School of Science, Computing and Engineering Technologies

SWINBURNE UNIVERSITY OF TECHNOLOGY

COS10025

Technology in an Indigenous Context Project

Final project reflection report

Project Title: Minions Group Project Presentation

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Date: 21/10/24

I wish to acknowledge the Wurundjeri people as the traditional owners of the land in which Melbourne is built on, and I extend my respect to their elders past, present and emerging.

Declaration

I declare that this report is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person.

Signature: 

Dylan Rodwell: 105341089

Part A:

Introduction (Project Description)

This project focuses on providing a design solution for issues in the remote indigenous township of Yarrabah. The town of Yarrabah is located 10kms due east of Cairns, Queensland. At the time of the town's latest census, it reported to have a population of 2,559 with over 97% of which identify as Aboriginal or Torres Strait Islander,[1] and is acknowledged as "Australia's largest discreet Aboriginal community."[2]

The town's issue that the design ideas shown in our project aims to solve is contaminated drinking water. In the past, the town has experienced a lack of clean water caused by contaminated drinking water due to government oversights.[3] "Lead was found in water at Yarrabah Health Facility in May (2023)."[4] As well as having problems with the drinking water, the town also faces hardship through seasonal droughts and harsher climates.[5]

The group has provided five design ideas to help solve this issue:

Design idea 1 idea focuses on thoroughly analysing the town's drinking water to identify more conclusively what the risks are and assist in the implementation of water filters in each household to hopefully prevent the risk of future contamination reaching the homes.

Design idea 2 proposes the instillation of rainwater collection systems in community members' home to help relieve dependency on the town's water system that has been unreliable in the past. The rainwater collection system aims to install a water system into homes that collects rainwater from the roof, removes debris and sediments before storing it in a water tank, and further purifying the water before being used in the home.

Design idea 3 focuses on the use of cheap handmade water filters as a cost-effective and easily accessible solution to filter drinking water in this remote community. The filter is made with layers of gravel, sand, activated charcoal and cloth to filter out smaller and smaller contaminants as the water travels down through the filter.

Design idea 4 aims to provide filtered clean water to the community using a public water storage tank. The design also uses various water quality sensors and digital databases to record purity, maintenance records and automatically notify the public and authorities of any contaminations found.

Lastly, design idea 5 acknowledges the hardships Yarrabah faces with seasonal droughts and aims to provide a solution using weirs. The design proposes installing weirs near the community that will store rainwater as an emergency water supply when the town faces a drought.

Recommended option to proceed

After judging each design idea on how well they match the design principles, a ranking of how well each design performed was made.

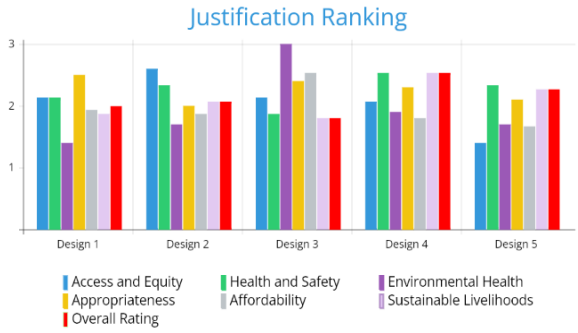


Figure [1] – Minions Group design idea justification rating graph

The solution that one of the best performing overall when compared to this criterion was design idea 4, Clean water access and warning system.

The reason this design was ranked so high was because of its effect on health and safety, its appropriateness to be implemented in Yarrabah and its superior sustainability.

Some of the benefits of the design include:

- The prevention of ingesting unclean water through warning the public via warning alerts and providing easy access to clean filtered drinking water for the community.
- Recording maintenance records and monitoring water quality virtually.
- Providing public access to all records and sensor readings.
    - Providing public access to everything also eliminates information regarding water contamination being kept hidden by authorities, similar to how they have in the past.
- Implementing automated and quick alerts through SMS and a public newsletter to spread information of contamination breaches fast and efficiently, reducing the risk of anybody ingesting the contaminant.
    - This encourages quick responses by authorities to prevent the contamination from spreading and informing residents not to drink the contaminated water.

This design was rated the most sustainable out of all the other design ideas. This is because of its extremely useful digital infrastructure that automatically monitors water for contaminants and recording all maintenance records, ensuring the system can be supported and maintained for a very long time with minimal effort.

This makes it ideal for Yarrabah's remote community because it would be hard to implement a large team to check and maintain water sensors all over the town and would almost be impossible to detect contamination quick and effectively over the whole town.

Although it may be difficult to initially set up the needed infrastructure, once in place the design is easily maintainable and provides essential information fast and efficiently to the public. Overall, this design is extremely suitable for the remote town of Yarrabah, providing a large amount of benefit for the community while also requiring minimal maintenance and manpower to operate effectively.

Part B: Project reflection

Group Work Reflection

1. Describe the group work strategies/processes that worked for your team.
   My group assigned roles to our members to help manage different aspects of the project. I (Dylan) was an editor along with Ali, Brendan and Truong. James was the meetings coordinator. Truong was the file sharer and submitter. Brendan was the team questioner to bring questions and concerns the group has to the tutor/convener. I was also the group mediator in case there was any conflicts or arguments.
   This worked well in my team and made organising the group a lot easier.

2. Describe the group work strategies/processes that did not work for your team.
   A strategy that my group lacked was promoting accountability. We had a problem where nobody would step up and decide what they would work on so we had to implement the member roles strategy which solved this issue and worked really well.

3. Describe what could be improved on next time you work in a group. This should be from your individual perspective, e.g., "not working with person X" is not something you can change.
   For the next time I work in a group I would like to dedicate more time towards the assignments and take more initiative than I have in this group assignment.

4. Describe an event/action (add evidences) in your team (i.e., not just from you) that you think was outstanding with respect to each of:
   a. **Team organisation**
      We use Microsoft Teams to organise our virtual and in person meetings to set times to work on our tasks as a group.

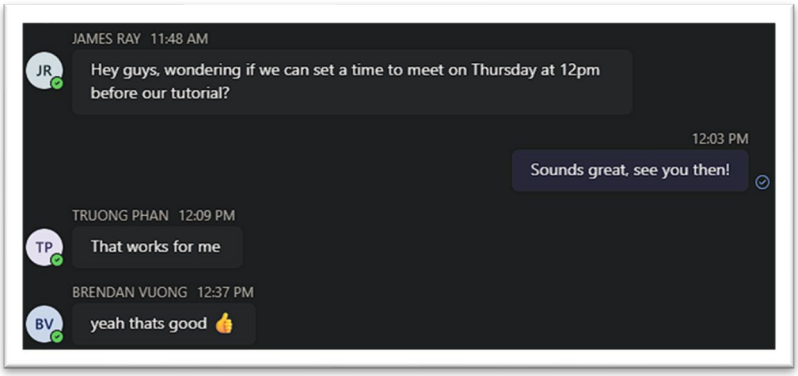


Figure [2] – Team meeting planning evidence

   b. **Meetings**
      Our team meetings in the library and in virtual calls have proved very beneficial with everybody attending to work on our project together.

Figure [3] – In person meetings evidence

c. Delivery of the project design ideas

i. We submitted the project design ideas 14 minutes late. Due to miscommunications within the group we were delayed for a little while and submitted the task late.

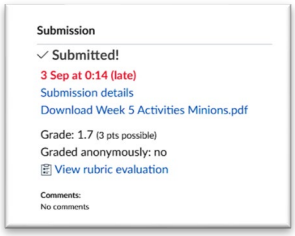


Figure [4] – Design ideas submission

d. Delivery of the Innovation concept

i. We submitted the innovation concept report before the due date.

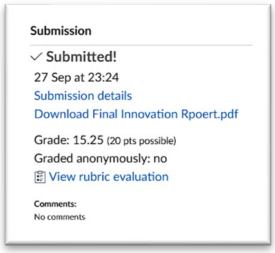


Figure [5] – Innovation concept report submission

e. Delivery of the final presentation

i. We submitted the final presentation before the due date

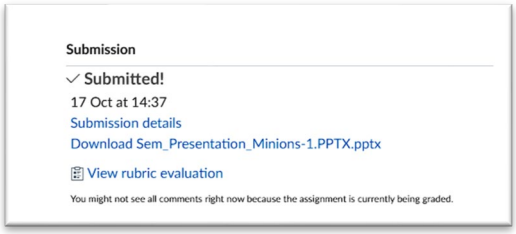
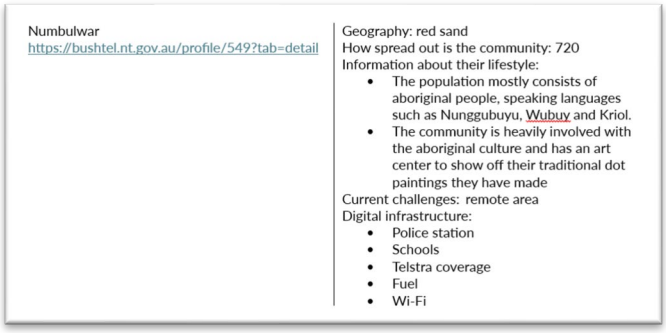


Figure [6] – Final presentation submission

Individual Work Reflection

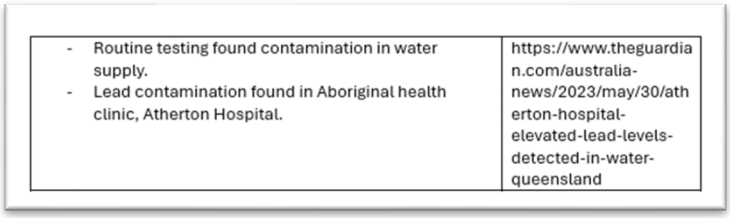
- Project tasks
  - Describe your tasks in the group project in each phase of the project (add evidences)
    - **Phase 1 – Identifying township and the team problem**
      - For identifying a township I investigated the town of Numbulwar, a small aboriginal community in the northern Territory.



Numbulwar https://bushtel.nt.gov.au/profile/549?tab=detail	Geography: red sand How spread out is the community: 720 Information about their lifestyle: • The population mostly consists of aboriginal people, speaking languages such as Nunggubuyu, Wubuy and Kriol. • The community is heavily involved with the aboriginal culture and has an art center to show off their traditional dot paintings they have made Current challenges: remote area Digital infrastructure: • Police station • Schools • Telstra coverage • Fuel • Wi-Fi

Figure [7] – Township evidence

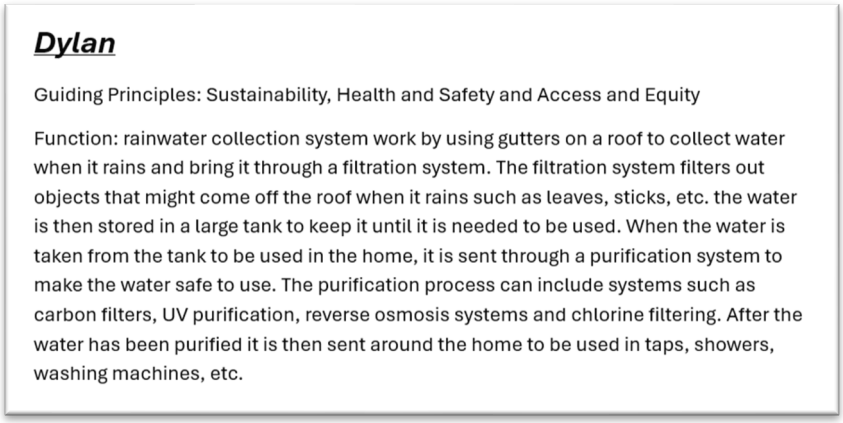
      - For the team problem my task was helping to find articles and researching about the issue of Yarrabah lead contamination.



- Routine testing found contamination in water supply. - Lead contamination found in Aboriginal health clinic, Atherton Hospital.	https://www.theguardian.com/australia-news/2023/may/30/atherton-hospital-elevated-lead-levels-detected-in-water-queensland

Figure [8] – Team problem evidence

    - **Phase 2 – Develop design ideas, Use design criteria to make standard design ideas, Analysing the benefits, impacts of each design idea**
      - The design idea I came up with is collecting rainwater as a backup/alternative to using the community's water system that has let them down and been contaminated in the past.



Dylan

Guiding Principles: Sustainability, Health and Safety and Access and Equity

Function: rainwater collection system work by using gutters on a roof to collect water when it rains and bring it through a filtration system. The filtration system filters out objects that might come off the roof when it rains such as leaves, sticks, etc. the water is then stored in a large tank to keep it until it is needed to be used. When the water is taken from the tank to be used in the home, it is sent through a purification system to make the water safe to use. The purification process can include systems such as carbon filters, UV purification, reverse osmosis systems and chlorine filtering. After the water has been purified it is then sent around the home to be used in taps, showers, washing machines, etc.

Figure [9.1] – Design idea evidence part 1

The purpose of home rainwater collection systems is to provide a more convenient and cost-effective solution to getting water to your home. By collecting your own water and using it to supply your home, it means that you will be able to rely less on water companies and will also bring down the cost of your water bills.

Analyse: to analyse the water's quality and the performance of the various filtration systems, a water quality tester can be used to compare the quality of the water before and after the filtration process

Eradicate: the amount of chemicals used is vitally important because using too much of a chemical like chlorine can be harmful in large quantities.

Prevent: Prevent sick recipients of water

Figure [9.2] – Design idea evidence part 2

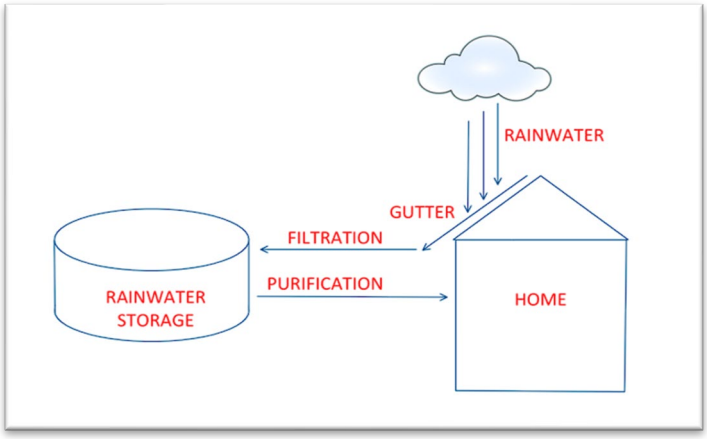


Figure [9.3] – Design idea diagram evidence

- **Phase 3 – Desing justification (using score sheets) by scoring the six guidelines**
  - My group scored all the design ideas based on six guidelines: access and equality, health and safety, environmental health, appropriateness, affordability and sustainable livelihoods.

	D1	D2	D3	D4	D5
AE	2.13333	2.6	2.13333	2.06667	1.4
HS	2.13333	2.33333	1.86667	2.53333	2.33333
EH	1.4	1.7	3	1.9	1.7
AP	2.5	2	2.4	2.3	2.1
AF	1.93333	1.86667	2.53333	1.8	1.66667
SL	1.86667	2.06667	1.8	2.53333	2.26667

Figure [10] – Design justification scoresheet

  - Design idea 1 scored highly on its ability to uphold health and safety, provide easy access to it and its appropriateness, but was scored lower due to its poor environmental impact due to a potential waste problem when discarding the filters after use.
  - Design idea 2 was deemed the most accessible design and also scored highly for health and safety, but was deemed the least appropriate design due to the infrastructure that would have to be built in order for it to function.

- Design idea 3 is the most affordable solution and scored second for appropriateness because it uses cheap and abundant materials that are easy to acquire, but it is also the least effective solution for health and safety and the least sustainable because of its simple and accessible design.
- Design idea 4 was the best performing at upholding health and safety and sustainability. The design also performed averagely in all other guidelines.
- Design idea 5 had the worst rating for affordability and access and equality, but was also scored highly for being sustainable, upholding environmental health and the health and safety principle.

- **Phase 4 – Analysing design average score sheets and improvising design ideas**
  - My group analysed how the design ideas performed in the justification scoring and tried to come up with ideas where we could improve each design and make it better overall.

- Contributions to the group
  - **Describe how your efforts contributed to the whole group**
    - I was assigned small tasks to do within all the group work to help balance the load between everybody.
    - I also helped format and edit the group work before submission
  - **Describe how you were involved in the teamwork environment**
    - I would attend group meetings where the group and I would work on our tasks together and provide feedback to one another.
    - In class I would also try to offer ideas and feedback where I could help my teammates when they needed it.
- Conclusion and recommendation
  - **Conclude your achievement in accordance with the culturally suitable solution (you can pick either 1 or 2 design ideas that suit well)**
    - The most culturally suitable design out of our ideas is design idea 3, the cheap homemade water filters. By using extremely common resources such as gravel, sand, charcoal and cloth, this makes the design extremely accessible for the people living in the remote town of Yarrabah. Although the design might not be the most effective solution we came up with, it is certainly the easiest to implement given its simple design and easy to acquire materials.
  - **Recommend how you could further improve your design ideas within a team environment**
    - In a team environment, if we spend more time planning out our designs and thinking of how we could increase the cultural appropriateness and ease of access to them, we could improve them greatly and come up with an effective and appropriate design that could realistically be implemented to help the town of Yarrabah.

Part C: Unit Learning Outcomes (ULOs)

1. Locate Indigenous knowledge systems and consider how they story the long history of technology, science, and engineering. (add evidences from weekly workshop team activities, weekly seminar reflections, assessments)
    a. Understanding and exploring Indigenous knowledge systems
    b. Ensure the project was undertaken in accordance with locating Indigenous knowledge systems (Technologies)

2. Explain the importance of, and find opportunities to, respectfully converge Western knowledge systems with Indigenous knowledge systems. (add evidences from weekly workshop team activities, weekly seminar reflections, assesments)
    a. Brainstorming the importance of Indigenous knowledge systems
    b. Understanding the Indigenous knowledge systems and uniting with Western knowledge systems
    c. Understanding and applying correct use of terminologies

3. Apply relevant knowledge of emerging technologies to a project within an Indigenous context taking into consideration and acknowledging Indigenous histories, worldviews, standpoints, and cultures. (add evidences from weekly workshop team activities, weekly seminar reflections, assessments)
    a. Analysing the challenges, needs and services for the remote Indigenous community
        i. Challenges that remote Indigenous communities face relate to things like scarcity of resources, financial limitations, logistics problems due to remote location, and the absence of modern infrastructures.
    b. Explore user access, affordability, appropriateness in relation to the design ideas
        i. Design idea 3 helps to solve most of these issues by using common and easy to acquire materials, it is very cost effective, and it is very simple to use and implement for a remote community.

4. Function as an effective team member using project management tools and demonstrating professionalism and ethical behaviour. (add evidences from weekly workshop team activities, weekly seminar reflections, assessments)
    a. Attended team meetings, facilitator meetings and workshops
        i. I attended all workshops and participated in the group team meetings.
    b. Assisted in planning for the team
        i. I helped add to the groups brainstorming whiteboard to plan tasks and assessments.

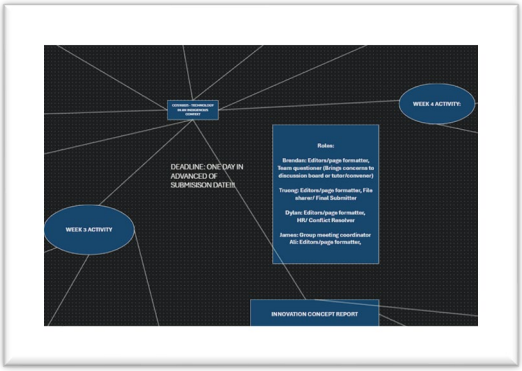


Figure [11] – Task planning evidence

c. Delivered work on time for the team

i. Our group would usually work on a shared document, and I would have my tasks finished before it was time for the document to be submitted.

5. Communicate within teams, stakeholders using appropriate verbal, written, and technological approaches. (add evidences from weekly workshop team activities, weekly seminar reflections, assessments)

a. Contributed to team meetings

i. I attended the group meetings and worked on tasks with my other group members.

b. Engaged with facilitator meetings

i. I attended the online lectures and listened to the presentations given by the facilitator.

c. Proficient in verbal communication, both presentations and conversation

i. I would frequently give feedback in virtual calls and in person to help my teammates.

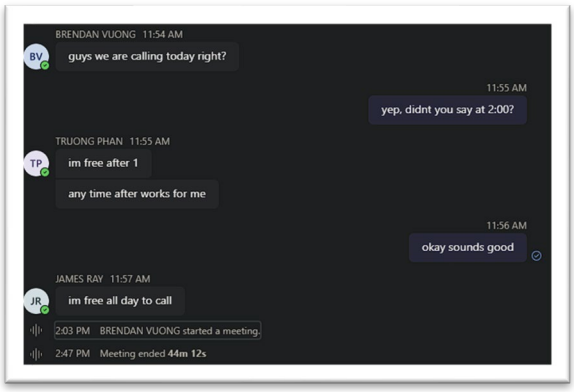


Figure [12] – Team meeting organisation evidence

d. Proficient in written communication, both reports and online interaction

i. I would also write to team members to provide feedback on their tasks and help them.

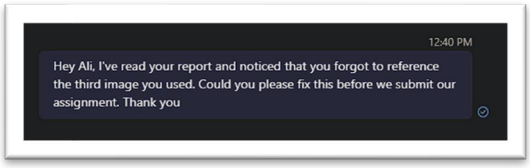


Figure [13] – Written feedback evidence

e. Made use of other tools (e.g., online brainstorming tools) to interact with others

i. My group used a brainstorming whiteboard tool to plan tasks and gather our thoughts.

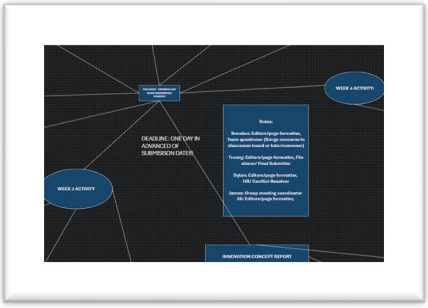


Figure [11] – Task planning evidence

6. Appreciate emerging technologies in a local, global and sustainable context (add evidences from weekly workshop team activities, weekly seminar reflections, assessments)
    a. **Considered a culturally appropriate design idea**
        i. The one of the most appropriate design ideas we thought of is design idea 1. That is because it focuses on installing water filters that only need replacing every 18-25 months, making it very cost effective and easy to maintain.
    b. **Explored sustainable livelihoods in relation to the design idea**
        i. Design idea 1 helps to maintain a sustainable livelihood because it is relatively cheap, is very effective at filtering water, it only needs replacing every 18-25 months, so it requires very low maintenance and is simple to implement.

Final word count: 2856

References:

[1] Yarrabah Aboriginal Shire Council. (2023). Yarrabah Aboriginal Shire Council Annual Report 2022 -2023. https://www.yarrabah.qld.gov.au/wp-content/uploads/2024/01/YASC_ANNUAL_REPORT_2023-FINAL.pdf

[2] QLD Government. (n.d.-a). *Community*. Yarrabah Aboriginal Shire Council. https://www.yarrabah.qld.gov.au/community/

[3] Yarrabah Aboriginal Council. (2016). *Drinking water quality management plan*. Trove. https://nla.gov.au/nla.obj-1203473299/view

[4] QLD Government. (2023, June 7). Lead detected in water at Yarrabah educational facilities. Queensland Health. https://www.health.qld.gov.au/newsroom/doh-media-releases/lead-detected-in-water-at-yarrabah-educational-facilities

[5] QLD Government. (n.d.-b). Torres Strait and Cape York Regional Drought Resilience Plan 2022-2030 Torres Strait and Cape York. https://www.agriculture.gov.au/sites/default/files/documents/torres-straight-cape-york-rdrp.pdf

Images:

Figure [1] Rodwell, D. (2024a). Minions Group design idea justification rating graph. In *Minions Presentation*.

Figure [2] Rodwell, D. (2024b). Team meeting planning evidence. In *Microsoft Teams*.

Figure [3] Ray, J. (2024a). In person meetings evidence.

Figure [4] Rodwell, D. (2024c). Design ideas submission. In *Canvas*.

Figure [5] Rodwell, D. (2024d). Innovation concept report submission. In *Canvas*.

Figure [6] Rodwell, D. (2024e). Final presentation submission. In *Canvas*.

Figure [7] Rodwell, D. (2024f). Township evidence. In *Week 3 Work Minions*.

Figure [8] Rodwell, D. (2024g). Team problem evidence. In *Week 4 Workshop Task Minions*.

Figure [9.1] Rodwell, D. (2024h). Design idea evidence part 1. In *Week 5 Activities Minions*.

Figure [9.2] Rodwell, D. (2024i). Design idea evidence part 2. In *Week 5 Activities Minions*.

Figure [9.3] Rodwell, D. (2024j). Design idea diagram evidence. In *Week 5 Activities Minions*.

Figure [10] Rodwell, D. (2024k). Design justification scoresheet.

Figure [11] Rodwell, D. (2024k). Task planning evidence. In whiteboard.office.com

Figure [12] Rodwell, D. (2024k). Team meeting organisation evidence. In *Microsoft Teams*.

Figure [13] Rodwell, D. (2024k). Written feedback evidence. In *Microsoft Teams*.