



GRIFFITH COLLEGE LIMERICK

Bachelor Degree in Computing Science (Honours)

Wellbeing & Mindfulness Android Mobile Application

Project Proposal Form

The form, fully completed, must be returned to:

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Faculty of Engineering, IT & Computing
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Limerick

Final Year Research & Development Project Proposal

PROJECT TITLE:	<i>Wellbeing & Mindfulness Android Mobile Application</i>
STUDENT NAME & ID:	
NAME OF DEPARTMENT:	Engineering, IT & Computing
PROGRAMME	Bachelor (Honours) Degree in Computing Science
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OTHER INSTITUTIONS / DEPARTMENTS / PERSONNEL ASSOCIATED WITH THE PROJECT:

Spectrum Life, based at Dell Technologies

PROJECT SUMMARY:

FULL DESCRIPTION OF THE PROJECT:

Problem Definition & Background Information:

According to Cullen (2018) Ireland is on the top four European countries out of 36 surveyed in the annual *Health at a Glance* report, where people are suffering from mental health illnesses. Rates of depression are above the European average, but luckily, the rates of suicide were below.

According to the OECD report, released on 22nd November 2018, 1 in 6 people in Europe (84 million in total) had a mental health issue in 2016, with the Irish population with mental health disorders (anxiety, depression, alcohol and drugs use, schizophrenia, bipolar disorder, etc.) being at 18.5% or higher in 2016, along with Finland, the Netherlands and France.

Annually, mental health problems cost over € 8.2 billion to the Irish economy (OECDiLibrary, 2020).

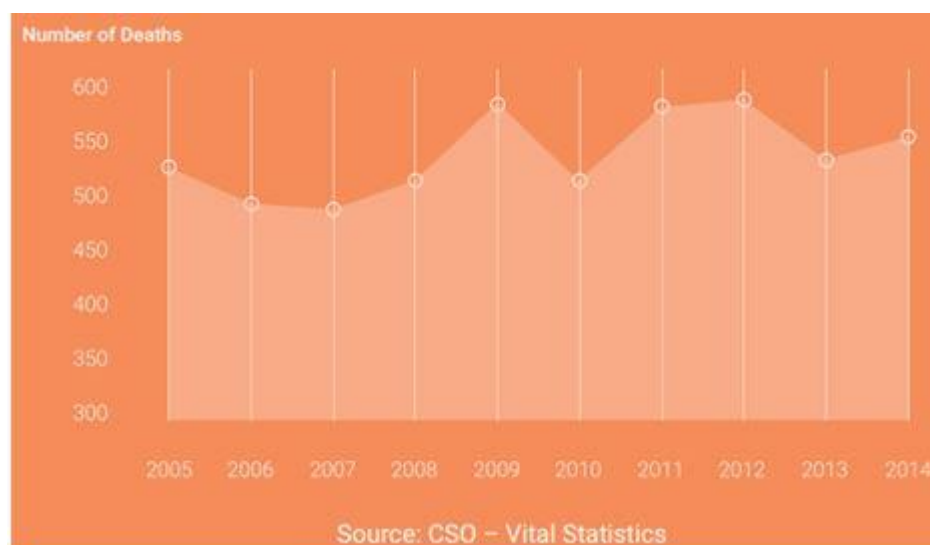


Figure 1: Number of Deaths by Suicide in Ireland between 2005-2014 (Central Statistic Office, 2017a).

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The Wellbeing of the Nation 2017 Survey has gathered the number of total deaths by suicide from 2005 up to 2014 (please, see Figure 1). In 2014, 559 people have died due to suicide, 15 more than the previous year. 2009 was the year with the most deaths registered, at 578, and 2007 had registered the lowest number, at 486, which is still a considerably high number that could have been prevented, if the individuals have received help on time, or have prevented themselves of feeling that way if they have been provided with awareness of emotional control at the first signs of stress, anxiety, and deep sadness experienced.

Suicide is amongst the highest cause of death for young individuals in Ireland, along with chronic conditions, such as hypertension, coronary heart disease, stroke and type-2 diabetes.

According to the Health Ireland Framework 2013 to 2025, the prevalence of such chronic illnesses increases dramatically with age, is greater in lower social economic groups, and seems to affect more males than females. This framework was not very positive in regard to improvement of such conditions in the country, expecting by year 2020 an increase of 40%, affecting more older age groups (31% for coronary heart disease 30% for diabetes, 28% for hypertension, 23% for chronic obstructive pulmonary disease), which makes sense as this is a product of years of unhealthy lifestyle.

According to a Survey, held in 2015 (please, see Figure 2), 32% of the population aged 15 and over were having a long-standing illness or health problem. Of those, 19% reported having chronic back pain and 16% have high blood pressure (Central Statistics Office, 2015).

However, by fixing of unhealthy lifestyle habits, those numbers could be significantly reduced along the years.

Nowadays, we are always rushing and focusing on running errands without paying too much attention to our posture, until we finally start to feel the pain. Simply picking up a heavy object (or a baby, or a child) from the floor can put a pressure on the back, if the person does not learn how to shift the weight on their legs instead. Tasks, like sweeping the floor, hovering, the way we sit on the sofa, or stay longer hours studying in bed, can damage the spine over time.

The research also pointed that in the two weeks prior to the survey undertaken, 8% of the population reported symptoms of at least moderate depression (see Figure 2). The highest rate was among those between 15 to 24 years old (Central Statistics Office, 2015).

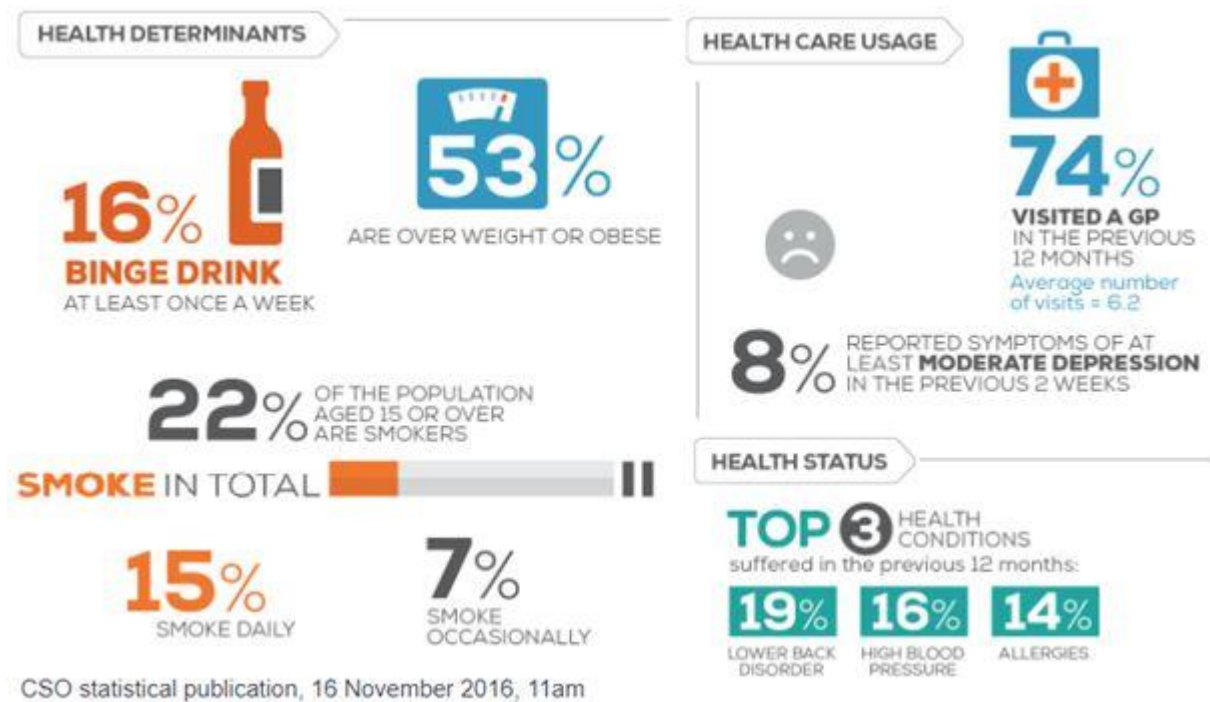


Figure 2: Relevant Points from the Irish Health Survey (Central Statistics Office, 2015)

It is also important to take in consideration the drinking and smoking problems, as they also affect the wellbeing of the population. The shocking revelation that 81% of the population are drinking alcohol on regular basis, with 16% of those have bingeing issues. Binge drinking can affect the individual's mental and physical health negatively. 22% of population over 15 years of age are smokers (see Figure 2).

The *Wellbeing of the Nation* Survey, held by the Central Statistics Office in 2017 pointed to an increase in the percentage of people, who are overweight or obese, revealing that 62% of the population are in that category (please, see Figure 3). 53% of the population were considered overweight or obese at the start of 2015, already a very high number (more than half of the population), which figure further increased to 60% by the last quarter of 2015 and reached 62% in 2017 (see Figure 3). According to the research, higher levels of overweight and obesity have an impact on wider society, as they can impact the national economy, due to higher spending on health care, and also will lower the levels of the overall health of Irish population compared to other European countries. This information again proves that the majority of the Irish population is not following a healthy lifestyle. Weight control is an important health determinant for the overall health and lifestyle of every individual.

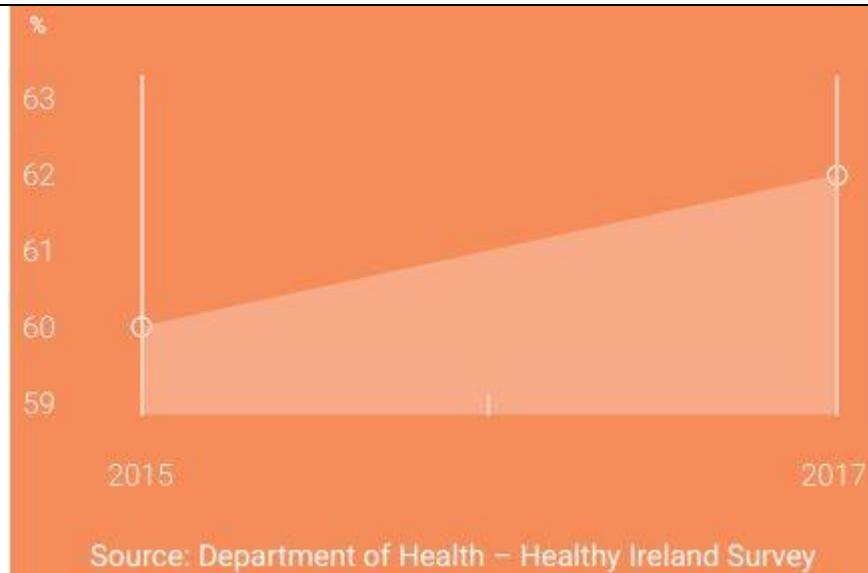


Figure 3: Percentage of Irish population who is overweight or obese (Central Statists Office, 2017b).

The proposed in the current document Project is aiming through comprehensive research on the topic to develop suitable **Wellbeing and Mindfulness** mobile application for the Irish population and provide a tool for everyone who is in need of help and awareness of wellbeing and balanced life.

The **Wellbeing and Mindfulness** application aims to provide awareness on the topic, so that people can fix unhealthy habits, such as posture, and the food they eat, to achieve a longer life with quality instead of pain and illnesses, and also aims to provide awareness of how to take control of overwhelming emotions and feelings to reduce/avoid stress and anxiety.

Covid-19 Impact on Mindfulness & Wellbeing:

Nearly 8 months since companies had to adapt and move the workforce to work from home, people are reporting mental tiredness and physical pain, probably from use of non-ergonomic equipment, such a comfortable office chair, an ideal size office table, etc. (Keogh, 2020).

When working from home, sometimes is hard to keep the schedule and timetable we had when working at the office. People are working longer hours simply because they could not switch off, did not want to 'break' the level of productivity, have to multitask and work longer hours because of competing and pressing family needs. Many people leave their work laptop on, when they don't suppose to be working and are constantly checking their emails.

In comparison, when they are working in the office, they would switch off the computer when

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is time to finish the working hours and leave. This way, their “work life” is kept to an extend separate from their “personal life”.

An article in The Irish Times (O’Connel, 2020) provided a statistics that only one in 20 Europeans has worked from home regularly in 2018, as opposed to about 42% of full-time workers on the WFH scheme, according to a Survey by *Behaviours and Attitudes*, RTE’s Prime Time.

Many companies now are encouraging employees to take their time off and be aware of the work-life balance as a way to recharge and be productive when working (Keogh, 2020). The **Wellbeing and Mindfulness** application can be very useful for companies to suggest their employees gradually to change their habits and start taking care of themselves - mentally and physically.

The application can also be used as a way to interact with colleagues, a fun way to integrate the team and create consciousness of their wellbeing, aside from work-related communications.

The Central Statistics Office (CSO), Ireland’s national statistical office, collected data between 8th and 23rd of April 2020 through a *Household Survey* to analyse the impact of Covid-19 on employment and life (please, see Figure 4).

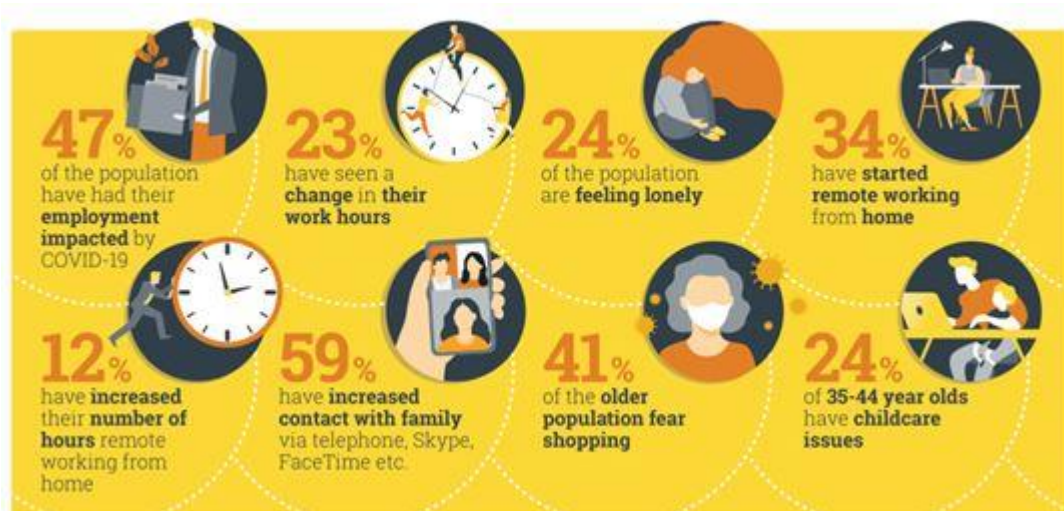


Figure 4: Infographic: Employment and Life effects of Covid-19 Survey, April 2020 (Central Statistics Office, 2020).

Of the 2288 responses from individuals over 15 years of age, 47% had their employment impacted, 24% stated they feel lonely, 41% are afraid to go shopping, 24% had childcare issues and 59% increased online social contacts with family (Central Statistics Office, 2020).

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The impact on employment could have been due to loss of employment, temporary layoff, change in work hours, start remote working from home or change to business model to online/takeaway.

34% of those who had their employment impacted, started working from home, and 23% of the total impacted on this category experienced an impact on their working hours.

The emotional wellbeing was also impacted with 24% of the respondents feeling lonely, 17% being worried about money, and 26% being afraid to go shopping (please, see Figure 5). Such numbers suggest a possible increase in the individual's suffering from anxiety or depression.

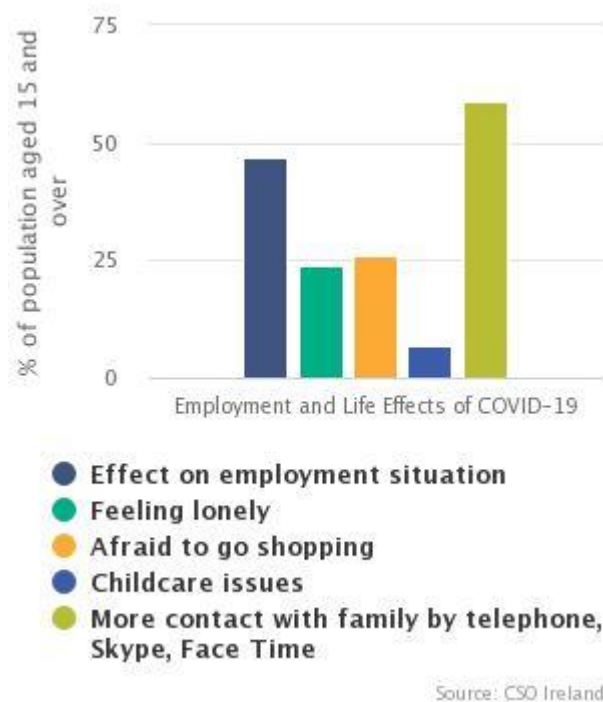


Figure 5: Employment and Life effects of Covid-19. Percentage of persons aged 15 and over by employment and life effects of Covid-19, April 2020 (Central Statistics Office, 2020).

Solution to the Problem:

The *Health Ireland Framework 2013-2025*, provided by the government, states that wellbeing is an integral part of the definition of health.

When we think about health, immediately to our mind comes fear of some disease or illness existing, however, health means the individual's potential to achieve and enjoy complete physical, mental, and social wellbeing.

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Wellbeing affects the quality of life of an individual, and a healthy person contributes to the health and quality of the community they live in. This is the reason of the government's interest to improve the health and wellbeing of everyone living in Ireland.

Due to increased need of online support for mental health and wellbeing, HSE Ireland recently released a programme '*Minding your Wellbeing*', composed of free online short evidence-based videos that aim to teach the population how to practice self-care, develop mindfulness, explore emotions, build positive relationships, and improve resilience (HSE Ireland, 2020).

According to the 2018 *Mental Health Insights* Survey, carried out by the Mental Health Ireland, 39% of the respondents believe that mental health and wellbeing can be improved by physical exercise, followed by 28% of respondents who believe that talking to a family member or a friend can help the individual, 13% of the respondents pointed that eating healthy food can improve wellbeing, and for another 10% each - speaking with a counsellor, and practicing mindfulness/Yoga could be factors in improving our mental health and wellbeing (Mental Health Ireland, 2018).

Based on these research results, the proposed for development *Wellbeing & Mindfulness* application should have all these elements to successfully help the population in the quest of improving their wellbeing and mental health state. The application is targeting both, healthy individuals, seeking improvements in their lives, and individuals that have some mental health pre-disposition to stress and lack of some emotional control.

"Consideration of health and wellbeing requires a shift in focus from what can go wrong in people's lives, to focusing on what makes their lives go well." (Department of Health, 2019).

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Project Goal:

The goal of this project is to research about wellbeing and mindfulness and what actions an individual can perform to achieve a balanced lifestyle. These actions, distributed in several categories, like, exercises, nutrition, social interactions, sleep, and self-awareness, will be presented in a form of everyday challenges to help users develop awareness of good lifestyle habits, according to their input and personal goals.

The overall goal that the application aims to achieve, is to help stimulate good physical and mental health of individuals or groups of any gender, age, fitness level, culture, religion, and socioeconomic status, thus reducing stress and anxiety levels and increasing happiness and self-esteem.

Project Scope:

Development of *Android Mobile application*, accessible by the general population, used as a tool for overall wellbeing & lifestyle improvements.

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Project Objectives:

The *Wellbeing and Mindfulness* Project objectives are as follows:

- Perform preliminary research on mental health and wellbeing in Ireland, as well as the impact that Covid-19 has on Irish population, providing statistical data regarding the topic.
- Research Case studies on existing applications for functionality comparison.
- Complete the Project Proposal
- Perform Primary research on mental health and wellbeing topic, following a Mixed Research methodology:
 - Using *Quantitative research* method to design and distribute Survey questionnaire to gather information from general public in Ireland and sport facilities (gyms) members about opinions on aspects of wellbeing, mindfulness, and achievement of work-life balance by the Irish population.
 - Using *Qualitative research* method to design and distribute Structured Interview questions to gather opinions of Management Staff on the impact of the Mindfulness sessions, provided by specified organisation in Ireland to their employees and the overall wellbeing and work-life balance before and after Covid-19.
- Analyse the Survey and Interview results to evaluate potential feasibility for the Project and application's functional requirements. Complete Thesis Ch.1.
- Perform comprehensive Literature review with historical and current perspectives on the topic and Cases studies of similar, existing applications. Complete Thesis Ch.2.

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- Structure System requirements in Conceptual model for the proposed application, generate and compare alternative solutions, and recommend the most relevant one for the Project. Complete Thesis Ch.3.
- Design and Code Graphical User Interface screens and Data structures of the application, implementing security measures for sensitive information. Complete Thesis Ch.4.
- Research on appropriate Testing methodologies to perform module, integration and system testing on the application. Complete Thesis Ch.5.
- Perform User Evaluation on the application Prototype, analyse results and apply, if necessary, users' feedback in measures to improve user's satisfaction; Provide meaningful conclusions and scope for future work on the Project. Complete Thesis Ch.6.
- Prepare Presentation slides.
- Submit the Thesis and present the Project.

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Project Methodology & Evaluation Criteria:

The Feasibility and viability study of the project will be performed using Mixed Research Method, combining both *Quantitative* and *Qualitative* approaches.

Quantitative research will be carried out with a Survey to gather statistical and measurable data from the general public and identify trends on Mental health and Wellbeing in Ireland, to confirm why this is a problem that is worth solving.

Qualitative research will be performed with Structured Interviews with Management personnel at Dell Technologies with expertise in the Wellbeing and Mindfulness programme, to gather their opinions and insights on the impact of mindfulness for people's overall wellbeing.

The System's Analysis phase of the proposed for development application will follow an Object-Oriented approach where the requirements will be analysed and structured in a Conceptual Model.

The Use Case modelling together with Sequence and Object class diagrams will be used to analyse the application requirements and will clearly present the application's functional and business requirements.

Three Alternative design strategies will be developed (Low-end, Mid-range and High-end alternatives) to build the new application and after evaluation, one will be chosen to be developed, following a feedback-driven approach using the Dynamic Systems Development Methodology (DSDM) as an Agile method for software development.

DSDM encapsulates the principles of Rapid Application Development (RAD) methodology, which uses prototyping to involve users input while increasing development speed on a tight budget; each prototype being the basis for further development and refinement, iteratively, until the final, satisfactory product is achieved and implemented (King, 1984). In this context, all the knowledge and experience gained from the previous prototype will be used to improve the next version of the application.

According to Bocij, *et al.* (2008) and the Agile Business Consortium (2019) in 1994 an UK organisation, known as DSDM Consortium, defined nine key principles that structure this method: active user involvement is imperative, teams must be empowered to make decisions,

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focus on frequent delivery of Products, fitness for business purpose, iterative and incremental development, changes are reversible, requirements are baselined at high level, testing is integrated throughout the life cycle, and collaborative and co-operative approach between all stakeholders.

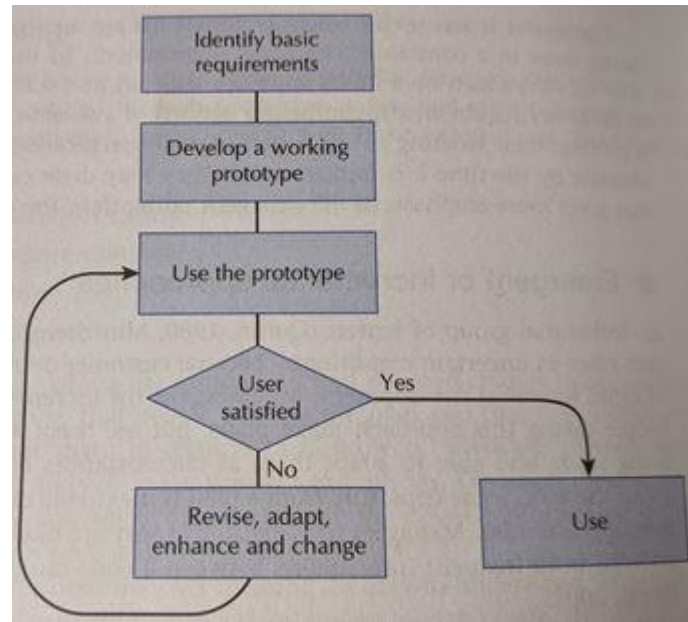


Figure 6: System Development with Prototyping (Boddy, *et al.*, 2008).

According to the Agile Business Consortium (2019), there are more governance and discipline to this prototyping iterative way of working, as compared to just using RAD.

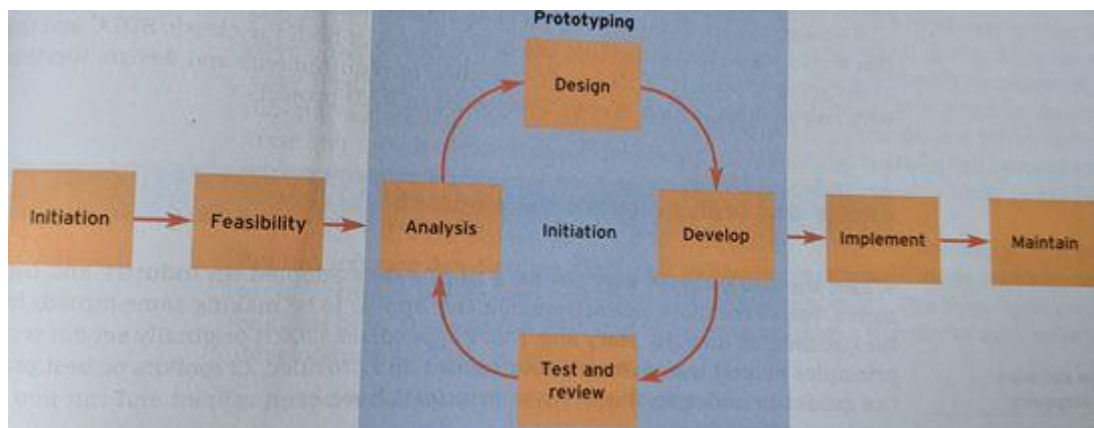


Figure 7: The role of prototyping within the systems development lifecycle (Bocij, *et al.*, 2008).

Evaluation Criteria:

Once developed, the application will be available on Google Play Store for download and an Evaluation Questionnaire will be provided online to target users to gather feedback.

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The Evaluation Questionnaire aims to measure the achievements of the project through user satisfaction with the development, as well as to gather suggestions (if any) for improvement.

The results of this analysis will be presented in the last Thesis chapter, along with a scope for future work on the Project.

The Criteria to be addressed in the Evaluation process are as follows:

- Accessibility → Is the application developed accessible on most Android devices? Is the application accessible to users without a smartwatch?
- Navigation → How easy and intuitive it is for user to navigate the application?
- Design → What is the users general feeling of the graphical interface? (colour scheme used, proper visual contrast, font family and appropriate size, element dispositions, hierarchical order of the elements, etc.)
- Privacy → Can the user control the privacy settings on the application? (e.g. only followers can see the accomplished challenge(s) the user posted on their feed).
- Smartwatch data → Ability to connect a smartwatch to the mobile app to gather and analyse accurately the data gathered from the smartwatch device.
- Content → Relevance of the app's content for the user's purpose and goal. If relevant, is the information delivered with clarity? (e.g. appropriate and didactic videos to learn how to perform an exercise and/or meditation).
- Engagement → Is the application engaging and fun to use? Will the user recommend the app to a friend/colleague? How often will the user use the application? (e.g. daily, weekly, several times a day, etc.)
- Responsive → Is the application responsive to user actions?
- Security → Is user's personal information protected against any threats and hacks? Provides strict measures against security flaws.

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Project Milestones, Deliverables, Risks:

The Project milestones include the following:

- Brainstorming ideas and research on potential topics.
- Perform preliminary Literature review, define goals and objectives, full description of the project and present project timeline for the Project Proposal draft.
- Contacting Volunteering organisations to include for the Chat option.
- Amend Project Proposal according to Supervisor's feedback.
- Identify sample participants for the Survey and Structured interviews.
- Design and distribute Survey and Structured interview questions to target participants.
- Critically analyse results obtained from the Survey and Interviews to complete Thesis Chapter 1.
- Perform comprehensive Literature review for Thesis Chapter 2.
- Perform System Analysis and create system's Conceptual model; choose appropriate SW Development method and complete Thesis Chapter 3.
- Submit Progress Report: Thesis Chapters 1, 2 and 3 (Thesis First draft).
- Get familiar with Android Studio and its tools. Improve programming skills and learn Google's Firebase.
- Design and Code the Graphical User Interface (GUI) screens and Data structures of the application, including connectivity with the created system database using Google's Firebase. Complete Thesis Chapter 4.
- Research on suitable Testing methods and choose the most appropriate to follow in the module, integration, and system Testing process of the developed application; complete Thesis Chapter 5.
- Perform User Evaluation, critically analyse the results, evaluating application's performance and Project's success, provide conclusions and scope for future work on the Project; complete Thesis Chapter 6.
- Submit second Progress Report: Thesis chapters 4, 5 and 6 (Thesis Second draft).
- Prepare PowerPoint presentation slides.
- Submit Thesis and present the Project.

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Project Deliverables:

- Project Proposal draft.
- Completed Project Proposal.
- Progress report: Thesis First draft.
- Progress report: Thesis Second draft.
- Completed and collated Thesis.
- PowerPoint presentation slides.
- Application's Source Code.

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Project Timeframe & Gantt Chart:

Include key timeframe, milestones, grant chart, identify risk and an RMMM matrix (Risk, Measurement, Monitor, Mitigation)

#	Milestone	Deliverables	Duration
1	- Brainstorming ideas and research on potential topics.	Identified suitable project and research method	2 weeks
2	- Perform preliminary Literature review for Project Proposal writing	Project Proposal draft	2 weeks
3	- Amend proposal according to Supervisor's feedback.	Completed Project Proposal	0.5 week
4	- Identify sample participants and design Survey & Structured Interview questions.	Survey Questionnaire & Structured Interview questions ready for distribution to target audiences	1 week
5	- Distribute Survey & Structured interview to target audiences; Write Thesis Ch. 1.	Gathered and analysed results of the Survey and Interviews; completed Thesis Chapter 1.	2.5 weeks
6	- Perform comprehensive Literature review; Write Thesis Ch.2.	Thesis Chapter 2 completed	2 weeks
7	- Learn Android Studio and Google's Firebase.	Preliminary knowledge acquired for the coding phase.	2 weeks
8	- Perform system Analysis & develop Conceptual model. - Write Ch.3 & submit Thesis First draft.	Thesis chapter 3 completed and Thesis First Draft submitted.	3 weeks
9	- Study/Improve coding skills.	Preliminary knowledge acquired for coding phase.	2 weeks
10	- Design and Code interface screens, data structures and connectivity; Write Thesis Ch.4.	Design and Coding phase completed. Thesis Chapter 4 completed.	6 weeks
11	- Test application with appropriately chosen method; Write Thesis Ch. 5.	Fully tested application. Thesis Chapter 5 completed.	2 weeks
12	- Perform User Evaluation to measure project's success; Provide Conclusion and scope for future work; Write Thesis Ch.6; Submit Thesis Second draft.	Thesis chapter 6 completed and Thesis Second Draft submitted.	2 weeks
13	- Prepare PowerPoint presentation slides; Complete & collate Thesis	Project presentation slides developed. Thesis completed & collated	1 week
14	- Submit Thesis and present the Project.	Thesis submitted and Project presented.	1 day

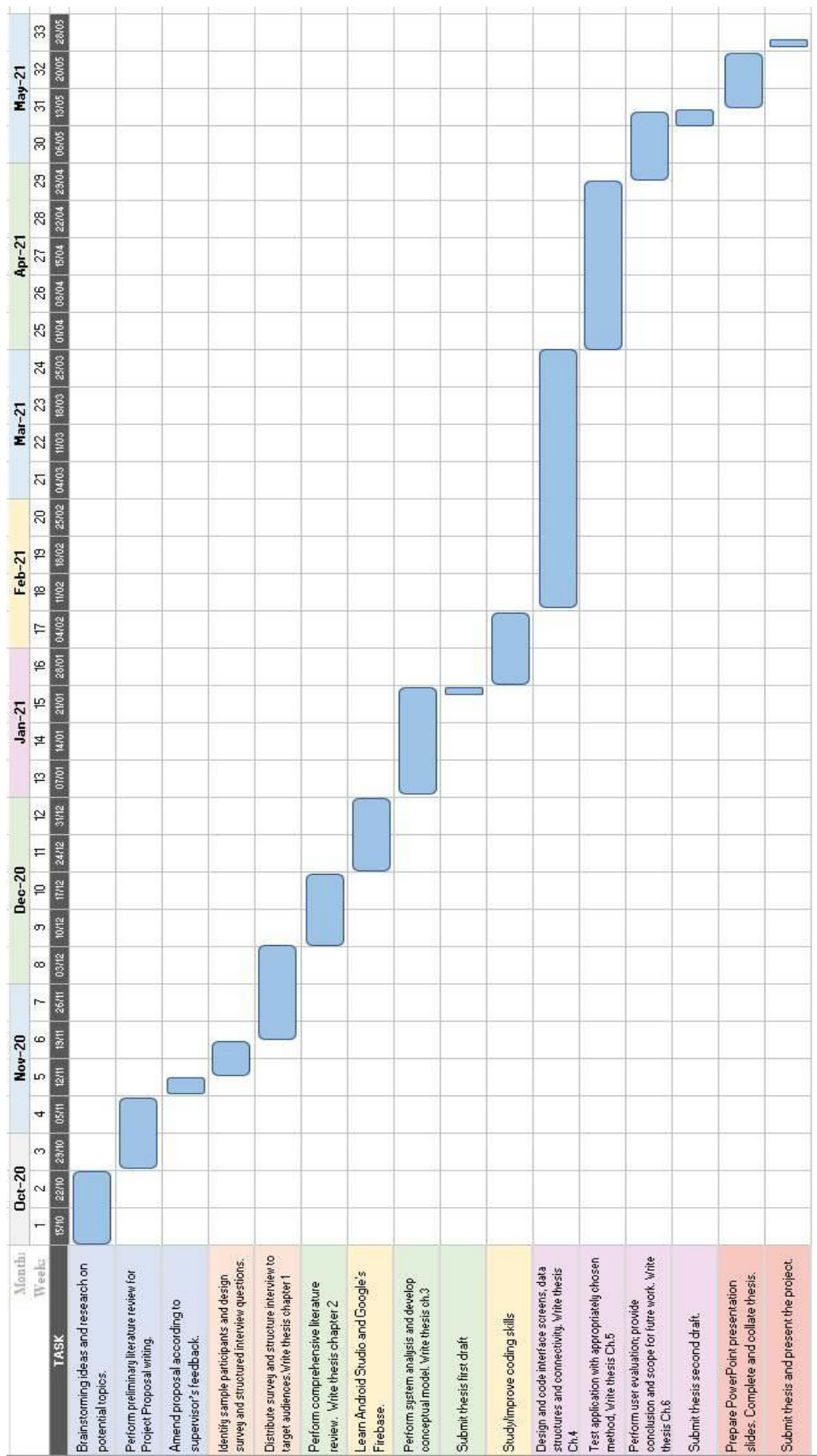
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Risk Mitigation Planning:

#	Risk Description	Impact	Action
1	Identify volunteering organisation that supports mental health for the chat option of the application.	Critical	Contact in advance organisations that share same goals of promoting mental health and wellbeing as the Project, making them aware of the planned donation feature in the application, as well.
2	Proper Time management.	Critical	Provide realistic deadlines for the Project tasks and follow the Gantt Chart. Switch to part-time job to have more time for the project.
3	Covid-19 restrictions	Medium	Contact organisations in advance. Online contact (email, Google Forms). Rely on online sources for the Literature review.
4	Unable to test application connection with different smartwatch devices.	Medium	Limit the scope to Fitbit smartwatches to perform proper testing.
5	Learn advanced programming languages (Android Studio with Java and Google Firebase).	Critical	Allocate sufficient time for studying/learning during Christmas break and the break between semesters (before Design and Coding phase starts). Use online tutorials
6	Loss of data.	Critical	Perform frequent backups and storage on the Cloud.
7	Permissions to use Videos.	Critical	Never use private resources without requesting permission of the owner. Rely on free Youtube videos.
8	Security of personal information.	Critical	Study well security measures provided by Google's Firebase and measures against security flaws.

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Project Gantt Chart:



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Student Signature:

Date:

Supervisor Signature:

Date: