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Introduction

To monitor and improve patient's health, health care providers could use a smart phone app to work towards rehabilitation following surgery, lose weight for health reasons, and lose weight in preparation for surgery or for general health conditions such as heart disease and diabetes. Today many people use smart phones and the features in the device could be used to improve health and wellbeing.

The World Health Organisation state that 31% of adults are inactive and 3.2 million deaths each year due to physical inactivity [1].

With healthcare providers only seeing their patients during outpatient appointments it is difficult to motivate the patients into keeping active in between hospital appointments. A smart phone health and fitness app could be the answer to this issue.

The smart phone app could be designed to link to Facebook or twitter accounts that could keep the healthcare provider and patient communication flow in between appointments. This could bridge the gap between the both using technology.

Based on a study reviewing a number of mobile fitness apps, looking at how to link the fitness app to twitter. The app could bridge the gap between the health care provider and the patient [2].

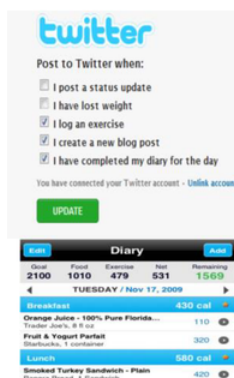


Figure 1 Example of app and twitter link [2]

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App Name	Audio Cues	Barcode Scanning	Virtual Coaching	Diet Monitoring	Exercise Monitoring	Facebook/ Twitter	Goal Setting	Music Playlist	Narrative Story	Progression	Sleep Monitoring	Sync with Other Apps	Sync with Other Devices	Tailored Feedback
Zombies, Run!	✓				✓	✓		✓	✓	✓		✓	✓	✓
Strava Running and Cycling	✓				✓	✓				✓			✓	✓
Nike+ Running	✓		✓		✓	✓		✓				✓	✓	✓
RunKeeper	✓				✓	✓	✓	✓	✓	✓		✓	✓	✓
Runtastic	✓				✓	✓		✓	✓	✓		✓	✓	✓
Map My Fitness	✓			✓	✓	✓		✓	✓	✓		✓	✓	✓
Fitbit	✓	✓		✓	✓	✓					✓		✓	✓
Map My Run	✓		✓	✓	✓	✓	✓	✓				✓	✓	✓
Fitocracy					✓	✓				✓		✓	✓	✓
Lose It!		✓	✓	✓	✓	✓	✓			✓		✓	✓	✓
MyFitnessPal		✓		✓	✓	✓	✓			✓		✓	✓	✓
Noom Weight Loss Coach			✓	✓	✓	✓	✓							✓
Fitocracy Macros				✓	✓	✓						✓		✓
Fooducate		✓		✓	✓	✓								✓
Sleep Cycle alarm clock										✓				✓
Couch to 5K	✓		✓		✓	✓		✓						✓
Runtastic Six Pack Abs			✓		✓		✓					✓		
Charity Miles					✓	✓	✓							
WebMD					✓									

Figure 2 Table showing a list of fitness apps and can link to facebook/twitter [1]

Even though many people are using smart phones, with females spending more time on their phones than males. Females spending on average 167 minutes per day, while males spend 154 minutes per day. With women more interested in communication and social apps and males more interested in games. This changes with age groups and with people over 51 spending on average 118 minutes [3]. This would be a challenge as the rehabilitation app I have developed would be mostly aimed for older people at around 50+. With this in mind careful consideration of design related affordance and metaphors will be critical to ensure the patient is able to easily use the app and get the best out of it.

Investigation of Target User Requirements

The target users who would be relevant to use the app are adults that are recovering from surgery, in preparation for surgery i.e. to lose weight prior to surgery for health reasons. It is important to look at the users who the application would benefit. The following questionnaire/survey was devised to record the information.

1. What is your gender – Male/Female
2. What is your age
3. Employment status

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4. Do you use a smart phone
5. Do you use social media i.e. Facebook/Twitter/Instagram
6. Would you consider using a health fitness app to liaise with your health professional via social media

Individuals I used for the questionnaire.

1. A colleague was due to go on planned sick leave for a knee replacement operation and agreed to take part
2. A colleague with similar health issues as above with plans for surgery within the next year needing to lose weight prior to surgery also agreed to take part

Both of a similar age and gender (both male) within the 55-60 age group, agreed that the app would be of benefit for rehabilitation following surgery and also in preparation for surgery. Both colleagues had no issues with using social media for uploading information to their healthcare professional.

3. A female colleague in the 55-60 group completed the questionnaire, she thought the app would be useful, however she felt that she would struggle with social media.

To identify the task and work out the steps required to upload the information to the healthcare professional from the patient I carried out a Hierarchical Task Analysis. This was to work out the steps required to design a paper prototype of the application to be reviewed and evaluated.

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Hierarchical Task Analysis

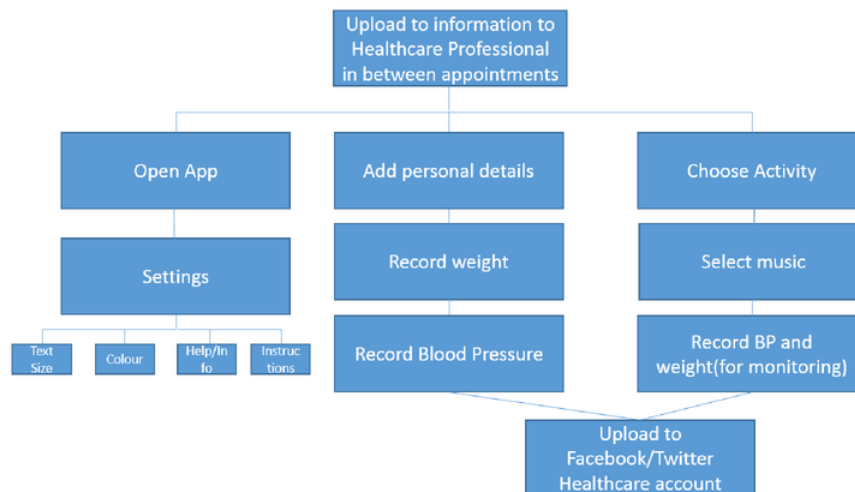


Figure 3 Communication between Healthcare professional and patient

Paper Prototype Walkthrough

Figure 4 below is the first draft of the design following the task analysis exercise carried out (see figure 3).

- 1) Open the App
- 2) Change settings; text size, colour, help and info and instructions available
- 3) Add personal details; weight, blood pressure
- 4) Choose the activity required
- 5) Select any music for workout (sync to exercise type)
- 6) Record blood pressure for monitoring after exercise. Weight to be recorded weekly.
- 7) Upload to social media, e.g Facebook, Twitter Healthcare account

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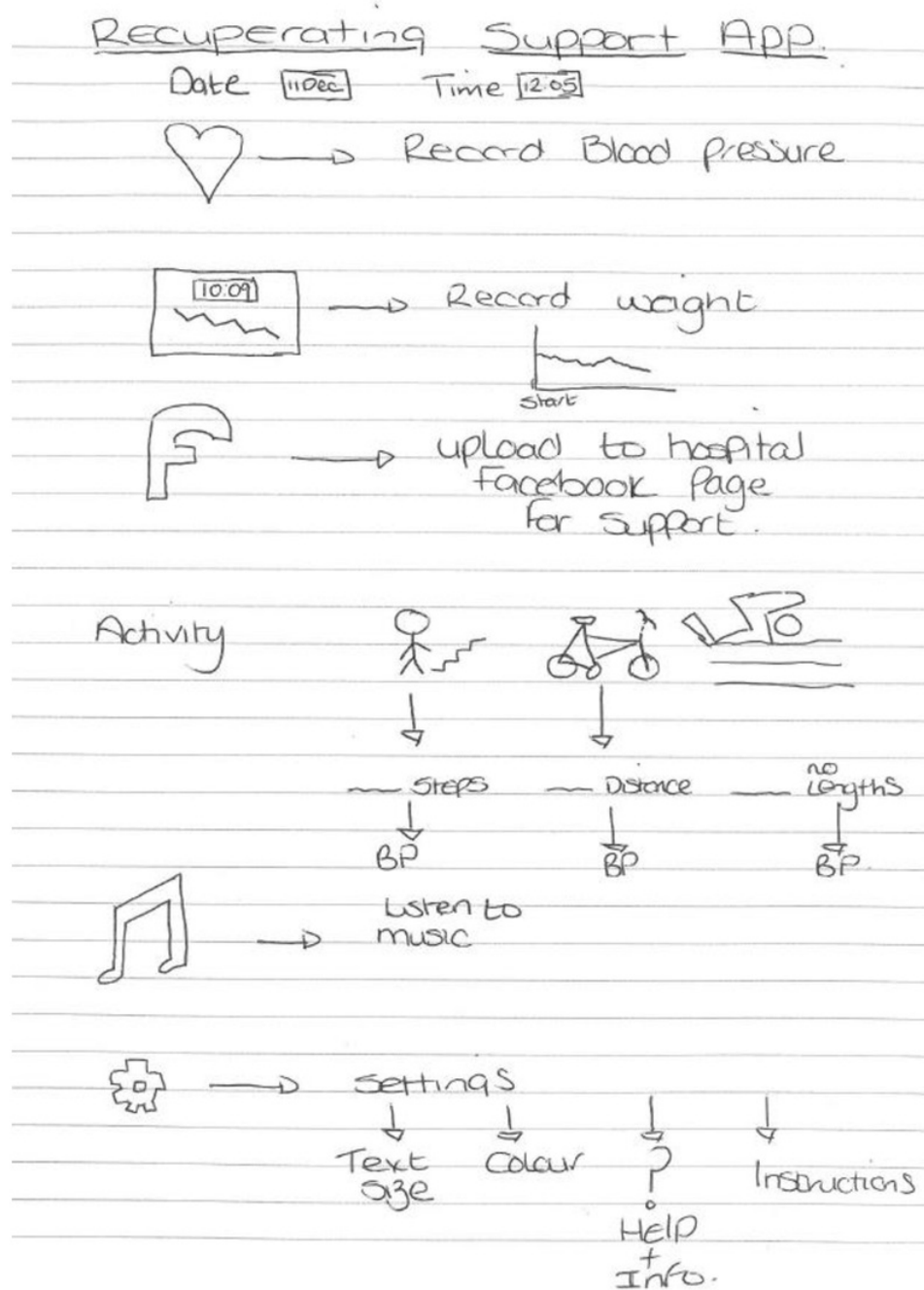


Figure 4 - paper prototype

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Analysis of Paper Prototype and Human Factors

When designing the paper prototype it is important to consider the human factors as part of the design. Human factors are visual perception, affordance, metaphors, memory and reasoning.

Human vision is split into two stages, the physical process of the eye picking up the light and the interpretation of the image to recognise objects, distance and colours.

The human eye is made up of the retina which is the light sensitive area at the back of the eye made up of rods and cones. Rods which are outside the retina are sensitive to light but do not pick up fine detail or colour. The cones operate under bright lighting conditions and are sensitive to red, green and blue, these give us our colour vision. Cones are positioned in the central point of the retina where we focus images. In design consideration must be taken to people who are colour blind and use colour with care.

It is important to consider vision perception in the design process and I have considered this in my paper prototype. Theory of perception has been greatly researched, some disapprove but many designers apply the 6 Gestalt principles to design to create interfaces that users can easily follow [4].

- 1) Applying similarity between different elements being; shape, colour, size, texture or value. The more similarity the greater the connection.
- 2) Continuation where use of lines draw the eye along a path.
- 3) Closure where objects are used for the eye to see closed shapes, used with stencilled art and logos.
- 4) Proximity where shapes are arranged as a group they are perceived by the eye to see a whole rather than the individual shape. Colour and texture can also be used in proximity.
- 5) Figure/ground where the eye see the objects from their background.
- 6) Symmetry is applied to achieve order and balance.

There are two types of perception theory's, they are the Gregory's top down and Gibson's bottom up.

Top down theory is where we compare objects with representations that are stored in our memory.

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Bottom up theory is direct there is no requirement for memory there is enough information in our environment [5].

In reality both approaches of perception are used in design and I have considered both. I have applied affordance in the design using symbols and drop down arrows for the users to associate the object with what they need to do. Affordance is defined in design as being an object or environment which allows the individual to perform an action [6]. Affordance was originally invented by Gibson to refer to the actions between the world and an actor. Norman's article explains how perceived affordance in graphical design is that the designer only really has control over perceived affordance [6] .

In design we need to consider human memory and how our sensory, short term, long term memory. With sensory memory retaining the images after the stimuli has ended which then passes into the short term memory. The short term memory in design we need to try to break the tasks into smaller chunks rather than overloading the short term memory as it is likely that the user will forget what they are doing [7]. With Long term memory we store information for a long time, recognition is the easiest form of recall. Graphics and menus allow users to make use of recognition.

The more ways we can connect previously stored knowledge the easier it will be to recall information. Using metaphor is a good way to do this [8]. By using similar images from other apps that users will be familiar with will help with usability so that the user can draw upon their stages of memory to use the app.

Using interface metaphor in design helps to explain something unfamiliar for example the desktop metaphor were it resembles an actual desk [9]. Using metaphor can help to explain what you want the user to do [9].

The final human factor to consider in the design is on human reasoning and how we use the knowledge we already have to draw on conclusions to solve problems. There are 3 types of human reasoning; deductive, inductive and abductive. Human reasoning can have implications in software design and need to be looked at carefully in the design.

Review of Paper Prototype Walkthrough

Below is the review that was carried out by Wendy Herbert following the walkthrough of my paper prototype.

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Good affordance as graphics show exactly what is expected of user but:

How often would you be recording BP and Weight? How would the user take own BP and for what purpose? Is the activity type and quantity set by the physiotherapy department or does the user just set their own goals? It would show the user's own progress but is there expectation that the physios monitor through FB page??

Is there an option to keep a track of exercise maybe by graph or like the Fitbit kind of way of tracking cummatively over the course of a week? Maybe a notification if haven't input in 24/48 hours?

I think it would be useful if goals are preset by physio. Could also benefit from other exercise forms such as stretching/yoga types of exercise?

I don't think the music is particularly useful as most people would already have music on their phones anyway.

It certainly is an improvement on the metaphor of print out exercise sheets/booklets which you would normally receive through a physio department as it provides an interactive record and tracks progress.

Wendy Herbert

Class Members Paper Prototype

Figure 5, paper prototype that has been designed by Wendy Herbert

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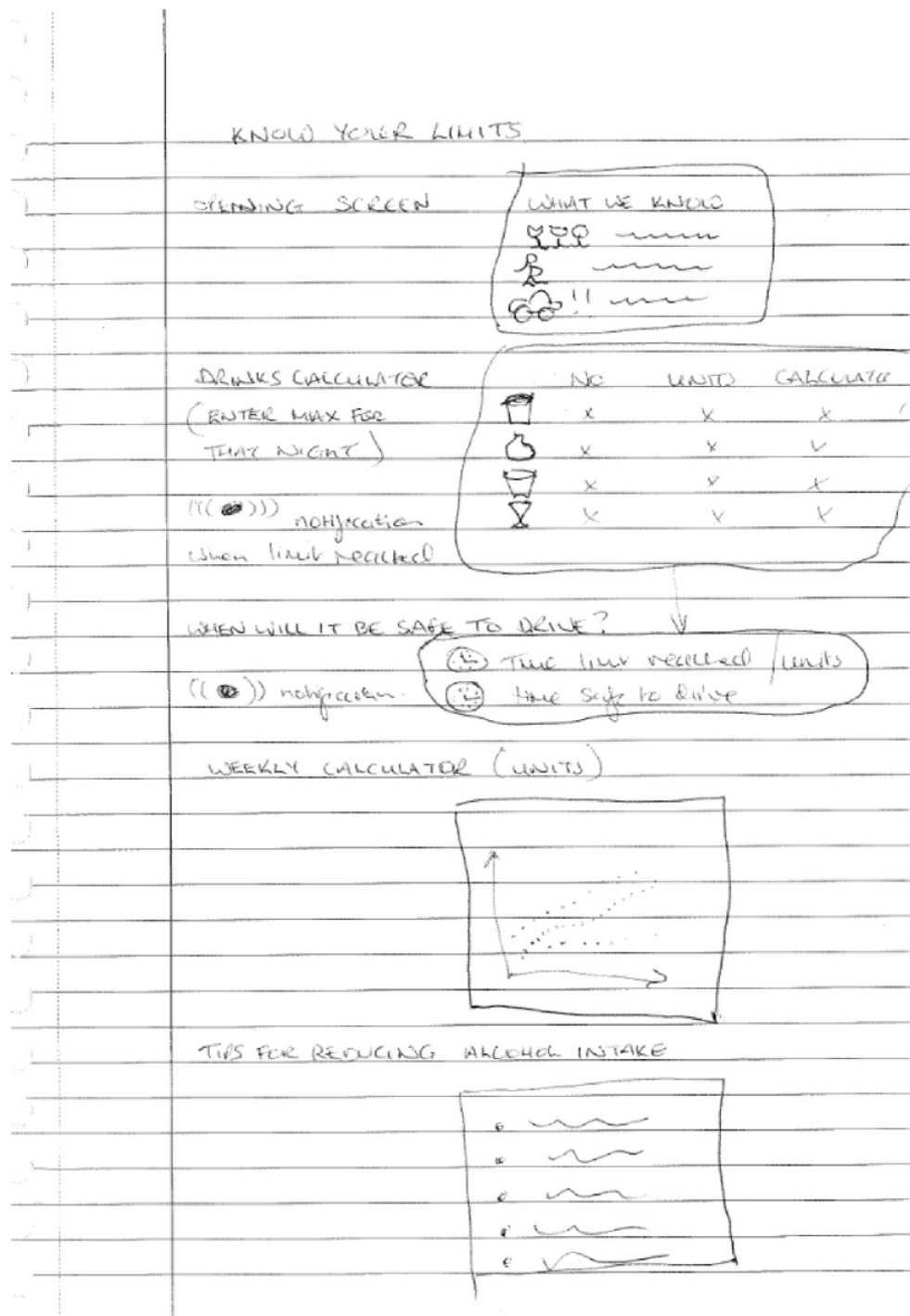


Figure 5- know your limits

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Evaluation of Class Members Design

- Opening screen to input details about the user
- Drinks calculator, tells the user how many units they are allowed for that night
- Notification alarm when the user has reached their limit
- Tells the user when it will be safe to drive
- Provides a weekly calculator to monitor how many units have been consumed for the week
- Provides tips on how to reduce alcohol intake

App is straight forward and easy to use. It is laid out well and also easy to navigate around.

Metaphors within the app, e.g. car image, drink and clock to highlight when it is safe to drive.

Good use of affordance on the home screen so that the user can know where they have to input their details.

I like the fact that the app not only records what the user has consumed but also provides tips on how to reduce alcohol intake.

My only concern is around how accurate is the monitoring? What if someone uses the app and it tells them it's safe to drive, when actually it is not and what implications are there if there are errors in the monitoring.

Software prototype

It was clear in the feedback from my paper prototype that was designed was missing some key elements to explain to the user on how the app is to be used. I have considered this in the software design.

Figure 6, front page, welcomes the user with some visual images and arrow to move to the next page and settings icon.



Figure 6 - Front screen

Figure 7, records the user's information, including;

- Name
- NHS number, this is required as a name alone cannot identify the patient to the healthcare professional.
- Date of birth

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- Height
- Weight
- Heart rate
- Blood pressure
- Pulse rate
- Forward and back arrows

The prototype is a rounded rectangle with a black border. At the top, the title 'My Info' is centered in a bold, black, sans-serif font. Below the title are five stacked input fields, each with a dashed border and a label inside: 'Name', 'NHS Number', 'Date of Birth', 'Height', and 'Start Weight'. Below these fields is a small icon of a red heart on a white background with a black ECG line. To the right of the heart icon are three stacked input fields with dashed borders and labels: 'Heart Rate', 'Initial BP', and 'Pulse Rate'. At the bottom of the form are two large blue arrows: one pointing left and one pointing right, positioned on either side of the 'Pulse Rate' field.

Figure 7 – Information page

Figure 8, records the activity details. The user is required to select the chosen activity and the app will work by populating the recommended work out details. This will be preset by the healthcare professional worked out by the users weight, blood pressure etc.

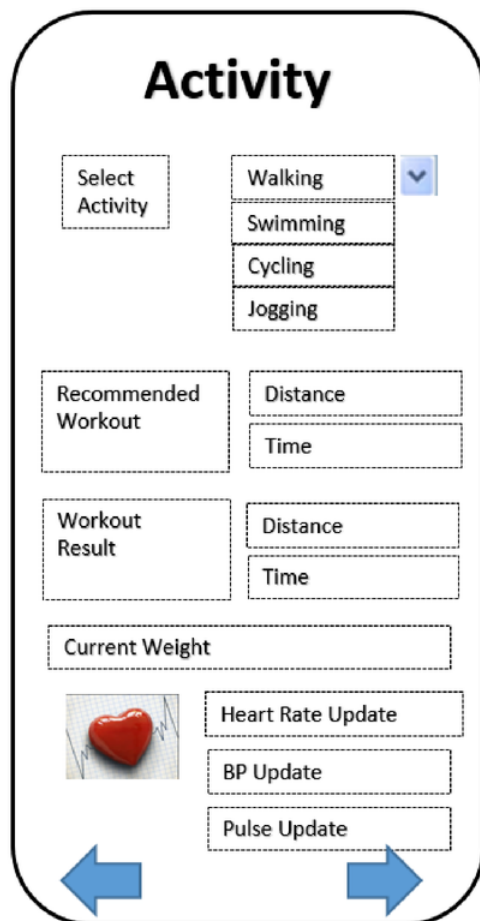
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The user is required to update the results of the workout. These results will be displayed on a dashboard and the user can upload results to the healthcare professional.

Weight will be recorded weekly.

Heart rate, blood pressure and pulse will be required after every workout.

Forward and back buttons to navigate around app.



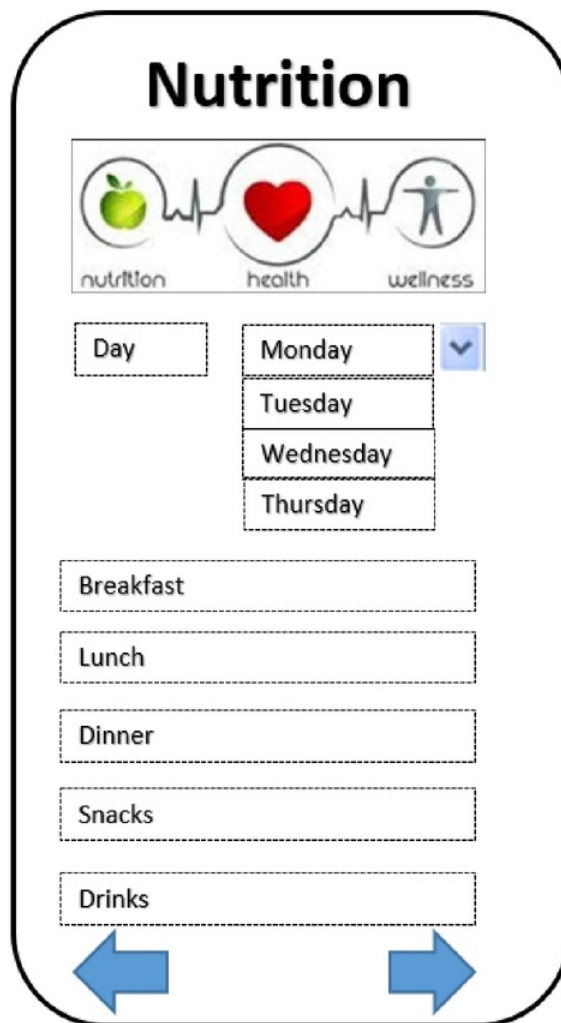
The image shows a mobile app prototype for an 'Activity' page. The page has a rounded rectangular border. At the top, the word 'Activity' is centered in a bold, black font. Below the title, there are several input fields and buttons. On the left, there is a 'Select Activity' button. To its right is a dropdown menu with 'Walking' selected, and options for 'Swimming', 'Cycling', and 'Jogging' below it. Further down, there are two pairs of input fields: 'Recommended Workout' with 'Distance' and 'Time' fields, and 'Workout Result' with 'Distance' and 'Time' fields. Below these is a 'Current Weight' input field. At the bottom left, there is a red heart icon with a pulse line. To its right are three stacked buttons: 'Heart Rate Update', 'BP Update', and 'Pulse Update'. At the very bottom, there are two large blue arrows pointing left and right for navigation.

Figure 8 - Activity page

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Figure 9, records nutritional information, selecting the day and adding the food consumed on that day. This will be useful for the healthcare provider to review the users eating habits and can make suggestions to dietary habits.

Forward and back arrows to navigate around the app.



The image shows a prototype of a 'Nutrition' app interface. At the top, the word 'Nutrition' is displayed in a large, bold, black font. Below the title is a horizontal row of three circular icons: a green apple, a red heart, and a person with arms raised. Each icon is labeled 'nutrition', 'health', and 'wellness' respectively. Below this row is a 'Day' label next to a dropdown menu currently showing 'Monday'. The dropdown menu lists 'Monday', 'Tuesday', 'Wednesday', and 'Thursday'. Below the day selector are five text input fields labeled 'Breakfast', 'Lunch', 'Dinner', 'Snacks', and 'Drinks'. At the bottom of the interface are two large blue arrows, one pointing left and one pointing right, for navigation.

Figure 9 – Nutrition

Figure 10, results page. There is a button here to upload the data to the healthcare provider. This could be a facebook or twitter account. The healthcare provider can then communicate with the user/patient keeping the communication going between them both.

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Forward and back arrows to navigate around the app.

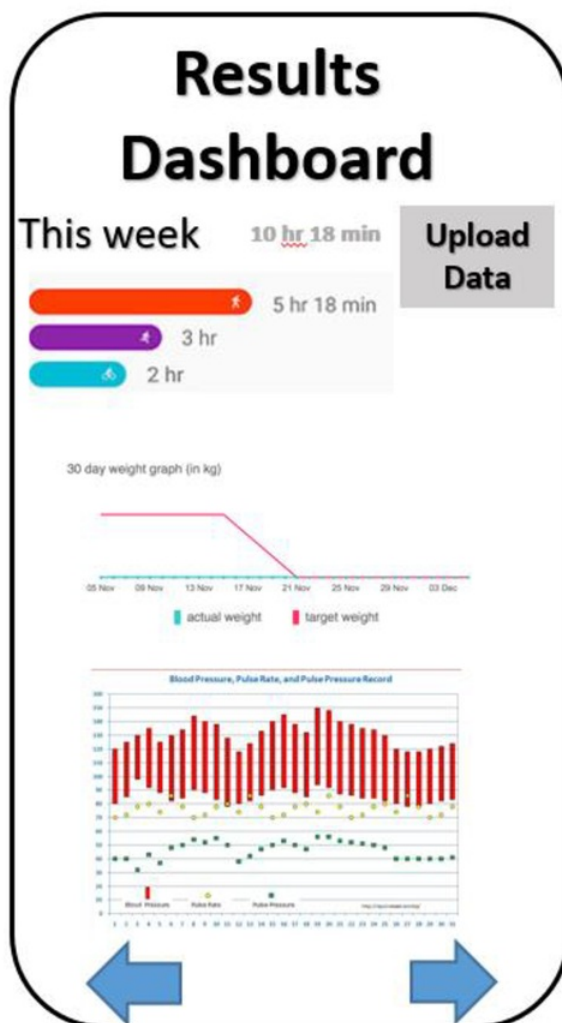


Figure 10 - Results Dashboard

For the software prototype I chose to use Microsoft PowerPoint as I am more familiar with this package. I was able to take screen shots of pictures and copy and paste into a shape which resembled a mobile phone screen. I was able to add text boxes, graphs, forward and back buttons. At this point in the process it did what I needed it to do. I am aware there are much

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better visual graphic programmes for prototyping screens such as Dreamweaver, Visual Studio and Photoshop which I will explore further.

Evaluation

Using health and fitness apps could work towards reducing the public health burden on the NHS. The app that I have designed is a reactive approach, rehabilitating after surgery or for ill health however smart phone fitness apps can also be a pro-active way to encourage people to keep active.

The task analysis exercise was the most useful usability engineering technique that I used as it helped to look at the steps that were required. I found that I had to re-visit the task analysis as there were steps that I had initially missed. I also found that learning about human factors and particularly around affordance and metaphor influenced the style of the app. I considered users who may not be familiar with fitness apps and added images that they could relate to.

Reflecting on the paper prototype feedback from Wendy I have added more features in the software prototype as the paper prototype didn't really explain what was required of the user. Such as, how often the user will be recording BP and weight. I have also added pulse rate and heart rate as these will be required to monitor the user is not overdoing the exercise, or the opposite and not doing enough.

I have also added a recommended workout which will be preset by the healthcare provider and also an achieved workout summary.

The expectation is that the healthcare will be monitored through facebook or twitter but this needs to be explored further particularly around privacy implications.

Exercise will be tracked in a similar way to Fitbit which is why I introduced a dashboard displaying the results and an upload button to share the information with the healthcare professional.

I chose not to add other forms of stretching or yoga type exercises to the software prototype but will consider going forward.

I have removed the music icon as suggested by Wendy as she made a valid point as it is not necessary as the user will probably already have music on their phones.

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Overall, the techniques used when designing the prototype have been effective, and writing this assignment has strengthened my knowledge and I can apply this to the further developments of the prototype. Such as looking at the colour choices I have made and how they may not suit users with visual impairments, I will look to change the colours that would be more suitable for users who may be colour blind.

References

- [1] J. P. Higgins, "Smartphone Applications for Patients' Health and Fitness," *The American journal of medicine*, vol. 129, no. 1, pp. 11–19, 2016. [Online]. Available at: [http://www.amjmed.com/article/S0002-9343\(15\)00537-9/pdf](http://www.amjmed.com/article/S0002-9343(15)00537-9/pdf). [Accessed 30/01/2018]
- [2] T. Vickey, J. Breslin, and A. Williams, "Fitness--There's an App for That: Review of Mobile Fitness Apps," *Int. J. Sport Soc.*, vol. 3, no. 4, pp. 109–127, 2012. [Online]. Available at: http://www.johnbreslin.org/files/publications/20120725_icss2012. [Accessed 30/01/2018]
- [3] I. Andone, K. Błaszczewicz, M. Eibes, B. Trendafilov, C. Montag, and A. Markowetz, "How age and gender affect smartphone usage," *Proc. 2016 ACM Int. Jt. Conf. Pervasive Ubiquitous Comput. Adjunct. - UbiComp '16*, no. September, pp. 9–12, 2016. [Online]. Available at: https://www.researchgate.net/publication/306263450_How_Age_and_Gender_Affect_Smartphone_Usage. [Accessed 30/01/2018]
- [4] S. Hampton-Smith, "The designer's guide to Gestalt Theory | Creative Bloq," *CB Creative Bloq*, p. 1, 2017. [Online] Available at: <https://www.creativebloq.com/graphic-design/gestalt-theory-10134960>. [Accessed 30/01/2018]
- [5] S. McLeod, "Visual Perception - Simply Psychology." 2007. [Online] Available at: <https://www.simplypsychology.org/perception-theories.html>. [Accessed 30/01/2018]
- [6] D. A. Norman, "Affordance, conventions, and design," *Interactions*, vol. 6, no. 3, pp. 38–43, 1999. [Online] Available at: <http://delivery.acm.org.ezproxy.uwtsd.ac.uk/10.1145/310000/301168/p38-norman.pdf?ip=193.62.89.124&id=301168&acc=ACTIVE%20SERVICE&key=BF07A2EE685417C5%2ED3B0B0D06D8A4908%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35>

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&_acm_=1517420731_324259454db68764d8f450933e5db74d. [Accessed 30/01/2018]

- [7] L. Mastin, "Sensory Memory - Types of Memory - The Human Memory," *Int'l Psychology Center*. 2010. [Online]. Available at http://www.human-memory.net/types_sensory.html. [Accessed 30/01/2018]
- [8] S. Bradley, "What Designers Should Know About Visual Perception and Memory - Vanseo Design." pp. 1–15, 2011. [Online] Available at: <http://vanseodesign.com/web-design/visual-perception-memory/>. [Accessed 30/01/2018]
- [9] "Metaphors and Analogies in Product Design – UX Planet." . [Online]. Available at: <https://uxplanet.org/metaphors-and-analogies-in-product-design-b9af77c18dba>. [Accessed 30/01/2018]

FINAL GRADE

/100

GENERAL COMMENTS

Instructor

Introduction

An excellent and well referenced Intro with very good academic English and evidence of thorough research condensed into the required short section.

Task Analysis

Evidence of good research with target users with an appropriate set of questions. This is used to construct a hierarchical task analysis which shows careful consideration of user characteristics and requirements. You do not stray into thinking ahead to the app design.

Paper Prototype

This shows application of usability techniques and good design work. It is well structured and includes many useful features showing careful consideration of user needs.

Human Factors

A good and well referenced discussion of Human Factors. Although you correctly describe the concepts and discuss their application it would have been an improvement to show me examples from your design.

Review of Classmate Design

The review made many useful and constructive suggestions for improvement with a good level of detail and application of theory.

Software Prototype

This is an excellent prototype with great design work and application of usability techniques. Also good discussion of changes made due to feedback and an evaluation of PowerPoint which was a simple but effective tool here.

Evaluation

Excellent analysis of the techniques used with many specific application in your work as requested.

Referencing and Format

Good referencing, appropriate and attractive format.

78%

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