DECO3200

JOSH'S PORTFOLIO

Part of team Pedestrian Plus

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"MAKE KIDS SAFER IN SCHOOL ZONES THROUGH MORE ENGAGING CROSSINGS"

Problem Statement

Road Traffic injuries are the leading cause of death for Australians between 1 and 14. This concerning statistic sparks the need for school zones where children have higher interactions with crossing the road to take action against jaywalking and unsafe road behaviours [1]. A major contributor to this issue is the disconnecting experience of current static pedestrian crossings that hold little appeal to young children [2] who require stimulating activities to remain excited and are unpredictable (in regards to movement and urges) in the way they travel compared to older pedestrians [3]. This neglect of behavioural consideration in the design of school crossings causes a decrease in usage and an increase in unsafe crossing. Therefore, Pedestrian Plus, is set out to change the current unappealing infrastructure into a more dynamic and interactive experience to promote safe crossing behaviours and usage, whilst making it more fun for all.

Final Product Description

The final concept is an interactive display that is situated within the centre of the walkway at either end of a children's crossing. The display is designed around the concepts of playfulness through interactivity, nature through water and the design principle entry point (usage of progressive lures) [3]. Through using light and water to interact with students as they approach it is an obtrusive design that draws students to the crossing whilst engaging them to undertake safer measures when crossing the road. The interaction is simple, as it is meant to be easy to understand for a younger audience whilst being memorable and interesting for them.

The interaction contains 3 main components:

- The whirlpool displayed in a clear tube that is displayed once the child is in range of the ultrasonic sensor.
- The LED light strips which provide ambient light to the whirlpool and overall display, that change based on the users distance.
- A sound effect that plays a victorious sound when the user crosses the road safely and as the whirlpool drains waiting for the next user.

These 3 key components make display that captivates a user and acts as a waypoint for a safer crossing location, whilst being minimal to not disrupt pedestrian flow across the crossing. Overall, this creates a more fun and exciting way for students to travel too and from school safely.

Victoria - Main Roles: MVP, Coder, Writer, UX Designer & Organiser

- Our quality assurance: she ensured that everything we did met the criteria set by the subject.
- Designer of prototypes and final product.
- Main report writer and researcher for assessment 1 & 2, whilst also writing the amazing introductions and problem statements for all assessments. She also helped me with report 3.
- The main coder - learnt and did almost all the coding iterations herself, she was the key to making our product interactive.Helped support every role by helping in every aspect.

Jared - Main Roles: Builder, Judge & Director

- Our go-to person for all the physical building of prototypes. For a majority of the prototypes, Jared helped keep any of our wild ideas realistic whilst also ensuring we can make them. He did a majority of the building with me in the final assessment as well.
- Also helped a lot with user testing and preparation for it.
- Videomaker and director helped make the video come to life.

Han - Main Roles: Major Support, Researcher & Actor

- Huge support when it came to anything research-based segments of the report. Helped write parts of it too.
- Was really creative and came up with some great saves in the building of the final product. Was actually a huge morale boost at a lot of points even when sick, which honestly, I think helped more than any individual task could at some points.
- His job mainly included research, supporting building and acting in the film.
- Though this isn't related to this topic 100% Han did a lot to assist Jared in their other assessments (2 other subjects together) meaning Jared had more time to build in our subject.

Jayce - Main Roles: Support & 3D Modelling

- Jayce tried to help where he could, pitching ideas and trying to assist in buying or building. Was a little hard to work with (outline later in challenges) but overall, his biggest contribution was assisting in 3D modelling.

OUR TEAM
INTRODUCTIONS

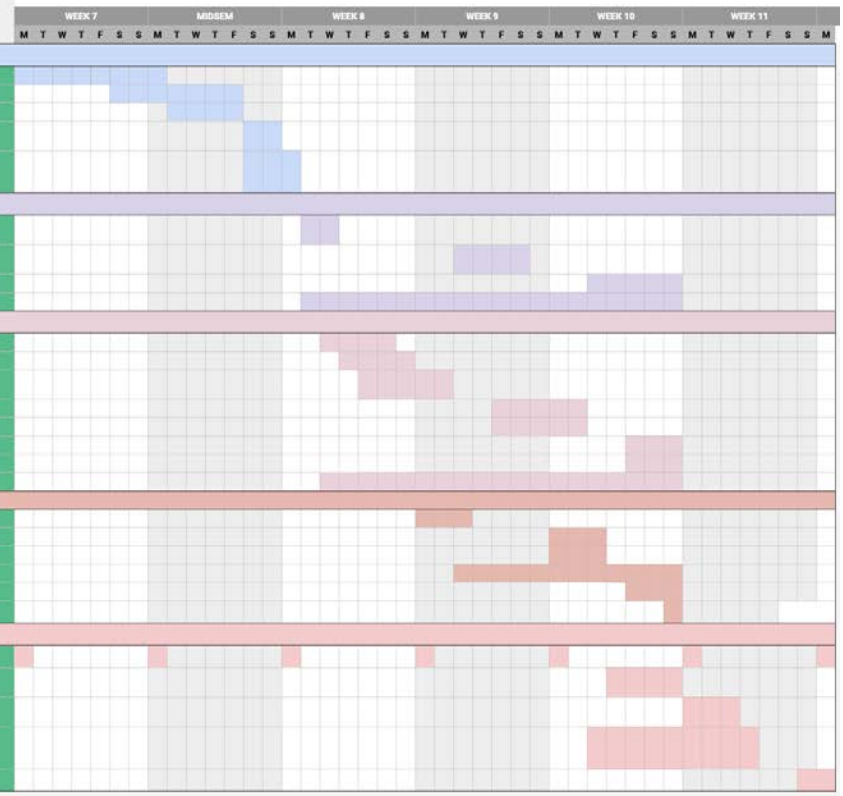
Josh (Me) - Main Roles: Team Leader, Electrician, 3D Modeller & UX Designer

- My major responsibility was to ensure everything was made and communicated clearly, acting as a stepping stone between the 3 groups, Physical Product Building, Coding & Hardware and Report & Video making.
- My role primarily was to facilitate teamwork between all the members on the team whilst ensuring they are on task to complete their necessary tasks. If a team member had an issue they would often ask me about potential methods of fixing it. I set up group meetings (minus is assessment 2 where it went a little south).
- My job leading up to final assessment was primarily prototyping and gathering user data. As the only person who had constant access to the younger audience needed to test our prototypes I played a key role in UX design for the iterations of prototypes. I needed to ensure the group had the data they needed to move onto the next step and prototype on time, often gathering and synthesising the data in 2 days because of time restraints.
- I was the main 3D modeller for the group, creating 3d models for most of the prototypes and their different forms for assessment 1.
- I was also in charge of ensuring all the wiring was correct and working. I required working in conjunction with Victoria who was constantly testing her code with different sensors. My job was to ensure it ran as smoothly and dictate if something was possible or not based on our level of experience.

Team Schedule For Assessment 3

PROJECT TITLE	Operation Whirlpool	COMPANY NAME	Pedestrian Plus
PROJECT MANAGER	Victoria Tran	DATE	2019

	TASK TITLE	TEAM MEMBER	START DATE	DUE DATE	DURATION	% OF TASK COMPLETE
1	**PLANNING**					
1.1	Designing iteration	Everyone	09/16	09/23	8	100%
1.1.1	Creating a blueprint	Everyone	9/21/19	9/27/19	7	100%
1.2	Budgeting	Everyone	9/24/19	9/27/19	4	100%
1.3	Gathering physical building materials e.g. Plastic Tube, Metal, etc.	Jared	9/28/19	9/29/19	2	100%
1.4	Gathering physical computing materials e.g. Arduino, Motion Sensor	Josh & Victoria	9/28/19	9/30/19	3	100%
2	**BUILDING**					
2.1	Building skeleton	Han Yi, Jared, Josh	10/1/19	10/2/19	2	100%
2.2	Building frame	Jared, Josh, Jayce	10/9/19	10/12/19	4	100%
2.3	Fully functional build	Jared	10/17/19	10/20/19	4	100%
2.4	Risk Management	Jared	10/1/19	10/20/19	20	100%
3	**CODING**					
3.1	Coding ultrasonic sensor	Victoria	10/2/19	10/5/19	4	100%
3.2	Coding motor for whirlpool	Victoria	10/3/19	10/6/19	4	100%
3.2	Coding motor to work with motion sensor	Victoria	10/4/19	10/8/19	5	100%
3.3.1	Coding Internal Lights	Victoria	10/11/19	10/15/19	5	100%
3.3.2	Coding internal lights with sensor	Victoria	–	–	5	100%
3.3.3	Animating Lighting to Sensor	Victoria & Josh	10/18/19	10/20/19	3	100%
3.4	Combining all function code together	Victoria			5	100%
3.5	Debugging	Josh & Victoria	10/2/19	10/20/19	31	100%
4	**TESTING**					
4.1	Test skeleton	Han Yi, Jared	10/7/19	10/9/19	3	100%
4.2	Test frame	Han Yi, Jared	10/14/19	10/16/19	3	100%
4.3	Check waterproofing	Jared	10/14/19	10/16/19	3	100%
4.4	Test Code	Josh & Victoria	10/9/19	10/20/19	12	100%
4.5	Test fully functional build	Everyone	10/18/19	10/20/19	3	100%
4.6	Evaluation methods	Everyone	10/20/19	10/20/19	1	100%
5	**REPORT**					
5.1	Reflective reports	Everyone	9/16/19	10/27/19	42	100%
5.1	Filming	Han Yi, Jared & Jayce	10/17/19	10/20/19	4	100%
5.1	Editing	Han Yi, Jared & Jayce	10/21/19	10/23/19	3	100%
5.2	Visual report	Josh & (Everyone checks over)	10/16/19	10/24/19	9	100%
5.4	Submission	Victoria	10/27/19	10/28/19	2	100%



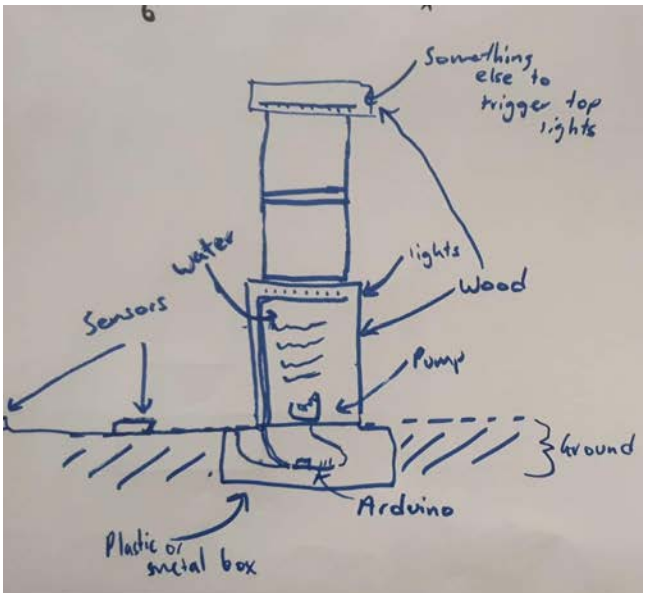
Team Gant Chart to keep us on schedule

CONTRIBUTIONS

WHAT I DID

Creating & Blueprinting The Concept of Whirlpool

I came up with the concept of Whirlpool and helped make some of the iterations leading up to it. In regards to whirlpool though, I had to articulate the concept, sketch out variations of it for people to have the concept explained to them and give them options to choose from.



Whirlpool Blueprint #1

```
LED_Strip_Fader
//NeilFarr's Arduino project - make a number of kitchen LED strips fade in when an ultrasonic sensor or switc
//contact neilsfarr@google.com

//define pins for the LEDs (using different ones for differnet strips to prevent MOSFET overloading and allow
#define STRIP1_LED 9  // Handles
#define STRIP2_LED 10 // Under cupboards
#define STRIP3_LED 11 // over cupboards
#define LIGHT_LED 3   // under cupboard downlights
#define ONBOARD_LED 13  // so we can see what is supposed to be happening, just with the onboard LED.

#define SENSOR 2 // PIR module
#define SWITCH 7 // push to make switch

//overall brightness value
int stripbright1 = 0;
int stripbright2 = 0;
int stripbright3 = 0;
int lightbright = 0;
int ledmaxbrightness = 80; // this is the maximum PWM brightness for the LED strips (the under cabinet LED li
                           // note that I set this at 80 for a good lighting for my use - remember the lights

int fadeSpeed1 = 20;
int fadeSpeed2 = 10; //slightly faster fade out time

int offset = 10; //offset allows for one light to begin the glow after the other one
int totaltime = 255 + (offset * 4); // 255 is the maximum brightness value

bool stillactive = false;
```

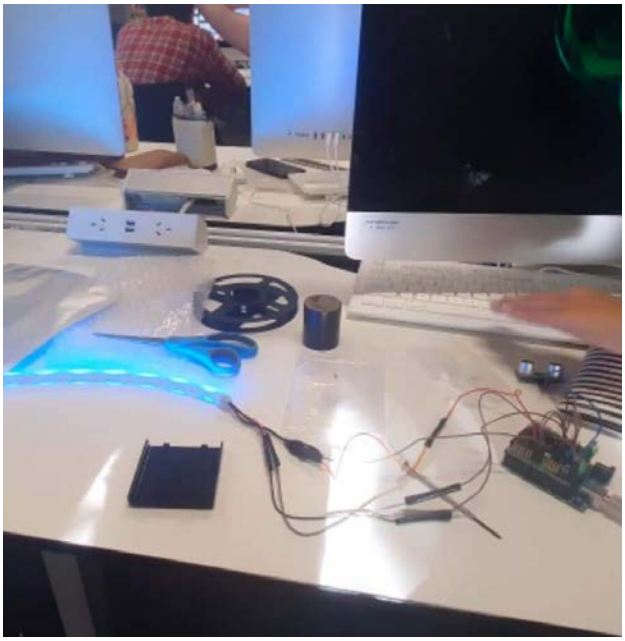
LED Light Strip Example Code

Secondary Coder

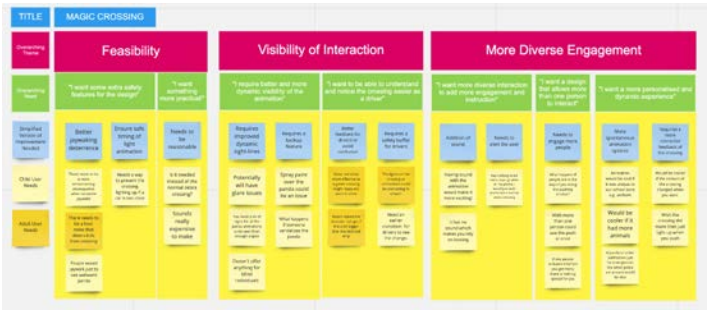
Victoria was the main coder, but I helped quite a lot in the debugging at some points. This was only a minor contribution but as Victoria did a majority of it herself. My main role though was to assist her in finding useful examples that would accelerate the process of coding.

Hardware & Wiring

I did all the hardware and wiring along with problem-solving things like voltage issues which we had more than once (sadly). My job was also to ensure the wiring and the physical product were always built with each other in mind, ensuring that that the products water supply bucket and tube were completely waterproofed to keep the electronics safe. Jared was the one who did all actual physical waterproofing though in the DMAF Lab.



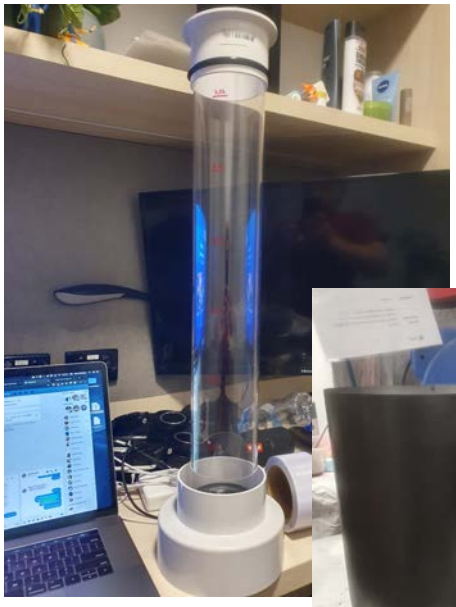
Wiring LED Light Strips



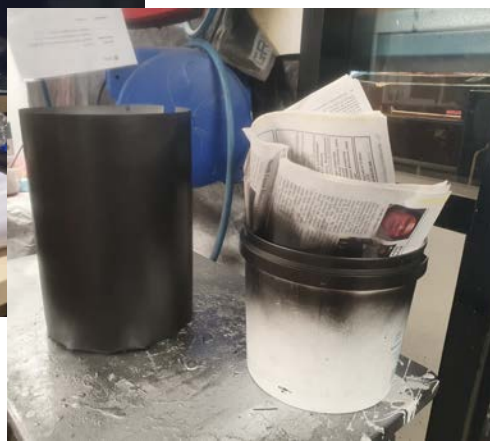
Affinity Diagram for Magic Crossing

Gathering & Synthesising User Data

Mainly because I was the only one with constant access to young kids through my family. For all the tests nearly I went back home to Wollongong and did the user testing with my family and family friends. My role was to facilitate the sessions, along with gathering all the feedback. I did think out loud, interviews and observations as my major data gathering methods as they were most suited to the target audiences attention span and way of thinking. My job was also to synthesise the data and draw correlations between it and our secondary research t and relay it to Victoria who added it to the report and wrote it up. Victoria also helped create the key links in data that were shown through Venn Diagrams in assessment 2.



Setting up plastic tube



Spray painting product

Helping Build The Physical Product & Prototypes

Jared was in charge of this but I did assist him, by painting, cutting, making a wooden base to sit in the metal container and some glueing. A majority of my role here was to explain what needed to be done, then getting Jared's feedback on the feasibility to compromise or make it in a different way if needed.

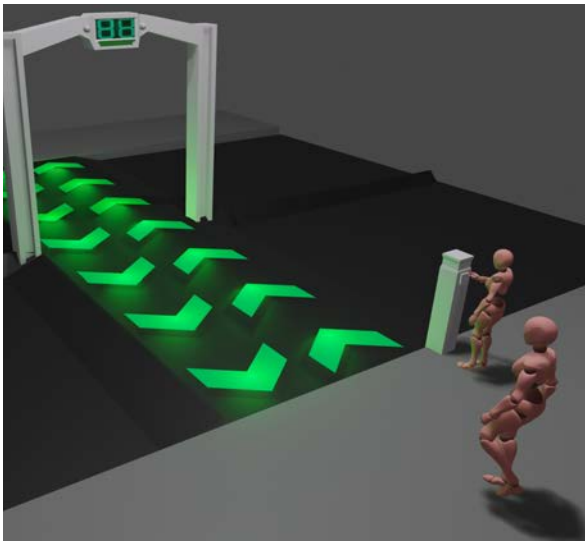
Report Writing

Victoria was hand's down MVP of the first 2 reports, but I took the role of making a majority of the final report. I wanted to make a simple but neat report that overviewed the main components of our assessment needed. In the other two reports, I helped a lot with synthesising the user research I gathered and merging it with Han and Victoria's research components. I did write up some parts here and there as well.

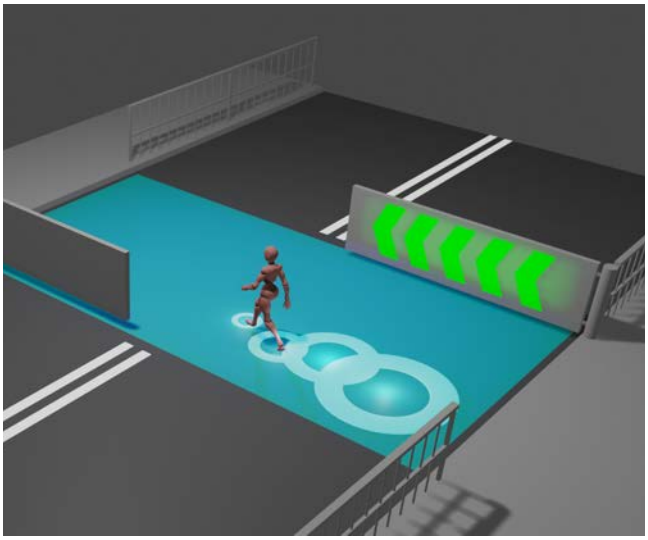
Final Report Cover Page

3D Modelling

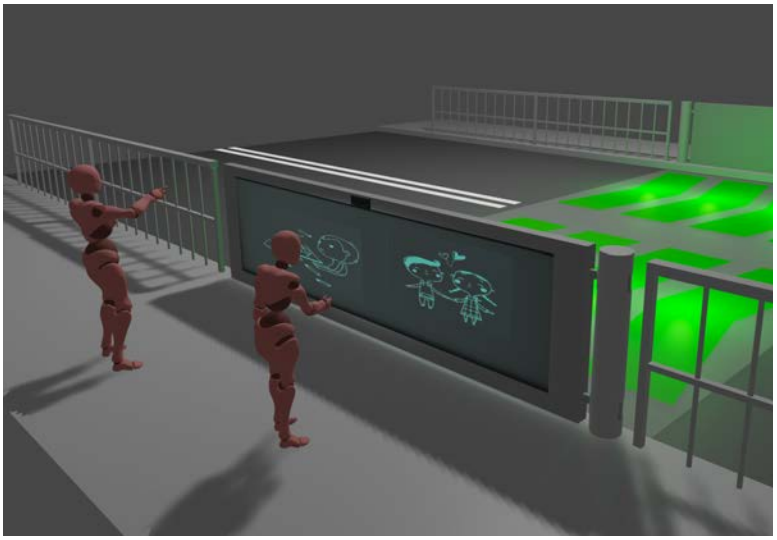
A majority of all the 3D modelling done throughout the semester was done by me. After the received feedback from our tutor in assessment 1 about my 3D modelled concept, it became my job to 3D model everyone's work in a similar fashion to mine. I had to 3D model the different interactions as well for each. Jayce helped a bit with making some of the smaller assets here and there and 3D modelling his own concept The Duck.



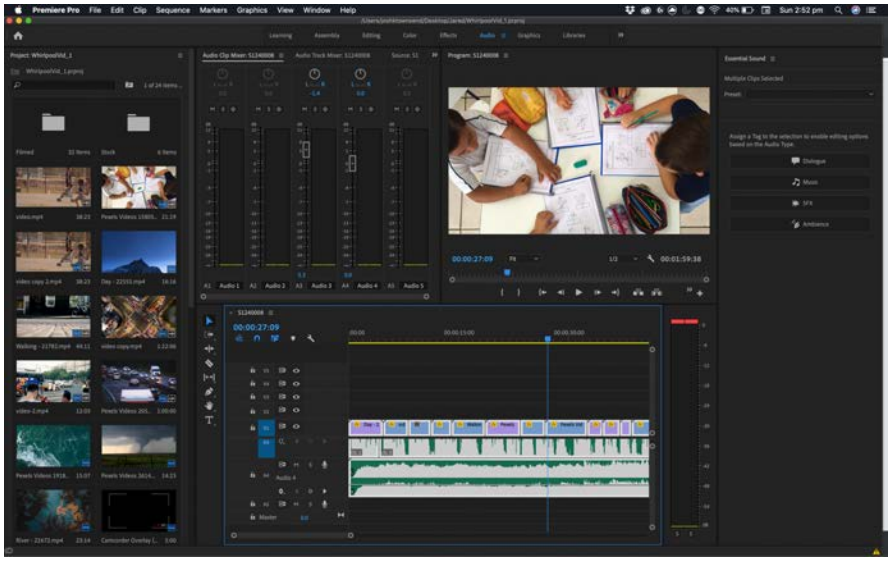
3D model of the concept Flow



3D model of the concept Han's Gate - gates open



3D model of the concept Han's Gate - gates shut



Editing the final video's audio

Video Editing, Filming & Voice Recording

My role for the final film was helping with physical filming, helping with storyboarding the concept and doing a majority of the editing and all of the voice recording. Jared though was the main director and created the original storyboard and did most of the shooting for it. He also helped edit the film.

CHALLENGES

OUR ISSUES

Teamwork Issues

- Admittedly this was actually the hardest semester I have had in terms of group dynamics and my personal life for this degree. In reflection mainly to assessment 2 where almost all the work was done by Victoria and I, I have found out that the group (minus Jayce who was a whole new challenge) all were undergoing some extreme hardships in their lives outside of uni. For me personally, I struggled a lot with depression this semester and had some people in my family have passed away and fall very ill, meaning my attention was very divided away from uni at points and I struggled.

- For Han, I knew he was very sick multiple times in the semester, while Jared and Victoria had a lot of external issues (I will not go into details out of respect) as well. This along with myself did put us in multiple slumps where it was very hard to get work done, so at points, we just called it quits for the day and all went home to relax.

- This experience with a team in a time of hardship was difficult. At times it was very hard to motivate them, including me, to get something done. Here is where I want to shoutout Victoria, she had hardships at points too but was the true glue that kept the team on track with ensuring we were meeting all the criteria needed to get high marks. My job from this was to communicate it to the others. When I fell ill just before submission of the second assessment she put aside her issues and carried all of us over the finish line. I am extremely appreciative of that.

- Now my final teamwork issue was Jayce. As I was the one who was meant to give tasks out, I struggled a lot to give him tasks. In the first assessment, I gave him a few to start, but partly due to language barriers and overall understanding from Jayce (we found out he only just completed half of the first-year units, yet somehow was doing a 3rd-year design computing class…?? Still not sure that works) so a majority of the work for him was lacking quality or was very different from what we needed. I have quite a few examples of this but don't want to shame him in anyway as it is not his fault. Overall I could see he was trying but it was very hard to get anything done if you relied on him (we had to fix up most of his work though). Still we would allow him to support us as much as he could.

Product Issues

- The main product issues came not from the product itself but our level of understanding. We all didn't have a strong knowledge of how to wire and code the product at points. We knew the basics but things like voltage issues took a long time to debug. In terms of the physical product our biggest issue came from just buying the right components. It was next to impossible to find the right size plastic tube, so it took a long time to buy and get it delivered, delaying production. For earlier iterations though we didn't have any issues with making the prototypes.

Overcoming Problems & Issues

- **Teamwork Issues:** In regards to teamwork issues there were just some things that couldn't be fixed due to the nature of them. Though for me to overcome my times where I was in a slump, I would try to change my work setting and the vibe for the group in hopes to also pick them up as well. This included studying outside, trying to add some fun if possible and also trying things in the DMAF lab. Changing setting when you see your team hit a brick wall can greatly help pick back up moral, I noticed this especially for myself. For assessment 2 when the issue of teamwork was really bad, I requested help from the class tutor to talk to the team. This helped greatly.When the team was going in the wrong direction or not getting something done, I would sit people down or message them one on one to see how they were doing and if they truly understand their task. On top of this I would do my best to try and engage everyone in decision making to make them feel that their opinion means something. When we couldn't decide on things we would just have the two or multiple sides pitch their story and vote. Sometimes this made us change our minds and go with someone else's way for it to be done.At points just being dead honest about the situation and lack of time especially in regards to getting work done, was the best option to motivate and prompt people to work.

- **Product Issues:** To overcome our issues, required a lot of patience and self teaching. Our degree set us up to have a very small knowledge of physical computing, but through a lot of tutorials, studying and trial and error we managed to solve each hurdle. To overcome the physical product issues we just improvised and did what we could. Many trips to Bunnings, 2 dollar stores and Jaycar trying to find the right materials and electronics to make our product work. It did in the end so we are super happy.

FINAL REFLECTION

IF WE DID IT AGAIN

How Well Did I Work In My Team?

- Overall I think I did well. My main job purely on the teamwork side was to encourage everyone to work, delegate tasks, take in their dislikes (about the concept and compromise/make agreements on where to go next, whilst also ensuring everyone is on the same page. When times were hard, I might not have been the best leader of the group but as I was quite busy struggling with my own personal stuff, so thinks at some small points were lacking communication, which is where Victoria really helped fill the gaps. In conclusion, I think I make an excellent team member. I clearly articulate my concepts for people to understand, I provide moral (with some hiccups but hey, cannot always be at 100%) and I am good at mediating peoples thoughts and feelings and turning them into a positive action that everyone agrees on.

What I would Of Done Differently:

- **Disclaimer:** Overall I learnt a lot about myself as a leader and how group dynamics work under stressful conditions. Though I wasn't perfect in my role and for the case of this semester could have been a lot better, I did try my best and in the end, we achieved high marks thanks to the efforts of the team. I am very proud of us! There is a lot I would improve on in hindsight though.
- I would have separated my personal life and uni life as much as possible. My family issues took me by surprise and I did let is stress me a lot at one point especially. In hindsight, I would have taken more measures to be calm and happy in the group setting so that others who had issues to could feel supported. If I had kept my head level more often we would have been more productive as a team because I was in the leadership role.
- I would have spent more time with Jayce, trying to help him understand and have potentially a greater role in the project. I do believe this would have been partly my fault, even though when I did try to give him tasks and explain it was very difficult. I do wish to learn from this though and learn to accommodate to more diversity and barriers in a team, but unfortunately, I wasn't in the right mindset to do so this time.
- Definitely would have pushed the group a bit more. I did give a bit to much leeway for some of the tasks, extending some deadlines but in reality, I needed to communicate the deadline a bit more strongly. Though empathy is a great tool to keep your team happy, sometimes it can also put greater burden on members who are work (e.g. Victoria).
- Called in help earlier for some of the more difficult tasks. I wish that as a group and I myself asked for more help from people who know electronics what to do at certain points e.g. voltage issues. Though my trial and error approach taught me a lot at points it slowed us down and caused us to buy a few things we really didn't need. Thankfully they were not too expensive!
- I would have tried to engage everyone more maybe through some group activities outside of uni and have some more celebrations for the wins to help pick up moral when it is needed. I think if I had spent more time on trying to make the team excited to work on certain tasks and feel more accomplished we would of got a lot more done or at least more done with less stress.

Are We Working On The Prototype More?

- No minus some potential slight upgrades and additions for Grad Show. No one will I believe will continue on working on the prototype post grad show.

CREDITING OTHERS WORK

BIBLIOGRAPHY

All Stock Images were taken from two free image sites: https://pixabay.com/ and https://www.pexels.com/

[1] Andreou, M. (2019). *Planning for Pedestrian Safety around Schools.* Sydney, Australia: UNSW. Retrieved from https://www.be.unsw.edu.au/sites/default/files/upload/pdf/schools_and_engagement/resources/_notes/5A3_27.pdf

[2] Department of Transport and Main Roads. (2013). *Evaluation of flashing school zone signs in Queensland.* Retrieved from QLD Government: https://www.tmr.qld.gov.au/-/media/Safety/roadsafety/Road-safety-research-reports/evaluation-flashing-school-zone-signs.pdf?la=en.

[3] NRMA. (2019). *Look Up: Keeping pedestrians safe.* Retrieved from https://www.mynrma.com.au/-/media/documents/advocacy/look-up-keeping-pedestrians-safe.pdf?la=en&hash=83AF22A582EF35C901E303FE7B6A2BFD