ENGD1000

EWB Challenge Report

Digital Mechanisms to Support the Tourist Experience in Holarua
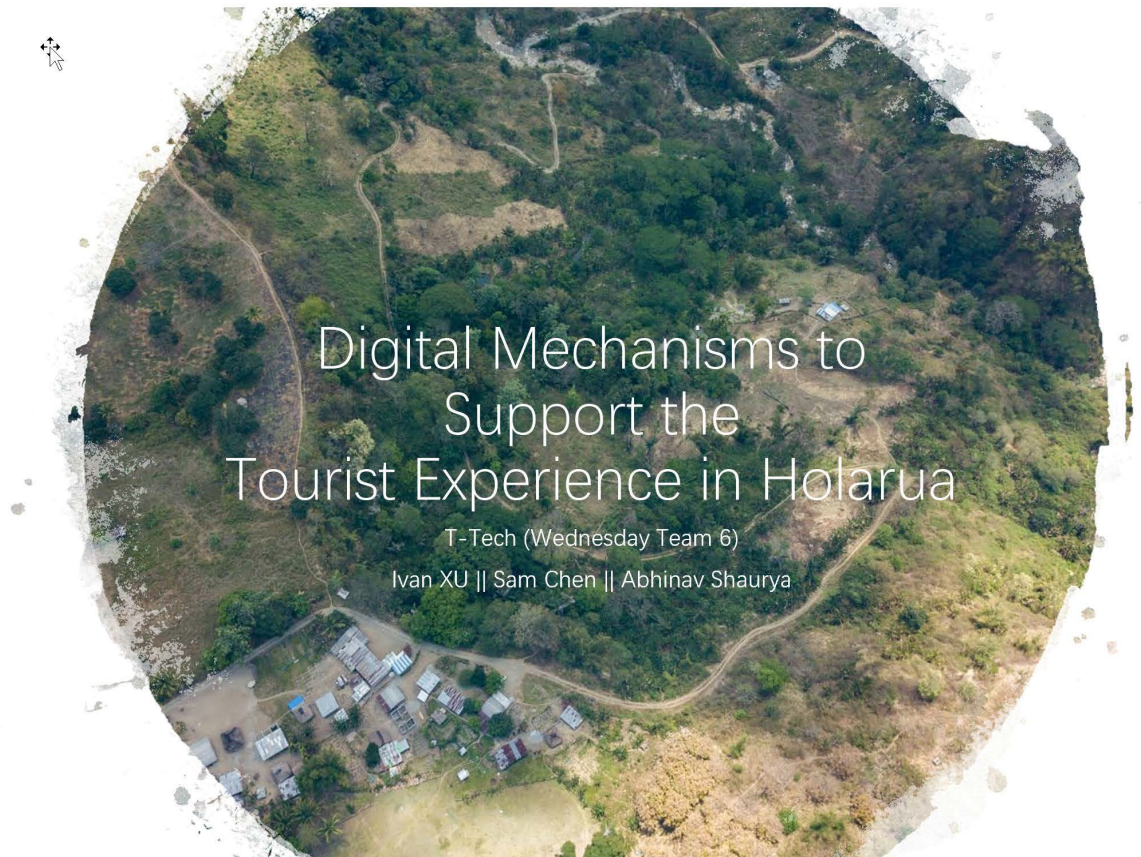
T-Tech (Wednesday Team 6)

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EXECUTIVE SUMMARY

Tourism today is one of the largest industries in the world. The development of tourism plays an important part in shaping up and developing any nation. As calculated by the United Nations in 2015, the tourism industry was growing at a rate of 4.6% and reaching 1,184 million tourist arrivals. It was also said by the United Nations that figures like these are not unbelievable and date back to around 1950. They have also made a rough estimate that by 2030 the tourism industry should see around 2 billion tourist arrivals. Though figures like this look quite stunning they don't account for the fact about those undeveloped places that have very low to almost no tourist attractions.

Suco Holarua in Timor Leste (which is an underdeveloped country) is still struggling in getting up their economy and having a sustainable GDP. Whilst having close to 50% people living there with below-average quality living standards and 20% of the people being unemployed, Timor Leste is in need of some significant economic support so that the people there can at least have a healthy lifestyle which would improve their quality of life.

To develop our project, we had to compare the feasibility of the multiple ways that we could have gone with. We also need to take the cost in account, focus on the project criteria, lookup stats on what tourists are attracted do, look at the pros and cons and most importantly focus on the benefits that it would offer.

We developed an interactive website so we could let tourists know that there exists a place known as Suco Holarua which is magnificent devices and visit worth but is just not in the limelight. And as it is not, it is also very less populous making an even better experience for them. Our project has the potential to not just improve the well-being of people in Suco Holarua by opening a whole new world of job opportunities for them in the tourism industry. Not only that but we are positive that it would also spread from there and would also have an impact on other towns and villages in Timor Leste, which would strengthen the complete tourism industry of Timor Leste.

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1. INTRODUCTION

1.1. Timor Leste

Timor Leste is a country in Maritime Southeast Asia. It comprises the eastern half of the island of Timor, the nearby islands of Atauro and Jaco, and Oecusse, an exclave on the northwestern side of the island surrounded by Indonesian West Timor ("Timor-Leste Geography & Climate", 2019). Australia is the country's southern neighbor, separated by the Timor Sea. Since the 16th century, Timor Leste was under the Portugal rule and was being known as Portuguese Timor. They got their independence from them in 1975 and 9 days later got invaded and occupied by Indonesia. Since then Timor Leste was being ruled and recently got their freedom in 2002 ("East Timor | Geography, History, & Facts", 2019). The country is far behind and very underdeveloped. Most of the development that has been happening in the country since then is mostly by assisted by volunteers, volunteers pertaining from health care fields as well as industrialist managers. Timor Leste having just an area of 15000 sq.km, has a population of about 1.2 million which is growing 3.2% per year. In 2015, gross national income averaged at about US$5080 per capita and gross domestic product growth was about 4% per year. Timor Leste's core economy right now comes from the extraction of oil reserves from the Timor Sea. It accounts for 80% of their GDP and has enabled them to invest in infrastructure, roads, and electricity and healthcare facilities. The conditions among the locals are still pretty disheartening, with close to 20% of people unemployed and almost 40% living under the poverty line. Moreover, Timor Leste has 74% of people from the rural area with the main activities they engage in for finance are fishing, forestry and farming ("Education in Timor-Leste", 2019).

Also, the healthcare facilities are running on a tax-base health system which is causing more trouble for the locals to access them as they are expensive. The country still has trouble getting supplies on time, hire trained health professionals, having an affordable means of transport etc. Everything is interconnected among itself.

As for the climate, Timor-Leste has a hot tropical climate with a dry season, May-November, and a wet season, December-April with the temperatures varying from 25-35 degree Celsius. The winds usually have a wet and cold feel to them as they are coming directly from the seas. Also, it is much cooler at higher elevations in the mountains.

1.2. Evaluation WHAT DOES THIS MEAN FOR OUR PROJECT?

By studying enough about Timor Leste, we can say that Timor Leste is a developing nation which is open to new ideas and is happy to make slight changes if it seems beneficial to the nation or boosts their economy in some sort. But to ensure this, we need to penetrate the mind-set of the local communities and make them consider our project's proposal as our project would be a low-cost simple technique to adapt which would have the potential to become a long-term staple in their country's tourism industry. And as our project involves significant involvement of the locals as well so we have to be careful to assess their take on the change as well. Only when we can make both the locals and the managing authorities agree and ready to adapt to our idea, then only can we be successful.

1.3. Current Challenges

Firstly, we are not going to target the whole of Timor Leste but just a small village named Suco Holarua. So, the main challenge is that when our project launches and gets adapted by Suco Holarua, then not for once should it show a decline in the start. It should come out as strong as we expect it to. Also, even if it is successful at the launch, it should keep continuing to be successful even when the authorities of Suco Holarua have taken over it. The early stages of any project are very crucial. No matter how good the project is, if it fails to make an impact, it would be a complete flop and end would not be adopted by any organization.

Lack of data available – The last ever surveys which have happened in Timor Leste goes back to 2015. There isn't any accurate information available as of now. As far as Suco Holarua goes, there is no specific information available about it as well. Information on different cultural practices that happen there to even the places of history that even exist there. This makes us have to gather a team which would have to physically go there and collect information. Only when we have new and updated information can we be able to plan accordingly.

Education – At the moment not every individual in Timor Leste has access to quality education, let alone Suco Holarua. Due to this the growth in the social, economic, and political development process is quite slow. Though there has been significant progress in the past 5 years by the enrolment rate improving from 67% to 83% in accordance with it, the repetition rates and drop-out rates have been high as well. There is also a language disparity as Timorese speak Portuguese/Tetum as their first language with English being taught at school. But due to Timorese not having access to proper education, there are just a few of them which can speak English. Also, in general, education plays a very important role because if Timorese are well educated then they would also be aware of what's happening around them and would be able to connect better with the tourists.

Unaware of Existence – The main challenge is to get the message through to the people that there is a country known as Timor Leste. As of now, people are not aware of there being a country named as Timor Leste. So, even if they come across its name, they are most likely to disregard it not even giving it another thought. To be able to make tourists aware of this small country and also having to visit would be a very tough task. Honestly, Timor Leste is a beautiful destination to choose for a vacation as its destinations are not exploited by tourism. Everything is in its natural and original form, having amazing natural landscapes and one of the best beaches in South East Asia.

2. A PROFESSIONAL'S ROLE IN GLOBAL SOCIETY

In our society, engineers play a role of making the society in a better level. That is, engineers' design always accommodate the needs of people and address the problems in our daily life. Engineers should be responsible for the thing they are creating, their design always brings impacts on the whole society. They need to carefully make their decision to make sure their design would result in a long-lasting positive influence on society. Usually, a good design would come with both long-term and short-term impacts on the community. With their skills, professors are required to meet the needs of the target community and address the issue. Different countries have different education and scientific levels. That makes professors would come with different designs. Their design should be appropriate on the targeted community and their design should be considered in all social, economic and environmental factors that affect the community. Throughout this report, the role of professionals in society will be evident and carefully evaluated by us.

2.1. Our Perspective

As Engineers, it comes on us to provide sustainable solutions through engineering projects that empower communities to meet their basic human needs and improve the quality of life. Suco Holarua is an underdeveloped country which suffers from a lack of industry other than oil excavation and has economic limitations. Our main focus is on making an economically feasible and a technologically simple project which would have a positive impact on the lifestyle of people of Timor Leste by providing a good source of earning. For people in Timor Leste, our project would be a low-cost simple technique to adapt which would have the potential to become a long-term staple in their country's tourism industry. As our project involves significant involvement of the locals, communities as well as the authorities, so we have to be careful to assess their take on the change as well. In order to ensure that our project is successful, we need to influence the mind-set of the local communities and make them convince our project's proposal attractiveness. Only when we can make both the locals and the managing authorities agree and ready to adapt to our idea, the project would be successful.

2.2. Our Mission

For our project, we have decided to find a solution to boosting up the tourism industry, while also recognizing & uplifting the genuine cultural practice of Suco Holarua and then let people how it is unique in itself. This would not be a one-way process, but instead, we would have a healthy engagement between the locals and the tourists to share their views and experience. We want the communities to engage with each other as that would help us in getting to know how we should improve our designs and adhere to the needs of the community. To gain and understand how past projects played out on implementation we would use the EWB discussions page and would keep interacting with the EWB staff for our research purposes. It is crucial for our project to have a positive impact on the people of Suco Holarua as only then would they truly be able to connect with it and reap the benefits.

As Suco Holarua is still a developing country and also has economic limitations, our main focus is on making an economically feasible and a technologically simple project. It should also mould in with the culture of Suco Holarua and should also not affect their way of life. To achieve this, we are rapidly going through every other project that has been successful in Suco Holarua and then picking out the factors that made it successful. Getting into more detail of the technology used, the functions served, the

benefits reaped and a bit more along those lines. Detailed project analysis and our strategies to fulfil our mission have been laid out further in this report. But a basic goal would be to create a system which would be driven by the locals and would allow them to modify it and use them in a way in which they personally find satisfaction because only then would it be a viable long-term solution and the project would be able to flourish and reach its true potential.

3. PLANNING

3.1. Analysis of Problem – Tourism Industry

Tourism has become a major source of income for a lot of countries, especially those with a young or developing economy. Importance of tourism arises from the numerous benefits and advantages it brings to the whole community. The potential importance of tourism to Timor-Leste has been discussed since before its independence in 2002. Since the tourism sector in Timor-Leste is new, its tourism industry is still in its infancy. And yet, thus far, the visitors have not arrived in large numbers.

Mostly the people who make their way to Timor Leste are there volunteering, for example, Doctors, industrialists. According to the figure, in the March quarter of 2017, Timor-Leste received around 30,000 visitors, up 12.4% on the previous year. This data needs to be taken with a grain of salt – many of these visitors, half of whom were from Indonesia, would have been travelling for business or family purposes rather than tourism as such（ROUGHNEEN, 2018）.

East Timor is also missing out on a potentially lucrative market given that more than a million Australians flew past East Timor to reach Bali, while the first three quarters of 2017 saw only 9,438 Australian arrivals land at Dili's Nicolau Lobato International Airport. One partial explanation for this is likely an image problem. For her 2016 PhD at Swinburne University, Sara Currie surveyed 316 Australians who had never visited Timor-Leste. One, who commented, 'I don't holiday in war zones', conveyed a fairly typical attitude. Also, Victoria McLadey, one who plans to visit East Timor, told her friends in Australia of her plans, she said the typical response was, "It's dangerous, why are you going there?"(Rose, 2019)

Efforts by outside actors to facilitate the development of tourism in Timor-Leste have mostly focused on countering this perception. The nation's official tourist website, set up on behalf of its government by the Australian government-funded Market Development Facility, does an excellent good job of showing what the country has to offer. However, the official tourist website only targets famous places like the capital city Dili, and hence not focusing on rural line at all. Since the tourism of East Timor aims to attract mainly people in developed countries such as China and Australia, it leads to a low chance that tourists from developing countries are attracted because their country has similar lifestyle (Rose, 2019). Hence, it important to also focus on improve the tourism industry level in rural areas.

3.2. Context - Need

Due to the influence of the official Timor-Leste tourist website, most of the tourists heading to Timor-Leste are visiting some of the famous cities, like Dili, Baucau, and Liquica. These cities have tasted the benefits of tourism and make other communities interested in developing their tourism industry too. Suco Holarua is one of them. As a Suco of Subdistrict Same from District Manufahi, Holarua has an area of 58 square kilometers with a population of around 7000. It's living standard is below the country's average level and it is tourism industry is not yet developed, so it requires the benefits of tourism at the current stage. Communities across Suco Holarua have expressed interest in growing their capacity to bring tourists to their communities and flourish their tourism industry, with a focus on locations of historical and cultural importance but are just unable to do it successfully. This is because tourists rarely

truly understand the fact and conditions of these communities due to the lack of informative sources of the basic guide of these areas. So, if we manage to attract tourists to the places that are maintained then the other places would match up with Suco Holurua and work on themselves.

3.3. Targeted Community

Timor Leste achieved its independence from Indonesia in 2002 but internal clashes between security services and groups challenging the government still go on. This further discourages travel to the eastern side of the country by both the Timor Leste and Australian authorities. Like what has been mentioned above, as far as Suco Hularua is concerned, tourists are not encouraged to go there as they know that it is still a developing place and they are also not even aware of the tourist attractions, historical places that are there. Right now, there are roughly 20% of people in Timor Leste that are unemployed ("The World Bank In Timor-Leste", 2019). So, if more tourists come then there would also be a rise in job opportunities in the tourism industry. Now to attract tourists, we need to make clear about the tourist attractions that exist there and to navigate them through those places properly. As Timor Leste is very close to Australia, we would target the Australian travelers in the first stage and later we will launch it globally if it addresses the issue. Right now there are tourist attractions that are not maintained properly just because there aren't people visiting and the communities have stopped paying attention, but if there is tourist activity in those places then tourism would again become popular and the communities would start working on maintaining the tourist spots.

3.4. The Proposal - Our solution

With Concerning the requirement, we propose the implementation of developing digital mechanisms to attract tourist's attentions and support their experience. In our design, the digital mechanism mainly focused on the initial first stage of being introduced to and navigating a new location, how to facilitate immersion in a site of cultural relevance, or other points on the journey of visiting and learning about Suco Holarua.

Since the digital mechanism is required to be used by tourists from other countries, with considering the convenience of this digital mechanism, it could be a mobile phone application, or a website which could be easily accessed by users: either download or browse from their devices respectively.

Firstly, the digital mechanism seeks the ability to collect basic information of Suco Holarua, to provide tourists with the most accurate and useful information in both the short- and long-term period. This means we would require a data collection platform to collect the latest data and a database to store data. The database is expected to contain all locations of historical, cultural importance, general information about the Area and methods of getting to Timor Leste and Suco Holarua. For the collection of data, we decided to use a public data collection platform this could be either an online voting platform or an online survey which it would be open for both travelers who have been to Suco Holarua and potential travelers. This data collection platform is expected to be used by local travel agents and after the data has been collected by them, personnel will be required to update them into the database weekly.

Secondly, the digital mechanism needs to have the ability of gaining the current location of users and navigate a new location for them. We would require Users have GPS and WIFI in their devices to access their locations, but it would be a problem if their GPS and WIFI turned off. Hence we propose to use the Basic Service Set Identifier (BSSID) technique which allows us to get information from the user's Wireless LAN Access Point to get an approximation of where they are located and record them into the database system, so we could basically get the location from the database without the use of GPS and WIFI. This is just in case when they meet emergency conditions, they are still able to know where they are.

Lastly, the digital mechanism is expected to be able to help tourists facilitate immersion in a site of cultural relevance. We propose to find a way to let tourist share their culture with locals in Suco Holarua, experiencing the lifestyle in Holarua and become one of the villagers for a few days through the digital mechanism.

3.5. Product Development

Extensive research would need to be conducted on the local community including the geographical, social, cultural factors and technological circumstances of the people of Suco Holarua. Other factors such as if the technical design is the most appropriate for the community and if this solution appropriate and aligned with the cultural and social practices of people within the community should all be considered when developing the digital mechanism. Certainly, similar digital mechanisms in other developing country's rural line such as Fiji's should also be researched and compared to evaluate if the digital mechanism is the most appropriate and suitable way to help tourists improve their experience as well as if this is the most relevant way to improve the local's tourism industry. This will maximize the impact of the digital mechanism on bringing tourist to Suco Holarua.

3.6. Selection of Design Options of Digital Mechanism

With the selection of digital mechanism, we mainly focus on evaluating the effectiveness it could bring to the tourists. There are two design options for us to develop: developing a website or developing a mobile phone application. With having analyzed the context, we developed a tradeoff table to determine which digital mechanism would be the most practical, suitable and effective one. Here are the criteria used in the trade off table:

3.6.1. Explanation of criteria

Immediacy is one of the factors we decided to consider because users always consider the convenience of accessing the digital mechanism. Immediacy means how long or how much effort does it take for users to begin using the mechanism. This criterion helps us to evaluate if the digital mechanism is easy for users to access through their devices. Admittedly, immediacy does affect users' in-use comfort, but this is unlikely for users to hate the website and not use it. We decide to give this criterion a weight of 7.5%.

Compatibility evaluates if the digital mechanism is compatible on a wide range of devices. This is important since, in real life, different people tend to use a different type of devices; for example,

someone prefers using a computer while others like mobile phones more. We need to make sure our digital mechanism is supported in most of the devices. Also, it is likely to see that tourists and locals tend to use different devices in their daily life since tourists are more likely to take their mobile phones only when they are on the trip. With considering these two groups of people, evaluating compatibility is quite important. Compatibility directly affects if the users and locals can use the digital mechanism successfully or not, we decide to give this criterion a weight of 10%.

Upgradability needed to be considered since after the digital mechanism has been developed and used, locals are required to upgrade the content on to the digital mechanism. Considering locals are not professional at technologies, we would be requiring a digital mechanism that can be edited and managed easily and flexibly. Upgradability directly affects the adaptability and sustainability of the project to locals and hence lead to an influence on the overall benefit of the design. We decide to give this criterion a weight of 15%.

Findability is something we need to be considered as users are less likely to use something hard to find. This criterion helps us to evaluate if the digital mechanism is easily finable and visible. One digital mechanism with bad visibility always lends itself to a bad design. Hence, we need to consider this through our evaluation. Findability is important but it has a minor contribution to the overall effectiveness of the design, so we decide to give this criterion a weight of 7.5%.

In our daily life, we always share good things with others and would like to know something new from others. Shareability hence becomes one of the important factors we need to consider. For our digital mechanism to be popular, we would be required users to share it with others. Hence, we need to evaluate if the digital mechanism has good shareability or not. Also, locals would need to share the digital mechanism to their family or neighborhood, so other locals can also gain benefit from it. Shareability directly affects the website's famous level but this contributes less to the overall effectiveness of the digital mechanism and hence the benefits to locals. So, we decide to give this criterion a weight of 10%.

We want our design to survive and be sustainable. Life Circle then becomes one of the factors we need to be considered. We want our digital mechanism to be kept from tourists and want them to keep using it. Life Circle directly affect the sustainability of the website and hence the long-term period benefit to locals, we decide to give this criterion a weight of 20%.

After we finished our design, locals would be required to take control of the digital mechanism. Hence Support and Maintenance would be one of the key factors we need to consider. Since locals are less likely to be professional at technologies, when the digital mechanism requires maintenance and support, they would be requiring help from others. Hence, we need to evaluate this criterion and make sure the support and maintenance of the digital mechanism are easy and cheap. Support and Maintenance do affect the users' in-use behaviors, but this has less contributed to the overall benefits to locals, so we decide to give this criterion a weight of 10%.

Time & Cost is important and necessary to be considered. This is because, considering the economy level of Suco Holarua, we need to make the digital mechanism comes with a low cost. Also, our design should appear on the market in a short time of period since the need for our design is urgent. Time & Cost directly link the economic benefit it would result in locals; hence it is quite important, we decide to give this criterion a weight of 20%.

3.6.2. Comparison

Immediacy:

Website is instantly accessible to users via a browser across a range of devices. Hence users can immediately use it by open the browser and search our website through the search engine.

Mobile phone application requires users to first download and install the application from an app marketplace such as Google Play store before the application can be viewed. This makes a barrier for users to access the content.

In conclusion, we decide to give Mobile App a score of 7/10 and website a score of 8/10.

Compatibility:

Website can reach users across many different types of mobile devices, no matter Apple users or Android users. It is also compatible with laptops, furthermore, website URLs are easily integrated within other mobile technologies.

Mobile apps require a separate version to be developed for each type of mobile devices. For example, Android users need to come with an Android version while apple users would require a different iOS version. Also, mobile app is not compatible with laptops.

In conclusion, we decide to give Mobile App a score of 5/10 and website a score of 8/10.

Upgradability:

A website is much more dynamic than an app in terms of pure flexibility to update content. If you want to change the design or content of a website, you simply publish the edit once and the changes are immediately visible. On the other hand, updating an app on the other hand requires the updates to be pushed to users, which then must be downloaded in order to update the app on each type of device. However, an app is easy for locals to update content, simply sign in through their administrator account to do the edit and management. On the hand, with editing the content of the website require a modify on both the database and the website through the website builder, which is more advanced and requires technological skills.

In conclusion, we decide to give Mobile App a score of 7/10 and website a score of 4/10.

Findability:

A website is much easier for users to find because their pages can be displayed in search results using search engines and listed in industry-specific directories, making it easy for qualified visitors to find out. In contrast, the visibility of an app is largely restricted to manufacturer app stores.

In conclusion, we decide to give Mobile App a score of 7/10 and website a score of 9/10.

Shareability:

Mobile website URLs are easily shared between users via a simple link on Facebook or other platforms, users can be easily directed by clicking the link. In contrast, an app simply cannot be shared in this method, but it could be shared through the share button in the App, QR code or other methods.

In conclusion, we decide to give both a score of 9/10.

Life Circle:

According to the research, "Pinch Media Data Shows the Average Shelf Life of an iPhone App Is Less Than 30 Days." (Schonfeld, 2009). So, an app must face a challenge, that is if the app is unique and helpful enough for users to keep on their device and not replaced by other Apps. Websites, on the other hand, are always available for users to return to them.

In conclusion, we decide to give Mobile App a score of 5/10 and website a score of 8/10.

Support and Maintenance:

Both mobile app and website don't end with the initial launch; properly supporting and maintaining an app and a website (upgrades, testing, compatibility issues and ongoing development) are required.

Hence, we decide to give both a score of 5/10.

Time & Cost:

Building an app costs more time than building a web, usually, it requires time for building two versions of the app, one for Android users, one for website users. However, the website requires time to build a database and website testing is way more complicated than App, lots of time will be spent on testing the website in different operating systems. In terms of cost, one biggest cost for both digital mechanisms would be the cost on the maintenance. By comparing them, app maintenance is more much more expensive and involved than supporting a website over time. Overall, website development is considerably more time and cost-effective than the development of an app.

Hence, we decide to give Mobile App a score of 6/10 and website a score of 5/10.

3.6.3. Trade Off table

Criteria	Weight (/10)	Mobile APP (/10)	Score	Website (/10)	Score
Immediacy	0.75	7	5.25	8	6
Compatibility	1	5	5	8	8
Upgradability	1.5	7	10.5	4	6
Findability	0.75	7	5.25	9	6.75
Shareability	1	9	9	9	9
Life Circle	2	5	10	8	16
Support and Maintenance	1	5	5	5	5
Time & Cost	2	6	12	5	10
Total		62		66.75	

3.6.4. Final decision

Based on the tradeoff table in relation to our criteria, we choose to develop a website. This decision was based on the scale of potential benefit on the community and its adaptability, sustainability and feasibility.

4. DEVELOPING OUR WEBSITE

4.1. Problem Definition – a close look at the Current Website

Currently, there is one official tourism website of Timor Leste providing tourist an overall guide of the country which is funded by a number of donors, including the Australian Government's Department Foreign Affairs and Trade, International Labor Organization, the New Zealand Ministry for Foreign Affairs and Trade, and The Asia Foundation (Rose, 2019)..

Function:

The Website has an about section which provide tourist with an overall guide and basic information of the country. The about section involves the economy condition, geography & climate situation of the country, History, People & Culture, and Natural & Wildlife pages to help tourist have a better view of the country ("Visit Timor", 2019).

The Website also has destination section mainly focus on introducing popular locations and famous areas to users and help them to make the decision of their destinations. It also provides users some lovely photos in a slide show view on the page.

In what to do section, the website gives a specific view of the local traditional culture, historical Attractions and local landscape including the Arts & Craft, beaches and so on. It also has a section called plan your trip which aims to help tourist plan their travel, providing information of accommodation, transport, travel tips in East Timor and so on.

Advantages:

- The website has enough functions and content which can satisfy what users require before and during their trip.
- The website has the ability for users to plan their trip and help them build correct perception of the country.
- The website has a nice layout and design structure which could attract user's attention.
- The website has an introduction video on the main page for users to view, so not only attract users with sentences but give users a visible view of the country. This benefits user who dislike reading the content but love getting to know a place well from photos and videos.

Disadvantages:

- The website is limited at this level since it only suggests some famous places and only provide some popular cities of Timor Leste to tourists.
- The website does not have a blog page for users to share their trip plan and advices with others.
- The website focus on introducing attractions too much and hence overlooking the local lifestyle, cultural and historical importance of the country.

With thinking about the advantages and disadvantages of the existing tourism website, we know what good things we can include and what we can improve from what has existed on the market already.

4.2. Further Technical Research of The Design

Like what we discussed in section 3.3, the planning section. Suco Holarua requires a platform to get themselves introduced to tourists, so for our website to succeed, we need to find an efficient way to collect useful data/information of Suco Holarua, storage and manage the data, then display them to tourists through our website. This leads to the requirement of following digital materials:

Data Collection Material:

One of the main purposes of our website is provided tourists with a guide which contains sufficient information about Suco Holarua. So, the content we provide to users must be good, this comes to the way we collect our data. We need to make sure the data collection method is efficient, and the method is likely to collect the data that is suitable and helpful for tourists. We propose to collect data from local travel agencies, potential tourists who want to come to Suco Holarua and tourist who have been to Suco Holarua in the past years since they are more likely to give us accurate and reliable data. By just asking them to provide us with the data is inefficient and less likely to achieve. We propose a solution to using an online public data collection platform with rewards if they participate. Considering developing our data collection platform takes a lot of time and it is hard for locals in Suco Holarua to do the platform maintenance. We decide to use the existing data collection materials that are available online. Top 3 popular materials on the market are Google Form, Kahoot, Survey Monkey. To compare the potential data collection material and choose the final design material, three factors were considered: Cost, Ease of Usage and Feature.

Google Form:

Cost: Google Forms is completely free regardless of the user's design, number of questions, or amount of responses. Users can create as many surveys as they need and could save them all and turn them into templates to use again. Hence for the cost, it receives a full score of 5/5.

Ease of Usage: Starting a survey is quite easy with only 3 steps: name your form, title your survey, and then start adding questions. Responses of each survey can be viewed on the same page. With clicking the Responses tab at the top then a quick Summary of survey's responses could be viewed with both bar and pie charts. Each response could be viewed separately by clicking the Individual button. Hence, overall it is quite easy to use. It receives a score of 4/5.

Feature: Google Form has templates sorted by personal, work, and education but the selection isn't huge with just over 15 templates to pick from. But one good thing is that users can edit any template they pick to suit their survey. Images and Videos can be added to each question. Survey results can be download as an excel format. Besides, surveys can be viewed publicly. It receives a score of 4/5.

Kahoot:

Cost: Kahoot is completely free regardless of the user's design, number of quizzes, number of questions. Users can create as many quizzes as they need, view the result and download each quiz in excel form for future usage. Hence for the cost, it receives a full score of 5/5.

Ease of Usage: Kahoot is easy to use, by creating a quiz with questions and give the correct answers to each question. Videos and Images can be easily added on each question too. Data analysis is

also easy by just click the save result button and results will be downloaded as an excel format. It receives a score of 4/5.

Feature: There is no template provided in Kahoot. However, each quiz can be not only taken by the selected group of people but also it can be published publicly, and all quiz results can be viewed easily on the result page. Kahoot is quite fun since when doing the quiz, it comes with background music and you can set a limited time to answer each question. Survey results can be downloaded as an excel format for data analysis. Quizzes won't be deleted online unless you want to, so you can keep getting the latest results from the public. It receives a score of 5/5.

Survey Monkey:

Cost: SurveyMonkey has both free and paid plans. The free basic plan gives users the ability to create unlimited surveys as per their requirements and each simple survey with only 10 questions with 100 responses. Paid plans are subscription-based and come with 3 different plan options: The Standard Plan, The Advantage Plan and The Premier Plan. Hence, for the cost, it receives a score of 3/5.

Ease of Usage: Like Google Form, only three steps will be required for creating a survey in Survey Monkey: five your survey a name, select a category for it, and then move onto customizing it. SurveyMonkey offers similar response viewing options to Google Forms with easy-to-read charts. It has functions such as review responses for each question, check out data trends or look at individual responses. Results of each survey could be downloaded as an excel format for future usage. It receives a score of 5/5.

Feature: Survey Monkey offers over 150 survey templates with options such as market research and education organizations. However, the template is not editable. Images and Videos can be added in each question, Survey Results can be download in various formats. It receives a score of 3/5.

Trade off Table:

Material	Cost (/5)	Ease of Usage (/5)	Feature (/5)	Result (/15)
Google Form	5	4	4	13
Kahoot	5	4	5	14
Survey Monkey	3	5	3	11

Final Decision: Based on the tradeoff table in relation to our criteria, we choose to use Kahoot as the main method for us to collect data.

Database:

The database is not necessary for website development. The purpose of the use of a database is it allows us to store content and retrieve data when needed. This helps enhance a site's design and maintenance, but the development of a database requires detailed technical knowledge in data analysis area and hence require additional costs and resources. The reason we would like to develop a database system for our website is it enhances the efficiency of managing data and updating content on to the website. Since we are doing a tourism website, our content needs to be up to date and it is likely for us to see that the articles, images, and page layouts on the website change dramatically from day to day. With the use of a database, we can use a server-side scripting language like PHP to automatically create web pages with content from the database. That means, once data is stored or updated, website pages

compiled with content that's retrieved from the database will be automatically generated. This saves countless hours on the layout. In addition, data will be classified by type and topic once data has been stored in the database system, this enhances the efficiency of searching data. With considering the future website administration of locals, the use of database not only helps them with the ease administration but also the ease of data arrangement. We also did a further research of the benefits of database to a tourism website, it shows that "A good example of a small business with constantly changing content is a local travel agent. Travel agents constantly update their pricing information, specials and available destinations, and it's not likely to be convenient or efficient for one employee to spend most of their time updating a Web page by hand. So, in this situation it might be convenient to automate some of the processes with a database." (LeMay, 2001) The above content analysis what a database system could benefit us; however, developing a database system does have drawbacks.

Disadvantages:

Technical Skill:

Developing a database system requires certain skills to implement and maintain a database-driven site. We can develop a draft version of the database system for them to use; however, for a high performing database to function well for a long period, a full-time database administrator will be required. Considering the context of locals in Suco Holarua and the village's scientific and technological level, for a database-driven site to be maintained, it is highly likely that it is necessary for them to employ a full-time database administrator. This might become a challenge since the village's economic level is horrible, they cannot afford to hire a database administrator at the current stage. In addition, a database-driven website is different to simpler website, instead of being hosted on other people's servers, it typically requires an own server, which could end up costing us and villagers quite a bit to purchase and host on a network. Considering the complexity and difficulty of a database management system, even a simple database-driven website requires a lot of time to develop and test than a simpler website. Also, the impact of the damage to database is numerous, a small error on the database would affect virtually all website pages that rely on it. Hence, usually a database maintenance takes much more time and lead to cost more.

Evaluation:

Admittedly, a database would enhance the overall effectiveness of our design; however, we can't ignore the disadvantages. Considering the context of the locals in Suco Holarua, their scientific and technological level and economy level is in a struggling level, having a database-driven website might bring them more negative impacts than the positive impacts. For example, they might have to afford and invest more money on to the design than what they can earn from it. In conclusion, we decide to make database-driven website to be one of our design options.

Weblog:

Our group has also come with a design option by involving a blog page on our website. The purpose of designing blog function on our website is allowing users to post their personal tourism experience or journals, or some particular subjects and comments on the website. It is likely to see that sharing their personal tourism experience through the website is more likely to attract potential tourists. Also, for those weblog visitors, they can comment and ask questions to authors on each blog section. On the

other hand, the blog page would also be used by locals. Locals are expected to post transportation hiring, accommodation, food advertisements through the blogs to make money. The weblog not only helps tourists to explore their interest in the area from looking at the journey written by people who have been to Suco Holarua but also has the ability for users to purchase local services. This is also an alternative method of collecting data since we can gain useful information from users' blogs. By doing this, we are more likely to get up to date information of Suco Holarua and these data more likely to be reliable and accurate. In comparison with developing data collection platform and database, weblog developing is much easier and cheaper. However, we need to consider a way to encourage users to share their trip with others, a solution of this is giving user rewards such as a discount on purchasing local services if they have shared useful information in their blogs.

4.3. Redefining the Scope of Our Initial Concept

4.3.1. Further primary research with EWB team

Our initial design concept was proposed as a long-term solution to introduce Suco Holarua, support tourists experience in Suco Holarua and over time flourish the overall tourism industry of the area, leading to bring individual income. However, after we have done a further discussion of our project and primary research with members of the EWB team. We decided to re-evaluate our project proposal. Our initial project proposal focuses too much on getting Suco Holarua to be popular and enhancing tourist experience instead of bringing significant positive impact on to the whole community. Admittedly, by considering the long-term period impact, our initial project proposal would definitely result in a positive influence on the local tourism industry. However, it might take several years for this to happen and bring everyone income constantly, that also means in terms of short-term period, the positive return of our project is minimum, and hence our project would most likely have failed to achieve a desirable outcome in the early stage. With Considering this, we are encouraged to find a more efficient way for everyone in Holarua to be benefited directly through the design of our website.

4.3.2. Further discussion with mentor

We also tried to gain feedback from our mentor, our mentor likes the new design consideration. He suggested us to do a case study of other tourism websites in other developing countries that focus on rural line development. He thinks that to attract tourists to a place that is rural and undeveloped like Suco Holarua in a short-term period is quite hard due to the lack of sources of travel experience that is available online, leading to the lack of attractiveness on scenic spots. We need to think about what would attract tourists to come to Suco Holarua instead of visiting more popular and famous tourist areas like Bali. We are encouraged to design our website unique in itself that unlike other tourism websites that simply telling tourist how attractive the scenic spots are.

Events & Activities & Workshops:

By considering this, we decide to figure out a way to give tourists a chance to meet with locals, making these two cultures integrate into each other. We planned to make our design not only give a good glimpse of the history and culture but also provide the tourists with a chance to experience a brand-new

culture and lifestyle which they don't have the opportunity to experience in their countries. The new design consideration would make tourists more interested in the culture, and hopefully make them visit the place and spend money there.

The addition of these design considerations makes us come with a design option of making our website mainly focus on displaying and advertising events, activities and workshops which are created by locals for tourists to attend. In that way, locals are expected to gain income by selling food, traditional hand-made items and so on to tourists in the events they arranged. With that consideration, we propose to make the design of our website allow locals to post, modify and update events, activities and workshops as per they desire easily and efficiently. Challenge does exist in this design option, as English is not widely spoken in Suco Holurua, we might require building a website content translator for translating the content on the website for the locals to understand and help them post activities on the website in English. Considering building a website content translator require time and cost, our alternative solution is we can hire one or two local tourism agency who are good at both languages working for us as a part-time job to handle it. This would limit the cost and address the issue perfectly.

5. DESIGN CRITERIA

5.1. Description of Criteria

As has been discussed in section 4, further technical researches give us 3 design options that mainly focus on different concepts. To make sure our design is appropriate to the target communities and become practical, sustainable and effective in the specific context of the villages. We have designed a set of criteria used to evaluate our design options throughout the design process and compete to one final design option that would benefit the local community the most. It contains a variety of factors that were judged necessary for our proposal.

These were:

5.1.1. Sustainability of design

5.1.1.1. *Reasons we choose this design criteria:*

We expect the locals to implement our design in a long-term period. Hence it is important for us to consider the long-term sustainability of our design proposal. This criterion helps us evaluate measures that could be put in place to ensure the successful continuation into the future. A good design always with a good sustainability, this is the main factor for the deign to survive in the competitive market.

5.1.1.2. *Weight: 1.5. Sustainability affects the duration of our design to be maintained on the market; hence lead to influence the duration of positive impacts on the local community. A good design always come with a good sustainability that is not easily to be replaced by others. That's the reason why we give it a weight of 1.5.*

5.1.2. Impacts to the community

5.1.2.1. *Reasons we choose this design criteria:*

This is the most significant factor in the criteria, the purpose of the design is bringing positive impacts to the both the local community and the tourist community. This criterion helps us evaluate the impact our design will have on members of the community, specify our key stakeholders and checkout that each community has been included and benefited in our design.

5.1.2.2. *Weight: 2. Impacts to the community is the most important and necessary factor to consider since that would be the purpose of us creating the design. It needs to come as a heavy weight, that's why we give 2 on it.*

5.1.3. Cultural and social appropriateness

5.1.3.1. *Reasons we choose this design criteria:*

For our design to be widely used in Suco Holarua, we need to firstly make sure if our design is appropriate and aligned with the cultural and social practices of people within the local communities.

This is important to evaluate because if not then the design will fail since it causes a crash with the local culture and society.

5.1.3.2. Weight: 1. Cultural and social appropriateness directly affect if our design can survive in the targeted culture and society. It is an important factor to consider but not the most significant one. Hence, we give it a result of 1.

5.1.4. Time & Cost

5.1.4.1. Reasons we choose this design criteria

Time is an important factor to consider since the time requires for us to build the design and time for locals to adapt to use the website directly affect the implementation plan of our project, hence lead to affect the time/period for locals to gain benefits from it. Evaluating if the design would benefit the locals in Suco Holarua in a short-term period is also important since it is likely for our project to be copied and replaced if our design maintained on the market for a while but failed to bring user positive impacts. Overall, it is better to let our design appear on the market as soon as possible since the requirement of the design is urgent at the current stage.

Cost is another important factor to consider since the economy level and individual's income level in Suco Holarua is in a terrible situation, we need to make sure the cost of the project, i.e. initial costs, material costs, implementation, operation/program delivery costs, and maintenance costs is afforded by locals. We need to consider if any potential economic benefits to the community would overweigh the investment/cost of the project because if it didn't, then our project would worth nothing and failed to achieve the expected outcome.

5.1.4.2. Weight: 1.5. Time & Cost directly affect if the design is realistic and practical on the community context. This lead to influence the overall effectiveness of our design. A really important factor to consider and hence it has a weight of 1.5.

5.1.5. Adaptability of Technical design

5.1.5.1. Reasons we choose this design criteria

If the technical design is the most appropriate for the community and can be easily adapted by both users and locals is one important question to ask our self. Hence the adaptability of the design becomes one of the important factors to consider. If our project does not have the ability to be easily adapted by users in their life, then it is unlikely for them to be affected by our project and this would make our design failed to achieve the expected results. On the other hand, if locals failed to adapt to use the website in their daily life, then the benefits of our design to them would be minimum and it is likely to see that the design been ignored and hence failed to achieve its purposes.

5.1.5.2. Weight: 1.5. For our deigns to be widely used by locals in their daily life. We need to make sure that we consider the adaptability of our design. This directly affect if our design is appropriate for locals to use in their daily life and lead to influence the overall effectiveness of our design. A really important factor to consider and hence it has a weight of 1.5.

5.1.6. Materials

5.1.6.1. *Reasons why choose this design criteria*

It is important that we use locally available materials that are culturally acceptable and environmentally friendly wherever possible. With the usage of materials that meet these requirements, our design would be more likely to be easily adapted by locals and sustain for a long period. We also need to evaluate if locals have access to the proposed material required in our project design and if the cost of project materials is afforded by locals.

5.1.6.2. *Weight: 0.5. With our design, materials are not necessarily required in the construction of our website. It is a factor to consider in the implementation plan but would not significantly affect the overall effectiveness of our project. Hence, it has the least weight with a value of 0.5.*

5.1.7. Feasibility of Construction and Implementation

5.1.7.1. *Reasons why choose this design criteria*

For our project to go to markets and utilize local labor and program managers, we need to come with a plan to construct and implement the project. We must evaluate the feasibility of the construction and implementation, since if the design is not feasible or realistic, then the design of the project would not be helpful at all and worth nothing. By evaluating the feasibility, it helps us to come with a design which is achievable by locals in Halarua and has the ability to address the current issue in Suco Holarua and meet the project's purpose properly. For our design to be widely used and well known, it must come with a logical and realistic implementation plan.

5.1.7.2. *Weight: 2. For our website to be implemented by locals, we need to make sure our design is realistic and achievable by the local community. It directly affects the value of our project, if this factor is not carefully evaluated then it is likely to see our project fail when it comes to the community. Due to that reason, we give it the heaviest weight of 2.*

6. REFINING THE DESIGN

As discussed earlier, based on the technical research of the design and feedback provided from EWB and mentors, various technical aspects required to make a good tourism website have been considered in our project design to satisfy the theoretical component of professional engineering in the global society. However, it is not realistic for our website to include all the technical aspects and design concepts as mentioned above. Due to that reason, we have developed 3 design options which mainly focus on 3 different design concepts. These were:

Design Option 1: Database-Driven Website;

This design concept is more focus on collecting useful and helpful data of Suco Holarua and provide the data to tourists through the website efficiently and easily.

Design Option 2: Weblog;

This design concept is more focus on letting the website has the ability for tourists to share their trip experience with others and creating a link between locals and tourist.

Design Option 3: Cultural Integration;

This design concept is more focus on letting tourist experience the local lifestyle and culture of Suco Holarua and provide them with an opportunity to meet locals through Events & Activities & Workshops.

We decided to determine a preferred option against the design criteria.

6.1. Comparison of Design Options with design Criteria

6.1.1. Sustainability of design

Database-Driven Website:

The database-driven website is evaluated to have good sustainability on the market since the content on the website is likely to be kept up to date from the database. That means, once data is stored or updated on the database, website pages compiled with content that's retrieved from the database will be automatically generated. This makes sure that the content of our website will not be easily outdated. Besides, the database system is not easily to be damaged or hacked, once the system has been developed, it could be used for a long-term period. Also, this design will not cause an environmental or cultural damage on the local community, this further enhances the sustainability of the design. However, for this design to be sustained on the market for a long-term period, locals surely require some data analysis skills. Helping them develop their skills to manage the database might become a challenge for us. Besides, database-driven website requires a huge amount of cost throughout the year, this also question us if the design will be maintaining developed on the market for a long period or not.

Score: 6/10;

Weblog:

A website with blog contained would make the content of the website to be up to date and help us to do the improvement of the design since we can get feedback from them, this enhance the sustainability of the design. No environmental and cultural damage will be caused throughout the implementation of our design. In addition, the weblog does not require any specific technical skills for locals to hold, just basically requiring them to have a device to access to the blog page. Weblog does not require a huge amount of cost throughout the year. So overall the sustainability of this design is good.

Score: 9/10;

Culture Experiences:

This design allows tourists to attend the latest events, activities and workshops created by locals, they should have a variety of choices to select. It is likely to see that these events will be developed in a long-term period since the benefits it would result on individuals. The website does require locals to have some technical skills but not much, locals are expected to have the ability to post, modify and edit the activities on the website. Besides, locals in charge of arranging and creating activities might require a leadership skill. Like the other two designs, the construction of this design does not bring any negative impact on the local culture and environment, but locals are required to have devices.

Score: 8/10;

6.1.2. Impacts to the community

All three design concepts have the same purpose, that means the impacts they would result on the community are similar. In terms of the negative impact, all three designs won't cause any environmental and cultural damage on the community which is good. In terms of positive impact, all 3 design concepts are developed to bring positive impacts to the community in 3 aspects: environment, social and economy. Database-driven website design would cause a positive long-term impact on the society, that is, it requires time for each individual of the community to taste the benefits. On the other hand, our design option 2: "Culture Experiences" is evaluated to bring benefit to each individual in a short-term period which means it is able to address the need and issue a lot quicker. Moreover, we evaluate that weblog cannot directly bring income to individuals in the community of Suco Holurua, this affects the impacts on the overall community to be minimum.

Hence, design option 1 receives a score of 7/10 while design option 2 and 3 have a score of 6/10 and 8/10 respectively.

6.1.3. Cultural and social appropriateness

All three design concepts are carefully fully designed to make sure they are appropriate and aligned with the cultural and social practices of people within the communities of Suco Holarua. People in Suco Holarua has an average individual living standard that below the country's average level and most of the people in the area don't have a job. Hence, our design concepts with the purpose of bringing income and job opportunities to an individual are appropriate in terms of social consideration. In terms of cultural appropriateness, one consideration would be the language difference between tourists and locals since the targeted community of our project is mainly Australians while English is not widely spoken in Suco Holarua. Especially for our design option three which aims to provide tourists with a chance to meet locals and experience the local lifestyle in a few days, as we know that letting people from two different cultures intergrade with each other would always cause some cultural clashes.

Hence, design option 1 and 2 receive a score of 7/10 while design option 3 have a score of 6/10.

6.1.4. Time & Cost

The database-driven website is evaluated to be the most complex and difficult to achieve. Hence, it takes the longest time to develop. A database-driven website typically requires an own server, which could end up costing quite a bit to purchase and host on a network. In addition, database maintenance is expensive, usually it is necessary to hire a full-time database administrator. In contrast, our design option 2 and 3 are easier to develop, as well as the cost is a lot of cheaper, purchasing a website domain name and hiring hosting on other people's servers will take around only approximately $100 each year.

Hence, design option 1 receives a score of 5/10 while design option 2 and 3 have a score of 8/10.

6.1.5. Adaptability of Technical design

The weblog (design option2) has been evaluated as the easiest design for locals to be adapted to use in their daily life since it requires nearly no skills or programming knowledge. It is just as simple as how they post things on Facebook, we expected them to adapt to use the website in a few days after the design has been implemented. However, they would be required some website development skills and knowledge to maintain the daily functioning of the website such as updating content and so on. In contrast, the database-driven website would be the hardest for locals to adapt to use since managing the database usually require data analysis skills and statistical knowledge. We estimated that it could take a year for locals to be fully adapted and has the ability to take control of the website by themselves. On the other hand, the website design with a focus on "Culture Experiences" (design option 3) requires few weeks for locals to adapt, we need to teach locals how to effectively use and manage the website and later on hand it over to them so that they can modify and update activities through the website as per their requirement.

Overall, design option 1 comes with the lowest score of 5/10, design option 3 scores 7/10 and the highest score goes for design option 2, it scores 8/10.

6.1.6. Materials

It is recommended to use locally available materials that are culturally acceptable and environmentally friendly wherever possible. All of 3 design option are website based; material required for locals would be electronic devices with access to the network. We have asked the availability of devices such as mobile phones and laptops in Suco Holarua to the members of EWB challenge team in Timor Leste. We received a positive answer that it is estimated approximately 60% of people, mostly young people, in Suco Holarua have mobile phones and laptops that allow access to the network ("EWB in Timor-Leste | EWB Challenge", 2019).

Overall, we evaluate that the materials required for all 3 our design options are currently available, culturally acceptable and environmentally friendly. Therefore, they all receive a full mark of 10/10.

6.1.7. Feasibility of Construction and Implementation

By considering the local economy level and scientific and technological level, the database-driven website comes with low feasibility since as mentioned above, it is quite complex to build and quite expensive to implement. In contrast, weblog comes with high feasibility due to the ease of construction and implementation. Besides, we evaluate design option 3 has the highest feasibility since it is not only

can be easily constructed and implemented but also could bring individual income in a short-term period.

Overall, design option 1 comes with the lowest score of 4/10, design option 2 scores 6/10 and the highest score goes for design option 3, it scores 8/10.

6.2. Design Trade off table

Design Criteria	Design Option 1	Design Option 2	Design Option 3	Weight (/10)
Sustainability of design	6	9	8	1.5
Impacts to the community	7	6	8	2
Cultural and social appropriateness	7	7	6	1
Time & Cost	5	8	8	1.5
Adaptability of Technical design	5	8	7	1.5
Materials	10	10	10	0.5
Feasibility of Construction and Implementation	4	6	8	2
Total	58	73.5	77.5	

6.3. Final Decision Evaluation

Having compared all these designs with the design criteria we specified the key issues with each individual design:

We felt that the issues associated with the database-driven website was its technical complications and intricate design features, which resulted in problems such as cost, maintenance and an overall increased likelihood of failure.

The major issue of our design option 2: a weblog was its positive impacts on each member of the whole community in Suco Holarua. We evaluate the overall benefit this design would result in the community is leading to an improvement of the tourism industry and reputation of Suco Holarua; however, this design could not directly benefit individuals.

Our design option 3: the website with design concept focus on creating a cultural medium of intercourse between locals and tourists comes to few very minor issues, such as how to deal with culture clashes when arranging meetings between locals and tourists. Ultimately the design was simple, yet effective and thus had fewer issues.

Thus, we concluded that the design option 3 was ultimately the best design.

7.   FINALISING THE DESIGN

7.1.   Technical Design and Engineering Principles

Our website design consists of two main concepts: functional and aesthetic/structure concepts.

The functional concept consists of 5 key components:

- Home Page
- "About" Section
    - o "Gallery & Natural Life" Page
    - o "Geography & Climate" Page
    - o "People & Culture" Page
    - o "History & Economy" Page
- "What to do" Section
    - o "Getting to Timor-Leste" Page
    - o "Learn some Tetum" Page
    - o "Explore the Village" Page
- "Plan your trip" Section
    - o "Activities" Page
    - o "Accommodation" Page
    - o "Transport" Page
- "Ask advice" Section
    - o "Online Form"
    - o "Call us"
    - o "Live chat"

The aesthetic/structure concept consists of 3 key components:

- Website Logo
- Website Theme
- Navigation Bar
- Footer

The number of website pages, content, overall structure and layout will be explored in the above sections corresponding to each subsection of our final product.

Engineering Principles / Technologies:

There are main two principles are used in developing our website:

Client-Side Scripting and Server-Side Scripting. Client-Side Scripting is the type of code that is executed or interpreted by browsers and Server-Side Scripting is the type of code that is executed or interpreted by the web server.

Client-Side Scripting Technologies used:

- HTML (Hypertext Markup Language)
- CSS (Cascading Style Sheets)
- JavaScript

Server-Side Scripting Technologies used:

- PHP (very common Server-Side Scripting language - Linux / Unix based Open Source - free redistribution, usually combines with MySQL database)
- Zend Framework (PHP's Object-Oriented Web Application Framework)

Materials / Tools used to develop the website:

Web development tool:

Dreamweaver

Photoshop

Microsoft Edge

7.2. Final Design Summary

As a result of analysis of the different features and functions of our website, we have come up with a final design summary in terms of functional and aesthetic concepts as discussed above.

7.2.1. Home Page

In every website, the home page is always the main page of the website, the start points for visitors. To make our home page to be attractive, we decided to include a profile image to attract visitors. By clicking the profile image, visitors will be delivered to the "Activities" page to plan their trip.

Figure 1: Profile Image designed by us

It should contain an introduction video of Suco Holarua and images in a slideshow display method. It should also contain an overview/introduction of Suco Holarua.
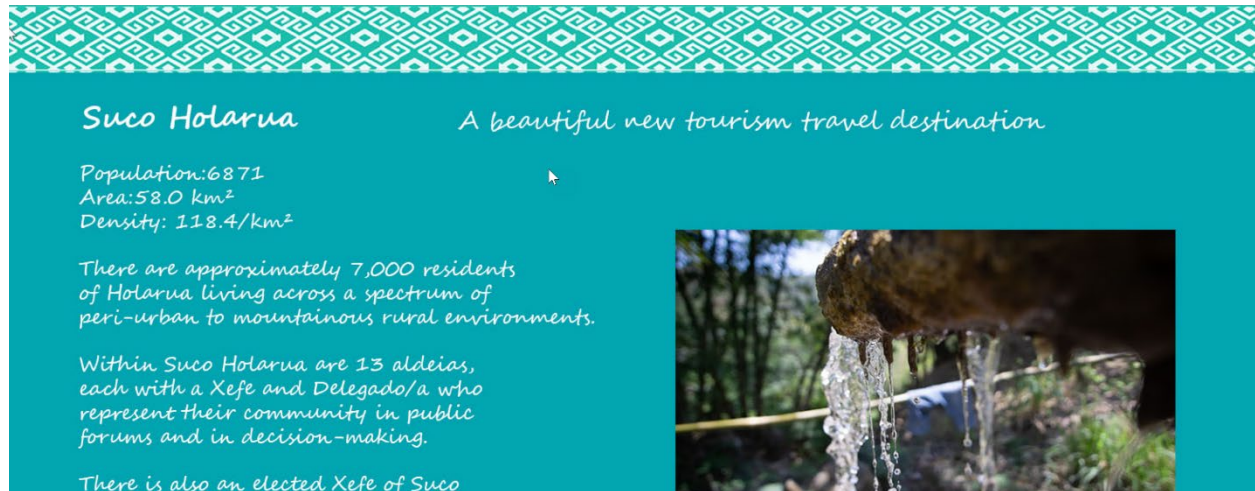
Suco Holarua — A beautiful new tourism travel destination

Population:6871
Area:58.0 km²
Density: 118.4/km²

There are approximately 7,000 residents of Holarua living across a spectrum of peri-urban to mountainous rural environments.

Within Suco Holarua are 13 aldeias, each with a Xefe and Delegado/a who represent their community in public forums and in decision-making.

There is also an elected Xefe of Suco

Figure 2: Overview of Suco Holarua Image designed by us

7.2.2. "About" Section

In the "About section", we decided to have 4 website pages help users to get to know Suco Holarua. The first website page is "Gallery & Natural Life", in this page we will provide images of Suco Holarua for visitors to view and provide users with a general introduction of the natural life in Holarua. The second website page is "Geography & Climate" that providing a map of the location of Suco Holarua, by clicking the map image, the website will redirect users to Google Maps page and help users to navigate to the location they want. General Climate Information will also be included and displayed to users.
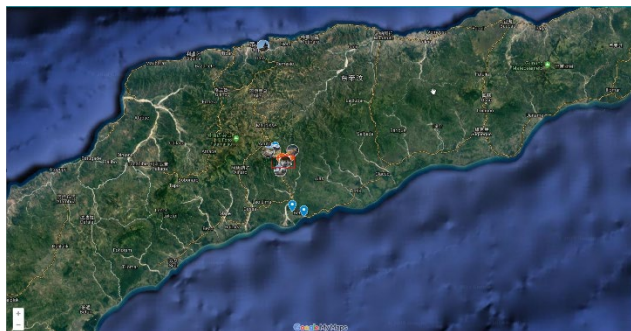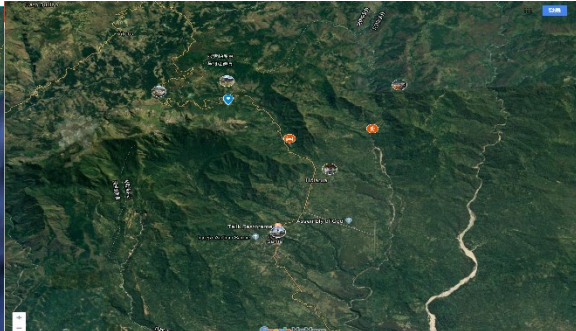

Figure 3: Holurua Map designed by us

Figure 4: Google Maps Navigation Page ("2019 EWB Challenge with WaterAid Timor-Leste - Google My Maps", 2019)

Moreover, the third website page in this section would be the "People & Culture". In this page, the local community situation and people's lifestyles in Holurua will be specifically stated. It would also come with some nice photos of the local community.

The last but not least, in the "History & Economy" page, the history line of Holurua will be introduced to visitors. Besides, the economy situation of Holurua will also be stated. Some nice images of historical spots will be also included.

7.2.3. "What to do" Section

In the "What to do" section, there will 3 pages that provide users with suggestions about what they need to know and what they could do prior to the trip to Suco Holarua. The website page "Getting to Timor-Leste" supports tourists' methods to come to the country, basically flight details such as where to buy the flight ticket and the duration of the flight. In the page "Learn some Tetum", we will provide visitors some basically communication skills with locals and simple greeting sentences in Tetum for users to learn as per their need. In the webpage "Explore the Village", we would provide visitors with the basic guide of local community's traditional culture including the music they like, their special dance and so on.

7.2.4. "Plan your trip" Section

There are 3 website pages in the "Plan your trip" section, they are "Activities", "Accommodation" and "transport". As discussed previously, "Activities" is the main focus of our website design. In the "Activities" page, Suco Holarua's events calendar will be provided, visitors will see those activities/events/workshops that are uploaded by locals on the website page with explanation and details including the time, photos, contacts and location information.
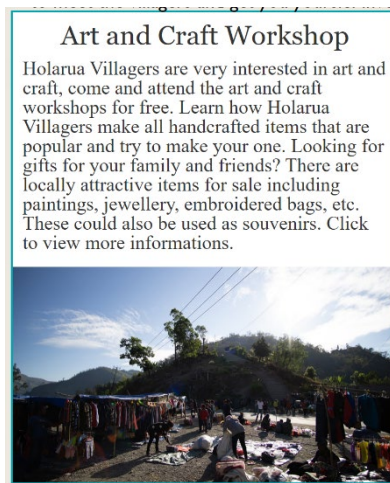

Figure 5: One example of Activities

Furthermore, in the "Accommodation" and "Transport" page, information of local sleep-over residences and local transportation methods will be provided.

7.2.5. "Ask advice" Section

In the "Ask advice" section, website users would be able to contact us through 3 methods: Online Form, Call us and Live chat. In the "Online Form" page, users would be able to submit as many as online forms to give us feedbacks of our website. Besides, both our contacts and local administrators' contacts will be provided on the "Call us" page. They could also start a live chat with us in the chatting active hours, a small chatting windows will pop up on the browser automatically.

Now let's move on to the aesthetic/structure concept, this is important because the overall aesthetic and structure of our website always affect the user's comfort level of the usage. A good layout of website would always make it easy for readers to receive information, grasp the essence of the article

and focus on the main content. Websites with a good layout will also encourage the visitor to view more pages on the site.

7.2.6. Website Logo

For our website to be easily identified and recognized. Our website logo should be designed to be memorable, since this would to help our website gain a real following. We decided to make our logo has a tree and a sun since this would make visitors have a feeling of rural life. This design is more likely to represent the lifestyle of Suco Holarua as well since it is geography located next to forests and locals in Holarua are mainly focus on farming in their daily life. By following the website convention, clicking the logo will redirect user to the home page.

7.2.7. Website Theme

We decided to use soft color for the background of our website since it is a tourism website, a soft color would make visitors feel relaxed and comfortable. Besides, a main color between blue and green is evaluated to be good since this gives visitors a feeling of ocean and forests.

7.2.8. Navigation Bar

Navigation Bar is quite important since it is a clear indication that our website is filled with knowledge and well organized. Good navigation can speed up the viewers search efficiency and attract them to view more pages on the site. For the design of navigation bar, we decided to make it has individual drop-down tabs on the panel which could redirect users to other pages by simply clicking the tab. It would have our website logo on the left-most of the navigation bar and tabs on the right side of the logo.

7.2.9. Footer

Footer is necessary to include in the website design since website footers are holding the purpose of notifying users that this is the end of the page, it helps to catch visitors like a safety net before they hit the bottom of the page hard. The additional purpose of a website footer is to help visitors by adding information and navigation options at the bottom of web pages.

7.3. Local Resourcing Evaluation

7.3.1. Demonstration of locally available materials

Since we are constructing a website, we are not requiring any locally available materials to be used during the design process/construction. However, when the website has been widely implemented on the local community, local people in Holarua will be required materials of network and devices to access the website and get in touch with our team. Locals are also expected to edit, update the website content regularly after they have taken control of the website. Therefore, further research of locally available materials has been done by us with the help of the EWB Challenge Team. Across Suco Holarua, a majority of communities have access to mobile phones to communicate with family and friends. Representatives in the EWB Challenge workshops estimated that approximately 60% of people, mostly young people, use online platforms such as WhatsApp or Facebook. Phone credit can be readily purchased in a variety of packages at shops or kiosks throughout the suco. The network is covered in the main area of Suco Holarua and most of the families in the community have laptop devices at home ("EWB in Timor-Leste | EWB Challenge", 2019). The materials required to maintain the sustainability of our website is locally available. Besides that, for the feature of our website, tourists are expected to get transportation help from the locals, and this is a nice way for locals to make money. We have done a further research of the availability of local transportation sources. We investigated that across the

different geographies of Holarua, transportation methods can take different forms. Motorcycles, cars, microlets, granmax, angunas, horses, and recently a few taxis are available and each suited to a different context or user. Microlets, granmax, and angunas are different forms of shared transportation. Microlets, like minibuses, drive predetermined routes but will stop anywhere passengers require to get on or off. Commonly found in urban areas, community members in Kano village noted that the microlet routes have been expanding organically in Holarua and wider areas are now being served. In addition, local accommodations recourses like hotels and motels are still in its infancy; however, from the discussion with EWB Challenge members in Suco Holarua, tourists are encouraged to live with local families, this not only help tourists to experience another rural lifestyle, but also allow locals to make money from it.

Our design has attempted to work in with the culture and lifestyle of the local people. We have been studied that network has been widely covered and used in the daily life of most of the local people in Holarua. That's means our website design is appropriate to integrate with the local practices. The activities section, which is the main focus of our design has been well-designed to integrate with the culture and lifestyle of local community. Our design allows the local people in Holarua to plan their activities and events which are open for tourists. That means the activities they created are most likely to be well integrated within their daily life. One of the good activities we suggest, and design is farming activity, farming activity not only can be easily integrated with the local practices, but also quite likely to be attracted by tourists. Participants in the EWB Challenge scoping workshops noted that farming was the primary activity which would keep most locals busy across a week. Community representatives also noted that men and women share work on household farms, though might have different responsibilities when it comes to specific tasks (i.e. when it comes time to cook, men will generally get wood and women will get water) (("EWB in Timor-Leste | EWB Challenge", 2019)). That means considering farming as one primary activity in our design and encourage tourists to participate is highly likely for our design to match with the local context. On the other hand, we evaluated that tourists from developing country would be interested in participating farming work in Suco Holarua because they usually don't have the opportunity to learn farming skills and try in their own countries. Overall, we evaluated that our design has been well designed to match with the local context.

In conclusion, we evaluated that locally available materials and resources are enough to support the performance of our website design.

8. INVESTIGATION: PROTOTYPING

8.1. Content of Prototype

Due to the copyright factor, the content required to finish the prototype design needs to be fake and only collected from the EWB challenge website. This has been discussed with the EWB Challenge team, so the only source we can use is the EWB Challenge website. The prototype constructs the overall structure of the website.

8.2. Steps for Construction

8.2.1. Website Theme

Before constructing the website, we need to make the decision of the color used in the layout. As discussed above, soft color is suggested to be used as the background color while a color between blue and green is decided to be used as the color of the website's navigation bar. Here is the main layout of our website:
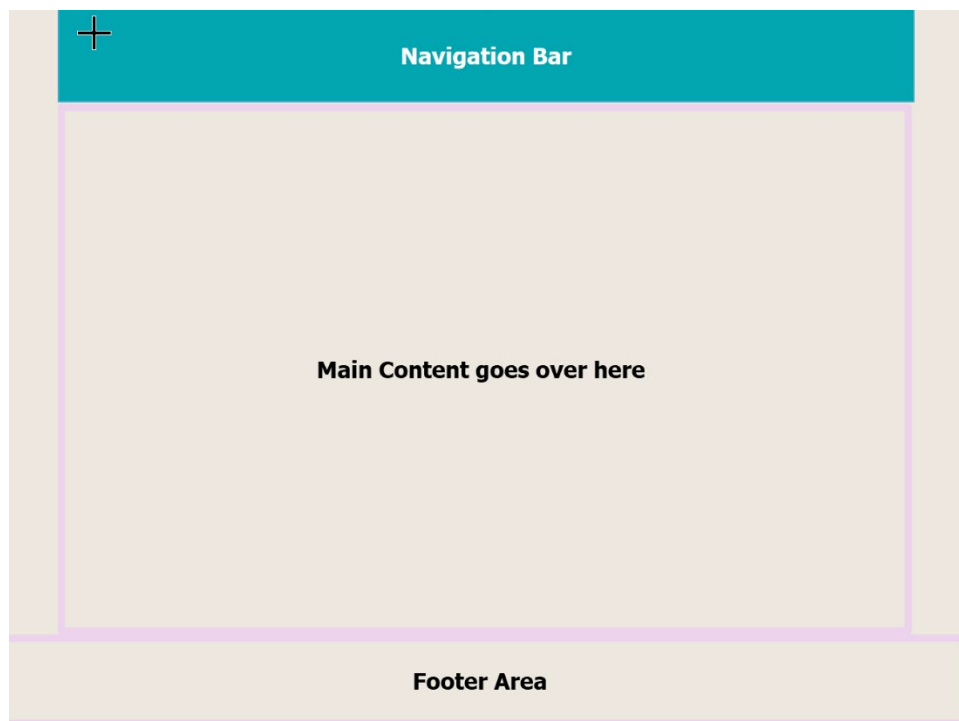

Figure 6: Main Layout of Website designed by us

Font color in navigation bar is decided to be white, this makes users a more clearly view of the content in it.

8.2.2. Logo

The logo has been created through Photoshop. Our logo should let users know that we are a tourism website of Holarua, hence it should contain the word Holarua. To make our logo more memorable, a tree and a sun have been added into the design of the logo. Images of the tree and sun are not created by us but are Copyright Free images.

Figure 7: Website Logo designed by us

We are following a website convention that by clicking the logo, users would be redirected to the home page.

8.2.3. Navigation Bar

Navigation Bar of our website has been constructed and designed through Dreamweaver. As discussed above, it has individual drop-down tabs on the panel when users place their mouse on each section. By simply clicking these tabs, users would be redirected other pages.
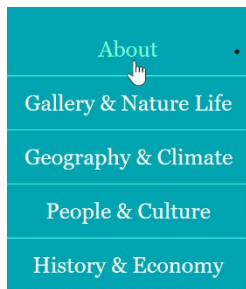

Figure 8: Navigation Bar designed by us
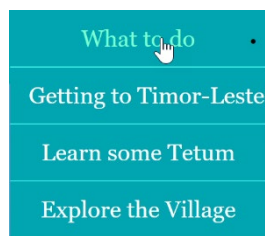

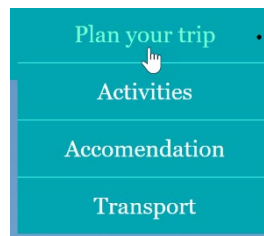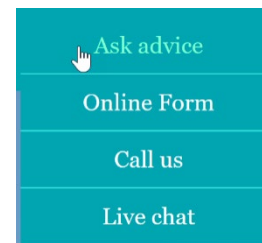Figure 9: About Section   Figure 10: What to do Section   Figure 11: Plan your trip Section   Figure 12: Ask Advice Section

Navigation bar is coded with programming languages of html and CSS. It has been tested by Edge browser.

8.2.4. Footer

Footer of our website will contain the function Back to Up. By clicking that, users would be easily redirected to the top of the page. Besides, it also has navigation options, unable users to direct to About Us, Contact Us and Privacy pages. This is a website convention.
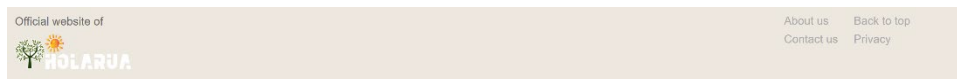
Figure 13: Footer Bar designed by us

Each page in our website has the identical footer and navigation bar.

8.2.5. Home Page & Gallery Page & Geography Page & Explore the Village Page & Activities Page

Due to the time factor and our limited access to the data of Suco Holarua. We only designed 5 pages of our site; however, this enough allowed us to explore key functional criteria for our design.

Home page comes with a profile image of our website, by clicking the profile image, visitors will be delivered to the "Activities" page to plan their trip. It also comes with an introduction video that will be

automatically played as long as users visit the page. The video has been constructed by using the programming language of JavaScript in Dreamweaver. The introduction video has been obtained from the EWB challenge website with their permission to use the video in our prototype design.
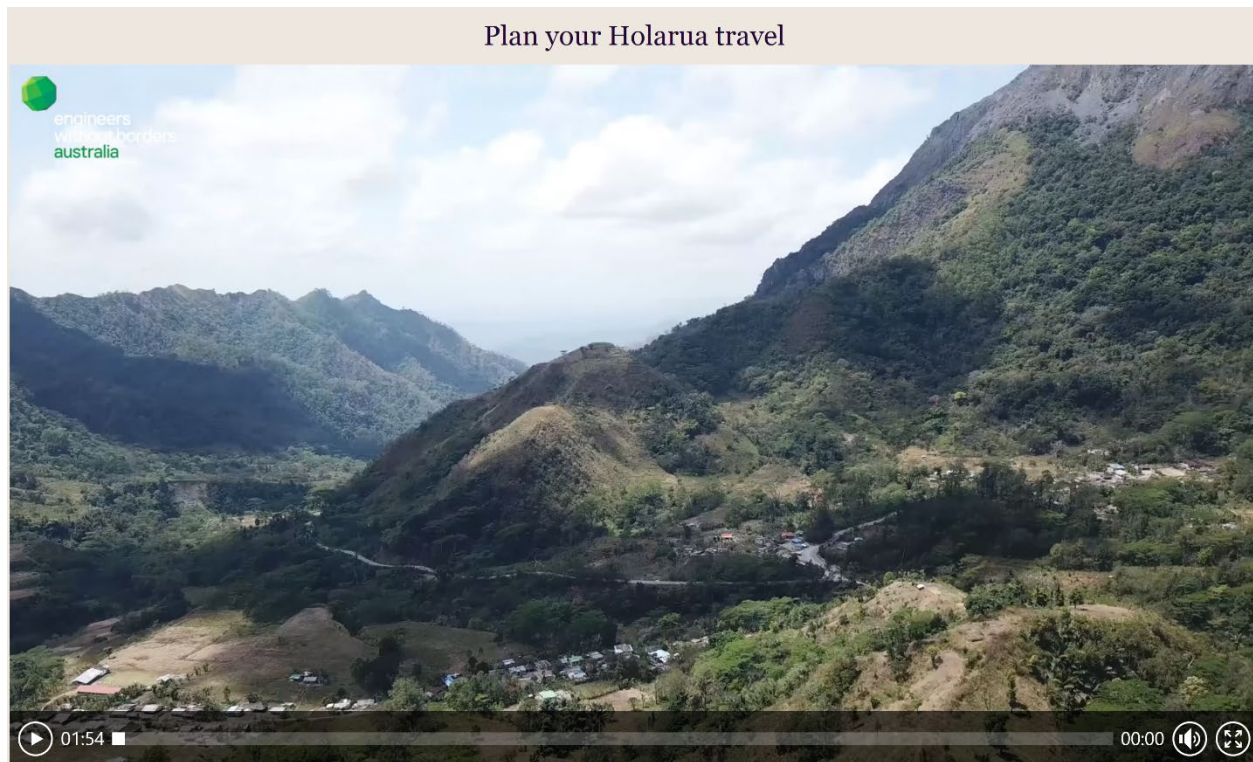
Figure 14: Introduction Video on the Main Page designed by us

As you can see from the above image, video can be easily used by visitors that it can pause the video and control the progress bar as per their desire. In addition, features would control the volume level and go to full screen mode.

On the home page of our protype, there will be an introduction content of Suco Holarua been provided to visitors. The information of the introduction content is obtained from the EWB Challenge website.

Additional features will be added on the home page on our final design.

Gallery page has been designed to provide images of Suco Holarua in a slide-show view on the page for users to view. All images are obtained from the EWB challenge, they have already given the full permission to use the images as per our require. In our final design, images will be taken by locals and uploaded by us on to the website.

Figure 15: Slide-show Effect of Images in Gallery Page designed by us

The slide-show effect has been coded by programming languages of JavaScript, CSS and html through Dreamweaver.

Geography page contains a map showing the geography location of Holarua. By clicking the image, visitors will be redirected to the EWB challenge website for a full view of the Map. In our final design, navigation function will be developed. By clicking the map, users will be asked permission to gain their current location, by clicking the point/destination on the map, navigation function would be automatically enabled. We are planned to use Google Navigator to achieve that since developing our own navigation system is not practical. Furthermore, the BSSID technique will be used to collect users' location and their locations will be automatically saved on the map. This ensures even though they are offline, they are still able to locate their self and view on the map.

Explore the Village page are the page designed for tourists to learn the culture and lifestyle of Suco Holarua. This helps them to have a clear view of the community before attending local activities. In our final design, this page's content will include but not limited to an explanation of the daily life of locals, their traditional dances and songs. Locals are expected to manage the content of this page, we will train them to have the ability to update, modify and edit the data of this page.

The last but not least is the "Activities" section. In our prototype, we constructed a general view of how the page would look like in the final design.

Activities

Suco Holarua's events calendar is loaded with activities, festivals and celebrations to delight and inspire you. Cultural festivals are held throughout the year, giving you a chance to meet the villagers and get you yourslef involved with the Holaura-community.

Art and Craft Workshop

Holarua Villagers are very interested in art and craft, come and attend the art and craft workshops for free. Learn how Holarua Villagers make all handcrafted items that are popular and try to make your one. Looking for gifts for your family and friends? There are locally attractive items for sale including paintings, jewellery, embroidered bags, etc. These could also be used as souvenirs. Click to view more informations.

Biking

We all know that one of the world's toughest bike races that happen in Timor Leste named Tour de Timor. It's around a 500km marathon with it's route varying every year!

Traditional Dance and Music Event

Wanna experience another culture?! Come to the Traditional Dance and Music Event! Learn how local villagers dance and sing, also meet some new friends here. The event is free, a real opportunity for you to be intrigued by experiencing a different culture.Click to view more informations.
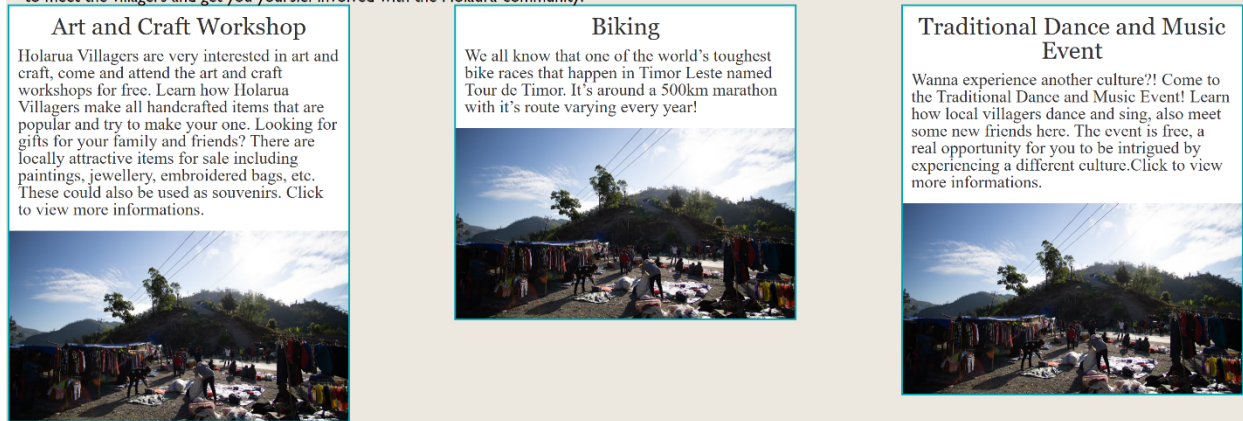
Figure 16: Activities section designed by us

The above image shows the look/layout of the section in our prototype, each section/square represents an activity. In our final design, each activity will be uploaded by the local event manager and appeared on the website. For the activity to function well, it follows a procedure of 3 steps. Step 1: Locals plan and arrange the activity; Step 2: Locals submit the activity plan to the local event manager; Step 3: After the plan has been approved then detail will be uploaded to the website in English by personnel. Activities will be required to be uploaded at least one day prior to the start day.
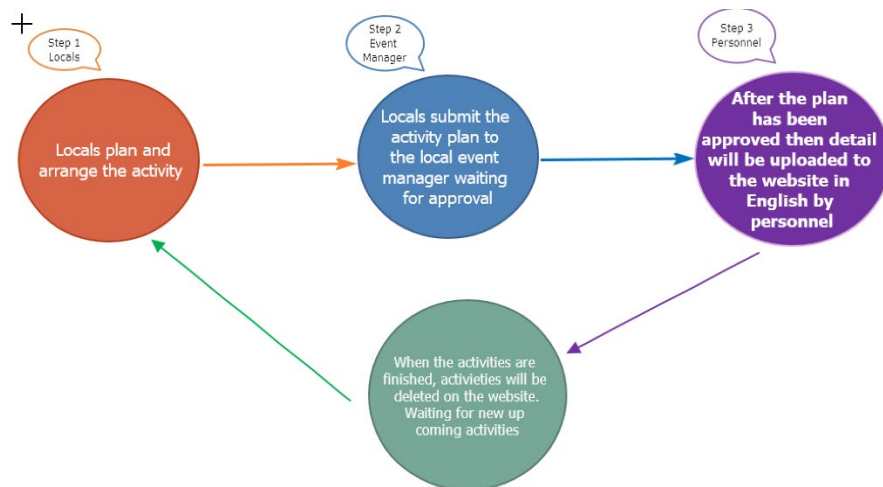

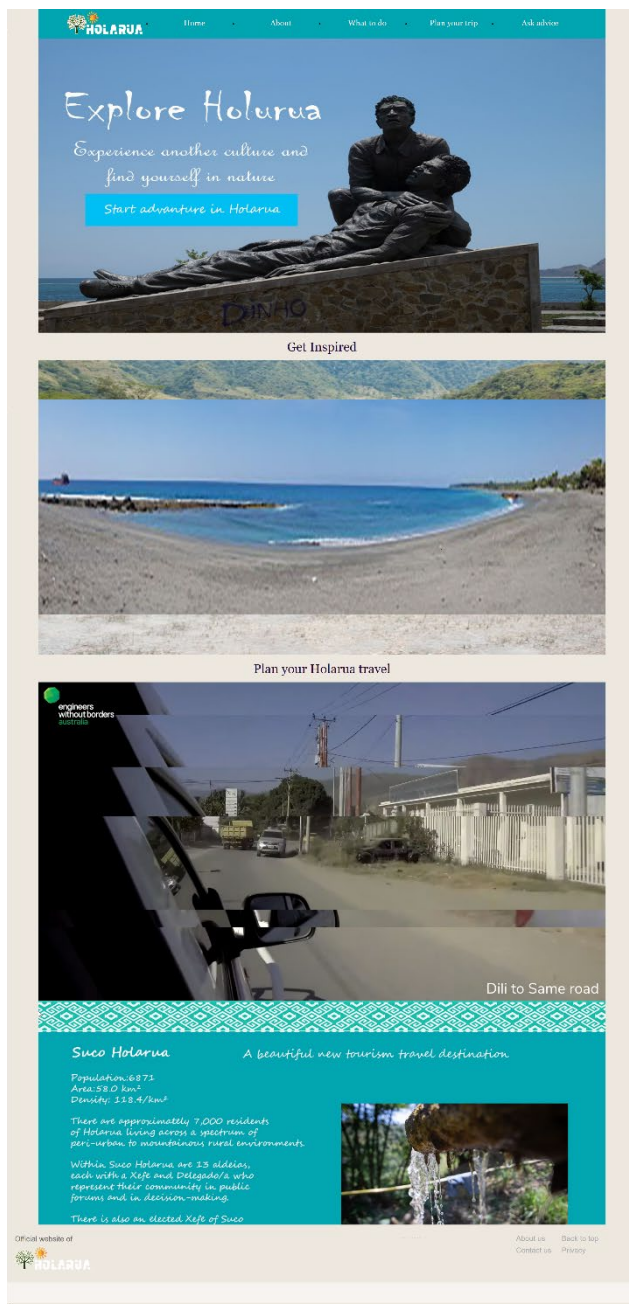Figure 17: a flow of the procedure

8.3. Results

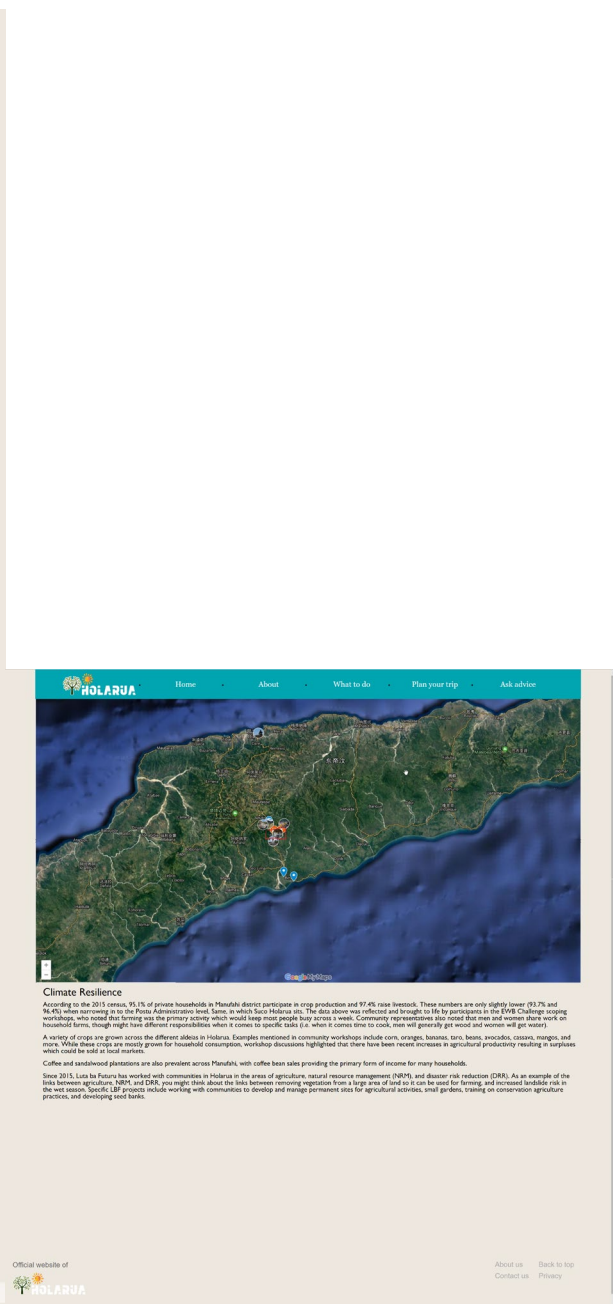Figure 18: Prototype Home Page

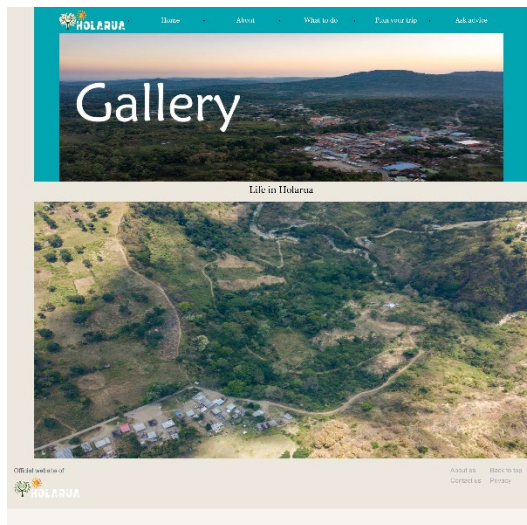Figure19: Prototype Geography Page

Figure 20: Prototype Gallery Page
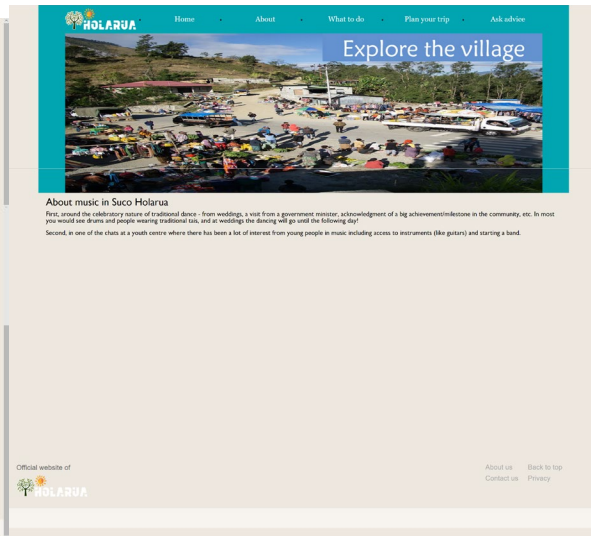
Figure 21: Prototype Explore the village page
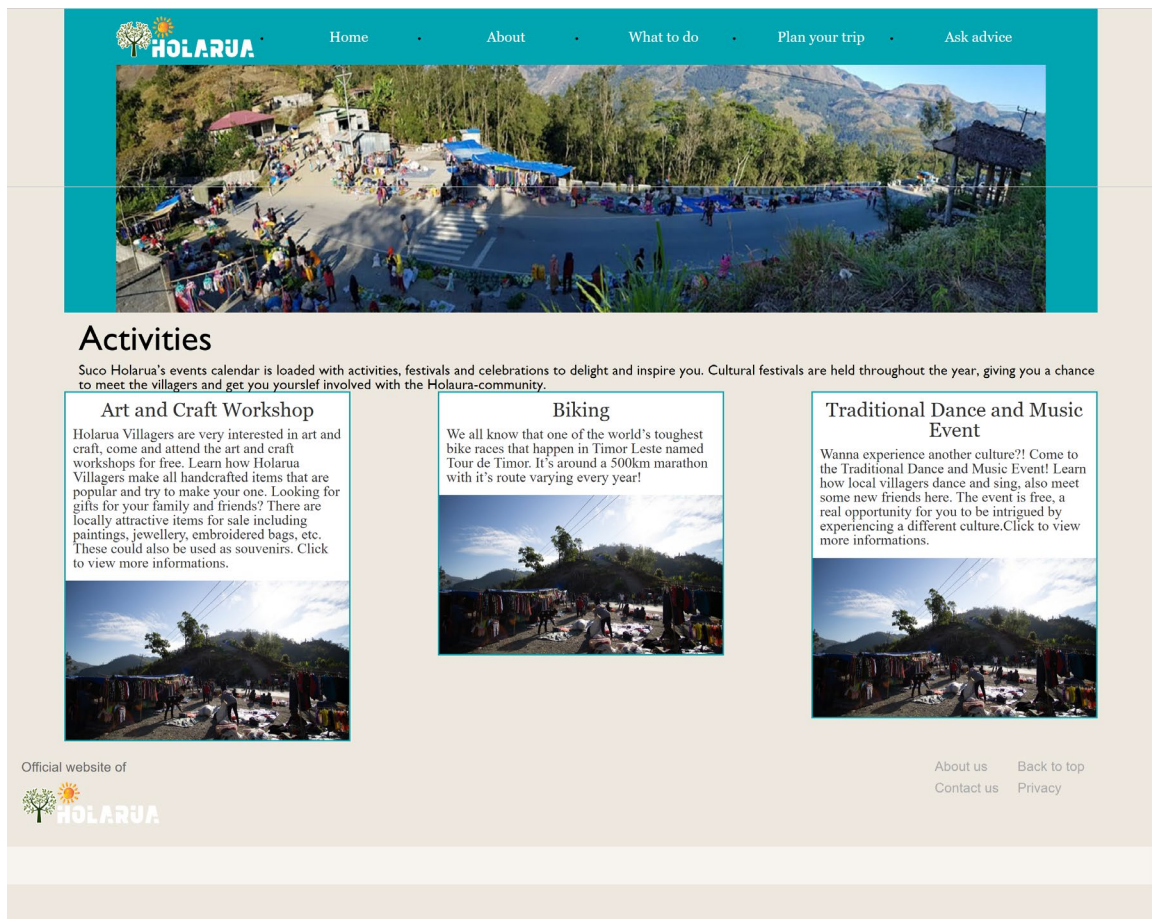
Figure 22: Prototype Activities Page

8.4. Final Design Solution Technically Sound – Final Evaluation

Our proof of concept prototype was limited in regard to our limited access to both local community and Copyright considerations. Thus, our prototype was not fully functional to meet the final design summary as discussed in Section 7. Nonetheless, by developing of process and considering the local resources that has been confirmed form the EWB Challenge Team, our protype consists of the most important functions that required in our final design and considering that our protype has been successfully achieved by us in few weeks. Hence, we are confident that our final design solution will appear technically sound.

9. PROJECT REALISATION

9.1. Website Construction

The website will be created with Adobe Dreamweaver, provided by Adobe Systems for construction of the website. We have already finished the frame of the website, and the following steps will be to collect information from the local villages and update them onto the website. As the website is designed to be a long-term website, we also need a data collection and storage system. Due to our consideration, we will use Microsoft Office Access, provided by Microsoft Office. It is a professional database software and is stable and easy to learn, which meets our requirements, just as Dreamweaver. Additional support such as Operating System will also be considered. However, as HTML is well supported in nearly all widely used Operating Systems, we will not treat is as a big problem in the construction stage. If problems arise later, we will further consider it according to users' feedback.

9.2. Financial Considerations

9.2.1. Funding and Partnership Considerations

In order to successfully implement our project, we need to look for investors. We have developed a two-fold funding plan, which involves seeking investment from private companies and local government. The final purpose would be improving the local villages' life and income, so the ideal first investment will be the local government, or the local community in order to make sure of fair distribution of the profit taken by the project. Of course, considering that the whole community is not wealthy, we will try our best to reduce the start of the investment. As the community makes a profit from the project, then they will be able to increase the funds and further perfect the website.

To achieve the goal of saving the community's funds, we also desire to take investments from private companies. According to TTS (Travel Technology & Solutions)'s research, technology, especially the Internet has changed the traditional tourism industry a lot. However, travel agents still take the major part of the market as they are usually more reliable ("The Impact of Technology on Travel Agencies | TTS", 2019). It is every travel-related companies' expectation to develop new travel lines as every new destination means additional potential profit. So, for promoting our website, we plan to collaborate with the local car and taxi rental companies and also with the airlines that fly to Timor Leste like Qantas. We would expect the companies to display our website as an advertisement on their websites or the car rental booths and for their advantage, we would make an online portal on our website so that tourists can book flights, buses or taxis online through them which would bring them more customers.

9.3. Establishment of the website

9.3.1. Timeline

Stage 1

In this stage, we will develop the websites for the project and get connected with the local community to communicate with the project. We will get the initial data for the website and develop some activities for the early stage of the project. Also, start funds for the project are required for purchasing equipment

and essential technology services, including computers, internet access, website host, licenses of software and so on.

Stage 2

After the website is ready and able to push online, we will take the prototype to seek cooperation with travel agents, airline companies and local travel-related service providers. Also, in the local community, volunteers will be recruited in this stage. As in this stage, the project is still unable to make profits, wages may not be guaranteed for them, volunteers who are able to speak English and take charge of the tourists are very important.

Stage 3

The stage has the website officially under operation, and some tourists come here by the advertisements of Suco Holarua. Volunteers would arrange accommodations and travel activities for them and collect feedbacks to improve our websites, activities and services. At the same time, the volunteers also train the villages to manage, maintain and update the websites. The local villages begin to take charge of the project step by step.

Stage 4

In this stage, the tourist's number increases, and more and more activities are hosted and introduced on the website. Related industries such as accommodation and restaurants begin to make a profit. Villages who have free time take part in the project and the whole tourism industry develops at a fast speed.

Stage 5

The project is self-operated, and the community is able to take a stable increasing income from the project. The travelling experience gets better, and more tourists are attracted. The whole community's economic situation improves, and the project can be further copied and introduced to other communities and hopefully improve the whole country's development finally.

9.4. End of life plan

Even though we want the project to be run for as long as it can, there are also some situations that the project's life comes to an end. This may happen so we also take it into consideration. Luckily, our project does not take too many investments and except the computers, all other use of funds is period-payment. They can be ended at any time if the project is no longer to be under service. The computer can be sold, and the community can get a refund for its investment. Other software licenses can be just ended, the project no longer pays that is all right. And for the advertisements by other cooperative companies, we give them notifications in advance to end the cooperation.

9.5. Risk analysis and assumptions

The project is not perfect, and we have to take its risks into consideration and get prepared for that. In every stage, we have different challenges and some of them may even prohibit the project from

promoting to the following stages. According to our analysis, the risks come from two aspects, hardware damage and industry competition.

For the first stage, there are not too many risks, as the project is not formally run. Even some data loss due to unexpected technology malfunction (such as the operating system breakdown) during the construction of the website, we can still do that part again. In this case, just another time is required, and by saving the website process time-to-time, we can obviously reduce these risks.

However, when the website has been pushed online, the breakdown of the system will be a very serious problem. Firstly, the website will be unable to access, and if this last for a long time, tourists will be disappointed with the website, and potential tourists may lose due to this. Also, unsaved data such as blog and advice will lose, and this is much more critical compared to the first one. After the system crash, a restart of the computer can restore the access to the website, and as there will be people taking charge of the website, it will not take long to discover and fix the problem. While the loss of web data may lead to tourists' unsatisfied experience. For example, if a tourist applies for one activity and the website breaks down, we may not receive the application and there will be a problem when the tourist comes. Moreover, when the number of tourists increases, more people will visit the website and the website's capacity will be a new problem. One solution for this is that we buy a better computer at first, or even a server ideally. But it is too expensive and voids our proposal for reducing the initial funds. So, our preferred will be renting server online. There are a lot of online server rental services now. We can choose a reliable provider like Google, as their service is much more stable and can save a lot for the hardware we need. By this method, our computer is only required for accessing the online server, and therefore the standard of configuration decreases and the possibility of data loss is reduced. Even though that happens, we can get compensation from the service provider, that minimize our potential loss due to that. Also, when the visit pressure exceeds the server's limit, we can simply upgrade our rent package instead of buying new computers or server.

In the following stages, there are potential competitions from other travelling agents. This is not a big challenge, as there are not such travel lines in Timor-Leste, we are not likely to be conflicted. In other words, we can seek cooperation, which not only make promotions for us but also expand their business. It is a win-win situation and we believe that they will not refuse us. Just in case that it is hard to make cooperation with international companies such as Qantas at first, we can contact local companies initially, and after we have shown our potential value, it would be easier to get collaboration with travel agents and airlines.

In the final stage, if the project is widely copied in Timor-Leste, competitions between Sucoes seem to be certain. At that time, it goes beyond our project, but our suggestion is that different Sucoes unite and make a national travel website. That would need the government's intervention and we believe every Suco can make a profit from union instead of loss from competitions. At that time, it will be a good ending for our project and Timor-Leste's tourism will be well-developed.

10. IMPACTS ON COMMUNITY

10.1. General overview

The essential purpose behind our project is to bring more tourists to Suco Holarua with the help of making a travel website to support the tourist experience. Our project will change the lives of the whole community, no matter what their job, gender or background is. This is because our project improves the community's wealth instead of some particular individuals' wealth.

The ()'s research shows that nearly 50% of Timor-Leste's population is under the poverty line and the situation is more serious in rural areas such as Suco Holarua. As tourism requires much less investment than manufacturing and other industries, the community shows a great interest of it and expect it to improve the local's lives as well as share its culture and history with the whole world.

Additionally, by bringing more tourists here, there will be a chain reaction that creates lots of benefits in the way of life for Suco Holarua's villages such as in social, economic and environmental aspects.

10.2. social impact

10.2.1. Cultural understanding

One of the social benefits of tourism is the understanding it engenders between tourists and hosts. Differences certainly exist between various countries' cultures. Even within countries, there is a difference between one part of the country and another part of the same country. Cultural communication between Suco Holarua and tourists all over the world can be a source of pride for their community. It allows them to look at their cultural heritage and history, and furthermore develop their own community identity. It may help them save local heritage sites from destroying and arise their awareness of maintaining their culture and traditions that they are forgetting (Morton, 2018). While at the same time, a better-presented culture may be more attractive to the tourists and help the promotion of our project.

10.2.2. Job opportunities and alleviation of poverty

Different from nowadays' manufacturing industry, the tourism industry is a very labor-intensive sector without doubts. This means more job opportunities as an increase in the number of tourists have to correspond to the number of people needed to cater for the needs of tourists. After jobs are created, the job position created also needs to be filled with people. More jobs result in more employment. For that 20 % who is unemployed, taking up such jobs get them to earn money and be able to put food on the table for their families ("Timor-Leste Economy: Population, GDP, Inflation, Business, Trade, FDI, Corruption", 2019). Parents can get their children to school and the citizens are able to pay their bills. Poverty generally is reduced, to a certain extent, where tourism flourishes.

10.3. Economic impact

10.3.1. Tourism activity creates demand

What is the industry? Group of companies producing goods and services for consumption. In other words, demand appears, and many companies try to provide goods or services for consumption. Tourism is one such industry that demands are created by tourists. There are two basic needs that tourists demand. One is the desire or curiosity to visit and see different places, experience different culture and lifestyle. Second is to travel. Travelling is an effective way to receive a good mood and have

become a basic need for today's people ("HuffPost is now a part of Verizon Media", 2017). All these needs create demand for travel and transportation services and products.

10.3.2. Tourism Industry spreads & meets Demand

The tourism value chain is created based on the above three requirements, which create the demand for different products and services. However, this value chain also means that tourism not only creates the needs of one or two industries but also many different industries. From an economic growth perspective, this is important because it can provide income and other benefits to these industries, such as job creation.

Figure 23: Table of Travel & Tourism created by us

Upon arriving, tourists demand begins. In the very first place is a need for stay & accommodation, food & beverages. Follows that comes transportation and local travelling. Also, during their stay, shopping and tourist sites would be needed. All these demands are labor needed, which means in every stage of a tourist's travelling, various industries are boosted.

10.3.3. Tourism brings development

To consistently attract new tourists, it is a must for the community to improve its tourism market and create improved infrastructure. For years World Economic Forum (WEF) has been monitoring the tourism competitiveness of countries and their growth and progress towards being a competitive inbound tourism market (Thakur, 2019). These are the key factors that they conclude which contribute to a country's tourism. It shows that only a complete growth and development across multiple industries can bring growth in tourism. This will stimulate the country to improve its countrywide environment to make more profit from tourism.
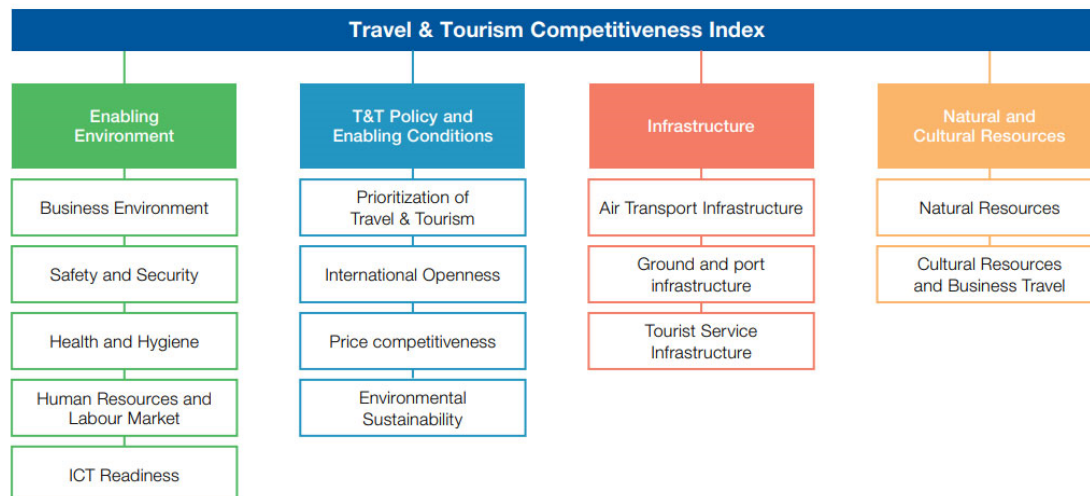
Figure 24: Table of Travel & Tourism Competitiveness Index created by us

10.3.4. Tourism stimulates the consumption

As we have talked about above, tourism creates demand for the economy. The tourists all want to thoroughly enjoy their tourism time. So, there is not a certain limit of how much the tourists would spend and what services or products they want. Like if you have planned to travel to some space then you may also want to take some time off to visit some nearby local places. Therefore, you may hire some local transport, visit some local markets, buy some souvenirs, try some local food, etc. So, it is very natural that a tourist would spend more than their plan during their journey, and it is what our project wants to grab to cut in.

10.3.5. Tourism contributes to national GDP

According to WTTC (World Travel & Tourism Council)'s statistic in 2019, travel & tourism growth keeps faster than the overall growth of the economy for the eighth year ("Travel Tourism continues strong growth above global GDP", 2019). As the GDP per capita for Timor-Leste is only 1187 in 2018 and the tourism credit experience a decrease, it will be a good idea for them to make investments in tourism industries which will stimulate the economy in multiple industries and help the country's depressed GDP ().

10.4. Environmental impact

10.4.1. Awareness of environment protection

As a problem in many developing countries, their efforts are put into developing and ignore the importance of protection. Take Suco Holarua as an example, they do not have a waste management system right now, and nearly most of its waste is put away in the natural environment. This may come from their behaviors, as the century's before, it is what all people do. However, times have changed, nowadays, a lot of waste are made of non-degradable material, it is pollution for the environment.

Tourism may help with this in two aspects. When tourism makes people more closely connected with nature and environment, it is possible to improve public awareness of the environment protection and spread awareness of environmental issues. This confrontation may raise people's awareness of natural values and lead to environmentally conscious behaviors and activities to protect the environment. For

example, Honduran schoolchildren from Tegucigalpa, the capital, are routinely led to visit the la Tigra cloud forest tourist center, which is partly funded by eco-tourists to understand the complexity of the rainforest ("Environmental Impacts of Tourism", 2019).

If sustainable development is to be achieved in the long run, tourism must be integrated into the principles and practices of sustainable consumption. Sustainable consumption includes the establishment of consumer demand for products produced using cleaner production technologies and for services, including tourism services, which are provided in a way that minimizes the impact on the environment. Tourism can play a key role in providing environmental information and raising tourists' awareness of the environmental consequences of their actions. Tourists and tourism-related enterprises consume a large number of goods and services; turning them from cradle to grave to use products produced and provided in an environmentally sustainable way may have a huge positive impact on the earth's environment.

10.4.2. Environmental management and planning

Good environmental management of tourism facilities, especially hotels, can increase the benefits of nature reserves. However, this requires careful planning for controlled development based on an analysis of the region's environmental resources. Planning helps to choose between conflicting uses or find ways to make them compatible. By planning the development of tourism as early as possible, we can prevent damaging and costly mistakes, and avoid the gradual deterioration of environmental assets of great significance to tourism.

Cleaner production technology can be an important tool for planning and operating tourism facilities in a way that minimizes the impact on the environment. For example, green buildings (using energy-efficient and pollution-free building materials, sewage treatment systems and energy) are increasingly important ways to reduce the impact of tourism on the environment. And since waste treatment and disposal are usually the main environmental problems existing in tourism for a long time, pollution prevention and waste minimization technology is particularly important for tourism.

10.5. Intersection of impacts

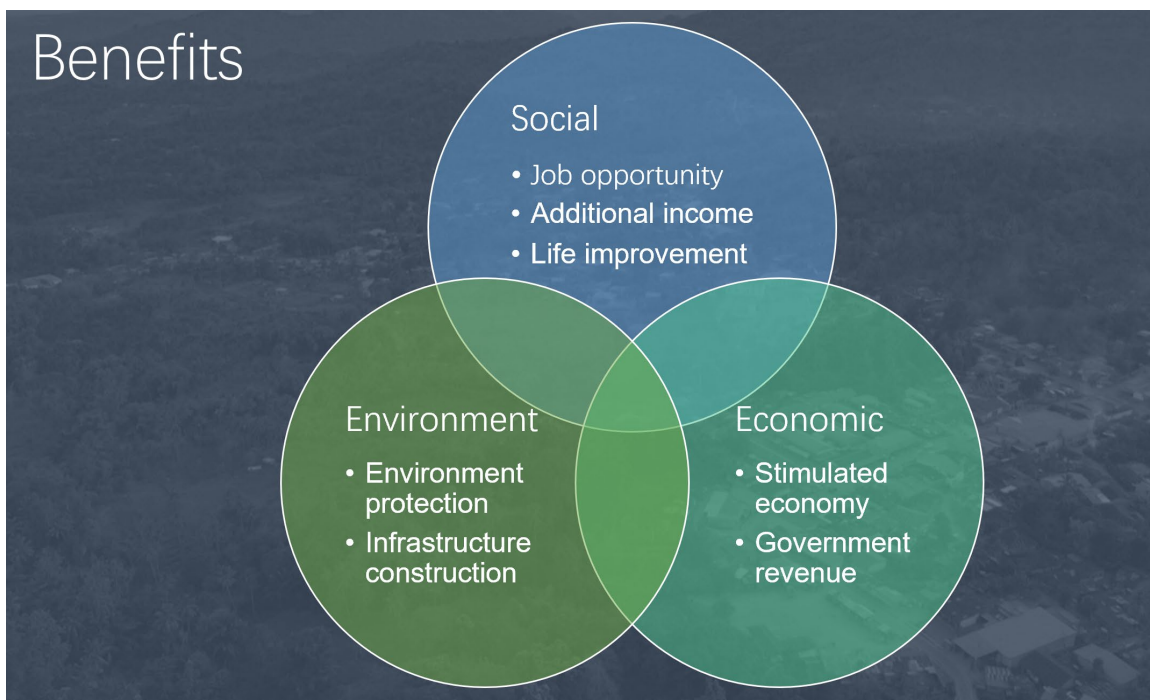Figure 25: Flow diagram of Benefits created by us

Figure 26: System Diagram of Benefits created by us

11. LOCAL CONTEXT CONSIDERATIONS

11.1. Culture Consideration

With our project, we have done our best to achieve the best-suited solution for the community by taking our time to create benefits in all aspects, which are social, economic and environmental aspects. The benefits might be well centralized within the tourism industry, but this would have an impact on other industries and people as well. There would be industries which would try to match up the progress, there will be people having a better quality of life and it would also give a morale boost in the livelihood of the people. As per our research, we have found out that Suco Holarua is a slow-paced community. They take time to adapt to change and due to this, there have been quite a few failures in the past as well. So, our project would have an interactive element to it so that the locals could engage with it easily and ab able to adapt quickly.

Our project has been designed to serve everyone equally. It is neither targeted at the rich nor the poor. All the benefits which follow our project would be aimed to be equally distributed among everyone. There is a possibility that upon launching of our project it may benefit the poor people first but slowly it would all be at the same level. This is an important factor to consider since lots of mentors ask us about that; hence we decide to get it be further discussed in the Equity Considerations section below.

Furthermore, upon implementation of this project into the community, we need to make sure that it has a design which compliments the cultural and social routines of the community. We need to be well aware that our team's background is very different from the Holarua community, and what may seem to be the way to go for us might be for them as they would have a completely different perspective and mindset. We need to evaluate the specifics properly and make a flexible design which can suit the community needs perfectly. This also requires getting over our cultural norms and beliefs and solely become one with that of the community to improve our project.

In addition to this, this system will be effectively adopted by the community as it is completely online, and according to the stats found on EWB Discussion's page, the number of people that own their device which is connected to a network is fairly high in Suco Holarua. So, the people could be anywhere at any time and without any hassle or disturbance to their schedule, be able to access our tourism website easily.

11.2. Equity considerations

Within our design, we have tried to make a fair solution for all members of the community.

Although many of the benefits arising from our project have been stated, one problem the local may concern how does the project make distribution of the profit. None of us expects to see that part of the villagers take most of the revenue, so this is the reason that we select the community to be the first and initial investor. The community knows its people best, so we want it to take control of the project. Then it can allocate job opportunities to those poorer first and takes a portion of the whole profit taken. Reallocation is always fairer than the villages directly take the money. Instead of direct income from the tourists due to accommodation and other services, we let the tourists pay to the management team, and the team then pay to those catering the tourists as wages.

The advantages of this distribution method are that most of the villagers are poor, and maybe not able to make the initial investment of accommodation like improving the condition of their house or

providing food. The community then can collect the fund and do that for the villages, and the villages can earn stable income without investments.

Also, if individuals take the funds and revenue, they may not willing to take it out when it comes to constructing the infrastructure and it is unfair for those who still do their previous work such as farming to support the community. This is not positive for the harmony of the community. While if the community take the revenue, it can concentrate their power on doing big things like environmental protection and infrastructure construction. Furthermore, the community's ability to allocate the tourism revenue can provide more help to the poorer first and avoid the situation that the rich get richer and the poor get poorer happens.

Hence the equality considerations of our project take place at the very first stage of our design that focus on improving the whole community's overall wealth.

11.3. Appropriateness of our project

In addition to the considerations of fair distribution of our project, we have also considered the appropriateness of our project, in other words, whether the community would accept the project that brings more tourists to their community. This is a significant factor in developing our project as the support from local villages is essential for the website running in the long term.

We have received the information from EWB Challenge organization that the communities across Suco Holarua have expressed great interest in growing their capacity to bring tourists to their communities, with a particular focus on locations of historical and cultural importance. (EWB Brief) This is a positive condition that shows the local's willingness to share their culture and history and communicate with the outer world. So, we suppose sufficient support from the local villages to our project.

Of course, it is a point that we should be careful of showing respect and understanding of the local culture. That is the base of culture communication and is also very important. We will display related information such as Timor-Leste's cultural taboos on our website and provide them to our corporations to remind the tourists of it.

12. REFLECTION OF THE LIFE OF OUR PROJECT

12.1. Community consultation

Community consultation is an integral part of the success of our project. To involve the community and seek their views on the project, we need to have active interactions with the municipality's authorities and the local communities not only during the lifetime of the project but more importantly at the time of starting the project.

The community consultation would need to be done in three phases.

First, the municipalities authorities and the local communities need to be brought on board the project through interactions with people holding important portfolios within the administration and local communities who can further convince people around them. This is essential for making a strong first impression of our project and to get a stand so as to be able to prove the authorities the worth of our project. If we are unable to influence the community in using our project in the first impression, then it would be very hard to make a comeback. We need to come out strong because otherwise who wants to use something which is right out in the market and doesn't have any background as such?

For implementing the project and capacity building, the locals need to be educated and trained to utilize the project's internet website /application through skill enhancement camps since the project involves active participation by the locals through the internet to handle tourists' requests. Also, as Suco Holarua doesn't have much access to digital resources (except than having mobiles), we would be providing them with a laptop and an internet connection to start off with. We would expect them to start investing in this on their own when they do start earning benefits from the project. Moreover, to keep the content of the website to be up to date, the ideal plan would be creating a blog page and encourage travelers who have been to the village to share their trip experience and travel plans. If the tourists provide valuable advice or recommend his experience to others, they may get a discount on their next trip. We would also try and collaborate with the local car and taxi rental companies and also with the airlines that fly to Timor Leste like Qantas. We would have the companies put up our advertisement on their websites or the car rental booths and for them, we would make an online portal on our website so that tourists can book flights, buses or taxis online through them which would bring them more customers. When it comes to the market, the first year of the project will be a promotional period and a lot discount will be provided for those who are willing to visit. It wouldn't be aimed to make a profit but rather the goal would be to publicize the website. The website at first might actually have to consume most or even all of the funds that are made by tourism but in the following years, the profit will slowly increase, and hopefully, it can offset the cost of the promotional activities and soon, Holarua would become known travel destination and local villages would be able to gain income from tourism.

There has to be a feedback mechanism wherein the administration/municipality authorities and the locals can provide suggestions/inputs to improve the implementation of the project throughout the lifetime of the project. This would help us to keep the information up to date and also regularly modify it so as to make it suit the lifestyle and culture of the locals. Only when our project flourishes and works in accordance with the communities can we also think about expanding it further.

The strategies for communicating a design proposal would also play a key role in the success of this project. Once the project starts reaping fruits in Suco Holarua, the strategies need to be implemented in other sucoes of Timor Leste based on an assessment whether the same strategies can be fruitful in other regions too as per the feedback that would be received from the administrative and the local communities.

12.2. The Future

As mentioned earlier, this project would start off with a very specific audience at first i.e. we would be targeting the potential tourists in Australia to visit Suco Holarua. We would be constantly receiving feedback and will keep improving our design to suit the community better. After our project hits the benchmark threshold that we have planned, we would start to expand it. It won't just be the tourists that are coming but also the tourism spots. We would one by one target different countries that are on our list and try to attract tourists from there. Also, instead of just sticking to Suco Holarua we would start expanding all around it till we cover the whole of Timor Leste. We haven't even decided or thought about our plans after covering Timor Leste but as of now, that's it. Furthermore, we would try and keep cutting the cost to make the project even cheaper so as to make the project more beneficial. Also, when we were going through the EWB Discussions Page then there were a lot of ideas which were unique and seemed to be effective but hadn't worked out well. Therefore, after successfully being able to handle one project we are sure to have had gained enough experience to run more projects, so we are going to invest some money in existing projects that failed to come to light or just lacked just marketing and would try to make them viable also.

13. CONCLUSION

One of the important issues faced by Suco Holarua has been to grow their tourism industry. Tourists are a means of economic growth to any country and also do open a lot of job opportunities but Suco Holarua doesn't seem to be getting any. They have many places of historical importance which goes hand in hand with a culture of their own. As tourism is very low here, the exploitation of these historical places by the tourists have been minimal, maintaining a natural feel to it (Utterdahl, 2019). Our project will make tourists aware of this place known as Suco Holaraua and will try to get the tourism industry up and back in action.

For our project, we would be creating an easy to use website which would all the information that one needs to know about Suco Holarua. It would also have pre-booking facilities available so interested tourists could directly start planning their trip from our website. Moreover, to give them a real insight into the experience, our website would even host a blog where travelers could put in their experience. This would make it fairly easy for any visiting tourist to know their way around Suco Holarua and have an enjoyable experience.

This project would not only boost the tourism industry but have a holistic impact on Suco Holarua. It would flourish the lifestyle in every aspect including social, economic and environmental. There will an improvement in the quality of life which would also make every person emotionally and mentally healthier.

Our key steps to realization include researching, development, and prototyping. The important key to success would be to influence the communities and make them understand the benefits and effectiveness of our project. We wouldn't be targeting just the authorities and developing something which they would be more inclined to use but rather we would keep in mind the need for each individual and develop something which benefits everyone. We have also designed pictorial pamphlets which would let the public know about our project and hopefully would also make them a part of it.

Appendix A - List of Initial Design Ideas

1. Building a kit which could be used at home to test the percentage of E-coli in water.
2. Creating an app which would help farmers connect with the vendors to ensure timely transportation and preventing crops from rotting.
3. Greenhouse powered by solar cells which would have the ability to store energy. Also the temperature inside could be changed as required by the plants that are growing.
4. Creating a platform to help and support people with disabilities. A system which would enable them to find a volunteer who is available to help them in the task they have specified.
5. A mobile application to support tourist experience.
6. A database-driven website to support tourist experience. A website focus on collecting useful and helpful data of Suco Holarua and provide the data to tourists through the website efficiently and easily.
7. A weblog website to support tourist experience. A website focus on letting the website has the ability for tourists to share their trip experience with others and creating a link between locals and tourists
8. A website to support tourist experience. A website focus on letting tourists experience the local lifestyle and culture of Suco Holarua and provide them with an opportunity to meet locals through Events & Activities & Workshops.

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