



# IT & Business Showcase

## 2021 Projects



Well connected. Right Here.



# Information Technology and Business

## Undergraduate and Postgraduate Projects

### Introduction

Welcome to the compilation of Final Project synopses. These projects are undertaken by Graduate Diploma in Information Technology and Graduate Diploma in Applied Business Management students, students in their final year of the Bachelor of Information Technology (BIT) and the Bachelor of Applied Business Management (BABM), from the School of Information Technology and Business. The degree is taught at Wellington Institute of Technology and Whitireia Community Polytechnic.

The synopses briefly captures the compulsory 450-hour capstone projects component that is available in IT and business programmes. By working with the industry and various research and development specialists, students have been able to execute projects at no cost.

### Qualifications – IT

The School offers a Masters in IT, Postgraduate Diplomas, Graduate Diplomas and a Bachelor of Information Technology degree, with majors in five specialised areas (and an unendorsed option allowing students to design their own degree). This is developed and delivered in partnership with Whitireia New Zealand.

The five specialised areas of the degree are:

- Software Development
- Networking and Infrastructure
- Cybersecurity
- Data Science
- Interaction Design

The Postgraduate Certificate, Diploma and Masters, along with the two Graduate Diploma programmes give a range of courses to choose from for a final project.

- Graduate Diploma in Information Technology (Level 7) has further options for students to gain a comprehensive understanding of specialist areas within IT and apply that knowledge by working on an IT project.
- Bachelor of IT students can dip extensively into the Graduate Diploma in Cybersecurity (Level 7) courses, and are offered experience in how to integrate security policy, practices and technologies into operational structures and explore the principles of survivability and information assurance, and students are able to use knowledge gained from some of the courses in this programme towards their final Project.
- Students have the option of an alignment with many international industry certifications like Cisco, Microsoft, ISTQB, etc., and can utilise some credits from this towards their degree affording further depth and a wider scope in developing their Project.

## Qualifications – Business

The school offers a Bachelors of Applied Business Management (BABM) and a Graduate Diploma in Applied Business Management (GDABM). The majors in these programmes include:

- Marketing & Sales (BABM & GDABM)
- Business Analysis & Knowledge Management (BABM & GDABM)
- Supply Chain and Logistics Management (BABM & GDABM)
- Accounting (BABM & GDABM)
- Operations Management (GDABM)

From 2022, the school will commence offering a Post-Graduate Diploma in Management and a Masters in Management. The majors in these programmes include:

- Marketing
- Information Systems
- Digital Business
- Innovation and Entrepreneurship

Our Business programmes are “real world” qualifications. They provide a programmes of study that are practical, focussed and deliver graduates that are work ready.

Research from employers consistently identifies the most important workplace skills as those of *communication, business knowledge* and the ability to *anticipate change*. Our programmes provide all these essential skills and, if you are studying on the Bachelor of Applied Business Management or the Graduate Diploma in Applied Business Management, you also acquire specific technical skills within the chosen area of your major.

## What these projects are really about

A capstone project, such as this, is intended to allow the student to refine the qualities that make them eminently employable. Where required our students select their own small teams and projects, and then work in independent teams, setting their own goals and pace in line with the project client’s needs. Students choose their own technologies, methodologies, and management practices in addressing both client’s needs and best industry practices. These projects represent: adaptability, responsibility, and perseverance.

With this in mind, and the arbitrary limits of 450 work hours we impose, many encounter ‘expert overconfidence’ – and must negotiate and manage new goals as the project progresses. This is a real learning curve for all project students, as in most of their studies our lab exercises are designed to work cleanly, but reality is never that tidy. They face real problems and develop real solutions.

The other skill the students develop in this project is teamwork. Prior to this project the bulk of their studies have been individual efforts, now they must form a team, utilise their diverse skillsets, maintain relationships, and rely on others for essential parts of the puzzle – just like in industry!

For most students this project will be the last time they undertake a project from beginning to end – but they do get to experience the many facets of the project lifecycle, and hopefully make better career choices because of it. As our industries run mainly on projects, and has many specialisations within it, this project will help students find their best place in the industry.

## Supporting the students

This year the project coordinators for IT were Robert Sutcliffe, Glenda Shaw, and Scott Morton, and for Business, it was Dr. Fahimi Ali. Their task was to find and evolve the projects, thoroughly brief the students, set standards, and support them through the rough patches. They also audited the projects to get projects managerially back on track, co-ordinate all the assessments, and develop this presentation booklet.

The students also had regular access to an academic staff member for advice and guidance on matters ranging from technical, administrative, to relationship management.

## Highlights of the Year

**IT projects at WelTec** had a new focus this year on game development with diverse application – everything from career exemplars, expo event attractions, e-sports support, to classroom collaborative fiction aids. There were several high-profile projects with our industry, especially the Department of Conservation AR Selfies project that won hearts, minds and jobs, all at the same time. There was also the usual slew of speculative developments, showing our students are thinking about the world we live in and what they can create for it. Whilst numbers were down because of Covid, quality certainly was not.

**Whitireia Capstone projects** for our final year students were again of high calibre. The focus of the projects this term came from non-for-profit organisations and health. Two of the teams worked with the Cancer Society to help with in house applications and their intranet facilities. We had a team working for Porirua Community Arts with a revamp of their presence on the internet. Another team worked for the Presbyterian Support Central in a research capacity looking at new applications for meal planning and delivery. Two teams looked at health, one looking at brain tumours by using AI to facilitate image tumour recognition and the other developing a mobile app for autism in children who have difficulties communicating. Overall this term was a great success and it showed in the feedback from one of the clients *“I’ve been very impressed by the work ethic and quality of the work”*.

**Business projects** this year saw a wide spectrum of projects from the humble fish and chips to biofuel at the other end. The task is to identify business problems and issues, and to find realistic business solutions for the partnering companies and organisations. Students (with the help of their advisors) are generally required to study volumes of existing literature around the topic/problem, plan and design the research, collect data where necessary, apply various tools to analyse the data and recommend solution/s. These students have produced some impressive outcomes.

If you have a project idea you’d like considered by the students for a future trimester, please let us know:

Email:

INFORMATION TECHNOLOGY

[Robert Sutcliffe](#) or [Glenda Shaw](#) or [Scott Morton](#)

BUSINESS

[Cyril Peter](#)

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30	<b>An investigation of how to solve the problem of products not consistently being provided to customers due to unstable international supply chain</b>	Shangshu Niu (Olivia)	Dr Fahimi Ali	2021
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33	<b>A proposal to identify the importance of Social Media Engagement</b>	Nadia Martinez	Dr Fahimi Ali	2021
34	<b>Project Report of Investigating the ways to improve the profit for ***Photography</b>	Jinxuan Jia	Dr Fahimi Ali	2021
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# 3D Game – Venture into the Endless

Team: Blair Rattray, Jose Miguel Bucal

Advisor: Reza Moosa

Client: Self-client



Venture into the Endless Main Menu



Boss battle aftermath

## INTRODUCTION

Venture into the Endless is a 3D first-person rogue-like shooter game. The player will be spawned in a procedurally generated level, meaning the rooms are pre-made but laid out in a random order. This game was developed using the Unity engine.

Our intention was to build a one player game which will be very visual and designed to stop people walking past expo stands to capture their attention. The game itself will be student branded and Weltec branded to both further raise the profile of student achievement and the institute.

## DEVELOPMENT

We developed this project using Unity, a cross platform game engine with a built-in IDE developed by Unity Technologies. It is a real-time game development platform that uses C# scripts, which are written using Visual Studio.

The development was accomplished using the SCRUM methodology, where the team works in two-week sprints to achieve their goal. The product and sprint backlogs were set up in Google Drive, and Unity Collaboration services were used for version control. All assets used within the game were either provided by our (former) Client or freely downloaded from the Unity asset store. Also, most sounds used came with the assets provided by the (former) Client. The main menu music was created by Eric Matyas using a Creative Commons license.

While the procedural room generation was being developed, the other members of the team were working on the player class, including their weapon,

movement, stats, and inventory. Once the player was completely developed the team then moved into implementing the enemy characters and their interaction with the player.

The game's features and functionality were tested using debugging and unit tests with Unity Test Runner. User Testing surveys were also sent out to testers to give the team feedback about improvements and recommendations regarding future development. Integration testing was done manually in test cases for Player input to check the function is correctly communicating with other modules inside the game. Compatibility testing was done to check for game compatibility on software, hardware, devices etc.

Once the main core features and functionality was fully developed and tested, we moved into adding event modes for rooms for the player to interact with. After the final feature was implemented, we worked on game optimizations to ensure that the product worked as intended before deploying as an executable.

## CONCLUSION

Our initial project plan proved to be quite accurate in the outcome of our project. We did have some issues with managing our (former) client. Due to the difficulties that arose, we had to let them go and undergo the project without a client.

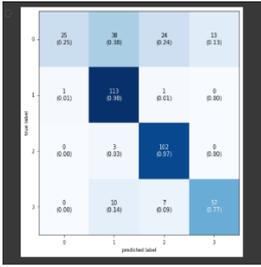
With the project planned out, we completed our sprints within the designated time frame. There were a few tasks that were not completed in a specific sprint, these were quickly sorted in subsequent sprints.

Testing took place to highlight any errors or helpful missing features. We got a lot of feedback from testers and implemented quite a few extra features that were suggested in our final development/touch-ups sprint.

# Brain Tumour MRI Image Classification using Deep Learning

Team: Soorya Parthiban and Risto K Rappai

Advisor: Adrian Hargreaves



	precision	recall	f1-score	support
0	0.96	0.25	0.40	100
1	0.69	0.98	0.81	115
2	0.76	0.97	0.85	105
3	0.81	0.77	0.79	74
accuracy			0.75	394
macro avg	0.81	0.74	0.71	394
weighted avg	0.80	0.75	0.71	394

MODEL NAME	TRAIN ACCURACY %	VALIDATION ACCURACY %	TRAIN LOSS %	VALIDATION LOSS %
VGG16	0.99	0.72	0.02	3.95
VGG19	1.00	0.79	7.23	10.12
ResNet50	1.00	0.78	1.19	4.60
Xception	1.00	0.75	0.01	8.69
EfficientNetB0	1.00	0.77	0.02	2.71

Xception Model's Confusion Matrix:

Xception Model's Classification:

Report Overall Performance Metric Report:

## INTRODUCTION

According to a New Zealand Ministry of Health (MoH) report, 7 per 100,000 males and 5 per 100,000 females are dying due to brain tumors each year in New Zealand. Brain tumors are hard to diagnose as they do not present any unique symptoms. Research from cancer.net and NZ MoH states that males, older people, non-Māori, and those who are exposed to chemicals and radiation are more susceptible to developing a brain tumor. Unfortunately, many countries lack the medical resources, including both trained doctors and equipment, to detect and diagnose brain tumors. This can lead to fatalities as a result. Our app attempts to address these problems using deep learning techniques to detect various types of tumors from MRI images of the brain. This may lead to speedy diagnoses, medication, and recovery.

## Methodology Used

This project was developed using the Cross-Industry Standard Process for Data Mining (CRISP-DM). CRISP-DM methodology is very similar to Agile but, an Agile for a Data Science project. This methodology has six phases, namely: Business Understanding, Data Understanding, Data Preparation, Modeling, Evaluation, Deployment. CRISP-DM methodology was highly beneficial because it provided functional templates for the development phase and, it was flexible and robust. Our project included all the phases within the CRISP-DM. Therefore, by using this CRISP-DM's template we could achieve all project objectives.

## Project Outcomes

Pre-processed all the images into 224 x 224 pixels from the original image size

- Built five image classification models: VGG16, VGG19, Xception, ResNet50, EfficientNetB0
- Built Web Application using HTML, CSS, and JavaScript

- Choose the best model as Xception based on validation accuracy, recall, F1-Score, Precision, and Support Score
- Integrated Xception Deep Learning AI model with the Web application using the Flask Framework

## Recommendations for future development

A Data Science project's efficiency is directly proportional to the amount of data that was used to build the project. To complete this project, we used a total of 3000 images belonging to four tumor classes. In the future, we could increase the efficiency of the overall project by bringing in new images, especially of the Glioma Tumor class. We could also increase the project's efficiency by building new custom CNN, R-CNN, and other deep learning models.

## Results

We created five different Image Classification AI models for this project namely: VGG16, VGG19, ResNet50, Xception, and EfficientNetB0.

Out of the five models, we choose the Xception model as the best one based on the validation accuracy score, Recall, F1-Score and Support and integrated it with the Web application.:

While building the Deep Learning AI models, we found that all the five models performed poorly when trying to predict the 0<sup>th</sup> class i.e., the Glioma Tumor Class. This issue could be addressed by including new images of the Glioma Tumor class and training the model again.

Overall, Xception model performs well in predicating the MRI images with tumor and their types.

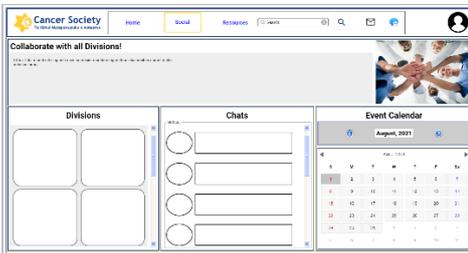
The Web application was built on the Flask Framework which is a robust framework and has a very low latency rate. Building the Web App using Flask allows the users to deploy the app easily to the cloud services or hosting platforms.

# Cancer Society Intranet

**Team:** Samanyu Turakapalli, Dakota September, Connor Shogo Teahan, Selena Pimenta

**Advisor:** Scott Morton

**Client:** Cancer Society



Wireframe design of the Social Page



Prototype design of Project Page



Home Page for the Website

## INTRODUCTION

Cancer Society wanted a website developed for them as their current one was not satisfying their requirements. We asked them what their ideal website would look like and the features that would be useful for them. We were given the opportunity and the freedom to design an Intranet for them.

## DEVELOPMENT

The initial stage was to get a wireframe designed and get it approved by our client. We had to make few changes to the Wireframes to reduce the number of pages.

Once we received approval from the client we went ahead and produced a prototype of the website. We searched for an appropriate open-source tool called 'Silver stripe' which is a web content management system.

This tool had all the requirements we wanted and was a permitted tool to develop government/non- government projects.

## CONCLUSION

Our project is still under development, and we are waiting on our client, the Cancer Society who will be filing a business case to receive funding by their board.

Once funding is received the project can continue.

<https://capstone.weltec.ac.nz/details-cancer.html>

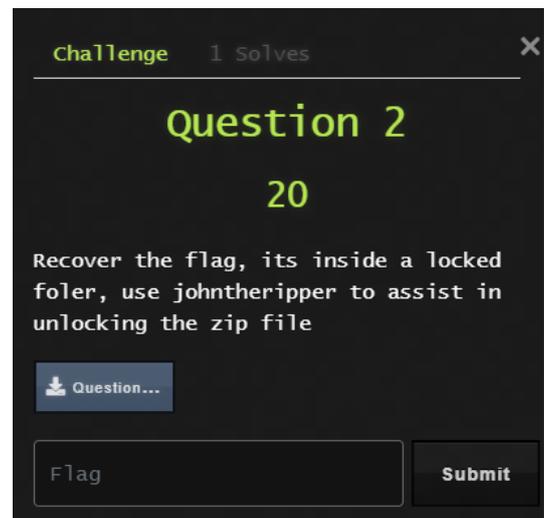
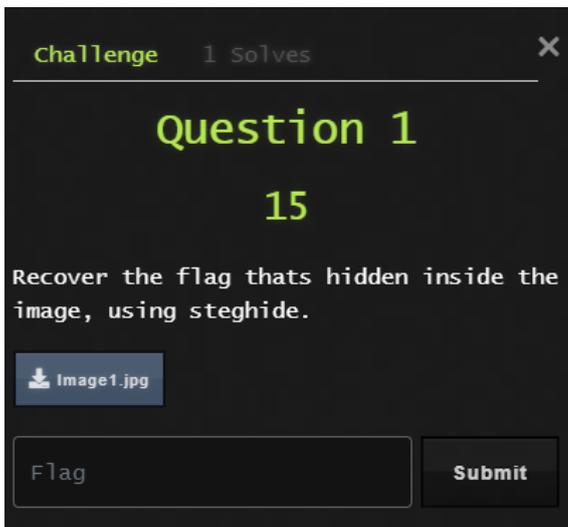
# Capture the Flag [Project]

## Sentinel Security

Team: Harsiddha Talwar, Ryan Jacobson, Jonathan Kothapally

Advisor: Dr Dax Roberts

Client: Paul Bryant



## INTRODUCTION

The goal of this project was to create a comprehensive Cybersecurity learning experience in the form of fun and exciting Capture the flag (CTF) challenges. Capture the flag is an IT game that requires competitors to utilize different tools, and techniques to recover hidden “flags”, the user then enters the flag into the CTFd.io website to confirm that they have the correct flag.

These challenges are based on the core disciplines of cybersecurity. Which include forensics, web, cryptography, social engineering, and many more. The challenge types can range from things such as jeopardy style or attack and defence. Our aim was to produce a series of challenging, yet educational, modules that would entice potential students to join the ever-expanding field of Cyber Security.

## DEVELOPMENT

The team developed these CTF challenges with the core goals of being challenging, yet also being educational and informative. These goals factor into enticing potential students into joining the Cybersecurity field. The five modules are divided into several separate questions each, and incorporate an array of tools and techniques that

players will learn and need to solve these challenges.

To accommodate the modules, the team has also produced more interactive documentation, in the form of a narrative document, which contains short stories relating to each of the modules to provide some context, and a layer of fun for the players. There are also instructional documents which can be used to guide players and provide an educational reasoning behind each exercise.

However, to produce all of this, a considerable amount of research was undertaken to make up for the team’s lack of familiarity with CTF challenges, prior to the commencement of this project. This was all supported by the team’s use of the Kanban methodology, as it allowed for the effective, and fair delegation of the work.

## CONCLUSION

The team successfully managed to develop five challenging, unique, and educational CTF modules, and produced thorough documentation, all of which cumulates into delivering an educational, and interactive experience that serves to provide potential students with a taster and insight into what is offered at WelTec, and the Cybersecurity field as a whole.

<https://capstone.weltec.ac.nz/details-ctf.html>

# Charity Accounting Portal for ENABLE

Team: Callum Croxson, Lilun Isaac Song

Advisor: Terry Jeon

Client: Clement Sudhakar Swarnappa

Date	Amount	Purpose	Specifics	Duration Type
2019/02/12 09:00 am	1200.00			C
2019/02/12 09:00 am	1200.00			C
2019/02/12 09:00 am	1200.00	1	(1212)	E
2019/02/12 09:00 am	80.00			C
01/03/2019 12:00:00 am	1200.00	1		E
01/03/2019 12:00:00 am	1200.00	6	1201	E
01/03/2019 12:00:00 am	80.00	1	hh	D
01/03/2019 12:00:00 am	1200.00	2	hh	E
01/03/2019 12:00:00 am	1200.00	1	12	D
01/03/2019 12:00:00 am	1200.00			C
01/03/2019 12:00:00 am	1200.00	2	hh	E
01/03/2019 12:00:00 am	1200.00			C

Homepage for the application

Report for yearly income

Expenditure form

## INTRODUCTION

The project 'Charity Accounting Portal for ENABLE' is a web application to be used by the ENABLE organisation. This application will help manage and show information for the organisation such as donors, donations and expenses made. Users will be able to add new data to be stored into a backend database. Using this database, reports can be generated to show the data in an organised way. These reports can then be printed out or exported.

This project is being created because the client currently uses excel spreadsheets to hold all this data. Using spreadsheets has been found to be tedious for him and wishes to have a system where processes can be automatic. He wants this application to create the reports for him by querying the database to speed up the creation.

## DEVELOPMENT

Since the team consisted of two team members, we decided that splitting the tasks between us tried to time them so we finish at the same would be best. This is so we can review each other's work at around the same time.

For the development of the project, we started with the design phase including getting the requirements from the client, so we know exactly what he wants. The design phase was also the place where we created the wireframes for the application to get an idea of how it could look.

Before we started creating the code, we created a database to store the data. We created six tables in total to hold all the required data. We used SQL for this.

Next, we started coding, we decided to code in Visual Studio using the ASP.NET MVC framework. We started the front-end design. This used HTML, CSS, and JavaScript for dynamic changes. Coding the backend came next, we started with the input form development. We created three types of forms, adding donors, donations, and expenditure.

The next step was to create the reports. This was done by querying the data using an entity framework that gives us easy access to the database.

## CONCLUSION

The final product does fulfil its target purpose. It can help clients simplify the financial process. All financial data can be stored in the database, which is easy to query. The management of donors is also more convenient. At the same time, reports can be created that helps the clients better understand the financial situation.

However, we did not manage to host this application on the client's website and the reports are simple and not suitable for the client's current needs. This application is a good base for now and is robust enough so that further development can be made to make it more suitable and complete for the client or potential new clients.

# Cross Campus Network Infrastructure Upgrade

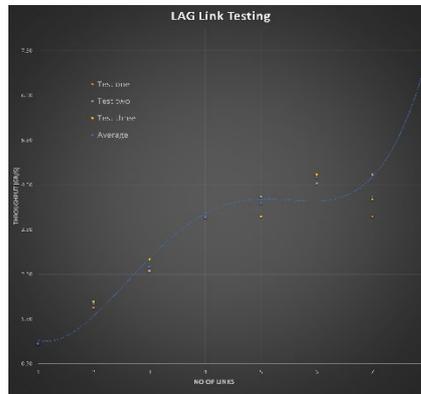
Team: Stefan Lategan, Luke Amos, Daniel Pillar, Grant Wilson

Advisor: Steve Cosgrove

Client: Geoff Gordan



Final switch setups with LAGS



Graph showing IPERF3 results

## INTRODUCTION

The purpose of our project was to improve upon the current networking infrastructure between WelTec's School of Information Technology and Business and Whitireia's School of Information Technology and Business.

The project's aim was to provide the highest possible network speed with equipment provided. When designing the upgrade, a requirement was to provide a solution in case the client was unable to use a fibre connection.

The project members all provided a different skill set from knowledge of networking to knowledge of operating systems.

## DEVELOPMENT

The first stage of development was to provide a proposal to the client of how we were going to achieve the outcome of the project. This proposal included an outline of the issue we were trying to resolve to how we aimed to fix the issues.

The second stage was to complete what we called Switch Familiarisation. As part of the project, we were provided with six switches in total, in which we had three different brands. This meant that we were required to research and learn how each brand operated and if they could operate together.

As part of the second stage, we were also required to find a way to test the network speed. As a result, we found a program called IPERF3, which is a program that sends data streams from a client computer to a

server computer then displays the resulting network speeds between the computers.

The third stage of the project was to prove the concept. This included running over a hundred network speed tests. We tested everything from straight fibre connect to using just copper cables.

The fourth and final stage was to design an implementation package. This can be seen as a 'getting started guide'. It outlined everything from how the team suggest the equipment be setup, to what commands need to be inputted into the switches to gain the desired results.

## CONCLUSION

The project was completed on time with the desired result. We managed to get an eight-gigabit network speed using link aggregation. This was the alternative to not using a fibre connection, which was a result of issues pertaining to the existing hardware not having any spare fibre ports.

The project had obstacles along the way, with the biggest being the COVID 19 pandemic. However, we worked through all the issues and provided the client with options on implementing the project.

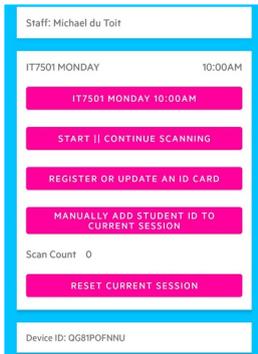
<https://capstone.weltec.ac.nz/details-netinf.html>

# Digital Attendance System (DAS) Project

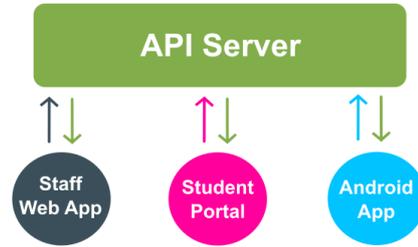
Team: Dan Hawkes, Michael du Toit, Alen Jose, Nick Sutton-Dicken

Advisor: Richa Panjabi

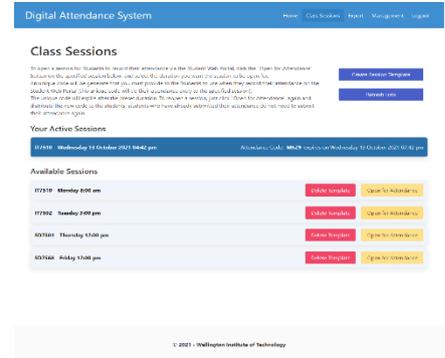
Client: Robert Sutcliffe



Mobile Application Staff View



DAS System Architecture



Web Interface for Portal Management

## INTRODUCTION

The Digital Attendance System (DAS) is a digital solution to an internal business process of collecting and recording attendance of students at the Wellington Institute of Technology. The team had noticed repeatedly over their time at the institute how tedious and time-consuming collecting attendance at classes was for staff. The project was undertaken with WelTec staff member Robert Sutcliffe as the client.

With information from the client, the team devised a digital solution for recording attendance at classes in a less tedious way for staff. Attendance is collected through an Android application or online web portal with an easy-to-use export feature which would format the collected data into a CSV format that is compatible with the import feature of the institute's current attendance system.

## DEVELOPMENT

The system was structured around four sub-systems that comprised the overall system. The central component to the system was a headless .NET Core-based API Server with a SQL database. This was complemented with Angular Web Applications for staff members to access and export the data, along with a web portal for students to record their attendance at lab sessions. An Android Application further complemented this by using Student IDs and the mobile's NFC reader to record attendance and had an offline-first approach to enable the application to be used offline seamlessly and sync its changes when it came back online.

We used Kanban for our project methodology, as it provided us with flexibility and allowed us to shift to any urgent tasks at any time with minimal time loss and helped the team to stay focused and engaged.

We had a few struggles throughout development due to Covid-19 changing the alert levels, one of our team members being absent twice due to family emergencies, and implementation of certain features taking longer than initially expected. Despite this we managed to keep development moving forward and implemented features with methods, concepts, and libraries we had never used before.

## CONCLUSION

The team accomplished delivering a product that fulfilled the digitisation of the attendance collecting and recording process, along with exporting it in a compatible format.

The team gave their best efforts during this project, and despite setbacks, lockdown and temporarily missing a team member, they are proud of what they achieved.

<https://capstone.weltec.ac.nz/details-das.html>

# DOC's AR Image System (DARIS)

Team: Emily Benjamin, Ayush Agarwal & Aditya Garg

Advisor: Thi Thu Trang Do

Client: Gavin Walker



Information Fragment



Splash Screen



Camera Screen

## INTRODUCTION

The main goal of this project is to produce a user-friendly POC mobile application, which people will be able to use their smartphone camera to interact with the virtual 3D animal models. The objective of DARIS is to make its use a memorable experience for the user. This is done by capturing the user's photo with animals and educating the public about wildlife conservation through information about habitat, breeding and fun facts. This is achieved via a pop-up. The application integrates with a database and a visualisation tool (Microsoft Power BI) that can be connected to create a dashboard or receive a report out of it. For example, visualisations and dashboards will contain data about how users are rating the application via their smartphones.

Several endangered animal species like the little blue penguin, yellow-eyed penguin, and many others are at risk from excessive interaction with the public. It is important to limit public interaction with wildlife as it can disturb the animal's habitat.

New Zealand's flora and fauna, and conservation efforts are popular among the public, and any interaction must be in a way that does not do any damage. This is accomplished through our augmented 3D POC application: 'Click the Wild Blink'.

## DEVELOPMENT

Our project "DARIS" is developed in six phases, each phase is briefly listed below:

1. During the first phase, we gathered requirements from the client and created a business proposal document for client approval.
2. After the business proposal was approved, we started the analysis work and created the user stories, activity diagrams, use case diagrams, etc.

We started the design work in parallel to the analysis work, and during this phase we focused on creating the diagrams for the application architecture, system design, prototype/wireframes, etc.

3. Once the analysis and design part was over, we started with the development phase in which we developed the primary deliverables first and then the secondary deliverables. During the development phase we also developed an additional feature requested by the client.
4. Alongside the development we also did the testing which included unit testing, system testing, performance testing, API testing, and UAT.
5. Since we were agile towards our approach for developing the application, we documented all the developed features and tests in parallel to the development and testing phases.

## CONCLUSION

The outcome for the final project was positive. The team members of The Conservation Crew worked well in parallel for a good outcome for 'Click the Wild Blink'.

We were able to complete all project deliverables outlined inside the project proposal.

We were also able to complete all the secondary deliverables.

If time permits storage of the rating data will be stored in a database; integration of Power-BI into the database that stores the data; creation of a dashboard and insights into the data.

We were also able to successfully implement a change request by the client – Gallery Button Feature.

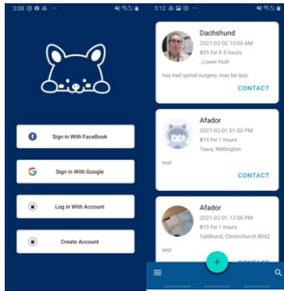
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# Dog Walking – PetCity

By: Jiali Xie

Advisor: Richa Panjabi

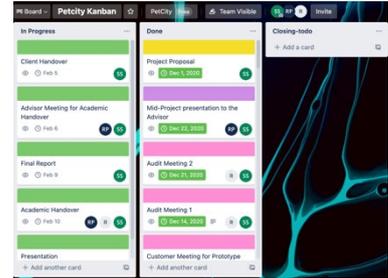
Client: Jiali Xie



Login & Home of Mobile Application



Project Team Member: Jiali Xie



Manage project progress with Trello

## INTRODUCTION

The aim of the project is to create a platform for people to post neighbourhood services, currently focused on dog walking services, and to provide more jobs for people coping with the job crisis and economic pressure caused by Covid-19.

This system will be completed through three iterations of updates, and this IT Capstone project is mainly for the development of the first version. The current version of the product includes a functional back-end service, an easy-to-use Android application.

Although this project has no official client yet, and based on its nature, there are many potential clients and good development prospects have been created.

## DEVELOPMENT

The project development follows an Agile development approach to software development, where the project team uses Scrum and Kanban and is well suited for small teams. Trello was also introduced to better manage the project and track its progress.

It is worth mentioning that the development process of this project consisted of four main sprints, and each sprint ended with a passing test. It is better to control the quality and efficiency of development and ensure the quality of final deliverables. The main areas involved in the development can be briefly summarized in the following four points.

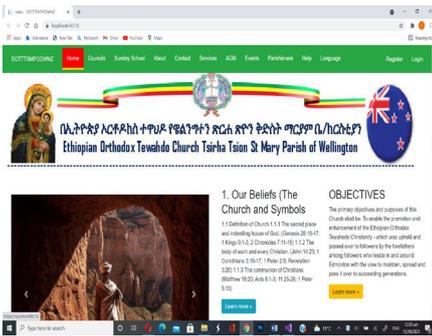
- **Android Development:** Android applications translate requirements into actual actions that can be performed by users and export the project's functionality and concept to users.
- **Node.js Server:** It is the technical core of the project, mainly decomposing requirements into concrete logic and returning business data to the app via API.
- **Testing:** Testing is an important tool to verify the quality of each phase of development and to ensure the quality of the final product delivered
- **Reports:** Each phase will produce different reports, mainly to convert data and related analysis into documents that can be understood by non-developers for later project maintenance and examiner review.

## CONCLUSION

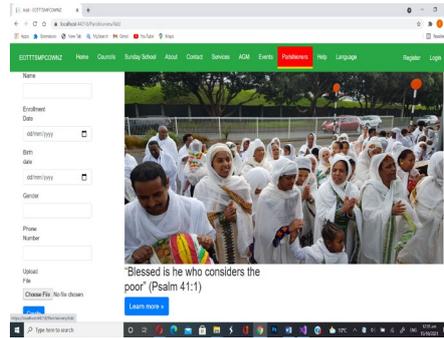
From the perspective of the Project Team, the project was a success and the results were promising. The Project Team not only practiced project management effectively during the development of the project, but also improved their professional and technical skills, enhancing their job prospects in the future.

The end of this phase of the project does not mean the end of product development, and the Project Team is happy and looking forward to the continuous development of the system.

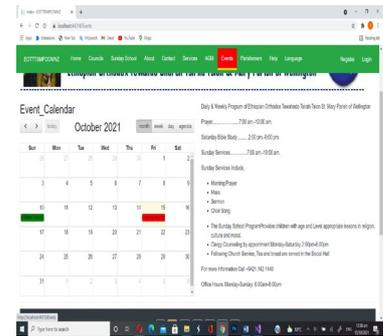
<https://capstone.weltec.ac.nz/details-dogwalking.html>



Home page



Parishioner page



Event page

## INTRODUCTION

The objectives of this work was to build a website for the *Ethiopian Orthodox Tewahedo Tsirah Tsion St Mary Parish* of Wellington (EOTTTSMPCOWNZ) that satisfy the requirements for a public point of contact with the local society as well as a database for managing parishioners, councils, events, and Sunday School, among other things.

The team set out to build a website that conveyed EOTTTSMPCOWNZ's approachable, energetic, and capable image to online visitors.

## DEVELOPMENT

The project started with some discussion within the project team on the website's overall layout, including pages, features, and back-end setup. Shuyi concentrated on the website's testing section. To make it easier Fentahun focused on the front-end: the website pages, their design, layout, and user interaction, server setup, data interfaces, and database design are all part of the back end.

The project's practical side began with analysis and design, which was immediately followed by development once the customer expressed satisfaction with the suggested structure and aesthetic design. The project was handled using scrum, a Gantt chart, and a simple project management technique, with Open project, a rather difficult web-based project management system, being used to digitalize the project and maintain and assign project tasks.

The website was developed using Asp.net MVC and C# language. Under it included Html, CSS, Bootstrap,

JQuery, and JavaScript framework for building modern, responsive, mobile-first webpages. We have used Microsoft Visual Studio 2019 community edition as an integrated development environment (IDE).

EOTTTSMPCOWNZ was given a satisfying product with a website consisting of a home page for general information, an event page presenting notices and all the up-coming events for EOTTTSMPCOWNZ. A parishioner page to display information and a parishioner register form. There is a Council page used only for Council members to register current leaders' detail. This page requires a council member login for security. A contact page displays the addresses of leaders, 'About' page informs the reader about the church, a help page shows how to upload videos and provides text training. A future use page displays support information, service page for assessing different services, a language page to change language. An 'all forums' page is linked to the Council page for security which uses the register forum participator detail. Admin and Council can manage all activities of EOTTTSMPCOW. including updating and maintenance of all the various pages.

## CONCLUSION

Even though our team was small, we worked well together and used maximum effort to create an excellent product. We gained a lot of new web-building expertise, including the pleasure of providing a local cornerstone with a customised website at no cost. We have learned how important teamwork is to provide a successful product.

# Gig Management Application

Team: Paolo Manlunas, Patch Lambert

Advisor: Richa Panjabi

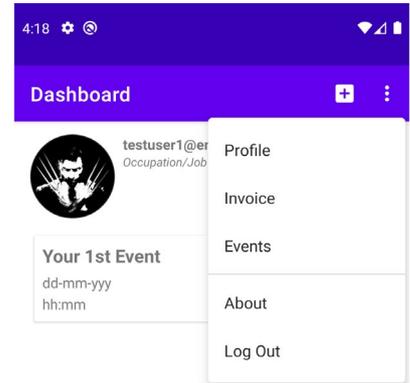
Client: PPLUS Ltd



Paolo Manlunas



Patch Lambert



## INTRODUCTION

The Gig Management Application (Stylised as “GeMA”) is developed by PPLUS Ltd, a two-person team consisting of Paolo Manlunas and Patch Lambert. The idea of the application was born around the team members experience’ as performers in the entertainment industry. Paolo (a musician) and Patch (a comedian) wanted to create a platform that would address the administration needs of semi-professionals in the entertainment industry.

GeMA is an android application where users can manage schedule their own events and create their own invoices from a singular point of contact. Each user can create and manage their own profile, create invoices and events, and have an at-glance-view of upcoming events through the dashboard.

## DEVELOPMENT

- With the team operating as the project’s client, GeMA was already defined before the group entered the planning phase.
- After the creation of the wireframes using Balsamiq, the application was subject to no major changes and throughout the development the team remained focused on delivering the MVP.
- Developed using Android Studio, adopting the Agile methodology, using sprints centred around each component of the application to ensure the team remained focused.
- *Atlassian* software was used to create a ‘home’ for their development: Jira to track their progress and allocate tasks, and ‘*BitBucket*’ as the repository.

- Adhering to Google’s Android development documentation, the team relied on the various libraries and material design elements developed by Google for UI and Kotlin development.
- To store user data, the team implemented ‘*firestore*’ - a cloud database where each user has their own collection of invoices and events sent directly from the application.
- The team developed four main pages: dashboard, user profile, events, and invoices.
- Development was wrapped up the week before handover to allow the team to focus on testing completion and the creation of supporting documents.

## CONCLUSION

The team was able to complete most of the requirements they set out to achieve. The application they created allowed users to create their own profile, create and manage events, and create invoices.

A feature the team were hoping to implement was for the app to convert user invoices to PDFs. Due to time constraints the team had to leave this for the next iteration.

Moving forward, the team are looking at the continued development of the application post-project. Their aim is to polish existing features and turn the app into a platform where users can also book and manage shows, acts and venues.

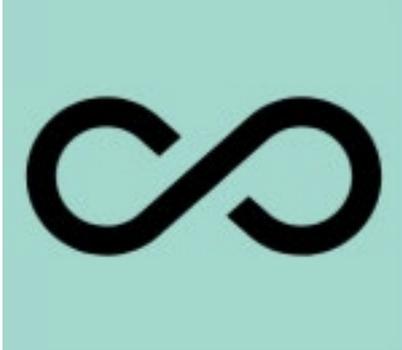
<https://capstone.weltec.ac.nz/details-gigmgmt.html>

# Help Me Say

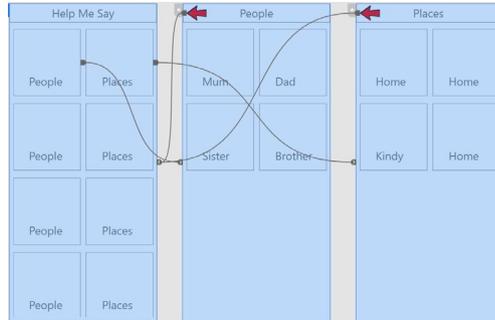
Team: Rhiannon Williams, Theresa Iofi, Rongomaiwahine Higgins-Herewini

Advisor: Dr Scott Morton

Client: Ayla Macdonald



Application Icon, all-inclusive



Adobe XD Prototype of the app



Home screen of the app

## INTRODUCTION

The 'Help Me Say' project is a prototype of an app that will assist non-verbal children to communicate with their family and friends. The reason for the development of this project is one of our team has a granddaughter who has Autism. This lovely young girl has not yet learnt to communicate with her family in a way they can understand.

The goal of the app is to help her to associate an image with the text of each button and the sound bite as it plays.

## DEVELOPMENT

The project started like all projects do, with a proposal. This outlined the requirements of the prototype and the time frame we had to build it. We began with creating a skeleton wireframe in Adobe XD (See image 2). This shows how the app functions in a practical sense.

Following this, we researched into Android Studio and how it worked. Lots of tutorials were completed to prove a refresh of skills for the developer. Over time the layout of the prototype went from a static screen with square button, to a scrolling screen with rectangular buttons. (See image 3).

Due to the time it took to develop the app, we have not been able to test it with the client and primary user.

## CONCLUSION

The client is very happy with the outcome of the project and looks forward to testing and future development of the application.

Future development is to create a webpage and back-end database so users can input their own words, images, and soundbites for use in the application after syncing the app with the account stored in the database.

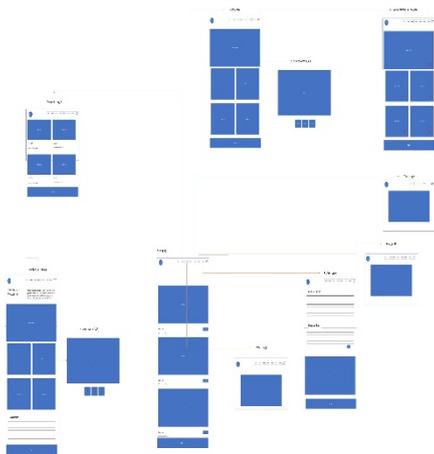
<https://capstone.weltec.ac.nz/details-helpmesay.html>

# Kitchens With Zest Website

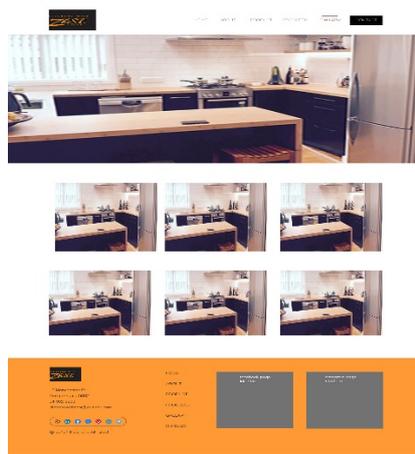
Team: Byron Holland, Shangda Du & Ying Zhang

Advisor: Scott Morton

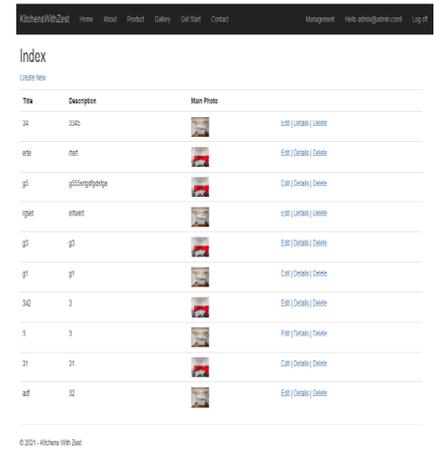
Client: Sam Hedge



Wire line of the Web



Design of the web – Gallery



The Gallery management page

## INTRODUCTION

This project was initiated to re-build a website for the client and to improve the user experience and increase website traffic.

The client wanted the web UI to be redesigned and the response speed to be increased. As there was no current or relevant data/statistics pertaining to website traffic, and no requirement for a content editor. This project was expected to lower financial costs for the client.

## DEVELOPMENT

An Agile approach was used during the project. Regular meetings were held to make sure the project kept on track. Several progressions have been done to ensure all steps to complete have been undertaken:

1. **Required analysis:** the team had discussions with the client to decide on the functions and wireframe of the web, and the content outlined in this step.
2. **Design:** the user interface was designed using Photoshop. The client was not satisfied with the gallery page in the first UI design. The UI was signed off after an agreed redesign of the gallery page.
3. **Wix platform:** Wix was used to create version 1.0 of this website. It was found that using Wix takes a long time to respond and is not a user-friendly application to use by the administrator, especially when managing the data.
4. **Programming:** Version 2.0 was created using ASP.NET MVC Framework architecture and the web coding used C# for backend language and HTML with CSS, JavaScript, and Bootstrap, for the frontend pages.

## CONCLUSION

The project was completed on time. The web site has a well-designed user interface for potential customers and the company staff.

The administrator can add, edit, and delete products and galleries on the management pages. Visitors can see the real time data via the user side pages.

A further iteration of the project will see an optimisation of the UI and the content to make the website relevant to customer searches.

The team needs to provide new information and updated images and metadata to make sure this website is the one that prospective customers use.

<https://capstone.weltec.ac.nz/details-kitchens.html>

# MAST (Mitre Att&ck SIEM Tool)

Team: Marcus Vidamo & Eric Mahinay

Advisor: Dr Thui Trang

Client: Ruben Meneses



[Reporting Interface](#)

[Team Name](#)

[Adding Common Field Name Interface](#)

## INTRODUCTION

MAST (Mitre Att&ck SIEM Tool) is an application that will produce common field names from attack types, to be populated into SIEM (Security information and event management). Once the SIEM is populated with the required field names, it will help a cyber security professional to monitor the systems security base on the threat model for the client's application or system.

Ensuring a system is safe from cyber-attacks is important in today's world. The existing process to set up a systems security is time consuming and unreliable for both Cyber Security Professionals and the Clients. The existing process is constant back and forth communication to discuss and figure out common field names to put into SIEM. To overcome this problem, MAST can generate the common field names based on the threat modelling which then can help populate the required fields for the SIEM.

Using MAST saves time and ensures reliability for both Cyber Security Professionals and Client. The user can ensure that they will be able to get a common field name report and can also add their own common field names relevant to Client's system.

## DEVELOPMENT

MAST has been developed alongside an Iterative approach to ensure proper planning and milestones have been created to ensure MAST has been created at its full functionality as required.

Upon completion of the design phase of MAST, the project team started the development. The challenging part within the development phase is the integration between SQLite and C# but at the end all requirements was met.

After completing the development phase, testing was done for MAST. Manual testing was performed by the team. Functional testing was done using the test plan and test cases created. All the testing performed has been documented and reported on.

As the project team only consisted of two members and just enough knowledge and experience to create databases and GUI it was a lot of time and effort on learning quickly and especially finishing up the documentation.

## CONCLUSION

The project was insightful and provided great experience to our current knowledge about our Majors. The development has been fruitful and full of learning experiences which has been moulded all throughout the 16 weeks creation of the project.

The activities will teach, demonstrate, and correct basic steps under Cyber Security and Networking Major.

The Project team has successfully completed the project and documents have been provided for further improvements that can be possibly done in the application. At the end of this project, the team gained a very good knowledge on different phases involved in the project.

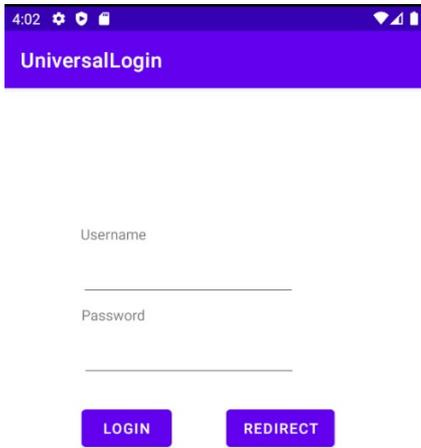
<https://capstone.weltec.ac.nz/details-mast.html>

# Mobile Authentication Portal App

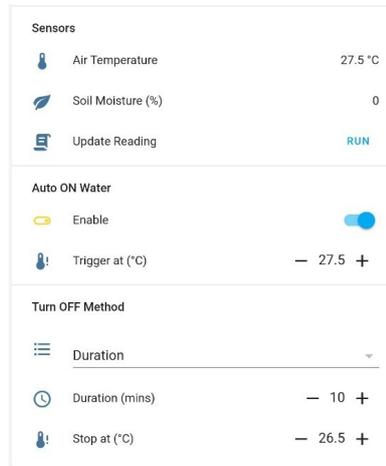
Team: Josh Velarde, Jiaming Guan, Keegan Seto

Advisor: Minjie Hu

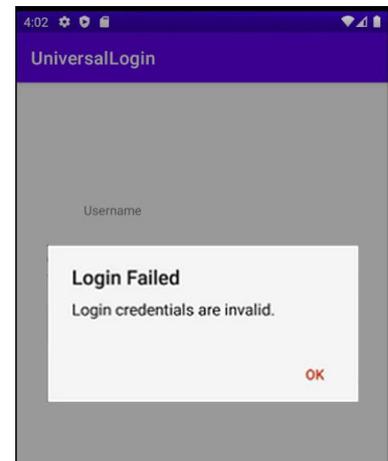
Client: Iwan Tjhin



The application main login page



Proposed values seen upon a successful login



Invalid Login

## INTRODUCTION

The focus of this project is to develop an Android mobile phone application.

The system will be used to introduce a factor of automation into agriculture-based jobs for farmers located in Borneo. Borneo farmers have harsher environment conditions due to increased humidity and temperature. The client is working to produce a system to provide the farmers with better living conditions.

The objective of this project is to develop an app intended to act as a front-end interface to the client's IoT system.

## DEVELOPMENT

The project had a few setbacks due to skill sets not entirely meeting the skills required for the project. For this reason, the team had to set aside time to learn the skills through the Mobile Application Development course for several weeks.

The application was developed to the point where credentials can be accepted and verified, and upon successful login, the application will redirect the user to the client's IoT system page where they are intended to see information and tools.

One specification was only partially met as a fix for an issue related to an API token that could not be found.

The testing phase was a chance to test the working components within the current build of the application.

## CONCLUSION

The final step of the project was to have the system display the utility functions. The issue with the API tokens was not resolved despite the team's best efforts to find a fix in the time allowed.

Further iterations of the project the team were confident that another project team could spend the necessary time on the API tokens to resolve the issue of information not displaying as intended.

Despite the difficulties the team felt they had learned a lot of new techniques in working together as a team and improving their communication skills.

<https://capstone.weltec.ac.nz/details-mobile.html>

# Once Upon A Dragon

By: Thamazine Edson

Advisor: Trang Do

Client: Robert Sutcliffe



Allows users to join a distance story without logging in



Allows supervisors to create a distance story

## INTRODUCTION

*Once Upon A Dragon* is a continuation from a previous project called 'Infinitybook'.

Infinitybook is a collaborative storybook writing experience where children take turns writing a storybook together. The client wanted some enhancements made to the pre-existing website, as well as some additional functionality added.

The Infinitybook project created a website so that the Advisor would set up a session and the children would call out what they wanted to write. '*Once Upon A Dragon*' involved not only enhancing the Infinitybook, but also expand beyond this and create a distance version. The distance version would allow the Advisor to generate a code to give to the children. The children would then enter this code in from their own devices to connect to the same story.

## DEVELOPMENT

The development of this project was started by gathering requirements from the client on the requested enhancements and additions to the website. During the requirements gathering, the client discussed issues left unresolved by the previous project team, as well as where they wished the website to eventually end up.

When selecting the methodology, the team had to choose one that not only worked with a team size of one, but also one that met the client's needs. The team

settled on using an Agile methodology that included using a KanBan board. This KanBan board would be used as the main monitoring tool for the team, while a Gantt Chart would be used as a baseline for timings of deliverables and milestones.

The KanBan board the team used consisted of three separate lists, "To Do", "Doing", "Completed". Each requirement / task was added to the initial To Do list and was slowly moved across the lists until it had reached 'Completed'. This was updated throughout the life span of the project and gave the team a visual representation of how much work had been completed and how much work was left to complete.

After development was finished, the team carried out manual testing which was based off the IEEE 829 Standard. Because this is a continuation of a previous project, the team also based their testing off the previous project teams testing to ensure consistent levels of acceptance were maintained through all defects found.

## CONCLUSION

Working on this project proved difficult, highlighting the issues that can arise from enhancing another team's work. This taught the team valuable skills that they can take with them into the workforce.

<https://capstone.weltec.ac.nz/details-collabstory.html>

# Open-Day

Team: Bhavneet Gujral, Dhiraj Mahal and Monil Patel

Advisor: Paul Bryant

Client: Paul Bryant



## INTRODUCTION

Open-Day is a project about making lab exercises for college / high school students to perform when they come to WelTec on Open Day. There are three different types of lab exercises students can choose from that are based on SQL, Networking and Security.

The Open-Day team wanted the students to have a glimpse of what practical work is taught in the School of IT and Business at WelTec. Our generated labs are completely based on the studies that we have completed at WelTec during our degree studies. Using our lab exercises, students will not only learn about IT skills but will be interested to obtain in-depth knowledge about various aspects of Information Technology.

## DEVELOPMENT

This project was developed using the 'OpenUP' project management process. We selected this particular methodology for this project as all our team members were developing lab exercises from their area of expertise. The 'OpenUP' method content is focused on the following disciplines: Requirements, Architecture, Development, Test, Project Management, and Configuration and Change Management.

The project team used Virtual machines to develop their challenges. More specifically the team used VMware workstation for developing and testing all the virtual machines. Most of the testing was integration testing, recovery testing, regression testing and use case testing.

The networking lab exercise consists of teaching how to block access to different websites with the help of *pfSense* which is an Open-source firewall used by different institutions for safe browsing. It uses *pfSense's* web configurator to set up firewalls, blocklists and rules.

The SQL challenge uses an OWASP Juice Shop instance as a vulnerable web application. The users use SQL injection to attack the Juice Shop instance. This challenge is intended to show students how SQL Injection may be used to exploit vulnerabilities.

The security lab exercise has been arranged in the form of ten step-by-step activities. Every activity has a different security module that explains how a user can escalate their user access privilege skills to exploit the system. A user can use misconfigured user access to gain unauthorised access to certain parts of the system.

Lab exercises assist students to learn a variety of IT aspects to help them with their understanding of networking, security, and vulnerability of systems.

## CONCLUSION

The project was a success from the point of view of the project team. We faced a lot of issues in terms of development, communication, achieving the milestones and much more. We still managed to deliver the product we promised to the client with confidence that the client will appreciate the team's effort and the outcome that was delivered by the team.

<https://capstone.weltec.ac.nz/details-openday.html>

# Open Day Game

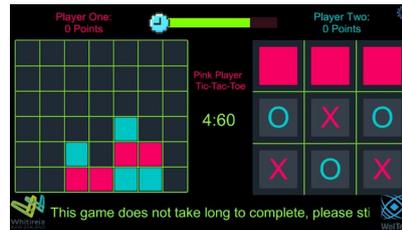
By: Dillon Laing

Advisor: Susan Scott

Client: Chalinor Baliuag



Game Main Menu



Game in Progress



Game Leader Board

## INTRODUCTION

The project was a 2-Player versus Player (PvP) game in which players compete in two games simultaneously, trying to best each other. They had to remain focused while under the added pressure of a timer and other features.

This game was developed for the Wellington Institute of Technology to use at various events to engage with possible new students and to demonstrate to them what can be achieved when choosing to study under the Software Development major.

## DEVELOPMENT

The Open Day Game project was developed in 'Unity', a cross platform game engine primarily using Unity UI game objects. All scripting done for the game was done in Visual Studio 2017 using the C# programming language.

SCRUM was used as the methodology for this project, the product and sprint backlogs were managed using an online tool called Jira and backups were managed with GitHub Desktop and then uploaded to a GitHub repository.

Two-weekly sprints were used to develop the game and each sprint focused on a different aspect of the game. The first sprint focused on each of the two games individually and testing them with both unit tests and user tests.

The second sprint was focused on taking the two separate games and then making them appear on the same screen while also linking the two game scripts so that players would be able to take turns on each game and then add the timer to those turns.

The third sprint was focused on developing and testing all the additional features added to these classic games. Variations of the game from the second sprint were created that all contained different features in UI placements, added features to create pressure, different sound effects and different colours.

The final sprint focused on user testing the variations from the third sprint and then drawing conclusions based on the results. These conclusion results were then used to create a final version of the game with any adjustments made to the features based on the results.

Once the final version was created it was thoroughly tested using black box unit tests and user tested to check that it met the clients' requirements.

## CONCLUSION

The project was a very intense but rewarding process. It highlighted areas of game development that had previously been overlooked. As a one-person team I was able to get hands on experience in every aspect of project development and the SCRUM process

The Project was completed on time and met the minimal viable product which resulted in all the client requirements being met.

Overall, I am satisfied with the game created for this project and I am grateful to my advisor and client for their support and understanding over the duration of this project.

<https://capstone.weltec.ac.nz/details-opendaygame.html>

# Porirua Community Arts

**Team:** David Cano, Kevin Weir, Adelene Botha

**Advisor:** Scott Morton

**Client:** Adrian Shields, Michael Bennington

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PCA

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## INTRODUCTION

Since the 1970's, Porirua Community Arts (PCA) promotes and supports all forms of art in the Porirua community.

The client (represented by Adrian Shields and Michael Bennington) wishes to improve the PCA's online presence. Online presence improvement is through the development of a prototype for a future website to allow interaction between PCA members, artists and others involved in the promotion or development of art in the city.

Initially the client had requirements for a fully functional website. Because of time constraints, it was agreed that the scope would be changed from delivering a website to a prototype built on *Wix*.

## DEVELOPMENT

A Scrumban approach was used for this project, as it is particularly adapted for fast paced development projects and is highly flexible.

This proved to be particularly useful throughout the project as requirements were added, and alterations became necessary.

The Scrumban approach made it easier to add database capabilities and to produce a user-friendly interface.

## CONCLUSION

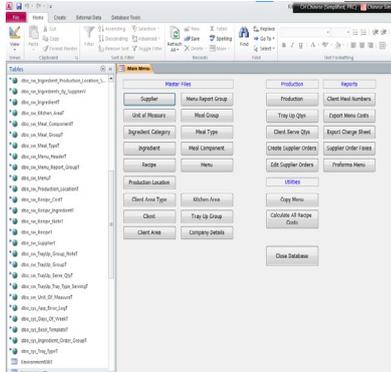
Communication with the clients was maintained regularly to ensure that the agreed requirements were met.

<https://capstone.weltec.ac.nz/details-pca.html>

**Team:** Cathy Chen, Hollie Gillum-Taylor, Michelle Rose-Holmes, Phill Smit, Simeng Zou

**Advisor:** Dr Hamid Mahroeian

**Clients:** Jonathan Gan, Darryl Simons, Marion Cox



KitchenApp, PSC's Current Kitchen Management App



6 vendors that support existing kitchen management solutions



Final deliverable Business Case

## INTRODUCTION

Presbyterian Support Central (PSC) currently uses an application called *Kitchen App* to manage 14 aged care facilities.

After the initial meeting with PSC, it was clear the staff are finding the current system to be outdated and difficult to use. This meant the project team was tasked with finding an alternative kitchen management solution that was functional and user-friendly.

## DEVELOPMENT

To find the best solution, we decided to do usability testing and user research of the current situation to be able to set solution requirements, before starting on the market research and making any recommendations.

## RESEARCH

To find the best solution we split the project into five iterations:

1. Proposal
2. Information Gathering
3. Requirement Analysis
4. Market Research
5. Recommendation.

The Proposal defined and set out what we tasks we needed to complete for the project. Whilst the information gathering, and requirement analysis gave us a clear understanding of PSC's needs, wants, and wishes.

The main bulk of our project was undertaking market research and the way we found our recommendation.

Information gathering was where we did our user testing, conducting interviews, observations, and surveys.

These findings were used to set requirements.

The market research iteration had us researching New Zealand's food management processes, existing food management solutions, and new development options.

Based on all the research the project team recommended an existing kitchen management solution which was called '*Kafoodle*' in a business case to PSC.

<https://capstone.weltec.ac.nz/details-psc.html>

# Project System Evaluation

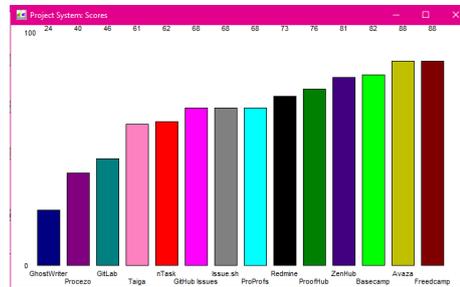
Team: Nadine N. Orr and Vanraj R. Odedara

Advisor: Robert Sutcliffe

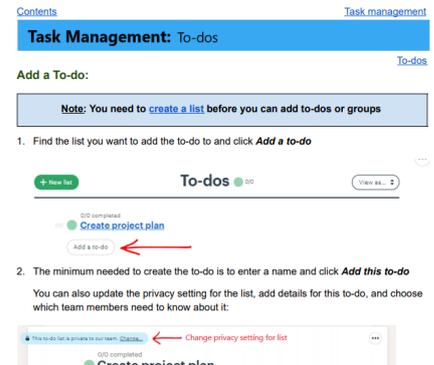
Client: Robert Sutcliffe

Project System Evaluation								
Ratings: 1 (Very poor), 2 (Poor), 3 (Average), 4 (Good), 5 (Very Good)								
	Audit 20.9	Project Management 20.9	Integration 17.1	Accessibility 17.1	Access Control 9.5	User Feedback 9.5	Cost 5	Weighted Score
GhostWriter	3	1	1	3	1	1	5	196
Procezo	3	3	2	4	1	2	1	251.5
GitLab	2	2	3	4	4	3	3	284.8
Talpa	4	2	3	4	5	4	3	345.6
ITask	4	4	3	3	3	4	2	346.3
GitHub Issues	4	2	5	4	4	4	3	370.3
Issue.sh	4	3	5	4	4	2	3	372.2
ProProfs	4	4	2	5	4	4	2	372.9
Redmine	5	4	4	2	5	3	3	381.7
ProotHub	4	5	2	5	5	4	2	403.3
ZenHub	5	3	5	4	4	4	5	422.1
Basecamp	5	3	4	5	4	5	4	426.6
Avaza	5	5	4	5	5	3	3	453.9
FreeCamp	5	5	4	5	5	3	3	453.9

Weighted Decision Matrix



Sensitivity analysis using V.I.S.A



Example of procedural instructions

## INTRODUCTION

Project management systems make it easier to plan and manage the Capstone Project - but finding one (and learning how to use one) can be difficult and stressful. The lack of consistency between project management tools used by project teams can also make it more challenging and time-consuming for staff to assess or review student work.

The goal of this project was to suggest a solution to these problems by identifying a project management system that is suitable for the requirements of the Capstone Project, and then developing procedural instructions designed to meet the needs of different types of users, for example - Students, Clients, and Advisors.

## DEVELOPMENT

The project methodology used was Adaptable Project Management (APM) methodology which combines elements of Agile and 'Project Management for All'. This methodology focuses on working as a team, producing quality products, product-based planning, reviewing progress, and regular communication with the client.

The project plan was based around the development of the three main deliverables.

### 1. Recommendation report

The report contained a shortlist of four project management systems which were determined to be suitable for the needs of the Capstone Project and was used by the client to make the final selection.

Developing the report involved gathering requirements and researching 50 different options. A Weighted Decision Matrix, and sensitivity analysis was used to evaluate and compare the project management systems. The project client chose Basecamp based on the report's recommendations.

### 2. Procedural Instructions

In this phase the project team gathered requirements by interviewing the Client and conducting user research. After the instruction documents were created as Google Docs, two rounds of testing were done to test their usability and find ways to improve them. The completed instructions were converted to PDF format.

### 3. Presentation

The final development phase was to plan and present the project findings, Basecamp, and the instructions to Capstone Project staff.

## CONCLUSION

This project was completed on time, and to the standards required by the client. During the second round of user testing the testers found the instructions helpful and easy to use.

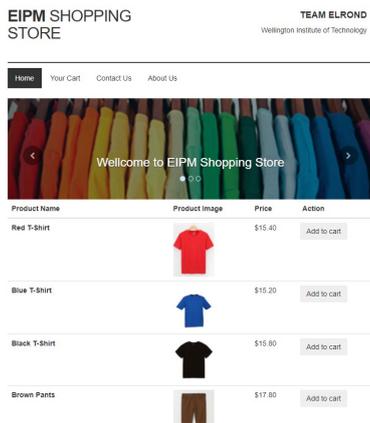
The project was a good opportunity to learn how to manage a project, maintain team relationships, and use analysis methods to develop products which meet user needs.

# Project Verifone EIPM

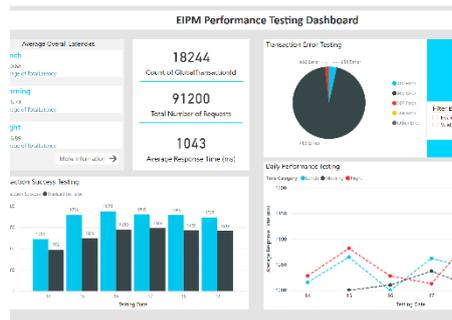
Team: Jessica Narbonita, Arlington Corpuz, Gabriel Peddie, Qiang Zhang

Advisor: Richa Panjabi

Client: Verifone New Zealand



E-commerce website



Performance Test Dashboard



Project Team

The e-commerce industry has come a long way since its inception, and the current pandemic has further fuelled the innovations in this sector. Verifone Inc. is one of the largest FinTech companies worldwide, and they are launching a new global product that will support e-commerce transactions of their third-party merchants.

Project Verifone E-commerce Integration and Performance Monitoring (Project Verifone EIPM) aims to test and optimise Verifone's e-commerce Hosted Payment Page (HPP) API. The project has been initiated to achieve two primary goals. The first goal is to plan, design and develop an e-commerce website that uses Verifone's API to process payments. The second goal is to carry out a performance and load test on the e-commerce HPP API. The test will help discover and identify anomalies caused by the increase of load to the API. The API optimisation will also be a byproduct of the performance test.

## DEVELOPMENT

The project opportunity came as the team used external resources to find an external client with a potential project that would fit the team's skill composition. Verifone provided us with the project briefing, and the group decided to take the project on. First, the team met with the client to verify the information from the briefing, gather requirements, and establish a good work relationship. Then, the team proceeded with the project bid so that work could begin.

The Business Proposal was the initial milestone of the project team. A plan was established for achieving the goals and an overall approach to the project.

Scrumban was the chosen methodology for the project as it fits both criteria needed by the client and our project team. The client prefers to meet on a timeboxed basis, while the team requires a flexible and collaborative approach to development. Thus, Scrumban was chosen as it fulfils both needs.

The e-commerce website was planned and developed based on Verifone's HPP API. It was created using Visual Studio 2019 Community as an integrated development environment (IDE) and was written in C# language based on ASP.NET Framework 4.7.2 and MVC architecture. While the database used is Microsoft SQL Server, and the Performance Testing dashboard was created using T-SQL and PowerBI.

As stated in the project's Business Proposal, the team committed eight weeks or four sprints, with two weeks duration for each sprint to accomplish the project's goals. After each sprint, a demo to the client was performed to ensure the client was up to date with the project's progress and gather feedback.

## CONCLUSION

Overall, the project was a success as it added value to the business. The client will utilise the e-commerce website developed, and the Performance Testing tools used in this project to test their other e-commerce APIs. As requested by the client, training guide on how to use the products were also provided for their future reference.

Apart from an approved requirement change, every deliverable has been produced and delivered within the agreed time.

<https://capstone.weltec.ac.nz/details-verifone.html>

# Support Crew Website Rebuild

Team: Denis Leamy, Mitchell Comeskey, Courtney Alpine

Advisor: Susan Scott

Client: Kelly Banks, Janet



Figure 2 Image of the website

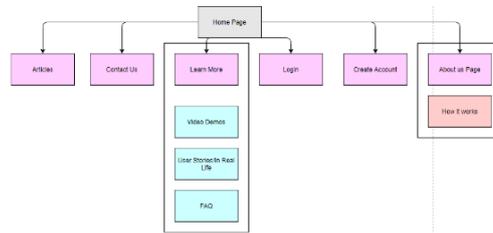


Figure 1 Sitemap of final website

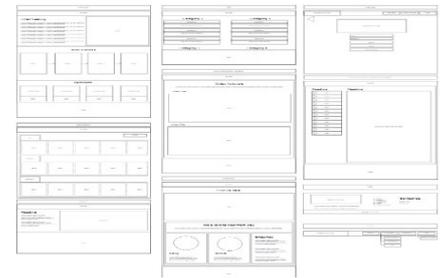


Figure 3 Design of final pages

## INTRODUCTION

This project involved rebuilding and redesigning an existing website called 'Support Crew'. It is meant for those who face any life-events, crisis or seek help allowing them to request or send meals and or services to friends, loved ones or family.

The website was originally built by Kelly and Janine after they both experienced personal crises. It was built using WordPress, they discussed migrating it to SilverStripe as their organisation's website will be moving onto CMS.

Another aim of the website was to be informative in helping people understand they are not alone and are allowed to ask for help. This included a three-platform-site. The platforms are 'Support Crew', 'Support Platform', and 'Givestore'.

## DEVELOPMENT

The CMS was developed using Agile UX methodology. During our first meeting, we discussed ideations processes and requested a branding manual.

We have developed helpful documentation, performed user research including, focus groups, expert heuristic evaluations, sitemaps, wireframes, UI / UX requirements, personas, and investigated google analytics.

We also researched add-ons that will be required when building this project for Intercom, accordion blocks for F.A.Q., shopify, and content blocks.

## CONCLUSION

The project has been impacted by the complexity of the SilverStripe CMS and was re-scoped into a functional prototype.

We have handed over detailed information and recommendations for future development.

The next project team could further progress this project by adding add-ons, further implementing content from the old website, conducting more user testing at each stage to ensure each element is usable and legible, and finishing off this rebuild.

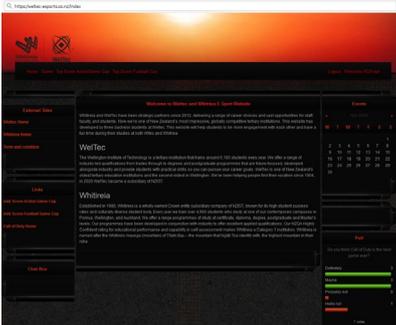
<https://capstone.weltec.ac.nz/details-support.html>

# Tournament Manager 3.0

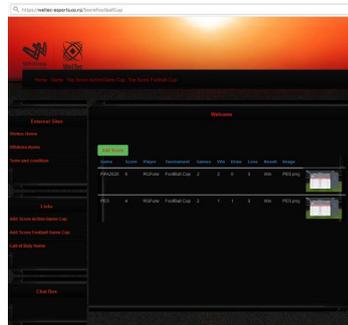
Team: Noora Awad, Daniel Cunningham-Bale, Isuri Shashipraba

Advisor: Reza Moosa

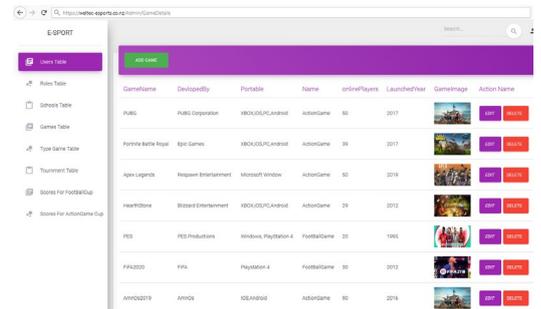
Client: Diana Eyes



Homepage



Player Scoring Dashboard



Administration Panel - Game Table

## INTRODUCTION

Online gaming has surprised the world with its rapid growth, ensuring development of media entertainment such as virtual gaming and 'eSporting' is not expected to slow anytime soon.

WelTec and Whitireia plan to create and host eSporting events encouraging students to engage with activities beyond academic study and assist students with developing their social, leadership and group management skills along the way.

## DEVELOPMENT

Tournament Manager System 3.0 was developed using Scrum methodology; an Agile methodology breaking project tasks into actionable steps that can be accomplished within each time frame.

The project has been developed in multiple stages; five sprints divided by seven milestones: Client approval on proposal, System Analysis, Development, Testing and End Project report.

After getting approval from the Client for business proposal, system analysis and design phases the team began the development of the website.

The backbone of the project was developed using the ASP.NET framework, Microsoft SQL server along with HTML, CSS, JS and Bootstrap.

The website has two different login systems, player, and administration login.

This website has two roles:

- **Player Interface** - Login, join events, add score to the scoring dashboard associated with player profiles.
- **Administration Panel** - Login, add, edit, delete users, score validation and update scoring dashboards.

## TESTING

At this stage the functional, unit and security tests were performed. Throughout the security testing phase multiple security risks ranging from web weaknesses and cross site scripting to remote code execution and elevation of privilege software vulnerabilities were identified and mitigated to ensure the application runs as intended without unexpected issues.

## CONCLUSION

Virtual gaming provides unlimited opportunities to compete with others all around the world with a large range of gaming types including car racing, battle royal, rugby, and football to name a few.

Players have the ability to learn and develop key skills in an individual or team environment with the support of students and tutors on site.

The team specially designed and developed an application aligning with the Client's expectations and requirements accordingly.

<https://capstone.weltec.ac.nz/details-tournament2021.html>

# Wellington Splashbacks

By: Barbara Salas

Advisor: Scott Morton

Client: Sam Hedge

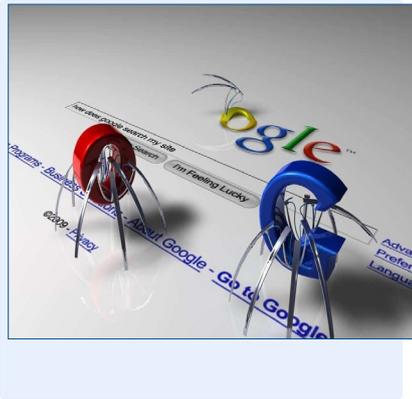
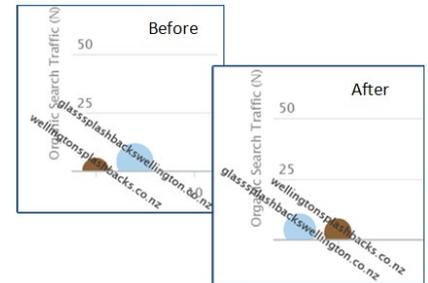


Image by MsPinkeye (Deviantart)



Image by Jose Mendoza (Imonru)



Before and after

## INTRODUCTION

Wellington Splashbacks is a company dedicated to the installation of kitchen splashback glass. It has an active website, but it is not displayed on the main Google search results causing a poor exposure to customers.

This project aims to place the site in an acceptable ranking result using organic SEO process (without advertisement payments).

## DEVELOPMENT

That involved an initial evaluation of the site detecting missing features or elements that had to be modified to be detected by search engines (such as the number of keywords, backlinks, structured data, headings, etc.).

After incorporating changes, the effects produced were analysed. Those revealed an important enhancement compared to the stage before changes.

## CONCLUSION

It was clear to me that this analysis demonstrated an increase in web page traffic. This was also shown by the number of clicks made by viewers.

The result was a proven better performance in front of another close competitor based on keywords used.

Those and other positive effects boosted the website to move from the 12<sup>th</sup> to 6<sup>th</sup> position which showed as [page one] when a Google search was made on the brand.

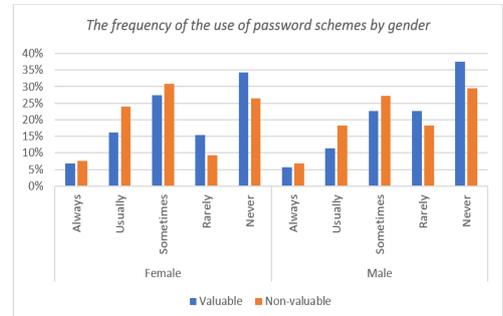
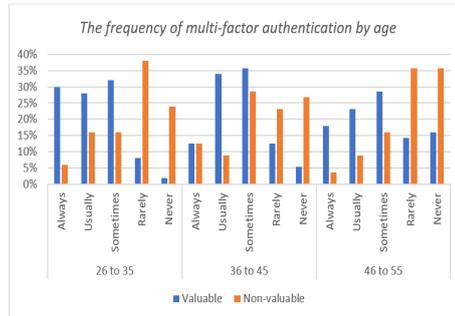
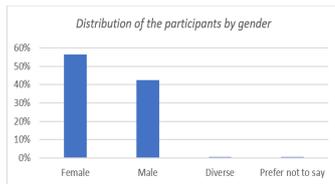
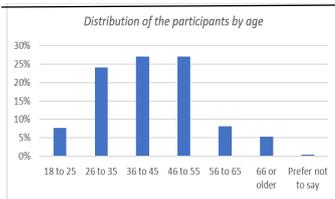
Such optimisation allowed for more website exposure, and the client (Sam Hedge) was happy with these results.

<https://capstone.weltec.ac.nz/details-splash.html>

# Password creation, usage, and perceived value of the resources protected by passwords

By: Li Hou (Postgraduate Student)

Advisors: Dr Dax Roberts, Dr Marta Vos



The demographics information

The finding of multi-factor authentication

The finding of the use of password schemes

## INTRODUCTION

Passwords play a vital role in online services, and password security needs to be considered carefully by the password user.

To explore whether individuals' perceived value has an impact on the creation and use of passwords, this thesis mainly focuses on analysing the habit of password creation and usage, particularly in relation to the individuals' perceived value of the resources protected by passwords.

## DEVELOPMENT

This research used the quantitative survey method. An online questionnaire was designed on SurveyMonkey to measure the differences in password creation behaviour and perceived value of the resource being protected between different participants.

The questionnaire was divided into three parts with a total of 38 questions, including the collection of demographic information, participants' password behaviour for valuable resources, and participants' password behaviour for non-valuable resources.

The participants were recruited via the researcher's personal Facebook page. All the participants were over the age of 18.

In the stage of data analysis, descriptive statistics were used to help understand the data. Data was visualised against different dimensions using tables and graphs.

## FINDINGS

Multi-factor authentication is used more frequently in valuable resources than in non-valuable resources. The younger the participants, the higher the proportion using multi-factor authentication. In addition, males use multi-factor authentication for valuable and non-valuable resources more frequently than females. New Zealanders use multi-factor authentication for valuable and non-valuable resources less often than Chinese.

Females are more likely to share passwords with their children than males. More males than females share passwords with their parents and friends.

## CONCLUSION

This research demonstrated participants' habits of password creation and usage, and established the relationship between individuals' password behaviour and perceived values.

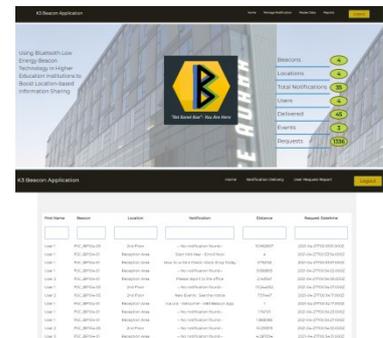
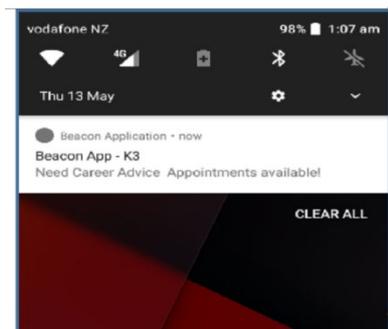
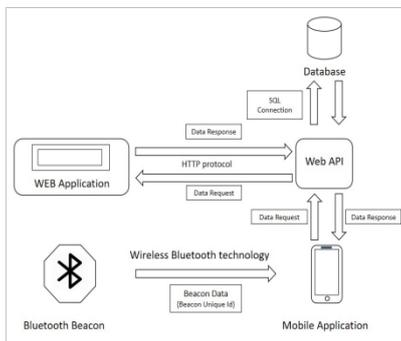
In this research, individuals have different perceived value to different resources. Online banking was considered to be the most valuable resource. In addition, the perceived value influences some behaviours of password creation and usage. When creating passwords, individuals prefer to set more characters for passwords with high perceived value, and less use password schemes for valuable resources. Individuals share valuable passwords less often than non-valuable passwords.

<https://capstone.weltec.ac.nz/details-postgrad1.html>

# Utilising Bluetooth Low Energy Beacon Technology to Improve Location-based Information Sharing Processes in Higher Education Institutions

By: Chanaka Jayarathne (Postgraduate Student)

Advisors: Steve Cosgrove / Dr Marta Vos



Key Components and Data Flow

Mobile Device Alert

Web Application / User Position Report

## INTRODUCTION

Exchanging information based on location is critical in today's world. Indoor positioning is a crucial technology that allows location-based services to work effectively indoors.

Bluetooth Low Energy (BLE) beacons have emerged as the most effective technique for indoor positioning because they are efficient, low energy consuming, inexpensive, and designed with simple insulation devices.

Education is one of the fields that use location-based resources and disseminates location-based information to numerous people daily. Using BLE beacon technology, this study aimed to build an artefact that could enhance information sharing in higher education institutions via mobile devices. BLE Beacons, mobile application, web application, web API, and database are the main component of the proposed artefact.

## DEVELOPMENT

The prototype was tested in four different locations on the Whitireia and WelTec Te Auaha Campus in Wellington, New Zealand.

Beacons were mounted on three floors in four areas in various settings. Data required for the experiment were configured through the web application including location details, beacon details and notification configurations. The mobile users were registered via the mobile application. Mobile notifications were observed while walking through the locations. The iBeacon beacon protocol was used, and a log-distance

path loss model was used to calculate the distance between the beacon and the user's mobile device using the RSSI value of the beacon signal.

During the evaluation process, the prototype produced reports to illustrate data observations. The number of configured notifications, number of received notifications and received beacon signals were captured in the experiment.

The prototype was evaluated through user observation and comparing estimated notification deliverables, actual delivered and mobile positioning calculations.

## FINDINGS

The findings of this study's evaluation revealed that the proposed approach could effectively deliver information and identify additional possible future development areas. This artefact can be used to keep track of a user's position at any given time. In a situation like coronavirus, close contacts can be discovered based on this artefact by analysing beacon receiving signals recorded in the database.

## CONCLUSION

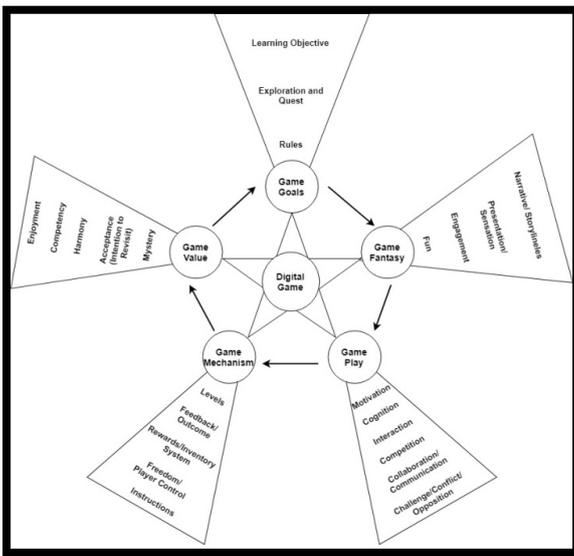
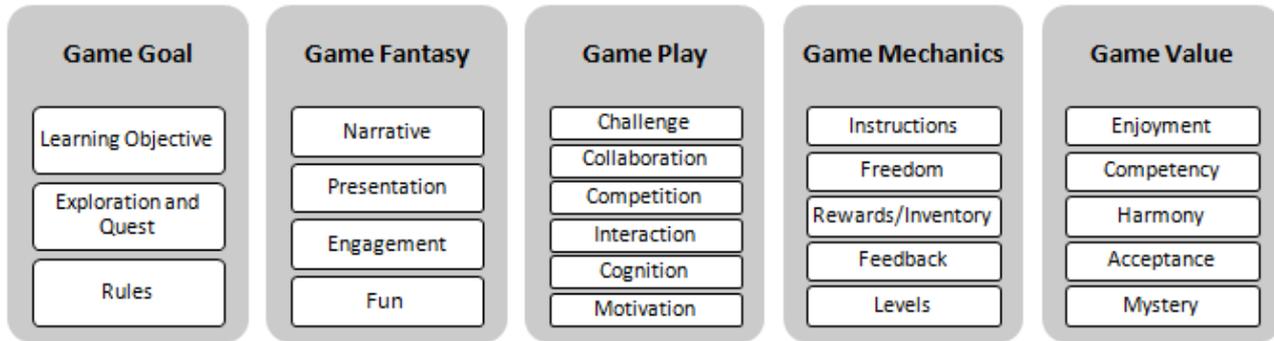
This research introduces a strategy for improving the information-sharing mechanism by developing a five-part artefact (BLE Beacons, mobile application, web application, web API, and database) based on specified parameters and essential criteria.

<https://capstone.weltec.ac.nz/details-postgrad2.html>

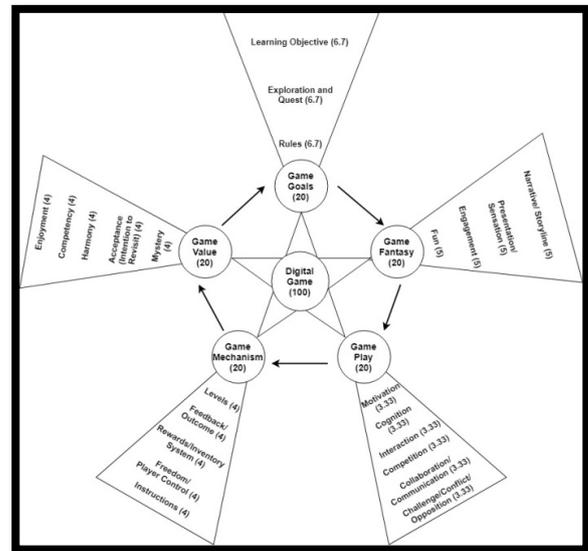
# Evaluating Key Attributes of Effective Digital Games in Tertiary Education: Solution to Designing a Digital Game Based Learning Model

By: Roopali Kulkarni

Advisor: Yuliya Khrypko



Summary Digital Game Based Learning (SDGBL) Model # 2



Weighted Summary Digital Game Based Learning (WSDGBL) Model # 3

## INTRODUCTION

The project is about proposing a novel approach for designing a DGBL model using high-level game design attributes of several educational digital games belonging to various game genres. This model can help educational game designers and educators in designing and integrating effective and engaging educational digital games into the tertiary education curriculum.

### What?

This project is about studying various literatures from the period of 1990-2020 to identify, know and organise key game attributes of educational digital games that make it an effective learning medium in tertiary education. These key game attributes are used to construct a universal model - Summary Digital Game Based Learning Model (SDGBL). The SDGBL model can be used to design and evaluate new/existing educational digital games belonging to any game genre to teach a particular skill or concept in tertiary education.

### Why?

The project was undertaken since one of the most serious issues with educational games to date is the insufficient convergence of educational and game design concepts which is partly because digital game designers and educational experts rarely share a common language. Additionally, the research to date has developed digital game-based learning (DGBL) models that can be used to design and evaluate educational digital games related to a specific game genre and they are hard to apply when the intended game genre varies significantly from the research default genres.

### DEVELOPMENT

This project was developed using the following research methodology:

To answer the research question and address the research problem presented in this study, this study used a combination of two types of qualitative research methods: systematic literature review and content analysis. (Ritterfeld et al. 2009; All et al. 2013; All et al. 2016) used a

similar combination of two methods: systematic literature review and content analysis to assess the effectiveness of DGBL in education.

This study used a systematic literature review method to find literatures related to the research topic, determine how digital games are used as an efficient learning medium in tertiary education and determine what attributes are used to design educational digital games. Next, the research used qualitative content analysis method to analyze the relevant high-level design attributes of digital games that contribute to their educational efficacy and used them to construct a universal DGBL model.

Thus, this research was carried out in three stages:

1. Stage 1: Conduct a Systematic Literature Review (the data for research was collected).
2. Stage 2: Design a Summary Digital Game Based Learning (SDGBL) Model (the research data was analysed).
3. Stage 3: Evaluate Existing DGBL Based on the SDGBL Model (The research outcome was evaluated).

## FINDINGS

The findings of this research are as follows:

- Discovered 23 common high-level design attributes of digital games belonging to various game genres based on the common properties, functionality, and values they share.
- The study revealed that these 23 key attributes of the educational digital games contribute to their educational efficacy.
- These 23 game attributes can be categorised into five game categories namely Game Goals, Game Fantasy, Game Play, Game Mechanism, Game Value using different approaches suggested by Sillaots et al., 2016; Federoff & Federoff, 2002; Adams, 2009.
- These 23 game attributes and the five game categories can be used to construct a novel conceptual model that can help educational game designers integrate learning resources into their games and help educators integrate digital games into tertiary education curricula.

## CONCLUSION

This research made the following contributions:

1. The universal SDGBL Model consisting of the game attributes and game categories can be used to:
  - Design and analyze digital games for educational purpose in tertiary education.
  - Test the applicability and appropriateness of any new or existing educational digital game before integrating it into the tertiary education curriculum.
  - Enhance teaching and learning practices in tertiary education institutions by assessing existing DGBL against the model and by incorporating assessed DGBL in the curriculum.
2. Based on the SDGBL Model, a digital educational game evaluation tool was designed - the WSDGBL Model (scoring model). The WSDGBL Model can be used as a universal model to evaluate any genre of educational digital games related to any subject, skill, or course in tertiary education.
3. This new conceptual model (SDGBL) and the evaluation tool the WSDGBL Model (scoring model) are the contribution to the knowledge on DGBL.

<https://capstone.weltec.ac.nz/details-postgrad3.html>

# Kiwi Biofuel's production, the feedstocks, revenue, and cost

By: Tahany Ibrahim

Advisor: Dr Fahimi Ali

Client: Executive Director

## Kiwi biofuels production the feedstocks Revenues, and cost

Project – Kiwi Biofuel

### INTRODUCTION

My industry Project was with the Executive Director of Innovation and Systems Limited who primarily works in the business and economic research area.

Biofuel's production faces various challenges such as the high production costs. Biofuels can mitigate the harm incurred by using fossil fuels in transport and all other aspects of technology. They aim to reduce carbon emissions and global warming. Biofuels could be a step for the government plan to reach zero-carbon emission in 2050.

The project aims to identify the feedstocks for Kiwi Biofuels productions, analyse and identify the cost of its production, and revenues. Topics like biofuels production costs, supply chains and the bioenergy value chain model, have been chosen to discuss biofuels production.

Reviewed peer articles have been identified to help me understand the challenges that face biofuel production.

The current trends pointed out to new software that has been invented recently to reduce energy and water consumption during biofuels production.

### DEVELOPMENT

My role in the project was to assess the viability of Biofuel's production costs.

During the project I have learned many skills such as how to participate in presentations, and business discussions. Identify revenue and costs by analysing financial worksheets.

### CONCLUSION

The project was exciting as it was a step in the right direction to reducing carbon dioxide emissions and convert bio waste into biofuel. This goes a long way to helping the environment and tackle global warming.

# An investigation of how to solve the problem of products not consistently being provided to customers due to unstable international supply chain

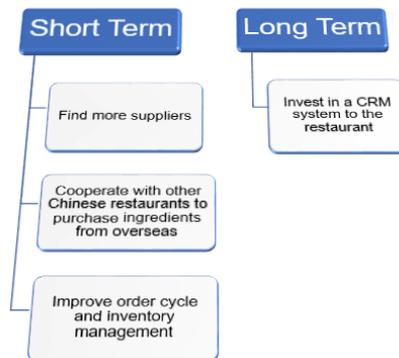
By: Shangshu Niu (Olivia)

Advisor: Dr Fahimi Ali

Client: Tiger Chinese Restaurant



## Recommendations:



## INTRODUCTION

The project was to investigate how to solve the problem of products not consistently being provided to Tiger Chinese Restaurant customers due to unstable international supply chains. The restaurant needs to solve current problems and maintain competitiveness.

## DEVELOPMENT

### Methodology:

My first task was to interview the host organisation's manager and one franchise operator from a chain of fast-food companies in New Zealand and then combine this with secondary data collected from news, journal articles, books, and online news items.

### Research Objective:

To investigate the problem of products being sold out which is primarily caused by unstable international logistics. To include finding the best method to improve customer satisfaction for a restaurant's longer business life.

Looking at ways to improve the utilisation of container space, and even the freight costs. Consider the risks due to supplier errors or emergencies.

Improve cooperation with other Chinese restaurants in purchasing goods from overseas.

### Findings:

- Order time – twice a year
- COVID-19 has disrupted the normality of the supply chain
- Supplier – only a single supplier for each kind of material. Small mistakes can then occur.
- Shipping price – increased 4 to 5 times since the COVID-19 pandemic.
- CRM – lack of CRM.

## CONCLUSION

After interviews and an investigation, I was able to determine the short term and long-term recommendations needed to improve service to customers.

### Short term:

- Find more suppliers
- Cooperate with other Chinese restaurants to purchase ingredients from overseas.
- Improve order cycle and inventory management.

### Long term:

- Invest in a CRM system to the restaurant.

The project was very helpful in my study as I am majoring in Supply Chain and Logistics Management which is at the forefront of world interest currently due to the world-wide issues caused by COVID.

# Identify the contribution factors of inconsistent raw materials supply for Moby Dick Fish & Chips

By: Ai-Hua Young (Joyce)

Advisor: Fahima Ali

Client: Moby Dick Fish & Chips



## INTRODUCTION

I am a degree student majoring in Supply Chain and Logistic Management and this project is to identify the contributing factors of inconsistent raw materials supply for *Moby Dick Fish & Chips* and find a good solution for the operating owners who have had supply issues over the last 16-months.

## DEVELOPMENT

### Method:

Interviewing the different business operators including the host organisation owner to find out if they have any supply chain issues over the last 18 months and observation of retail shops in the area such as other fast-food owners, Japanese used car importers, Gazebo importers NZ and an exporter in China.

### Findings:

#### **COVID-19 impact**

- Global food supply chain
- Global logistic price surges
- Insufficient port space due to lockdown.

#### **Host organisation's management**

- Passive situation
- Absorbing of extra costs
- Profit margin fall
- No strategy for the changes that occurred.

### Recommendations:

#### **Short term recommendations**

- Improve the order cycle time

- Develop multi-supplier strategy
- Collaborate with other fast-food outlets

#### **Long term recommendations**

- Business sustainability
- Healthy cooking methods
- Source ingredients locally
- Environment friendly
- Transparency

## CONCLUSION

Over the last 16-months Moby Fish & Chips have seen large increase in price fluctuations. They have been in this business for the last 20 years and have not come across these type of price fluctuations before.

My investigation showed that COVID-19 is the cause for these fluctuations and after interviewing and researching for solutions I was able to offer short and long-term recommendations to help them navigate the problems they have encountered.

The research and interviews have helped me with my studies in Supply Chain and Logistic Management which is the area I will be majoring in after I finish my degree studies at the Wellington Institute of Technology.

<https://capstone.weltec.ac.nz/details-business2.html>

# How can Epic Hospitality use social media marketing to grow the business?

By: Parth Kanubhai Patel

Advisor: Dr Fahimi

Client: Epic Hospitality



Epic Hospitality Wellington

## INTRODUCTION

As I work for Epic Hospitality it was a logical choice to help them improve their marketing of their business. I had a background in photography, and this also was helpful in providing insight into the images they could be using.

The main reason for this research is to study how Epic Hospitality uses their social media pages currently to attract customers, and market their product and the business.

## DEVELOPMENT

The aim of this project is to find ways to grow Epic Hospitality social media presence and improve the branding.

One of my first tasks was to research. I researched 15 peer reviewed articles focusing on topics such as competitive analysis marketing, effects of colour use in marketing adverts, promoting food and beverage through social media, understanding the target market, and regulating alcohol marketing in the digital age.

Epic Hospitality owns and runs four bar/restaurant businesses in Wellington. As they have a great customer base offline people do visit the bars/restaurants frequently, but the same thing cannot be said about their social media pages.

## Methodology

The project used a survey and short interviews to gather data. The survey was conducted by using google forms and was posted on several social media pages.

## KEY FINDINGS:

- 63.2% of the participant have not heard of hospitality business – 'Epic Hospitality' on social media.
- 33.3% of the participant go to bars every 1-2 times a week.
- 86.8% of the participant use Facebook every day. The survey questions were related to those that use Facebook and visit the bar.
- Out of 114 participants 45 would use social media 10-20 times a day

## CONCLUSION

### Significant recommendations:

It is recommended for Epic Hospitality in the short term to focus on building their Facebook and Instagram platforms.

They could hire a professional photographer and social media manager.

In the long term, Epic Hospitality could take this advantage by investing in a Search Engine Optimisation program. Google offer this type of service and it would be a good starting point for the client.

<https://capstone.weltec.ac.nz/details-business4.html>

# A Proposal to Identify the Importance of Social Media Engagement

Advisor: Dr Fahimi Ali

By: Nadia Martinez

Client: AREA Events

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## Host Organisation

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### INTRODUCTION

AREA Events is a conference and event venue based in Wellington. They currently attract mostly corporate clients. They are wanting to attract new corporate clients and reach out to new leisure clients.

### DEVELOPMENT

#### Objectives:

The project's objective was to find ways to increase social media engagement and brand awareness for AREA Events.

#### Methodology:

The project used a short survey and short interviews to gather data.

- 25 people were surveyed.
- 10 clients were interviewed.

#### Key Findings:

- 72% of the surveyed clients have used AREA Events as their chosen venue in the last six months.
- Out of the surveyed clients 48% of corporate clients, 44% are government clients and 8% are leisure clients.
- 68% of surveyed clients said they would follow brands/companies they like on social media.
- 100% of interviewed clients do not follow AREA Events on any social media platform due to not engaging in posts.
- It can be easily distributed and reach a wider audience.
- It is best to research and learn about your target market and create specific social media strategies for each market and platform.

### CONCLUSION

#### Recommendations:

It is recommended for AREA Events in the short term to focus on building their Facebook and LinkedIn platforms and to also create individual social media strategies for each platform.

AREA Events is recommended to research their ideal target market and cater to the social media strategy for the market.

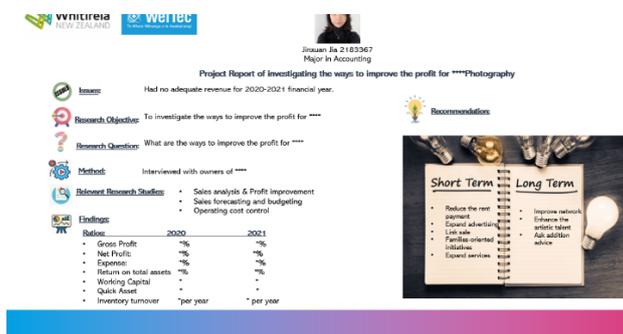
AREA Events should ensure that all posts made on social media are purposeful and are relevant.

<https://capstone.weltec.ac.nz/details-business5.html>

# Project Report – investigating the ways to improve the profit for \*\*\*\*Photography

By: Jinxuan Jia

Advisor: Dr Fahimi Ali



## INTRODUCTION

With the spread of COVID-19, the global economy is on the verge of a recession, and photographers are not exempt to the financial implications. In these special times, with social distancing becoming the norm, photography is more of a luxury product than a necessity, with demand decreasing and dropping in lockstep with client budgets. As a recession approaches, it might expect a drop in demand for photographic services in general.

This report around three topics with five literature review articles for each topic. The first topic is sales analysis and profit improvement, the second is sales forecasting and budgeting, the third is operating cost control. Accompanied by ratio analysis of financial statements, find the reason for the issues of having no adequate revenue for the 2020-21 financial year, and help my host organisation to investigate the ways to improve the profit.

## DEVELOPMENT

The investigation that I undertook for the small photographing business impacted by COVID 19. I interviewed the owners of this small photography business and found that the company had received no financial support over the lockdown period and the owners had not sought assistance to cover their losses over this period.

Part of my research was reading three topics with five literary reviews for each topic.

The readings covered the three areas listed below.

1. Sales analysis and profit improvement
2. Sales for costing and budgeting
3. Operating costs control

## CONCLUSION

### Short term recommendations:

- Reduce rent payment
- Expand advertising
- Link sale
- Family orientated initiatives
- Expand services

### Long term recommendations:

- Improve network
- Enhance the artistic talent
- Request for additional advice.

<https://capstone.weltec.ac.nz/details-business6.html>

# Project to identify the ways to improve profit margins for the vape shop

By: Jia Li (Lyra)

Advisor: Jamie Smiler

Client: The Vape Shop



## INTRODUCTION

The Vape Shop wants to make more profit and open two chain stores under the brand in downtown Wellington.

With New Zealand's 2025 smoke-free plan, the e-cigarette industry has changed a lot. According to experts, e-cigarette consumption is far less harmful than cigarette products.

This report provides an in-depth look at the finances of The Vape Shop. Through communication with the store manager, I learned that the manager hoped to increase and improve the financial liquidity of the enterprise by improving profits, and to open more stores in the central Wellington, to open more opportunities in the New Zealand market.

## DEVELOPMENT

### Literature Review:

- Pricing strategy
- Inventory management system model (IT and EOQ)

This report mainly helps enterprises to improve profits through three aspects. First, adopt differential pricing strategy to increase the price of some products. Secondly, through the introduction of inventory management system to improve the product out of stock, as well as part of the product storage surplus. Finally, the operating cost of the store also needs to be controlled to a certain extent, especially the decoration cost of the store. Through the analysis

of these three directions, the company can improve its profits more reasonably and thus create more opportunities to expand the market

### Findings:

- Some e-cigarette products are priced too low.
- There is a lack of a well working inventory management system.
- Some products are out of stock and some products are surplus to requirements.
- High operating costs.

## CONCLUSION

- Incorporate a moderate price increase.
- Purchase a good inventory management system software.
- Save on decoration costs.