School of Science, Computing and Engineering Technologies

COS10025 Technology in an Indigenous Context Project

Business Case and Project reflection report

Project Title: Digital Connectivity Infrastructure for Remote Indigenous Communications

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Date: 02 November 2022

Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

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: Kayes

Part A: Business case

Executive Summary

A small town with a 40-kilometre size, Bamaga is located in the northern part of Queensland, Australia. It is a region of NPA with a population of approximately 1164. There are 20% of them. The Bamaga Township was relocated to its current location in 1947 because the original inhabitants need a larger source of fresh water.

There were 1,164 people living in Bamakga as of the 2016 census, and 957 (82.4%) of them self-identified as being of Aboriginal or Torres Strait Islander descent. Currently, there are around 75% Islanders and 20% Aboriginal people living there.

This whole project is about indigenous people in Australia and their lifestyle. Well, this project basically focused on their problems with telecommunication including basic needs education , wellbeing, hospital facilities etc. Firstly, We find out all the problems that are related with remote telecommunication systems and then we move on that what could be the solutions and find out what are the actual solutions. And we figured out working with our team mates.

Introduction (Project Description & Motivation)

The obsolete telecommunications in Bamaga, Cape York, prevent residents from using the internet and its associated services for communication, education, and well-being.

This project's main objective is to suggest a cost-effective solution to Bamaga's poor telecommunications infrastructure. Governments have in the past found it to be prohibitively expensive to provide modern telecommunication services to outlying areas, putting isolated villages like Bamaga far behind in technology and shielding them from the advantages that come with it.

 As a result, a cheap solution must be put up to pique key stakeholders' interest in funding the project. To make sure it is the greatest solution and enhances the community's quality of life as much as possible, the solution must also be appealing to the end user: the residents of Bamaga.

The ideal answer for the Bamaga town residents must take into account their needs. The guiding concepts for telecommunications were immediately applied to our demands;

they are as followed:

● Access & Equity

 ● Health & Safety

 ● Appropriateness

● Affordability

 ● Environmental Health

● Sustainable Livelihoods

The adoption and efficacy of communication technologies and services can be greatly impacted by a wide range of factors. The goal of this research is to examine the difficulties that isolated Indigenous communities in Australia are now facing, as well as their needs for communication technology and service.

Summary of project budget (all design ideas)

Disaster Awareness

Router - $25,000

Satellite Dish - $100,000

CAT-6 Ethernet Cable - $4,500

Power Adapter - $5,500

Installation / Maintenance - $0

Total(+10%) - $148,500

Health

4G compatible Antenna	- $66,000
CAT-6 cables	- $4,500
Router	- $45,00
Installation / Maintenance	- $35,000
Internet Monthly	- $59.95
Total	- $165,550

Affordability & Current Infrastructure

Free standing communication tower (6m)	- $16,280.00
Long Range Internet Satellite(1.2 – 1.5km)	- $12,000.00
Cabling & Power Connections	- $1,000.00
Labour Costs	- $1,000
Modem	- $200
Total	- $30,280

Network Management

NICs	- $450
Server	- $300
Station	- $8000
HUB	- $2000
Switch	- $300
Router	- $1000.00
Connector	- $100
Total	- $12,150

Education

Computers & Projectors	- $184,505.70 & $2,899.00
Router & Cloud Server	- $307.40 & $2,931.00
LAN	- $2,949.00
Cabling & Power Connections	- $1,000.00
Internet Satellite & Tower	- $9,998.00
Installation/Maintenance Costs	- $4,000.00
Total	- $208,590.10

All The Costs	Total
Labour Costs	$10,000
Component / device costs	$456,219
Installation/ Implementations costs	$39,000
Monthly Internet Costs	$60
Total (15%) -	**$505,279**

In our group we worked on 5 different problems and each problem has different budgeting and in this section first I tried to show all the budgeting and then we have come up with the total cost of the whole project. It also includes labour costs , component / devices costs, installation costs etc. I tried my best to show the best estimate cost for the project.

Recommended option to proceed

Since our Township is Bamaga , we carefully researched through the internet and the resources that are on the canvas and we tried our best to find the best solutions of those problems and I believe , we found the best solution for those problems which is also budget friendly. In this whole journey internet was the best helpful tools and the best resources in it. We along with our group mates worked thoroughly to figure out the best solutions of these problems.

Now I will go through all the major problems that we found in Bamaga,

❏ Disaster Awareness

❏ Health

❏ Current Telecommunication and Affordability

❏ Network Management

❏ Education

Among all these problems , I think health is the very important one cause it's above all. In my opinion anyone will first focus on this Health sector. Cause it's one of the vital part of human rights. Aboriginal people in Bamaga may readily access health applications, make online reservations, and stay informed about their physical and mental health thanks to the area's robust and extensive Internet connectivity. Last but not least, if individuals have better access to online learning and study tools via the Internet, their cultural standards will rise and Indigenous students can catch up with their non-Indigenous schoolmates in terms of academic performance. And it is also so important to have a better internet connection in that whole area.

Part B: Project reflection

Group Work Reflection

1. **Group work strategies did work:**

    Well, in our group we are 6 members in total. And they are Shreeya Shrestha, Elijah Roberts, Kayes Ahmed Koushik, Md Nahid Tanjum, James Kojdovski,Moriom Rahman. We basically communicate through Discord app. Everyone shared their ideas ,thoughts everything about the project in that platform, we supported and respected each others idea. Actually discord the platform where we all group mates communicate each other.

2. **Group work strategies did not work:**

    When it comes to team work there is always something that is not gonna work and that's also happened with us as well.However, it didn't really affect in our group work and somehow figured out all the problems solutions and special thanks to our team member James cause he did really great work in our team. Shreeya also helps us to organise google docx where we kept all our ideas and information about the project.

3. **what could be improved on next time:**

    There are a lot hings to improve. Well, we didn't really attend any face to face meeting with just us instead of that we figured out by chatting in discord and I think it's needed to improve in the next group project cause that way group work would be very effective in my opinion actually. And also we messed up in the presentation part cause we didn't maintain the time that we needed. That's one of most important thing when it comes to public speaking it needs to practise along with groupmates that we didn't. Ans so we faced that problem.So , at least I will highly focus on this thing in the next group project.

4. **Event/action in your team:**

    Team organisation:

    a. **Meetings:**

        We didn't really attend any face to face group meeting but we did attend all the workshops and that was actually our face to face group meeting.That worked really but I would like to arrange face to group meeting among our group mates.

    b. **Delivery of the project design ideas/budget:**

        Disaster Awareness, which falls under the guiding principle of health and safety in telecommunication, is the learning topic I am addressing. Lack of timely access to warnings about weather, natural disasters, and health issues like pandemics is referred to as disaster awareness (COVID-19). Considering

where the community located, missing these messages could have serious consequences.

I had to think about design specifications, such as the necessary hardware and software, as I was coming up with this solution. According to the three-level hierarchical paradigm, satellite connectivity is a Level 3 - Core Layer. The core layer, which controls the transit from the uplink to the end user, is referred to as the network's backbone.

The actual hardware used in this solution will be this. Although satellites are initially expensive, as stated below 4 under affordability, the typical pay in Bamaga is substantial, allowing for expenses like these to be tailored for. As a result, factors like cost will need to be taken into consideration.

There is less room for optical fibre connections because of how far rural areas are from urban areas. Establishing a fixed wireless network throughout the city is one potential design concept. Using radio waves, a fixed wireless connection enables a location to access the internet.
The fixed wireless link is suitable for the town of Bamaga because it rejects the use of optical fibre and satellites and provides effective bandwidth and low latency to the general public at an affordable price.

The Bamaga people take in a pleasant living as a whole. In comparison to the rest of Australia, Bamaga residents currently pay less than half as much in weekly rent—a median of $120 per week vs a national average of $300. In 2021, the Australian Bureau of Statistics Their household's median weekly income is $1630. Although these workers are paid well, it is not feasible to use high-speed, contemporary technology in such a remote area due to the huge costs involved.

c. Delivery of the Innovation concept :

d. Delivery of the final presentation:

In my opinion our final presentation was not that good. Cause my team finished the presentation on time since the ideas were presented clearly and briefly. Some team members, however, struggled to maintain constant eye contact with the audience and frequently read from slides.

Individual Work Reflection

- **Project tasks**

Phase 1 – Problem identification and identifying learning issue:

In this part, I discussed about the current telecommunication systems of Bamaga, environmental health and what are the issues with the people of Bamaga.

1. There is no redundancy in case of breakage or other outages due to other circumstances, and there is just one Telstra fibre optic cable that connects Cairns to the Torres Strait. In the past, communication services in the upper part of Cape York and the Torres Strait were inaccessible for weeks due to rat damage to the fibre line.
2. Telstra has not responded to Cape York Weekly or provided any justifications to the people as to why it continually performs poorly in the region.
3. The owners of a remote roadhouse in Cape York are upgrading a fatal blackspot using their own technology and investing tens of thousands of dollars in order to get mobile reception.
They claim that they are without internet service throughout cyclone season.
4. In Queensland's far north, on Cape York Peninsula, mining, overuse, and contamination of streams, as well as clearing land for pastoralism, which frequently entails burning, pose dangers to the region (Ockwell and Rydin 2006, Schneiders 2006).

Phase 2 – Develop design ideas using diagrammatic tools:
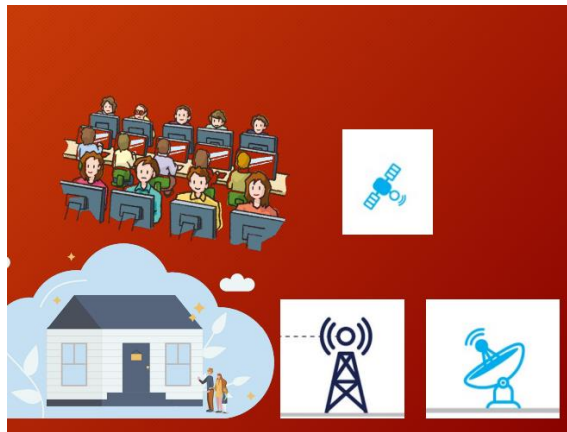
For this project design I used these devices found very useful and workable right down below. Here is the 3 layer network architecture:

- LAN (accumulation of all devices)
- Router (distribution layer)
- Cloud Server (core layer)
- Connection to Internet (wireless - access layer)
- Network Tower (core & distribution layers)
- Computers (end devices)
- Projectors (end devices)
- Satellite (core & distribution layer)

Phase 3 – Estimation of cost (budgeting):

Here is the estimation of cost which is budgeting of the project that I designed right down below,

Devices/Components	No. of Units	Cost/Unit	Total Cost
Computers & Projectors	15 & 1	$12,300.38 & $2,899.00	$184,505.70 & $2,899.00
Router & Cloud Server	2 & 1	$153.70 & 2,931.00	$307.40 & $2,931.00
LAN	2	$1,474.50	$2,949.00
Cabling & Power Connections	1	$1000.00	$1,000.00
Internet Satellite & Tower	2	$4,999.00	$9,998.00
Installation/Maintenance Costs	Estimate per household	$80.00	$4,000.00
Total			= $208,590.10

Phase4 –

- Since, free high-speed internet access is something we offer, and we also keep things secure.18, they may utilise it to its fullest potential and make the most of it in their daily lives technology.
- We can increase locals' understanding of health and safety issues by offering free internet access in Bamaga.
- We did our best to meet all the criteria and needs for the project, and we hope that the design idea we are providing will cover everything, especially from the perspective of education. This project is primarily for the people of Bamaga.
- The equipment and hardwired that we are going to utilise for this project are very cost-effective and easy to use.
- We took steps to ensure that this project won't use fewer materials that have an adverse impact on the environment.

• **Contributions to the group:**

Like everyone else I did my best to contribute towards my group. From the beginning I tried to attend every workshop and group conversations and delivery process. I co-operate with everyone single member in my group.
And they also co-operated with me very well. It was a really amazing journey with them and in future I really would like work with them again.

• **Conclusion and recommendation:**

In conclusion, for me it was really amazing learning with the team . And each an everyone has contributed to the project their best effort and has worked well with others, there are still certain shortcomings as always when it comes to group work in terms of participation cause we practise along with our team members.
The extensive installation of Internet towers and the use of servers are the results that have allowed us to complete our project. They are the one of the most important project design principles and the primary techniques for digital connectivity and infrastructure.

We should incorporate more remote connections components and establish a more consistent connection to telecommunication in each of our design ideas if we want to improve them. Instead, than merely discussing software measures, every member's article should discuss Internet deployment.

Part C: Unit Learning Outcomes (ULOs)

1. Locate Indigenous knowledge systems and consider how they story the long history of technology, science, and engineering.

    a. Indigenous or, Torres Strait Islander people, their communities, and their organisations and companies value indigenous knowledge as a valuable resource. Indigenous knowledge can reveal and pinpoint a community's history, cultural identity, and moral principles.

    b. According to our vision, culture will continue to play a significant role in our lives both now and in the future, with people constituting the core of our area. Our culture will remain strong and the future will be directed by those who live in the region, understand it, and value its distinctive traits if we give our people the freedom to participate in and make decisions about their own destiny.

2. Explain the importance of, and find opportunities to, respectfully converge Western knowledge systems with Indigenous knowledge systems.

    a. Indigenous wisdom offers local groups, especially the underprivileged, problem-solving techniques. Indigenous knowledge is a significant part of the global knowledge base about development concerns. Indigenous knowledge is a resource that is underutilised in the process of development.

    b. Through the course of human history, several cultures from throughout the globe have evolved distinct perspectives on nature. Indigenous people use many of them to comprehend and interpret their biophysical environment, and many of them are based on traditional systems of religion (Iaccarino, 2003). Many indigenous groups' cultural identities and social cohesion are inextricably linked to these environmental management strategies.

    c. Australia is home to a variety of Aboriginal and Torres Strait Islander cultures and identities. Always ask the preferences and conventions surrounding appropriate language from the Aboriginal and Torres Strait Islander population in your local school or early learning service.

3. Function as an effective team member using project management tools and demonstrating professionalism and ethical behaviour.
    a. I along with my team mates attented all the group meetings during workshops and discussed thoroughly .
    b. Team leader's responsibilities include allocating tasks to each team member and providing an overall strategy for the team's assignments. To help the team plan, additional members must participate in meetings and constantly voice their opinions.Delivered work on time for the team

4. Communicate within teams, stakeholders using appropriate verbal, written, and technological approaches.

- Reference books and news articles (information gathering)

- Make wise judgements (gaps in knowledge)

- Clarify any misconceptions with the facilitator (authenticity)

- Select and use a systematic design approach (such as agile, scrum, or human-centered design).

- Use design software (such as Adobe Illustrators, Lucidchart, etc.) to aid in the selection and development of ideas. Always strive for a solution that puts the community first.

References:

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