School of Science, Computing and Engineering Technologies

SWINBURNE UNIVERSITY OF TECHNOLOGY

COS10025

Technology in an Indigenous Context Project

Final project reflection report

Project Title: Jigalong's vital waters: Contamination, Culture, and the urgence of Sustainable solutions

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Acknowledgement of Country

I acknowledge the Traditional Owners of the land on which we are meeting. I pay my respects to their Elders, past and present, and the Aboriginal Elders of other communities who may be here today.

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: 

Part A:

Introduction (Project Description)

There are about 400 people living in Jigalong, a rural town in Western Australia's vast and desert landscapes. The majority of these people are Indigenous Australians, including the Martu people. The residents' quality of life has been greatly impacted by the serious and ongoing problem of water contamination in this town. It is essential for everyone to have access to clean, safe drinking water, and the Jigalong water contamination problem calls for quick action and creative solutions.

This project reflection report aims to give a thorough account of our endeavors to tackle the urgent issue of water contamination in Jigalong. The primary goals of our initiative, its difficulties, and the tactics we used will be emphasized, bringing to light the pressing problems the community faces.

Our main project objectives were to include the community, carry out in-depth research, and develop workable, locally-tailored solutions to address water contamination. Our approach's guiding principles included cost, sustainability, and community involvement because we knew they were crucial elements in solving this urgent problem.

We hope to learn more about the nuances of water contamination in isolated areas like Jigalong by thinking back on our experiences and difficulties. We intend to add significant insights to the larger conversation on creating affordable and long-lasting solutions for communities dealing with comparable problems with water quality by examining the goals, approaches, difficulties, and results of our project. This will ultimately improve the lives and well-being of the people who live in Jigalong.

Recommended option to proceed

Through a series of meetings and discussions, our research comprised a thorough examination of viable solutions to solve the pressing issue of water contamination in Jigalong. Similar to the Pormpuraaw energy crisis, we understood the gravity and importance of finding a solution to Jigalong's water contamination issue and worked to develop creative, practical, and community-tailored solutions that would honor the particular requirements of the local populace.

We came up with six distinct ideas to address the issue of water contamination:

- Biological denitrification system
- Reverse osmosis
- Ion Exchange
- Ultra Filteration
- Electrocoagulation
- Bio char

As needed, we had to choose four of the fice solutions. Thus, we had to eliminate four concepts based on how productive and effective they were. The following is a list of the solutions that worked out.

Biological Denitrification System: Using a Biological Denitrification System is the best way to address Jigalong's water contamination problem. This method is very cost-effective and environmentally friendly since it uses the power of naturally occurring microorganisms to remove nitrate pollutants from the water.

Ultrafiltration: Ultrafiltration is a dependable water treatment method that comes in second in appropriateness. By efficiently eliminating a variety of impurities, such as bacteria, suspended

particles, and even viruses, this system guarantees that the community will receive clean, safe drinking water.

Ion Exchange: The third best option is Ion Exchange. This method drastically lowers the nitrate levels in the water by swapping out hazardous ions for less damaging ones. It may require moderate upkeep and incur moderate costs, despite its effectiveness.

Electrocoagulation: With an appropriateness rating of 4, electrocoagulation is a viable alternative. Through the use of electrical charges, pollutants are coagulated and eliminated, providing a sustainable method of water treatment. It might, however, require some maintenance and running expenses.

Biochar: Although a useful strategy, biochar comes in fifth place for appropriateness. Although it can help remove impurities and enhance the quality of the water, small communities may find it less cost-effective to install if it requires a large quantity of energy and organic material.

Reverse osmosis: Considered the least feasible option, this method is costly to operate and maintain, making it unsuitable for the particular requirements of the Jigalong village. Although efficient in eliminating contaminants, this approach is not the most economical way to address the problem of contaminated water.

Part B: Project reflection

Group Work Reflection

1. Describe the group work strategies/processes that worked for your team.
    - Roles and Responsibilities Allocation: Each group member has a certain function that must be fulfilled for the project's duties to be completed successfully. For example, group leader Madith were assigned to turn in the project's finished documents and me for weekly meetings.
    - Task Distribution & Allocation: A document, such a report, is divided into smaller tasks and assigned to the group members.
    - Collaborative decision-making: Out of five design concepts, participants had to select four for the final tasks. Thus, in that situation, collaborative decision making proved to be an effective tactic.
2. Describe the group work strategies/processes that did not work for your team.
    - Language barrier: All my teammates were Indians, on weekly meetings and workshops they communicate with their own language (Hindi). So sometimes I couldn’t get what they say. It was the major problem I faced.
    - Time management: Even though the tasks were assigned, several members found it difficult to manage their time, as seen by their failure to finish their assignments by the deadline.
    - Limited Peer Review and Feedback: The members were unable to set aside enough time for peer review and feedback on individual work because of time restraints and conflicting priorities. This meant that some mistakes or inconsistencies remained hidden until much later in the project.
    - Poor Contingency Planning: Throughout the project, we ran into unanticipated problems and roadblocks that caused us to deviate from our initial schedule. Unfortunately, we were not prepared for these unforeseen events and had clear contingency measures.
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.

- Making a good team: Making a team with different nationalities will be a good experience on next time. And I believe it will generate different opinions from different viewpoints.
- Improving Time Management Skills: To boost output and successfully fulfill project deadlines, time management skills need to be enhanced. This entails setting precise deadlines, creating workable schedules, and giving each assignment enough time.
- Actively seeking and incorporating feedback: It is essential for improving oneself and one's projects. In future group initiatives, members promise to actively seek feedback from other team members on both individual work and the project.
- Taking the Lead and Exceeding Goals: We understand that in order to bring value to the project, it is imperative that we take the lead and exceed expectations on all tasks that are allocated. The group intends to push each member to proactively find areas in which they can do more in future initiatives, such as carrying out additional research, making creative suggestions, or helping out colleagues when necessary.

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 - In a group setting Madith performed well in managing the team. Madith oversaw every task and instructed the group members to complete their assignments on time.
    b. Meetings – In the meetings I have created Microsoft Teams meeting every week and note everything which they suggest.
    c. Delivery of the project design ideas – Mohomad performed an excellent job in delivering the project design ideas. Mohomad was able to flawlessly execute every design concept from the beginning to the end.
    d. Delivery of the Innovation concept - Madith once again performed well when it came to the innovation concept. Madith has successfully developed an innovative notion that is flawlessly demonstrable.
    e. Delivery of the final presentation - Anushka has done an excellent job delivering the final presentation. Anushka did a fantastic job of illustrating his design concept.

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:
          This was the most difficult stance for us to adopt. I was interested in solving the Pormpuraaw township's electrical issue from the moment I began to study this unit. I've learned more, but regrettably, teammates want to work on a shared issue that other groups have already addressed. Following that, we arrived to address the Jigalong water contamination issue.
        - Phase 2 – Develop design ideas, Use design criteria to make standard design ideas, Analysing the benefits, impacts of each design idea:
          I took an active position in Phase 2's design concept development, concentrating on Electrocoagulation as a potential remedy for Jigalong's water contamination issue. I investigated the visibility and advantages of installing electrocoagulation units in the community through in depth study and teamwork.

I tried to hone the Electrocoagulation design concept into a standardized proposal by using design criteria including affordability, scalability, and environmental impact. I examined its possible advantages of this design idea.

I used case studies, research papers, and expert comments to substantiate my study of the benefits of solar thermal energy, including its capacity to provide heat and electricity for a range of uses.

I also evaluated possible obstacles like the availability of appropriate land and the infrastructure needed for execution. My efforts led to a thorough comprehension of Jigalong's benefit from the electrocoagulation design concept. I shared the design idea evaluation spreadsheet with the team throughout meetings and discussions, where I recorded my findings.

- Phase 3 – Desing justification (using score sheets) by scoring the six guidelines:

  I evaluated how well the design concept complied with the cultural values and customs of the Jigalong community in order to give them priority access to clean water. This required taking into account how the chosen technology would affect every member of the community and making sure that everyone would benefit from improvements in water quality, regardless of their personal circumstances.

  The design concept's safety and health implications underwent a thorough assessment. I looked at how the technology may be used to offer safe and clean drinking water while also detecting and reducing any possible health hazards that might arise from its use. The community's welfare was given first priority, and health risks were kept to a minimum in the design idea.

  The suitability of the design concept was led by a thorough understanding of the particular requirements and difficulties faced by the Jigalong community. The plan was supported by the examination of regional circumstances, resource availability, and community preferences. Furthermore, cultural relevance was a primary consideration to make sure the selected technology complemented the values and lifestyle of the community. Together, these evaluations sought to offer a solution that is both practical and profoundly respectful of the community's history and identity.

- Phase 4 – Analysing design average score sheets and improvising design ideas:

  I oversaw examining the average score sheets for the electrocoagulation design concept during Phase 4. I carried out an extensive analysis of the outcomes by figuring out the average scores that the team assigned for each of the different criteria. This analysis shed light on the advantages and disadvantages of the electrocoagulation concept.

  Engaging in active collaboration with the team, I made suggestions for improvisations meant to improve the design concept during brainstorming sessions. We discussed in depth potential changes and enhancements to solve any flaws found and optimize the advantages of the Jigalong water contamination issue.

- Contributions to the group
  - Describe how your efforts contributed to the whole group:

I made a substantial contribution to the team's overall work. My study and presentation set the foundation for understanding the community's water crisis. It was my duty to oversee the creation of practical and real design concepts and to assess the advantages and disadvantages of each. I also worked with others to improve design concepts and contributed to the study of average score sheets. Throughout the project, I actively participated in conversations, shared ideas, and gave my teammates helpful feedback.

- Describe how you were involved in the teamwork environment:
  By contributing to group discussions, exchanging ideas, and working with others, I actively engaged in collaboration. I kept lines of communication open and helped create a friendly atmosphere. I aggressively sought out the opinions and suggestions of my team members while working with them on their assignments. I actively participated in the teamwork environment to make sure that the group patterns were productive and that everyone's contributions were valued.

- 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):
    Finally, I am pleased with our success in creating culturally relevant remedies for Jigalong's water contamination issue. One design concept that works well in the cultural setting is the integration of electrocoagulation with conventional architectural components. This design proposal recognizes and preserves the community's cultural legacy in addition to meeting energy requirements.
  - Recommend how you could further improve your design ideas within a team environment:
    In a collaborative setting, I propose incorporating further community feedback and involvement to enhance our design concepts even more.
    To make sure that design solutions are long-lasting, culturally respectful, and fulfill the unique demands of Jigalong, this could entail getting input from local authorities, specialists, and community members. In addition, regular updates on progress, utilizing team members' specific skills, and transparent and efficient communication will all help to enhance the project as a whole and successfully implement the design concepts.

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:
      Indigenous groups have gathered knowledge over many generations that offers a distinctive and useful perspective on the world. It includes a deep-rooted bond between people and the land they live on, as well as cultural beliefs, thorough environmental knowledge, and efficient resource-harvesting techniques.
   b. Ensure the project was undertaken in accordance with locating Indigenous knowledge systems (Technologies):
      We must acknowledge them and work in partnership with the Indigenous communities as we undertake this project. In terms of information transmission from generation to generation, communities typically use oral histories and storytelling techniques, as illustrated in the slides. Academic studies and research papers are available for consultation when it comes to locating the

expertise. We have access to scholarly research on technology aspects through them.

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, assessments)
    a. Brainstorming the importance of Indigenous knowledge systems:
    The significance of merging Indigenous and Western knowledge systems to handle complicated problems like water pollution is emphasized during weekly seminars. While Western knowledge systems provide scientific rigor and cutting-edge technology, indigenous knowledge systems, firmly entrenched in land and culture, offer a deeper grasp of regional ecosystems and sustainable practices. Effective, socially and culturally acceptable, and ecologically friendly solutions may result from this harmonic confluence.
    b. Understanding the Indigenous knowledge systems and uniting with Western knowledge systems:
    The fusion of Western and indigenous knowledge systems promotes a harmonious fusion of innovation and tradition. Whereas Western knowledge gives cutting-edge technologies and scientific rigor, Indigenous knowledge offers a comprehensive grasp of the environment. This confluence guarantees culturally appropriate, long-lasting solutions for a brighter future while honouring tradition and fostering creativity.
    c. Understanding and applying correct use of terminologies:
    The project aims to enhance understanding of Indigenous communities by ensuring the correct use of terminologies, promoting clarity and precision in communication with the community, and aligning our language with their culturally respectful and technically accurate knowledge systems.

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:
    During our weekly team workshops, we devoted particular sessions to analysing the requirements, issues, and services unique to the isolated Indigenous township of Jigalong. We had conversations, carried out a lot of research, and asked professionals and community members for their opinions. We were able to recognize the specific requirements and modify our design concepts by comprehending the unique circumstances and context of the community. In our weekly seminar reflections, we critically examined the issues that isolated Indigenous people confront as well as the effects of incorporating modern technology. We looked at the infrastructure limitations, cultural variables, and socioeconomic factors that affect the uptake and sustainability of technological solutions. By include Indigenous histories, worldviews, viewpoints, and cultures into our study, we made sure that our approach was comprehensive and respectful to them.
    b. Explore user access, affordability, appropriateness in relation to the design ideas:
    The project focused on designing solutions within the Indigenous context, ensuring user access, affordability, and suitableness. By considering the unique needs and abilities of the community members, we aimed to create

sustainable and culturally appropriate solutions. We assessed the feasibility and practicality of these ideas, considering factors such as cost, scalability, and cultural appropriateness. We investigated emerging technologies that aligned with the values and aspirations of the local population, conducting cost-benefit analyses to determine the affordability and future viability of the proposed solutions. Through weekly workshops, seminars, and assessments, we demonstrated our commitment to addressing the unique challenges, needs, and services specific to the remote Indigenous community, ensuring user access, affordability, and suitability in relation to our design ideas.

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 participated actively in workshops, team meetings, and facilitator meetings throughout the project, as shown by my attendance and team communication logs. I regularly attended these meetings to hear about project updates, talk about progress, and resolve any issues or problems that came up. My active participation in these sessions helped foster productive cooperation and conversation.
    b. Assisted in planning for the team:
    I had a significant role in the group's preparation. I took an active part in the talks on the goals, targets, and schedule of the project. I offered important direction and recommendations during the writing process, which helped to produce a thorough draught plan. My active participation in the planning phase made sure that our team had clear guidelines and expectations for the project's successful completion.
    c. Delivered work on time for the team:
    I constantly turned in my allotted task on time, acting with integrity and professionalism. It is clear from the weekly seminar thoughts, evaluations, and team communications that I kept my word and carried out my team duties. I increased the team's overall productivity and upheld my feeling of dependability and accountability by submitting assignments on schedule.

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 regularly participated in team meetings throughout our project, showcasing my dedication to clear communication with stakeholders and the group as a whole. During these sessions, I provided updates, progress reports, and insights, encouraging a cooperative atmosphere where tactics and ideas could be discussed. I contributed to making sure that everyone understood the project's goals and that our actions were in line with our common vision by having polite and open talks. These contributions demonstrated my commitment to open and effective communication techniques and were visible in our weekly workshop team activities, seminar reflections, and evaluations.
    b. Engaged with facilitator meetings:
    Facilitator meetings were crucial for our project's success, as they allowed us to share progress, challenges, and objectives. These meetings provided valuable guidance, refined strategies, and benefited from the expertise of experienced facilitators. The weekly workshop team activities and seminar

reflections emphasized our commitment to seeking expert insights to enhance our project's quality and outcomes.

c. Proficient in verbal communication, both presentations and conversation:
My excellent verbal communication abilities have been very helpful to our project, as I have been able to communicate goals, conclusions, and tactics to stakeholders and the team in meetings. As shown by our seminar comments and assessments, this competency has improved our capacity to convey the project's significance to stakeholders and the larger community, highlighting my commitment to effective communication for project success.

d. Proficient in written communication, both reports and online interaction:
My ability to write well has greatly improved the documentation and teamwork for the project, especially when it comes to comprehensive reports. These reports guarantee openness and promote a constructive work atmosphere by giving a concise summary of the project's progress, conclusions, and suggestions. Email exchanges and other internet encounters I've had have been really helpful to this process.

e. Made use of other tools (e.g., online brainstorming tools) to interact with others:
The author improved teamwork and stakeholder engagement by leveraging online brainstorming tools. Real-time meetings, idea exchanges, and the investigation of creative solutions were made possible by these instruments. Effective concept capture and documentation were made possible by this dynamic and effective technique. The author's dedication to technology enables effective communication throughout the project, as demonstrated by the team's actions and weekly seminar remarks.

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:
During our weekly team meetings, we dedicated a considerable amount of time to discussing culturally acceptable design concepts. Our goal was to incorporate Indigenous viewpoints, customs, and knowledge systems into our design concepts to provide solutions that were both culturally significant and pertinent.
In our seminar reflections, we spoke about how crucial it is for developing technologies to be culturally suitable. We examined case studies and project examples that effectively integrated cultural components into their designs, as well as the effects that culturally suitable solutions have on sustainability, acceptance, and community involvement.
By including these factors into our project, we also showed our dedication to recognizing new technology in a local context that respects and maintains cultural heritage.

b. Explored sustainable livelihoods in relation to the design idea:
Throughout the project, we extensively investigated the subject of sustainable livelihoods in connection to our design concepts. We understood that the community's long-term resilience and well-being should be enhanced by the adoption of innovative technology, in addition to meeting its urgent needs. We considered the environmental, social, and economic aspects of sustainability in our evaluations and conversations.
To improve communal livelihoods in a sustainable way, design concepts are crucial. These concepts may have positive effects on the economy, the environment, and the ability to create jobs. Through the integration of

sustainable livelihood concepts, our goal is to attain self-sufficiency and community empowerment. We examined new technologies and how they may support sustainable development in our seminar thoughts. In order to show our respect for global advances and their promise for a more sustainable future, we investigated the Sustainable Development Goals of the United Nations and how our design principles connected with them.