The Pacific Region
The University of the South Pacific
(USP)

FINAL REPORT
ON
THE DATA COLLECTION SURVEY
FOR
THE DISTANCE LEARNING SYSTEM
AND COMMUNICATION NETWORK
OF
THE UNIVERSITY OF THE SOUTH PACIFIC
IN
THE PACIFIC REGION

MARCH 2022

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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Summary

The purpose of this data collection survey (hereinafter referred to as “the Survey”) conducted by the JICA Study Team (hereinafter referred to as “the Team”) was to investigate and analyze the current state of USPNet at the University of the South Pacific (USP), and to examine the direction of JICA’s future assistance to USP, taking into account the budget of USP and other donors such as Australia and New Zealand, and the possibility of future collaboration. In addition to the above, the Survey aimed to make a simple proposal for assistance in the field of digital transformation (DX), which is expected to have potential in Fiji in the future.

This final report presents information on the results of the survey on USP distance learning system (Chapters 1-4), the results of the survey on the DX field in Fiji (Chapter 5), and recommendations for evaluation, verification, etc. (Chapter 6) on matters for which confirmation is limited due to survey limitations. A summary for those is provided below.

1. Overview of Education Sector in the Pacific Region

(1) Regional Overview

The Oceania region is a large area on the Pacific Ocean, and is one of the six geographic regions of the world. The total land area of all of the island countries, excluding Australia and New Zealand, is about 530,000 km^2, while the exclusive economic zone of these countries is about 20 million km^2, meaning that the land area is only about 2.6% the size of the ocean area. The islands are spread out over a vast area of the Pacific Ocean, and the distances between them are extremely large. Therefore, the island nations of the region are characterized by remoteness and isolation, in addition to their maritime nature and narrowness.

The 9th Pacific Islands Leaders Meeting (PALM), held in July 2021, discussions focused on areas such as the response to the new coronavirus infection (COVID-19), sustainable oceans based on the rule of law, climate change and disaster prevention, and human exchange and human resource development. The general direction of Japan’s assistance to the island countries of Oceania includes disaster prevention, human resource development, environmental conservation, marine resource management, and support for economic activities (infrastructure such as roads and ferry vessels), which were also topics of discussion at the 9th PALM.

(2) Overview of Education Sector in USP Member Countries

Twelve USP member countries in the Pacific together govern USP, the focus of the Survey, for the purpose of human resources development, with tertiary level qualifications through regional university campuses and centres, i.e., tertiary education institutions. Some of those who complete their secondary education in the Pacific region go on to higher education or training, but because of the limited opportunities for higher education in the Pacific region, many go on to higher education institutions in Australia, New Zealand, and the United States (including Hawaii). There are only six tertiary education institutions called "University" in the USP member countries, as shown in Table 1. Therefore, opportunities for tertiary education provided by the five other universities and USP are highly valuable, considering that there are only a few available institutions in the Pacific.

Table 1　Universities located in USP member countries

No.	University	Type of operation	Location
1	The University of the South Pacific (USP)	12 member countries govern USP together	12 countries/regions including Fiji
2	Fiji National University (FNU)	National university	Fiji
3	University of Fiji (Uni-Fiji)	Private university	Fiji
4	National University of Samoa (NUS)	National university	Samoa
5	Oceania University of Medicine (OUM)	Private university	Samoa
6	Solomon Islands National University (SINU)	National university	Solomon Islands

2. Current State of USP

（1） University of the South Pacific (USP) Overview

USP was established in 1968 and is now governed jointly by 12 countries and regions. That its governance spreads over international boundaries is rare. The legal constitutional documents of USP are its Charter and Statutes. USP is unique in that its highest governance body, the university Council, is mainly composed of representatives of the member countries, mostly the ministers of education or the equivalent. The Council meets twice a year, in mid-May and in the first week of November. Day-to-day administration of the University is carried out on behalf of the Council by the Vice-Chancellor, who is the University's chief academic and administrative officer.

Education programmes are offered in the distance education format at various USP campuses and centres in the 12 member countries. Each of the 12 member countries has one regional campus, except for Fiji, which has two regional campuses, Lautoka and Labasa, in addition to the main campus at Laucala.

The total number of students at each campus exceeds 17,000[1] in terms of EFTS as shown in Table 2. The fact that about half of the students are part-time students[2] who study and work at the same time. It reflects an important role of USP as a lifelong education institution.

Table 2　Number of Students by Campus (EFTS)

Campus	2019	2020
Cook Islands	51.7	55.3
Fiji - Labasa	626.6	623.7
Fiji - Laucala	10091.9	10356.2
Fiji - Lautoka	1001.7	1023.6
Kiribati	910.2	915.2
Marshall Islands	83.5	91.9
Nauru	32.0	35.9
Niue	21.6	16.9
Samoa - Alafua	284.2	275.6
Solomon Islands	1967.8	2042.2
Tokelau	46.0	48.7
Tonga	528.0	606.3
Tuvalu	159.2	132.1
Vanuatu - Emalus	1377.5	1472.3
Total	**17181.9**	**17695.9**

Source: USP Annual Report 2020

1 The actual number of students (Headcount) is 31,547 (2019) and 31,096 (2020): USP Ann

2 Number of students by type (EFTS): 9,138.4 full-time, 8,557.5 part-time (2020) : USP Ar

USP commenced delivery of distance education by means of the conventional method of shipping printed materials to students residing in member island nations right after its establishment in 1968. In 1974, the satellite communication network used PEACESAT had been operated for distance learning at the time enabled only one-way audio communication though. Since then, USP have continued to improve distance learning through the use of satellite communications, such as the joint project by Japan, Australia, and New Zealand to provide communications satellite facilities to all USP member countries, and Japan's technical cooperation project “ICT for Human Development and Human Security Project” to provide antenna facilities for remote island bases, etc..

（2） Status of Assistance for to USP by Development Partners

The Japanese government has provided assistance to USP in various ways. Especially for USP’s distance learning system, the Japanese government has provided assistance for the development of communications satellite facilities (USPNet[3]), and a technical cooperation project by dispatching experts from Japanese universities in this field[4], etc., all of which have been a major foundation for USP’s distance learning system today. In addition to Australia and New Zealand, which were involved in the establishment of USP, many development partners/donors support USP. Currently, the assistance provided by these development partners is mainly for capacity building of staff and the organizations of USP.

（3） Current State of the Distance Learning System

The current USP distance learning system is composed of various elements, including a communication network using satellites and submarine fiber-optic cables connecting campuses and centres in the 12 member countries, hardware such as satellite communications equipment and server systems, and software running on these networks. In this study, information was collected various perspectives in order to understand the current state of the existing USP distance learning system. This section presents the results of the survey on communication infrastructure, hardware, and software.

(i) Communication Infrastructure and Hardware

To conduct distance learning at campuses and centres in the 12 member countries, a network connecting each country is essential and critical basic infrastructure. Currently, USP operates a network consisting of satellite networks (USPNet) using the C-Band[5] and the Ku-Band[6] and networks via the Internet through a hub station at the Laucala main campus in Fiji. The sites connected by USPNet can access various USP

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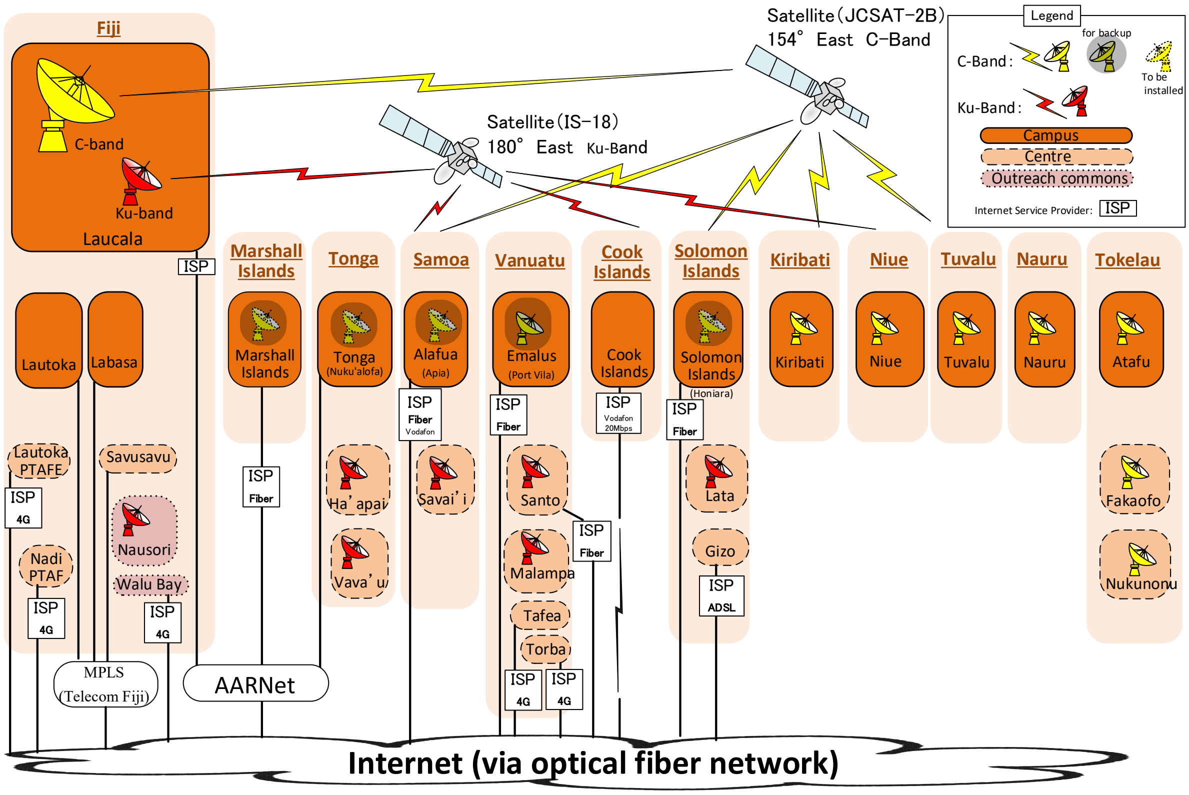
[3] Grant Aid "Project for Upgrading of USP-Net Communication System" and Technical Cooperation "ICT for Human Development and Human Security Project"

[4] Technical Cooperation "ICT for Human Development and Human Security Project"

[5] The C-Band is a microwave frequency band corresponding to centimeter waves in the 6 GHz band (4-8 GHz; 37-75 mm wavelength). It is used for communication satellites, fixed wireless, radio access and radar.

[6] The Ku band is a microwave frequency band in the frequency range of 12-18 GHz. It is used for satellite communications and satellite broadcasting.

services provided from the data centre at the Laucala main campus, and also have access to the Internet via the Laucala main campus. A diagram of the USP network is shown in Figure 1.



Source: JICA Study Team

Figure 1 Existing USPNet Network

Table 3 shows the evaluation and issues for the current communication infrastructure and hardware.

Table 3 Summary of the Current State of the Network Infrastructure

Items			Conditions
Communication Network	Internet (Optical Fiber)		The data capacity required for distance education is secured. The data transmission capacity depends on the contract with the ISP.
	Satellite Link	C-Band	Conditions are at the same level as the Internet, and there is sufficient capacity to serve as the distance learning infrastructure provided by USP.
		Ku-Band	The minimum transmission capacity necessary for two-way real-time communication is secured, but the transmission capacity is expected to be increased to increase the number of real-time communications and to increase the capacity for services with low communication priority.
Data Centre	Computer System and Network Routing System		The data centre at the Laucala main campus houses the server systems, which provide various services that affect the entire distance education infrastructure provided by USP, as well as the routing system that controls the network. All major equipment installed in this data centre has redundancies and is equipped with an uninterrupted power supply to ensure sufficient reliability. On the other hand, there is a risk that the entire system will go down if the Laucala main campus is damaged in a disaster. At each campus/centre, most of the equipment is operated without redundancies, and the power supply is not backed up.
	Security		All services are tied to a login portal to ensure security. External computer connections to the USP network are also properly managed.

(ii) Software

The current USP distance learning system consists of a class support system using the learning management system Moodle, and other software, internal services, and external services. This configuration is comparable to the eLearning environment built and operated by a typical university in Japan. In addition to allowing students and academic and administrative staff to perform standard operations such as viewing eLearning materials, watching lectures on demand, downloading materials, submitting assignments, taking online tests, and conducting questionnaires and surveys, the system is also linked to the academic affairs system and a plagiarism checking tool, which is essential for Japanese universities. Recently, a proctoring plug-in that automatically acquires an image of the examinee and judges whether the exam is acceptable or not has been introduced and is being used.

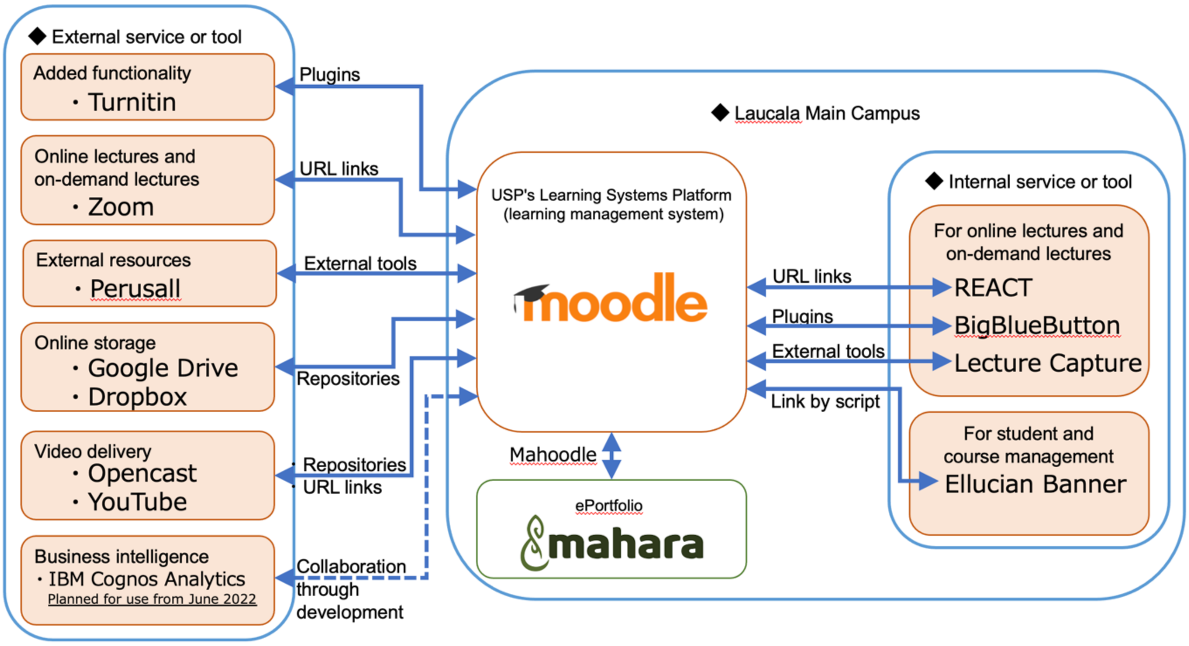


Figure 2 Configuration of USP Moodle and Integration between USP Moodle and the Elements of the Distance Learning System

In order to enhance and improve the distance learning system in the future, the current status of USP Moodle was evaluated by the Team and the overall evaluation of USP Moodle was positive.

(4) Challenges for Distance Learning System

The Team identified the challenges facing the existing USP distance learning system through interviews, online surveys for students and academic staff, and questionnaire responses from the related department of USP, and organized them in Table 4.

Table 4 Issues Related to Distance Learning Systems

No	Issue	Details of the issue and consideration of countermeasures
1	Expansion of Ku-Band satellite link capacity	The six remote centres and one outreach commons in five countries connected by Ku-Band have doubled the frequency bands used for satellite communications in 2020 in order to increase their capacity. However, the downstream capacity from the Fiji hub station is 21 Mbps and the upstream capacity is 2 Mbps, which is less than the Internet and the C-Band satellite circuits. The current Ku-Band used at USP transmits at an 8 PSK modulation, but 16 PSK and even 32 PSK, which can double the transmission capacity, have been developed for practical use. Therefore, a technical review of the link design, called the link budget, by INTELSAT, the satellite communication service provider of Ku-Band is required to determine whether or not increasing the PSK is feasible.
2	BCP measures/ decentralizing hub stations	USP's communication network consists of a WAN via the Internet and the USPNet satellite WAN, both of which are centred at a hub at Fiji's Laucala main campus. On the other hand, if the hub station suffers damage due to a natural disaster, the infrastructure of the entire network will cease to function. From the perspective of a business continuity plan (BCP), it is necessary to avoid concentrating the hub functions in one location. Therefore, establishment of a secondary hub similar in function to the current hub is desirable.
3	Training of engineers	The network that supports USP's distance education is infrastructure that enables two-way real-time communication between 12 island countries using the Internet and satellite links, and is supported by advanced state-of-the-art technology. It is necessary to keep up with the latest technologies in order to build and maintain an optimal network, and technical training to develop new network engineers and keep existing network engineers up to date is an urgent issue.
4	Connection problems	Each service and tool of the distance learning system, especially Moodle, depends on the quality of the network, such as its connectivity and stability, and in some cases, learning opportunities may be lost if the network is of insufficient quality. Network connectivity for students, is in need of improvement.
5	Provide appropriate user support	Students are using the online user guides more frequently and requesting different support methods, such as video content and support via Zoom. Inadequate user support system is an issue.
6	Overloading of the Moodle system	In the future, when ITS updates the server device and middleware, or upgrades the Moodle version, the settings of Moodle and the middleware will revert to their default values, and overload and other problems may occur again, so prior confirmation of the settings is necessary.
7	Content design	Some of the current content for teaching materials is not compatible with mobile devices, and it is confirmed that some of the content does not display properly or operate correctly during the course. One of a cause is that staff involved in content production may not understand the latest information on content production, media, authoring methods, etc. An issue is lack of human resources for this purpose; and continuously develop human resources.
8	Building a content creation environment	While a physical production environment such as a studio with hardware such as cameras and lighting is important, it is necessary to build an environment that enables more efficient production of high-quality educational content by sharing past content files and audio, video, and other assets and using them to enable group authoring by multiple staff members in their respective roles.

Source: Prepared by the JICA Study Team

During the interviews with USP staff, the Team confirmed the requests from several parties for the reconstruction of the Communications Building. The building was located at the Laucala main campus, but was destroyed by fire in 2018. The building housed the Centre for flexible Learning (CFL), which provides support for the planning and implementation of distance education at USP. The CFL, which used to occupy the third floor of the building, is now operating in a part of another building on a temporary basis, but its office space is limited to less than half of what it was before the fire. The REACT system[7] located on the same floor is also in temporary operation in other buildings, and the recording studio has lost its function as a

[7] The REACT system is a remote lecture system to realize two-way communication on satellite lines with limited communication capacity. See Section 2-3-1 (2) 1) b) for details.

recording studio, which hinders the creation of educational content. Like the CFL, the CFS and the SAS, which were housed on the second and first floors of the building, have been operating in reduced office spaces dispersed throughout the campus, and their early restoration is required.

(5) Comprehensive Analysis of the Current State of and Challenges for Distance Learning Systems

The Team held a workshop with the CFL, the department that promotes the implementation of distance education in terms of educational content, to confirm the current situation and identify issues facing distance education learners, in addition to issues related to facilities and equipment. The results of the applying SWOT analysis to the issues identified in the workshop and organizing the information are shown in Table 5.

Table 5 Further SWOT Analysis Combining Internal and External Elements of Flexible Learning at USP

	Strength	Weakness
Opportunities	**Opportunities x Strength** ✓ Activate research in FL in collaboration with schools with relevant expertise using already established communication network Regional Campuses/Centres ✓ Streamline student support services provided through own devices (smart phone)	**Opportunities x Weakness** ✓ Deliver FL using advanced technology in selected campuses connected with optic fibre for piloting advanced education and research purpose. ✓ Enhance FL through mobile devices (smart phone) by introducing material development technology learning
Threats	**Threats x Strength** ✓ Ease digital divide with ku band communication system which USP is equipped with physical and human resources.	**Threats x Weakness** ✓ Prepare for emergency such as pandemic prevalence and also natural disasters periodically attack pacific islands.

3. Future Objective for Distance Learning System

(1) Outline of Future Objective

Based on the current state of USP, including the challenges it faces, the Team discussed the future objectives that USP should pursue, especially in the distance learning/education field. As clarified in the SWOT analysis presented at the end of the previous chapter, USP is a unique tertiary education institution in which distance education is a necessary delivery mode for education programmes, due its being composed of 12 small and remote island nations spread out over the Pacific region.

Research will first be undertaken on the latest advanced technology derived from USP's education practices. Then possible applications of approaches in distance learning derived from the research outcomes will be applied and extended within USP. In short, the future objective for the distance education offered by USP is to establish a reputation in the distance education community regionally and nationally as an education and research institution with expertise in distance education. The following figure depicts this objective.

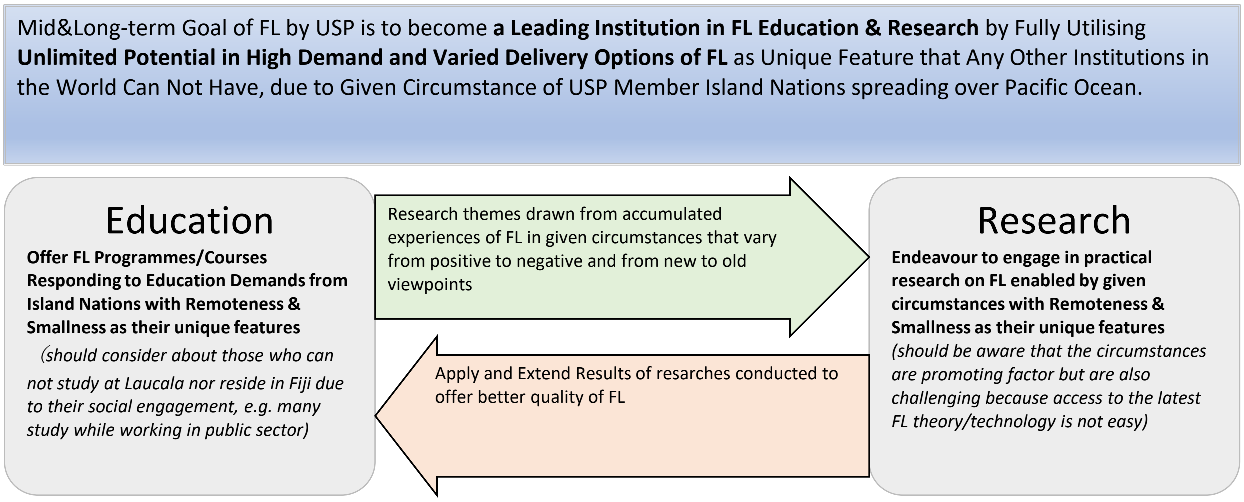


Figure 3　Concept of Future Objective for Distance Education by USP

（2） Steps Toward the Realization of the Objective

Various activities need to be planned and implemented to realize the future objective. The expected steps to be followed are outlined below.

Table 6　Steps Toward the Realization of the Objective

Step	Outline
Step 1 Short-term recommendations for USP	Further information that could not be obtained in the field survey needs to be collected and thoroughly analyzed. This will be elaborated on in Chapter 6.
Step 2 Development of facilities	Issues of facilities and hardware identified in this Survey as well as the short-term recommendations for USP in Step 1 above should be addressed first. Issues related to communication that are common among or unique to the other 11 USP member countries should be compiled and addressed at an early stage. Further, the office space and facilities for distance education where the CFL was able to exercise its specialty function and that were lost in the fire need to be recovered urgently. Details are described in Chapter 4.
Step 3 Detailed project design and preparation of establishment of institutional framework	Considering the assistance by a Technical Cooperation Project in order to realize the future objective. Prior to the implementation of the project, a field survey to formulate the details of the design of the project should be conducted.
Step 4 Intervention by implementation of the Technical Cooperation Project	Experts should be dispatched to help USP develop its capacity in education and research in distance education through the implementation of a Technical Cooperation Project. In the meantime, mid- and long-term strategies should be developed and shared through continual discussions among stakeholders, and these strategies and discussions should be incorporated into the official planning documents and USP's budgetary planning as preparatory actions.
Step 5 Establishment of sustainable framework after completion of the project	When all of the above steps are successfully completed, it is expected that USP will be better recognized as an institution with expertise in distance education practice and research. To further develop their reputation, USP should continue to strengthen their partnerships with universities in Japan as well as their participation in international societies.

4. Recommendations for Cooperation between JICA and USP

(1) Infrastructure-Related Support

In order to overcome the above-mentioned issues and to realize the future objective for the distance learning system, the Team proposes that JICA provide infrastructure support to USP in the form of constructing a communications building and implementing a secondary hub station.

Table 7 Estimated Costs and Expected Outcomes of Infrastructure-Related Support

No.	Items	Estimated costs/ (Scheme of Assistance)	Expected outcomes
1	Construction of a communications building * Refer to 4-1(1)	Total amount of the project: 1,420 mil JPY (Grant)	Improving the quality of distance learning offered by USP and expanding distance learning research
2	Renewal of Ku-band satellite facilities * Refer to 4-1(1) Project 1	Total amount of the project : 83 mil JPY (Technical Cooperation)	Improving the reliability of aging satellite communication facilities
3	Improvements to the REACT system * Refer to 4-1(1) Project 2	Total amount of the project: 9.9 mil JPY (Technical Cooperation)	Improving the quality of distance learning using the intensive learning system
4	Integration of SAS (Student Administrative Services) * Refer to 4-1(1) Project 3	Included in No.1 above	Improve services provided by USP to students
5	Establishment of secondary hub station * Refer to 4-1(2)	Total amount of the project: 1,200 mil JPY (Grant)	Improving the reliability of USP communication infrastructure against natural disasters

(2) Technical Cooperation Support

USP, with its unique circumstances as a university with 12 island nation members spread out in the Pacific Ocean, already has the necessary organizational features to realize this objective, such as the CFL and ITS, which together have been leading and supporting distance education, and schools such as the School of Information Technology, Engineering, Mathematics and Physics and the School of Pacific Arts, Communication and Education, each of which may contribute to the development and delivery of distance education. In order to initiate endeavors to achieve this vision, however, it is crucially important to bring in and absorb external expertise so education and research activities can be conducted based on the establishment of firm relations with external supporting institutions.

Table 8 Proposal of Technical Cooperation Support to USP

No.	Items	Outline of the Support	Expected outcomes
1	Project for Research Capacity Development in Flexible Learning (Technical Cooperation)	Goal: USP will contribute to human resources development first regionally and then internationally through its education and research activities.	- Set appropriate research themes in selected pilot programmes for each of the five steps of the ADDIE Model. - The CFL will take part in analysis of the need for education programmes specializing in learning design. - The CFL will be given a mandate for advisory and confirmation in the production of the learning design framework (objectives and assessment) of education programmes. - The CFL will support teaching and learning material development that effectively utilizes authoring tools. - The CFL will advise in learner support based on data on learners (formative assessment of delivery (implementation) of 15- (or 30-) week courses). - The CFL will advise on the use of the results of the learning evaluation (registration of next level courses, participation in the outside world, etc.) (formative assessment). - The CFL will present research papers internationally.
2	Project for Human Resource Development in Flexible Learning (Technical Cooperation)	Goal: Assign a role for human resources development in distance education to USP	There will be international students and researchers who think “I want to study flexible learning at USP!” or “I want to be engaged in research at USP!” when USP gains wide international recognition in research activities in the area of flexible learning.
3	Scholarships for postgraduate programmes in Japan for CFL staff	Strengthening the capacity of CFL staff by Scholarships programs for the purpose of fomenting a foundation for technical cooperation projects	- Capacity development to CFL staff - Enhance creation of relationships between USP and Japanese universities - By providing this support in advance, it is possible to prepare for the technical cooperation projects mentioned above.

5. Support for the DX Sector in Fiji

This section describes the results of a survey of the DX sector in Fiji. Based on the results of interviews and desktop research, the general consensus is that there is much room for improvement by applying digital technologies and solutions in Fiji.

Generally, old fashioned manpower-based activities are prevailing in the both public and private sectors rather than utilizing available options, most of them would be replaceable with existing digital technologies or solutions. Recently, there are a few emerging cases of digitalization as initiative for digitalFIJI[8], careFiji[9],

[8] digitalFIJI is a programme to implement a number of government applications, enhance the overall ICT infrastructure and build and develop capacity in digital transformation in the government.

[9] careFIJI is mobile application which launched to monitor and track the ongoing Covid-19 pandemic in Fiji. An initiative led by the Ministry of Health and Medical Services.

M-PaiSA[10], etc.

In the interviews or questionnaire surveys, issues and needs for digitization were raised. The common response was that each and every respondent express general but strong and solid interests in digitalization, knowing abstractly its potential benefits, while all of them express their expectation to Japan for supporting to overcome their challenges and needs.

Based on the issues and needs identified in the Survey, we examined the possibilities for future support and organized the some assistance in Table 9.

Table 9 Proposals for Fiji's Support of the DX Sector

No.	Assistance proposal	Cost Estimation*（Scheme of Assistance）	Expected outcome
1	Capacity-building for Public officials	Total: 238.8 mil JPY (Technical Cooperation)	Accelerated utilization of digital tools in government, Efficiency and effectiveness of public services, etc.
2	Nurturing Cybersecurity talents (Capacity-building)	Total: 173.9 mil JPY (Technical Cooperation)	Continuous protection against growing cyberthreats, etc.
3	Flood risk monitoring and alerting for Residents' safety & security	Total: 294.3 mil JPY (Technical Cooperation)	Mitigation of direct disaster risks triggered by climate change and indirect risks, Protection of rights and properties, etc.
4	Support for digital nautical chart and DEM seamlessly connecting land and sea areas	Total:1,030.0 mil JPY (Grant)	Publication and distribution of electronic navigation charts, Utilization of DEM for Preparation and protection for tsunami, climate change
5	Remote air traffic control systems for airports in remote areas	Total:805.0 mil JPY (Grant)	Efficient air traffic controls, Management cost reduction, Integrated management of relevant information, etc.

*Amount of the cost for technical cooperation projects are not included procurement cost for facility/equipment

6. Limitations on the Survey under the COVID-19 Pandemic

The Survey was subject to a few limitations, including the fact that the period during which it was conducted included Christmas (summer vacation), and that it was not possible to travel to any USP member countries other than Fiji to conduct the field survey due to the spread of COVID-19. Therefore, in this chapter, the Team provides the following suggestions for analysis, evaluation, and verification of matters that were able to receive only limited confirmation in the Survey due to the constraints related to time, people, and transportation. The Team believes that these suggestions will be useful for JICA when considering the details of its Assistance to the USP distance learning system in the future.

[10] A remittance and settlement application provided by Vodafone Fiji, a local subsidiary of the global telecommunications giant.

Table 10 Proposal for Additional Research on the USP Distance Learning System

No.	Suggestions for analysis, evaluation, and verification	Outline of the suggestion
1	Analysis of the expected impact of the establishment of new centres	It is recommended that thorough data collection and analysis be done on the expected impact of the establishment of new centres in specific locations, including the number of students who would choose to study there.
2	Network monitoring to assess connectivity	The actual connectivity of students at each campus/centre should be measured during the busy period of the USP semester to obtain information on the usage of communication lines and the load on the network.
3	Develop a medium/long-term renewal plan for telecommunications infrastructure	Gather detailed information on each piece of telecommunications infrastructure used by USP, including plans for laying optical submarine cables, the broadband network services provided by telecommunication companies in each country, and costs associated with their use. It is recommended that a long-term and comprehensive renewal plan for the communication infrastructure for the USP distance learning system then be developed, and that operation and maintenance be carried out in accordance with this plan.
4	Examining the effects of the different learning modes	USP currently offers the following four (4) learning modes: face-to-face mode, blended mode, online mode, and print mode. In order to capture all of these different modes of learning in a comprehensive manner, it is recommended that the effectiveness of each mode of learning be examined.
5	Consideration of potential secondary hub sites	As part of the business continuity plan (BCP), the Team is considering the construction of a secondary hub to back up the functions of the satellite hub station and data center at the Laucala main campus. Possible candidate sites include Tonga, Samoa, and the Marshall Islands, where optical submarine cables have been laid. It will be necessary to collect information on the facilities, equipment, and personnel of each campus, the surrounding environment, and services provided by local ISPs, and to consider countermeasures for disasters such as tsunamis and earthquakes before proceeding with the study.
6	Confirmation of Damage to USP campuses/centres due to Tonga undersea volcanic eruption	Analysis will be conducted on the damage to telecommunications infrastructure caused by the underwater volcanic eruption in Tonga, and the status of telecommunications infrastructure operation after the disaster. After that, it will be recommended that each campus/centre in the USP member countries, including Tonga, update its BCP (redundancy of communication equipment and power facilities, review of organizational structure in case of emergency, etc.).

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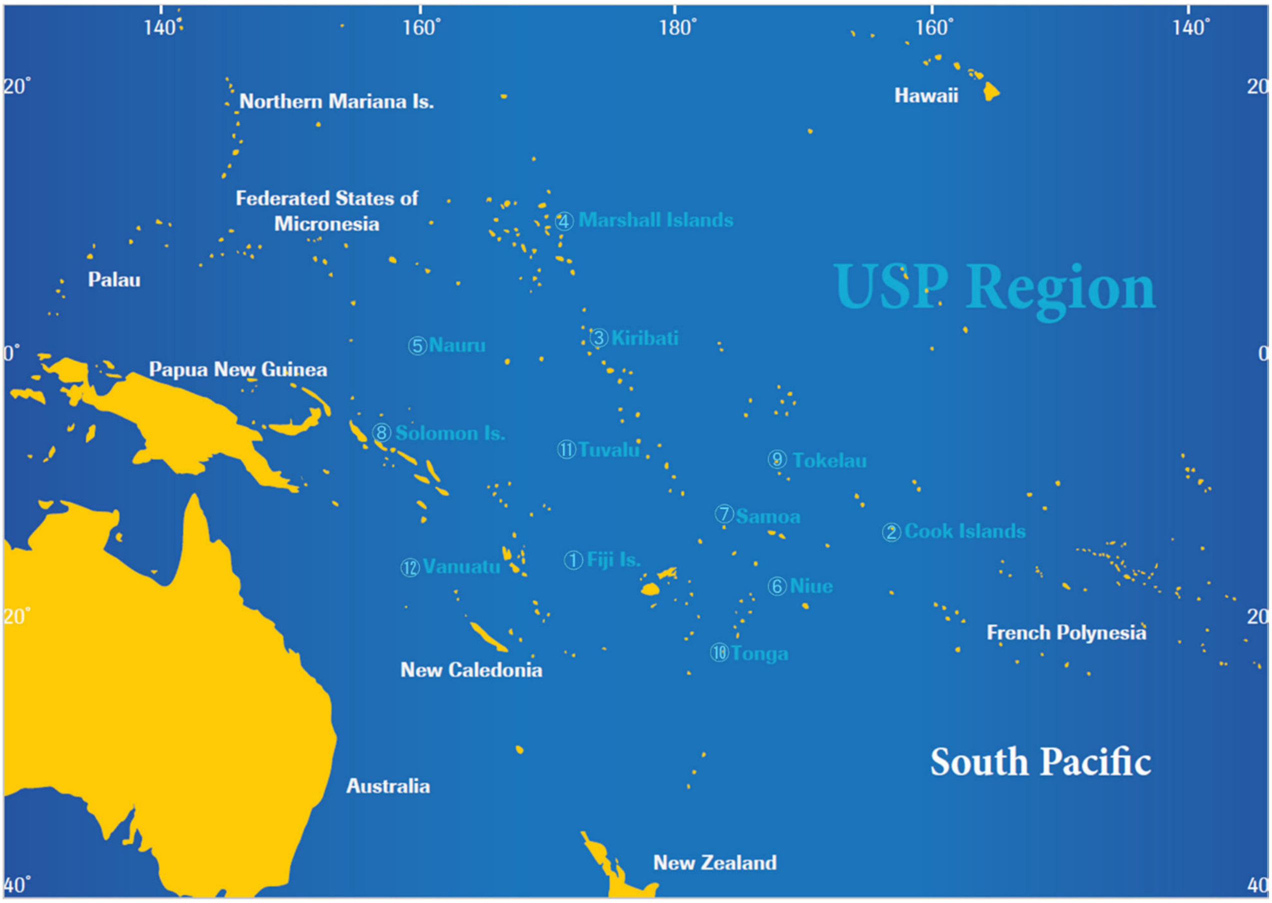


(1) Fiji (Laucala Campus, Labasa Campus, Lautoka Campus, etc.)

(2) Cook Islands (Cook Islands Campus)

(3) Kiribati (Kiribati Campus)

(4) Marshall Islands (Marshall Islands Campus)

(5) Nauru (Nauru Campus)

(6) Niue (Niue Campus)

(7) Samoa (Alafua Campus, etc.)

(8) Solomon Islands (Solomon Islands Campus, etc.)

(9) Tokelau (Tokelau Campus, etc.)

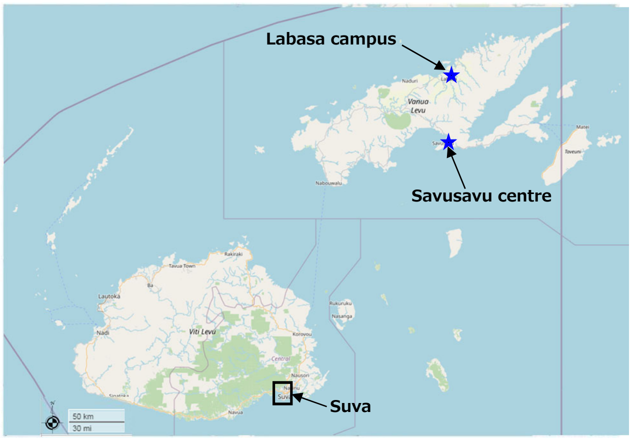
(10) Tonga (Tonga Campus, etc.)

(11) Tuvalu (Tuvalu Campus)

(12) Vanuatu (Emalus Campus, etc.)

Location Map of USP Member Countries

South Pacific



Fiji

The University of the South Pacific in Suva

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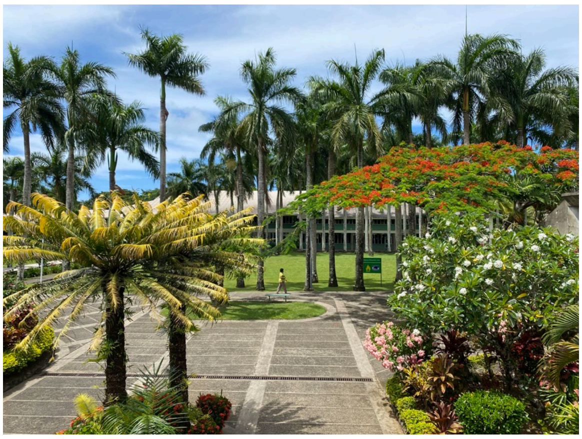
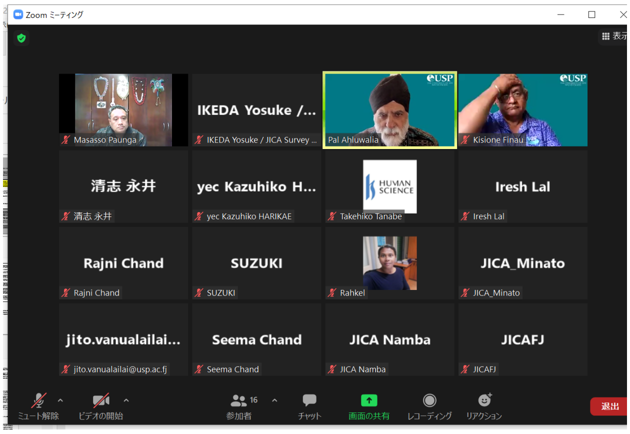


USP Laucala Campus in Fiji

The USP main campus (Laucala Campus) in Suva, the capital of Fiji, is located 2 km east of the city center.

Communications Building that burned down

The remains of the Communications Building, burned down in a fire in 2018.

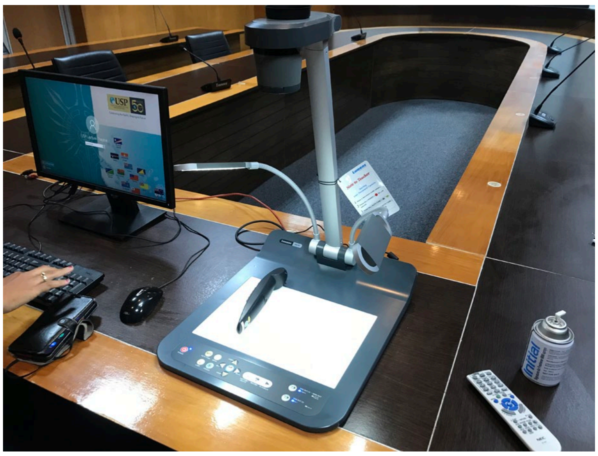


Kick-off meeting

The Vice-Chancellar attends the kick-off meeting held remotely (top row, second from right).

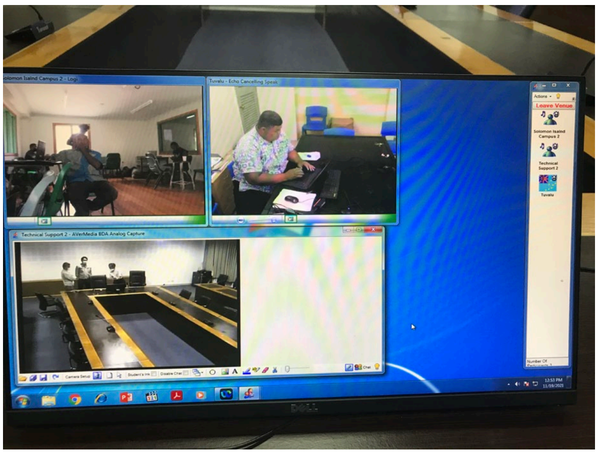
Server at Laucala campus in Fiji

Survey in the server room at the Laucala campus in Fiji, which functions as the hub for the entire USP network.



REACT system

REACT system equipment in temporary operation in a conference room. In addition to video and audio, the teacher can use a document camera to project documents and share them with students.



REACT system GUI

Demonstration of REACT's connection with the Solomon Islands' Honiara Campus and Kiribati Campus. A window is displayed for each connected site.

Japan-Pacific ICT center

At the USP main campus in Suva, Fiji's capital city (Laucala campus), the Japan-Pacific ICT Center, which was constructed with a grant aid from Japan (2009), is in operation.

Hearing from remote campus

Hearings were conducted remotely from remote campuses due to restrictions on travel outside of Fiji due to the coronavirus pandemic.

Face-to-face hearing at remote center

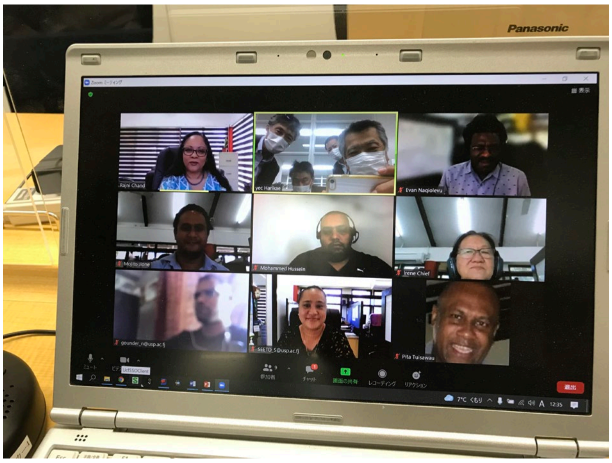
Face-to-face interviews at the Savusavu remote centre in Fiji. Although there were restrictions on activities due to the coronavirus pandemic, the survey was conducted at the Labasa campus and Savusavu centre in Fiji.

Workshop

The first workshop to confirm the USP Connect concept conducted with CFL members.

Hearing for DX survey

Hearing and exchange of opinions with a group of researchers from a local university who are conducting research on the current status of and issues regarding digital literacy and cyber security literacy.



Remote workshop from Japan

The second workshop with CFL on the future objective of distance education, conducted remotely after returning to Japan.

Abbreviations

AAPS	Australian Association for Pacific Studies
AARNet	Australian Academic Research Network
ACIAR	Australian Association for Pacific Studies
ADDIE	Analysis, Design, Development, Implementation, Evaluation
ADB	Asian Development Bank
AI	Artificial Intelligence
ANGLE	Academic Network on Global Education and Learning
APTC	Australia Pacific Training Coalition
ARC	Audit and Risk Committee
BCP	Business Continuity Plan
BEMS	Building Energy Management System
BI	Business Intelligence
BULA	Building University Links for Action
BUPT	Beijing University of Posts and Telecommunications
CARPIMS I/II	Caribbean-Pacific Island Mobility Schemes I/II
CARPIMS III	Caribbean-Pacific Island Mobility Schemes III
CBDC	Central Banking Digital Currency
CBHTS	College of Business, Hospitality and Tourism Studies
CCES	Climate Change and Environmental Sustainability
CEPM	Center for Economic Policy and Modeling
CEST	College of Engineering, Science and Technology
CDD-CFDL	Course Design and Development – Center for Flexible and Distance Learning
CFL	Centre for Flexible Learning
CFS	Centre for Foundation studies
CHE	College of Humanities and Education
CI-USP	Confucius Institute
CITC	Communication Information Technology Committee
COVID-19	Corona, Virus, Disease, 2019
CPA	Consortium Partnership Agreement
CROP	Council of Regional Organizations in the Pacific
CS	Computer Science
CVET	Continuing Vocational Education and Training
DFL	Distance Flexible Learning
DX	Digital Transformation
EC	Executive Committee
ECCA	Enhancing Climate Change Adaptation
ECOPAS	European Consortium for Pacific Studies
EFTS	Equivalent Full-time Students

EQAP	Education Quality and Assessment Programme
FFA	Pacific Islands Forum Fisheries Agency
FIC	Finance & Investments Committee
FINTEL	Fiji International Telecommunication Limited
FNU	Fiji National University
FYE	First Year Experience
GCCA	Global Climate Change Alliance
GPI	Gender Parity Index
GSD	Graduate School of Development
HEMS	Home Energy Management System
H5P	HTML5 Package
ICN	Interchange Cable Network
ICT	Information Communication Technology
IoT	Internet of Things
IP	Internet Protocol
ISP	Internet Service Provider
IT	Information Technology
IT R&T	Information Technology Research and Training
ITS	Information Technology Services
IXP	Internet exchange Point
JENESYS	Japan-East Asia Network of Exchange for Students and Youths
LEAP	Lifelong Learning on Energy Efficiency, Access and Security in African and Pacific Small Island Developing States
LLB	Bachelor of Laws
LMS	Learning Management System
LTA	Learning Technologies & Analytics
LXDD	Learning Experience Design & Development
MBBS	Bachelor of Medicine and Bachelor of Surgery
MFF	Multi-tranche Financing Facility
MIRAB	Migration, Remittance, Aid, Bureaucracy
NTPC	National Training and Productivity Centre
NUS	National University of Samoa
NUSI	National University of Solomon Islands
NZUE	New Zealand University Entrance
OPP	Offline Print Package
OUM	Oceania University of Medicine
PAASCU	Philippine Accrediting Association for Schools, Colleges and Universities
PACE-NET	Pacific Europe Network for Science and Technology
PASO	Pacific Aviation Safety Office
PDCA	Plan, Do, Check, Action

PEACESAT	Pan-Pacific Education and Communication Experiments by Satellite
PICPA	Pacific Islands Centre for Public Administration
PIDP	Pacific Islands Development Programme
PIFS	Pacific Islands Forum Secretariat
PPA	Pacific Power Association
PRIDE	Pacific Regional Initiatives for the Delivery of Basic Education
PSK	Phase Shift Keying
PSSC	Pacific Secondary School Certificate
PacLII	Pacific Islands Legal Information Institute
QoS	Quality of Services
REACT	Remote Education and Conferencing Tool
REMCOM	Remuneration Committee
SAFE	School of Accounting, Finance and Economics
SAGEONS	School of Agriculture, Geography, Environment, Oceans, and Natural Sciences
SAS	Student Administration Service
SBM	School of Business and Management
SCORM	Sharable Content Object Reference Model
SDG	Sustainable development goal
SLS	Student Learning Support
SMT	Senior Management Team
SNS	Social Networking Service
SOLS	Student Online Services
SPACE	School of Pacific Arts, Communication, and Education
SPBEA	South Pacific Board for Education Assessment
SPC	Secretariat of Pacific Community
SPCE	School of Professional and Continuing Education
SPF	South Pacific Form
SPFSC	South Pacific Form Seven Certificate
SPREP	Secretariat of the Pacific Regional Environment Programme
SPTO	South Pacific Tourism Organisation
STEMP	School of Information Technology, Engineering, Mathematics, and Physics
SoLaSS	School of Law and Social Sciences
SWOT	Strength, Weakness, Opportunity, Threat
TCL	Tonga Cable Limited
TDCE	Tonga Domestic Cable Extension
TVET	Technical and Vocational Education and Training
uni Fiji	University of Fiji
USP	University of the South Pacific
USP Moodle	USP's Leaning Systems Platform

UWI	The University of The West Indies
VR	Virtual Reality
WHO	World Health Organization

CHAPTER 1 OVERVIEW OF EDUCATION SECTOR IN THE PACIFIC REGION

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1-1 Regional Overview

The Oceania region stretches from a latitude of 21 degrees north (at the Mariana Islands) to 45 degrees south (at the South Island of New Zealand) across the equator, and from a longitude of 134 degrees east (at Palau) to 109 degrees west (at Easter Island) across the International Date Line, and is one of the six geographic regions of the world. While Australia is a subcontinent within this region, having an area of 7.68 million km^2, the rest of the land consists of island countries of various sizes, ranging from Papua New Guinea (462 thousand km^2), New Zealand (268 thousand km^2), and the Solomon Islands (28 thousand km^2), to Nauru, which at 21 km^2 is the smallest. Thus, the land area of this region is very small compared to the ocean area. The total land area of all of the island countries, excluding Australia and New Zealand, is about 530,000 km^2, while the exclusive economic zone of these countries is about 20 million km^2, meaning that the land area is only about 2.6% the size of the ocean area. The distance between the islands is also extremely large, and compared to Japan or the Caribbean, which also consist of islands but the islands are connected in the manner of an archipelago, the islands of Oceania are remote and isolated. This means that the economic scale and human resources of the islands are limited for an independent state, therefore Oceania contains 15 overseas territories (of the United States, the United Kingdom, France, and Australia) besides 16 independent island states. The area and population of each country and overseas territory are shown in Table 1-1-1 and Table 1-1-2, respectively.

Table 1-1-1 Countries of Oceania

Code	Name of Country	Capital	Area (km^2)	Population
AU	Australia	Canberra	7,686,850	25,687,040
CK	Cook Islands	Avarua	237	17,564
FJ	Fiji	Suva	18,270	896,444
FM	Federated States of Micronesia	Palikir	702	115,021
KI	Kiribati	South Tarawa	811	119,446
MH	Marshall Islands	Majuro	326	59,194
NR	Nauru	Yaren (*de facto*)	21	10,834
NU	Niue	Alofi	260	1,626
NZ	New Zealand	Wellington	268,680	5,084,300
PG	Papua New Guinea	Port Moresby	462,840	8,947,027
PW	Palau	Ngerulmud	458	18,092
SB	Solomon Islands	Honiara	28,450	686,878
TO	Tonga	Nuku'alofa	748	105,697
TV	Tuvalu	Funafuti	26	11,792
VU	Vanuatu	Port Vila	12,200	307,150
WS	Samoa	Apia	2,944	198,410

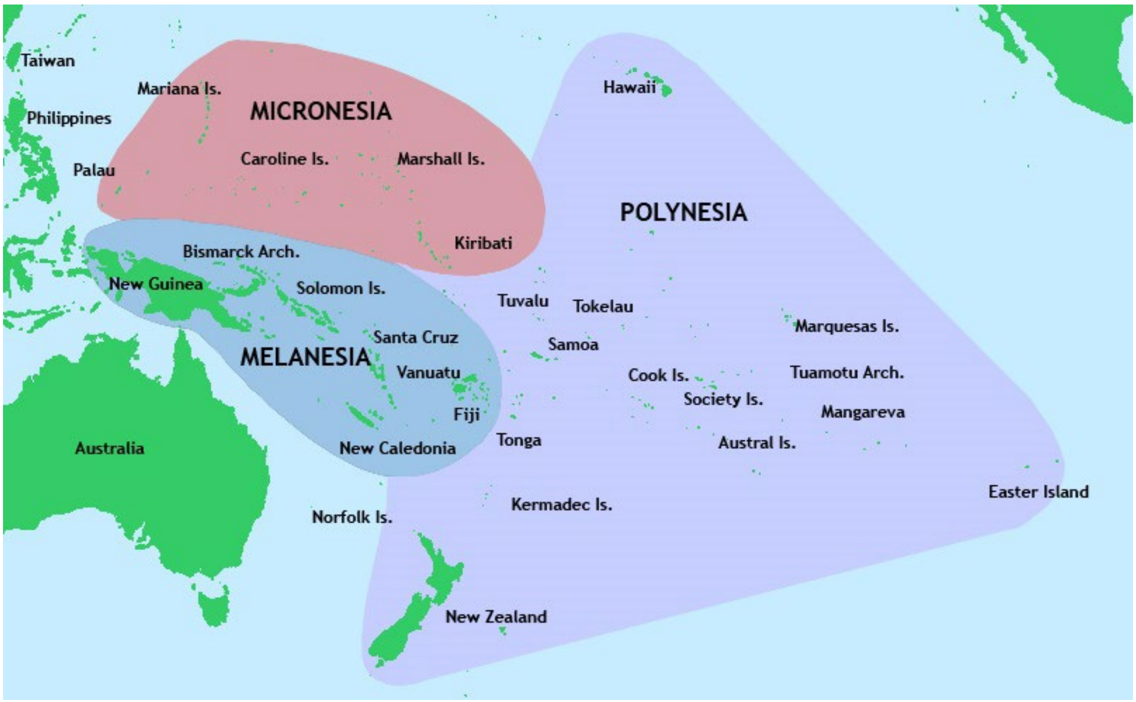
Source: "Oceania," Wikipedia, The Free Encyclopedia, January 2022. Population as of 2020 is taken from World Bank data and UN data (for Cook Islands and Niue)

Table 1-1-2 Major Overseas Territories in Oceania

Code	Name of Territory	Capital	Area (km^2)	Population*
AS	American Samoa (USA)	Pago Pago	199	55,465
CC	Cocos (Keeling) Islands (Australia)	West Island	14	544
CX	Christmas Island (Australia)	Flying Fish Cove	143	1,843
GU	Guam (USA)	Hagåtña	549	165,768
MP	Northern Mariana Islands (USA)	Saipan	477	56,882
NC	New Caledonia (France)	Nouméa	19,000	279,993
NF	Norfolk Island (Australia)	Kingston	35	2,302
PF	French Polynesia (France)	Papeete	4,167	277,679
PN	Pitcairn Islands (UK)	Adamstown	47	47
TK	Tokelau (New Zealand)	Atafu (*de facto*)	10	1,319
US	Hawaii (USA)	Honolulu	16,635	1,360,301
WF	Wallis and Futuna (France)	Mata Utu	274	11,661
UM	Wake Island (USA)	—	7	150
UM	Johnston Atoll (USA)	—	3	0
UM	Midway Atoll (USA)	—	6	40

*Population is 2018 data.
Source: "Oceania," Wikipedia, The Free Encyclopedia, January 2022.

From an ethnic and geographical perspective, the Oceania region can be divided into the Australian subcontinent and the three island regions of Polynesia, Melanesia, and Micronesia. Figure 1-1-1 shows a map of the Oceania region and these classifications.



Source: "Oceania," Wikipedia, The Free Encyclopedia, January 2022.

Figure 1-1-1 Map of the Oceania Region with the Three Classifications

The climate of the region is oceanic, with much of the region having a tropical rainforest climate. The amount of rainfall can be as high as 8,000 mm per year on volcanic islands (for example, in the Gulf of Papua) because the moisture from the sea hits the volcanoes and causes rainfall. This does not happen on the lower atoll islands, where rainfall is low (for example, 1,000 mm in New Caledonia). Since the geology of atoll islands is mainly limestone, the permeability of the soil is high, and most of the rainfall penetrates the ground immediately, making it difficult for many atoll islands to secure water resources. Many of the volcanic islands are located in Melanesia in a volcanically active region belonging to the Pacific Ring of Fire. This region is often subject to large earthquakes. Micronesia has many small atoll islands, while Polynesia has a mixture of volcanic islands, such as Hawaii and New Zealand, and atoll islands, such as Tuvalu.

There are no major industries in the most small island countries of Polynesia and Micronesia, and their economies are driven by what is known as MIRAB[1], although in recent years some countries, such as Palau, have developed tourism. In general, the outflow of emigrants is larger in Oceania than for the Caribbean or Indian Ocean islands, and many countries have a low percentage of tertiary industry, while international aid and the national budget make up a high percentage of GDP. In addition, the distance to the nearest populated area where tourism and trade partners are located is greater in Oceania. While the populated area of about 100 million people is at a distance of 4,000 km for the Caribbean and Indian Ocean island countries, it is at a distance of 8,000 km for the Republic of Fiji (hereafter referred to as "Fiji") .

In order to overcome the challenges of smallness, remoteness, and isolation, Japan has been holding the Pacific Island Leaders Meeting (PALM) every three years since 1997, where discussions are held at the summit level with the aim of achieving stability and prosperity in the Oceania region. A total of 19 countries and territories, including Japan, Australia, New Zealand, and various island countries and territories[2], participate in PALM, including all of the countries that are members of The University of the South Pacific (USP), the subject of this study. At the most recent meeting, the 9th PALM, held in July 2021, discussions focused on areas such as the response to the new coronavirus infection (COVID-19), sustainable oceans based on the rule of law, climate change and disaster prevention, and human exchange and human resource development. The general direction of Japan's assistance to the island countries of Oceania includes disaster prevention, human resource development, environmental conservation, marine resource management, and support for economic activities (infrastructure such as roads and ferry vessels), which were also topics of discussion at the 9th PALM. In addition to bilateral cooperation, South-South cooperation and regional cooperation have been used as aid methods, and USP is one of the regional cooperation programs.

Fiji is a country that has become a hub for regional cooperation. Fiji is an island nation consisting of 330 islands and atolls with a total population of about 896,000 (World Bank, 2020). It gained

[1] MIRAB is an acronym for migration, remittance, aid, and bureaucracy, and represents the economic characteristics of the resource-poor Pacific Island countries.

[2] The French overseas territories of New Caledonia and French Polynesia are included as two of the 19 countries and territories.

independence from Britain in 1970. Many people of Indian descent immigrated to the country during the British colonial era to work on sugar plantations, and people of Indian descent now make up about 40% of the population. The country has a land area of 18,000 km^2, the second largest among the small island countries of Oceania, after the Solomon Islands. The population of the metropolitan area of Fiji's capital and largest city, Suva, exceeds 300,000 including neighboring Nausori, making it the largest metropolitan area in the island countries of Oceania. Further, the only other city with a population of more than 100,000 is Noumea in New Caledonia. In addition to forests and fishery resources, the country is blessed with mineral resources such as gold, copper, and bauxite. Further, tourism is also thriving. The main export items are clothing, sugar, gold, fish, and wood chips, with the United States, Australia, Japan, New Zealand, and China being the major export destinations. According to trade statistics of the Asian Development Bank, the value of exports from Fiji was USD 920 million in 2019, while the value of imports was USD 3.17 billion, which is a significant trade deficit. Fiji's GNI per capita reached a high of USD 5,910 in 2018, but was at USD 4,890 in 2020. This is nonetheless more than double the USD 2,230 GNI per capita in 2000.

Fiji has become a center of economic activity in the island countries of Oceania, where many international and regional organizations have established their offices. The Government of Fiji released its 5-year and 20-year National Development Plan in 2017 as a medium and long term plan respectively. As a long-term plan up to year 2036 it aims to strategically promote comprehensive social and economic development and transformation, including poverty eradication, provision of electricity and water supply services to all citizens, provision of quality education and health services, development of new industries, enhancement of connectivity through transport and communication services, enhancement of people's skills and productivity, and urban development and regional development. Japan's development cooperation policy also states that, in order to overcome the economic and social development challenges arising from economic growth, climate change, social transformation, etc., Japan will support the development of a well-balanced and self-reliant country based on Fiji's national development plan and the direction of the Japanese government's overall policy toward the island countries of Oceania, including the conclusions of PALM. The areas of priority include support for infrastructure projects for economic development, such as those for transportation and traffic, urban planning, electric power and energy, the water supply, and telecommunications, and the related human resource development for the development, renewal, and maintenance of infrastructure. In terms of fishery resource management contributing to climate change and environmental measures for Sustainable Development Goal 14 (SDG 14: "Life Below Water—conserve and sustainably use the oceans, seas and marine resources"), the plan calls for mainstreaming disaster prevention, introducing renewable energy, reducing waste (including measures against marine plastic waste), and improving sewage treatment. Further, in order to improve the quality of social services, the plan calls for building a service delivery system and developing related human resources.

1-2 Overview of Education Sector in USP Member Countries

Before describing education sector of the University of the South Pacific (USP) member countries, an overview of other organizations that serve the Pacific Island nations and have a similar institutional position to USP will be given for context.

Regional organizations in the Pacific have been formed in conjunction with various governing states such as suzerains in colonial times and administering authorities of a United Nations Trusteeship, so the situation is complex for only below 20 countries with relatively small populations and economy. At present, the following nine regional organizations shown in the table 1-2-1 are widely recognized in their specialized areas as members of the Council of Regional Organisations in the Pacific (CROP), with the Pacific Islands Forum (PIF) as a coordinating organization. USP, the subject of this survey, is a member of CROP specialized in tertiary education.

Table 1-2-1 Major Regional Organizations in the Pacific (CROP)

Name (at present)	Abbreviation
Pacific Aviation Safety Office	PASO
Pacific Islands Development Programme	PIDP
Pacific Islands Forum Fisheries Agency	FFA
Pacific Islands Forum Secretariat	PIFS
Pacific Power Association	PPA
Secretariat of the Pacific Community	SPC
Secretariat of the Pacific Regional Environment Programme	SPREP
South Pacific Tourism Organisation	SPTO
University of the South Pacific	USP

Source: The Survey Team

PIF, the coordinating organization for CROP, is briefly outlined hereinafter. In August 1971, the first summit conference of the South Pacific Forum (SPF, PIF at present) was held in Wellington in New Zealand. Since then, it has developed as an organizer of summits for dialogue between leaders of the Pacific Island nations and also as a core body of regional cooperation. Sixteen countries and two French territories are present PIF members. The membership includes 11 of the 12 USP member countries (excluding Tokelau), as well as Papua New Guinea, the Federated States of Micronesia, Palau, Australia, New Zealand, French Polynesia, and the French collectivity of New Caledonia. The permanent offices of the Pacific Islands Forum Secretariat are located in Suva, Fiji. Dialogue with countries outside of the Pacific, mainly donors, began in 1989 with Japan, the USA, the UK, France, and Canada. Later countries and unions include the EU (from 1991), South Korea (from 1995), Malaysia (from 1997), the Philippines (from 2000), Indonesia (from 2001), India (from 2003), Thailand (from 2005), Italy (from 2007), Spain (from 2014), Turkey (from 2014), and Germany (from 2016). The Government of Japan participates in dialogues mainly on trade, investments and promotion of tourism through the Pacific Islands Centre, which is an international organization with its secretariat based in Tokyo[3].One of the members of CROP, the Secretariat of the Pacific Community[4] (SPC), addresses issues of regional development. In addition

3 Australia and New Zealand are development partners for island nations but not direct dialogue partners for PIC.

4 Originally established in 1947 as the South Pacific Commission. The name was changed in 1997. It comprises 27 countries

to the members of PIF, American territories such as Guam or American Samoa have also joined SPC. Tokelau is a member of USP but not of PIF, but is an official member of SPC. SPC's secretariat is located in Noumena in New Caledonia. The target themes of SPC are education, marine resources, energy, human rights, land use, public health, and statistics for development.

The Education Quality and Assessment Programme (EQAP) is one of nine divisions[5] of SPC which specialize in educational development in the region. EQAP was originally established as an independent regional organization called the South Pacific Board for Educational Assessment (SPBEA) by countries in the Pacific. As its name indicates, it was involved in educational assessment; it organized examinations for regional secondary education completion certifications up to the year 2013. It was amalgamated with SPC in 2010, and then the name was changed to EQAP, reflecting the change in focus of its activities[6]. After abolishment of regional examinations, EQAP has continued to collect and compile data in education, mostly basic education, across the Pacific so as to identify education development intervention opportunities. Its secretariat has been located in Suva, Fiji since the inception of SPBEA.

USP, the focus of this survey, is another CROP member. Twelve USP member countries in the Pacific together govern USP for the purpose of human resources development, with tertiary level qualifications through regional university campuses and centres, i.e., tertiary education institutions. Detailed information on USP is given in the following chapter. In principle, students who attend USP have completed the basic education offered in one or more of the 12 member countries and have also completed secondary education. An overview of the basic education of the member countries is given next.

1-2-1 Overview of Basic Education

As a regional organization in educational development, the Education Quality and Assessment Programme (EQAP) is a reliable information source, especially in basic education. According to its HP[7] it focuses on four key outcomes to fulfill SPC's development objective of improving the quality of education in the Pacific. Three are key goals that relate to education quality outcomes and the fourth relates to strengthening its knowledge and capacity in order to realize the three key education quality goals.

and regions (22 island nations and territories and five suzerains, namely Australia, France, New Zealand, the UK and the USA. The UK and the Netherlands joined at the time of establishment but withdrew afterwards, then UK rejoined in 2021.

5 The others are the Climate Change and Environmental Sustainability (CCES) Programme, the Fisheries, Aquaculture and Marine Ecosystems (FAME) Division, the Geoscience, Energy and Maritime (GEM) Division, the Human Rights and Social Development (HRSD) Division, the Land Resources Division (LRD), the Public Health Division (PHD), the Statistics for Development Division (SDD), and Integrated Programmes

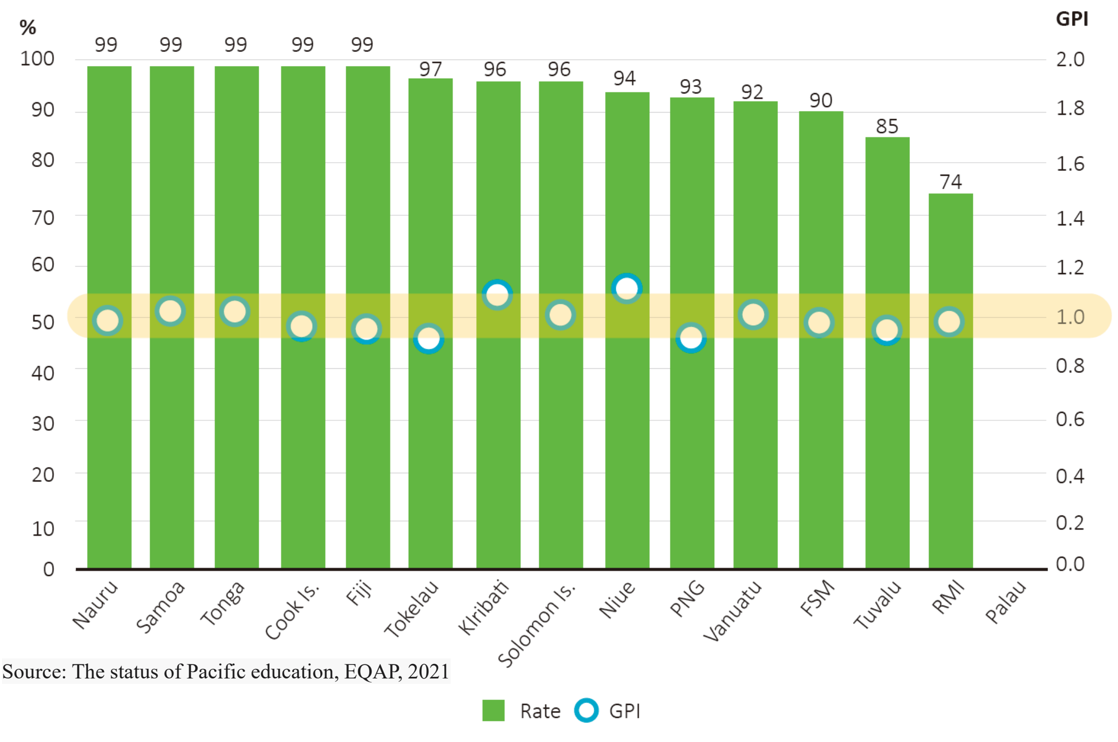
6 https://www.dfat.gov.au/sites/default/files/pacific-register-of-qualifications-standards-strategic-review.pdf

7 https://eqap.spc.int/about-eqap

1. *More national Ministries of Education and other key institutions increase the use of information for policy development and implementation, planning and management*
2. *More PICT schools increase and improve the assessment of students performance against curricula*
3. *More PICT national agencies, employers and learners increase the use of recognized quality assured qualifications*
4. *EQAP is increasingly recognized as a leader and source of knowledge and expertise in education in the Pacific*

As the use of information is emphasized in the above Goal 1, EQAP itself makes efforts to compile information originally collected by the authorities of member countries. EQAP member countries include all 12 USP member countries[8] and some other countries and territories in the Pacific. Educational statistics of the Pacific Island nations compiled by EQAP are surveyed hereinafter.

The following figure shows net enrollment rates in the primary education. Most USP member countries exceed 90%, with the Marshall Islands and Tuvalu being the exceptions.



Source: The status of Pacific education, EQAP, 2021

Figure 1-2-1　Total Net Enrollment Rate in Primary Education[9]

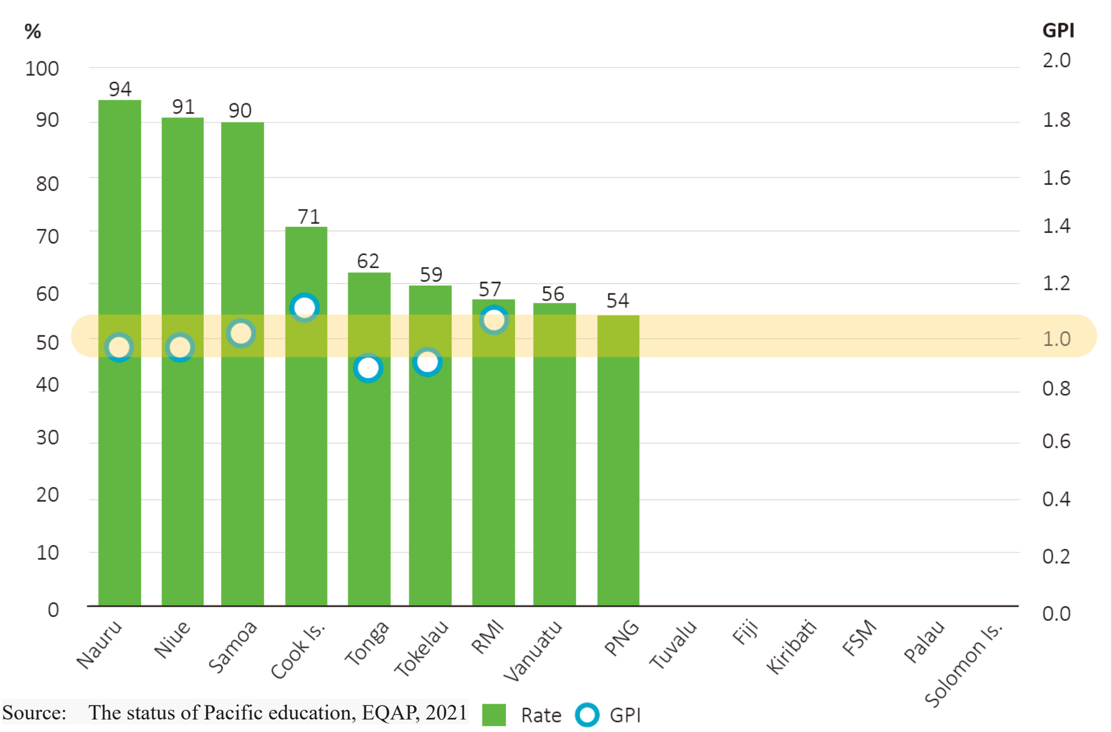
The following figure 1-2-2 shows net enrollment rates in the secondary education. Three USP member

[8] Japan has diplomatic relations with 14 of the Pacific Island member countries of PIF (Australia and New Zealand are not counted in this category). All are SPC members, but three countries, Papua New Guinea, Palau, and the Federated States of Micronesia, are not USP members.

[9] Gender Parity Index (GPI): (Enrollment rate of females)/(enrollment rate of males). One of the indices to indicate gender gaps between males and females.

countries, Nauru, Niue and Samoa, exceed 90%, while five countries remain between about 50% to 70%, and four countries are missing data.

The SPC report states that although further investigation is needed, disparity in access to secondary education is one of the hindering factors for education in rural areas and poor households.



Source: The status of Pacific education, EQAP, 2021

Figure 1-2-2 Total Net Enrollment Rate in Upper Secondary Education

The following two figures show literacy and numeracy proficiency in grade 6 in primary education. The data was collected through the Pacific Islands Literacy and Numeracy Assessment 2018 coordinated by EQAP. Results of USP member countries in literacy vary between just below 50% (Tonga and Tuvalu) to up to 80% (Cook Islands), while those for numeracy vary from over 60% (Nauru, Tokelau and Niue) to over 90% (Solomon Islands, Fiji and Tonga). Please note that translation of languages was involved in some of the assessment instruments in some of the countries, so that comparison among countries may require thorough data processing and analysis.

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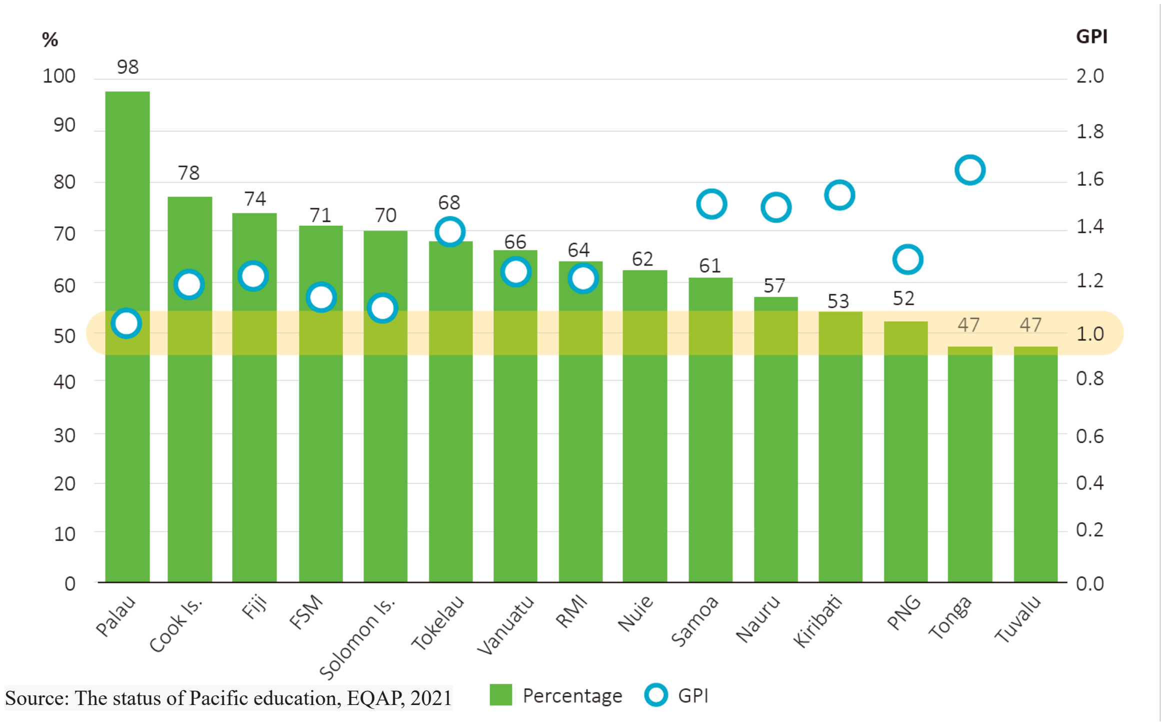


Figure 1-2-3 Literacy Proficiency in Primary Education (PILNA)

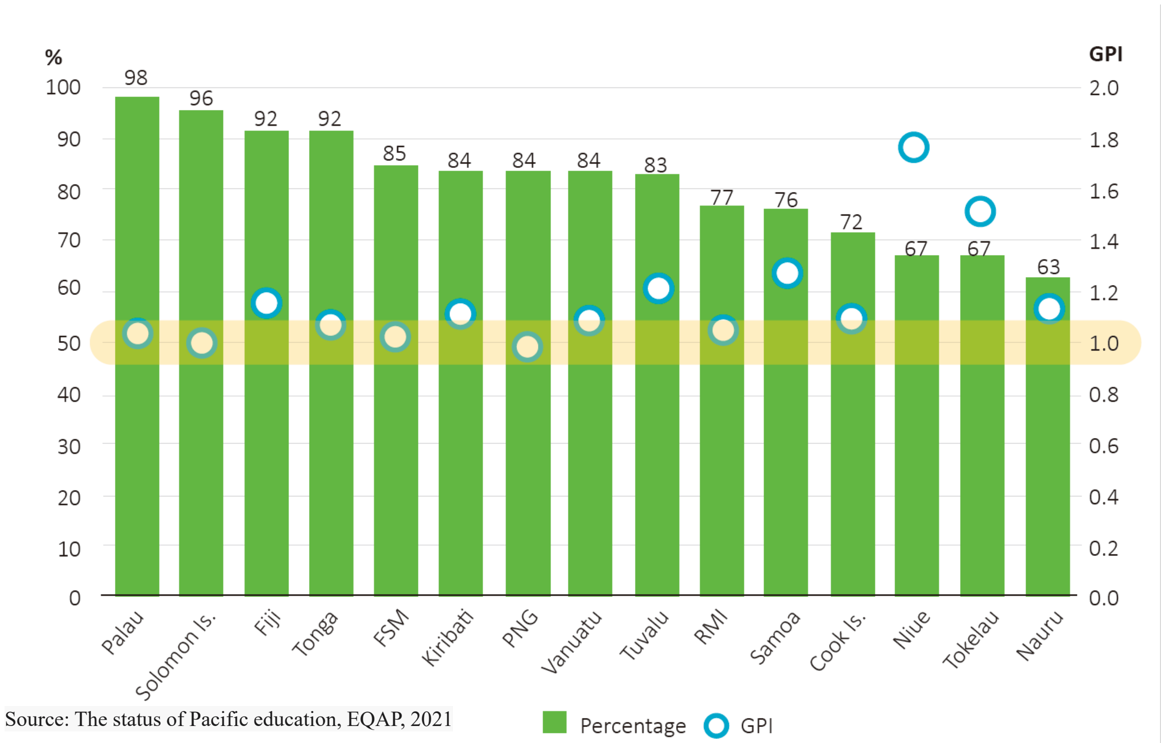
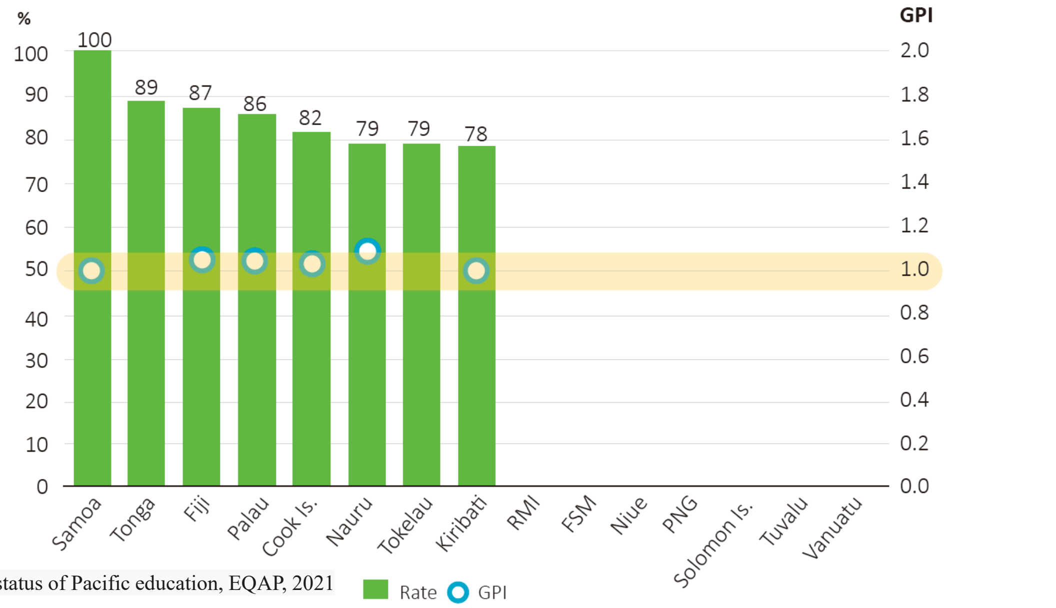


Figure 1-2-4 Numeracy Proficiency in Primary Education (PILNA)

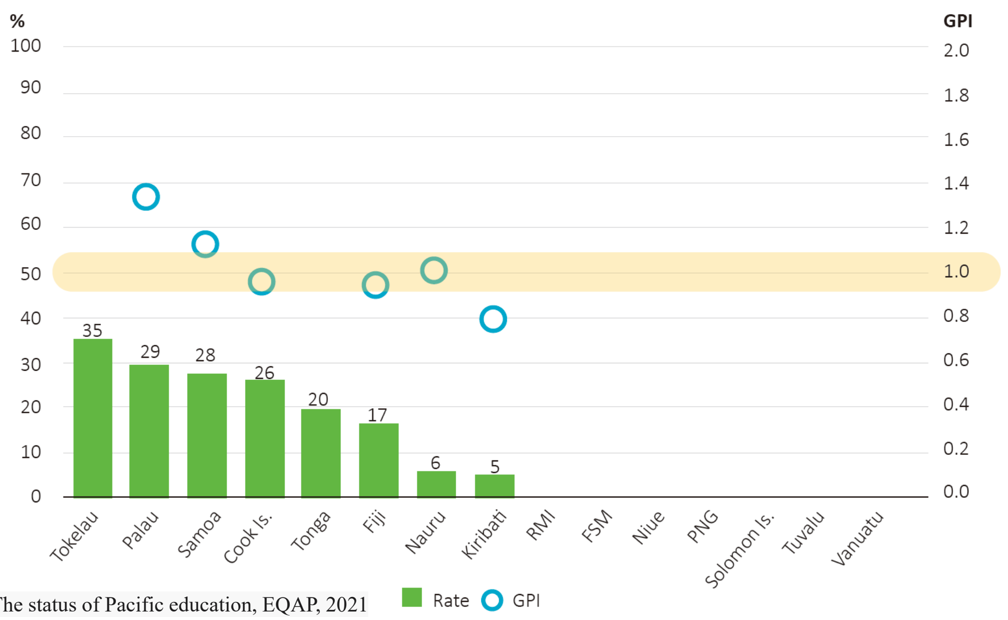
The following figure 1-2-5 shows the attainment of lower secondary education for the population aged 25 or over. Five countries out of the 12 USP member countries lack data, so this limits our ability to generalize for the 12 USP member countries. Nonetheless, seven USP member countries have a lower secondary education attainment of almost 80% or higher. This may be evidence that there is readiness and demand for upper secondary education and tertiary education.



Source: The status of Pacific education, EQAP, 2021

Figure 1-2-5 Lower Secondary Education Attainment of Population Aged 25+

The following figure 1-2-6 shows the attainment of post-secondary education for the population aged 25 or over. Five countries out of the 12 USP member countries again lack data. Attainment levels for the seven USP member countries with data vary from 5% (Kiribati) to 35% (Tokelau). These numbers likely include those who studied at USP. Taking the relatively high attainment for secondary education seen in the previous figure into consideration, it is possible that the potential demand for post-secondary education and training is much larger than can be met by the existing programs offered in the region, although cost obviously affects participation as well. Analysis of the cost implications will be attempted later in this chapter.



Source: The status of Pacific education, EQAP, 2021

Figure 1-2-6 Post-secondary Education Attainment of Population Aged 25+

The Figure 1-2-6 shown above indicates degrees of participations in post-secondary education attainment of the general public in the Pacific region, however, which are not compiled by age group. Therefore, it is likely including all those USP graduates still living, which was established more than 50 years ago. Since participation in post-secondary education may vary by age group, the figure may not properly represent current picture of participation in tertiary education in the recent years. Taking that into consideration, results of query in EQAP database regarding two indicators relevant to recent participation in tertiary education for 5 years from 2016 to 2020 are shown in the table 1-2-2 below.

Table 1-2-2 Gross Enrolment Ratio and Gross Attendance Ratio for Tertiary Education

	Time	2016	2017	2018	2019	2020
Indicator						
Pacific Island Countries and territories: Fiji						
Gross enrolment ratio for tertiary education (administrative data), both sexes (%)					53.49	
Pacific Island Countries and territories: Kiribati						
Gross attendance ratio for tertiary education (household survey data), both sexes (%)					4.27	
Pacific Island Countries and territories: Marshall Islands						
Gross enrolment ratio for tertiary education (administrative data), both sexes (%)					25.82	
Pacific Island Countries and territories: Niue						
Gross enrolment ratio for tertiary education (administrative data), both sexes (%)		0				
Pacific Island Countries and territories: Papua New Guinea						
Gross attendance ratio for tertiary education (household survey data), both sexes (%)				3.68		
Pacific Island Countries and territories: Samoa						
Gross enrolment ratio for tertiary education (administrative data), both sexes (%)			13.68	14.64	14.02	17.21
Pacific Island Countries and territories: Tonga						
Gross enrolment ratio for tertiary education (administrative data), both sexes (%)						18.4
Gross attendance ratio for tertiary education (household survey data), both sexes (%)					13.37	

Source: EQAP Database

Data available of the USP member countries are only for Fiji, Marshall Islands, Samoa and Tonga. Gross enrollment ratio for tertiary education of Fiji is over 50% in 2019, which is very high comparing to others. Considering that available data on education is limited in cross-cutting the 12 USP member countries, Fiji is highlighted since its population is the highest among the USP member countries and students from Fiji occupy more than half of the total USP student. Table 1-2-3 below shows students enrolments in Fiji from results of the National Census conducted in 2017 by the Government of Fiji.

Table 1-2-3 Enrolment by Level of Education in Fiji(2017)

Education Level	Students
Special School	1,037
Pre-School	15,685
Year 1	18,896
Year 2	18,541
Year 3	16,626
Year 4	16,326
Year 5	16,031
Year 6	16,176
Year 7	15,399
Year 8	15,740
Year 9	14,307
Year 10	14,087
Year 11	13,003
Year 12	11,767
Year 13	9,050
Foundation	2,047
Certificate	5,392
Diploma	5,435
Degree	10,786
Post Graduate Certificate	210
Post Graduate Diploma	285
Masters	334
Doctorate	32
Total	**237,192**

Source: National Census, Fiji, 2017

An attempt is made here to calculate rates of participation in different level of education in Fiji based on available information for references for participation rates in the tertiary education. Enrolment in the last year of the secondary education as a sum of year 13 and foundation is 11,097 based on the National Census. Then enrolment in Degree level is 10,786. Assuming standard Degree programmes will take three years to complete, approximately 3,595 students enroll in them a year if the total number of enrolments divided by 3. These 3,595 students in a same cohort are 32.4% of 11,097, the number of enrolments of the last year of the secondary education. It should be noted that this is an estimation with limited information and some assumptions, so that there are possible differences from actual figures of indicators. E.g., it is highly possible that there are students who study programmes for certificates and diplomas at universities after completion of the year 13, which would increase the calculated rate of the tertiary education participation. On the other hand, as there are many part-time students at the USP to be stated later in the following chapter, the participation rate may be lower than the above calculation. Therefore, it should be noted that accuracy of the above calculation based on the available indirect information from National Census is limited.

Participation rates in the tertiary education of the other countries than Fiji may be lower than that of Fiji considering there are three universities in Fiji that offer more opportunities for participating in the tertiary education than in the other countries.

Economic aspects of education are discussed hereinafter with reference to Key Indicators[10] published by ADB[11]. The ADB report refers to a suggestion made by UNESCO that at least 4%–6% of GDP should go to education. However, only 15 countries listed in the table 1-2-4 below satisfy this criterium (highlighted in green)[12]. All five USP member countries with data available among those countries meet the criterium of 4% of GDP for expenditure for education suggested by UNESCO. It could be noted that all the countries with small economies with GDP below USD8,000 meet the criterium (highlighted in orange), which may be common feature to those countries. Other USP member countries are missing data and difficult to examine their statuses. However, it is reasonable to assume that those other countries are also in similar statuses considering that economies of the small island states have many elements in common. Although detailed breakdown of expenditures for education above is not available, it is inferred that the expenditures of the USP member countries include Government contributions to the USP budget and scholarships for students of their own countries.

[10] Key Indicators for Asia and the Pacific 2021 (adb.org)

[11] ADB data is used here for wider coverage of USP member countries because WB database, which is often used for of economic analysis, does not include data of Cook Islands and Niue that have various implications in public administration by New Zealand as well as Tokelau that is not an independent country. Sources of ADB data, however, are WB statistics in many cases.

[12] p.110, Key Indicators for Asia and the Pacific 2021 (adb.org)

Table 1-2-4 GDP and Government Expenditure for Education (% of GDP) of ADB Member Countries

ADB Regional Member	Gross Domestic Product (current $ million)				Education			
Developing ADB Member Economies	**2010**	**2015**	**2019**	**2020**	**2010**	**2015**	**2019**	**2020**
Central and West Asia	492,970	683,266	653,819	...				
Afghanistan[a]	16,078	20,607	18,904	19,793	3.6	3.6	3.2	2.1
Armenia	9,260	10,553	13,619	12,641	3.2	2.9	2.4	2.8*
Azerbaijan	52,906	53,076	48,174	42,607	2.9	3.1	2.8	...
Georgia	12,243	14,954	17,477	15,892	2.8	4.4	4.4	4.4
Kazakhstan	148,047	184,388	181,667	171,240	3.5	3.3	3.7	...
Kyrgyz Republic	4,794	6,678	8,871	7,736	5.4	5.9	5.8	6.7
Pakistan[b]	174,508	267,035	253,847	256,777	...	...	...	...
Tajikistan[c]	5,642	8,271	8,301	7,997	4	5	5.7	5.4*
Turkmenistan	22,582	35,855	45,231	...	...	...	...	...
Uzbekistan	46,909	81,847	57,727	57,707	...	6	7	6.3
East Asia	7,911,047	13,383,417	16,920,607	17,388,963				
China, People's Republic of	6,087,192	11,061,573	14,279,968	14,722,801	3	3.8	3.5	3.6
Hong Kong, China[d]	228,639	309,386	363,016	346,584	3.5	3.4	4	...
Korea, Republic of	1,143,672	1,466,039	1,651,423	1,637,896	2.8	3	3.7	...
Mongolia	7,189	11,750	13,997	13,137	5.1	3	3.7	...
Taipei,China	444,354	534,670	612,203	668,546	1.7	1.4	1.5	...
South Asia	1,861,270	2,451,609	3,317,417	...				
Bangladesh[b]	114,508	194,466	301,051	329,484	2	2	2.5	2.3
Bhutan[b]	1,548	2,004	2,531	...	6.7	6	5.4	...
India[d]	1,669,620	2,146,759	2,889,934	2,664,748	4.4	4.4	4.7	...
Maldives	2,588	4,109	5,642	...	5.3	4.6	4.2	5.8*
Nepal[e]	16,281	23,667	34,268	33,079	3.9	3.7	1	...
Sri Lanka	56,726	80,604	83,991	80,677	1.6	2.1	1.9	...
Southeast Asia	1,999,422	2,480,721	3,171,824	...				
Brunei Darussalam[d]	13,707	12,930	13,469	12,016	3.6	4.1	3.6	...
Cambodia	11,242	18,050	27,089	25,291	1.6	2	2.7	2.8*
Indonesia	755,094	860,854	1,119,091	1,058,424	3.4	3.3	2.8	3
Lao People's Democratic Republic	6,747	14,426	18,741	19,082	...	...	...	...
Malaysia	255,018	301,355	364,684	336,664	6.1	4.8	4.2	...
Myanmar[f]	...	62,543	69,329	...	1.5	2.1	2	...
Philippines[g]	208,369	306,446	376,823	361,489	2.4	2.8	3.4	3.9
Singapore[d]	239,808	307,999	374,398	339,988	3	2.9	2.6	...
Thailand[h]	341,105	401,282	544,261	501,795	...	3.8	3	3.1
Timor-Leste	882	1,594	2,018	...	7.8	6.5	4.8	...
Viet Nam	115,932	193,241	261,921	271,158	...	...	...	...
The Pacific	21,198	31,065	35,778	...				
Cook Islands[b]	241	302	379	284	4	3.5	3.2*	...
Fiji	3,140	4,682	5,496	...	...	...	...	...
Kiribati[b]	156	171	198	...	...	9.9	12.2*	...
Marshall Islands[h]	162	185	240	244	20.4	16.4	...	...
Micronesia, Federated States of	297	316	...	...	...	...	...	...
Nauru	51	90	115	117	...	...	...	...
Niue	18	24	31	...	...	...	...	...
Palau	184	279	280	...	...	...	...	...
Papua New Guinea	14,251	21,723	24,829	23,592	...	...	...	...
Samoa[b]	692	787	847	772	5.8	4.5	4.5	4.9
Solomon Islands	903	1,307	...	...	...	...	...	...
Tonga	371	403	508	...	...	...	...	...
Tuvalu	31	35	54	...	16	23.2	...	...
Vanuatu	701	760	...	...	6.2	5.4	6.7	...
Developed ADB Member Economies	7,099,186	5,843,499	6,719,108	...				
Australia[b]	1,193,597	1,220,504	1,357,436	1,366,360	5.9	5.4	5.4	5.7
Japan[d]	5,759,072	4,444,931	5,148,781	5,048,688	2.8	2.6	2.5	...
New Zealand[b]	146,518	178,064	212,891	...	6.8	6.2	5.8	6.1

Source: Key Indicators 2021, ADB

Government expenditures for education was discussed using the Table 1-2-4 shown above. While the Government contributions to the USP and the scholarships for their own nationals are borne by the respective Government, there are those students who pay their own fees to study at tertiary education institutions. To examine burdens on those students, fees to study at USP is explored for reference hereinafter. GNI per capita presented in the above ADB report is shown in the Table below. While three USP member countries exceeding USD10,000, namely Nauru that earns good amount of foreign currency income through export of mineral resources, Cook Island and Niue that have close relations with New Zealand, other countries range from below USD6,000 of Fiji to over USD2,000 of Solomon Islands.

Table 1-2-5 GNI per capita (USD)

ADB Regional Member	2010	2015	2016	2017	2018	2019	2020
The Pacific[b]	2,039	3,122	3,010	2,928	3,005	3,137	…
Cook Islands	9,349	17,157	18,347	17,360	19,709	19,160	17,482
Fiji	3,650	5,100	5,280	5,370	5,910	5,800	4,720
Kiribati	2,050	3,470	2,920	3,020	3,080	3,340	3,010
Marshall Islands	3,550	4,250	4,200	4,390	4,780	5,010	…
Micronesia, Federated States of	2,900	3,490	3,410	3,450	3,400	4,010	…
Nauru	5,810	13,690	12,730	12,370	14,320	16,630	…
Niue	10,896	…	…	14,016	…	…	…
Palau	11,400	15,860	16,680	16,650	17,810	16,500	…
Papua New Guinea	1,740	2,860	2,710	2,590	2,600	2,750	2,660
Samoa	3,240	3,960	4,110	4,070	4,030	4,200	4,070
Solomon Islands	1,470	2,130	2,150	2,220	2,360	2,370	2,300
Tonga	3,370	4,440	4,410	4,590	4,800	5,000	…
Tuvalu	4,400	5,440	5,060	4,810	5,440	5,620	5,820
Vanuatu	2,600	2,780	2,750	2,860	3,110	3,360	2,780

Source: Key Indicator 2021, ADB

Average annual tuition fees are approximately FJD5,500 for face-to-face learning mode on campus and FJD4,700 for distance learning mode, which are calculated in the following chapter where education programmes offered by USP are surveyed. Percentages of FJD5,500 as annual tuition fees for face-to-face study against GNI per capita are calculated and compared[13]. While they range between 10% and 20% for Cook Islands, Niue and Nauru with higher GNI per capita, they are greater than 40% for others, even over 100% especially for Solomon Islands. In 2021 school year in Japan, standard fees chargeable by national universities comprise JPY282,000 for entrance fee only for the first year and JPY535,800 for annual tuition fees. If a student graduates in 4 years, total fees are JPY2,425,200, i.e., average annual fees is JPY606,300. That is about 13% of GNI per capita in Japan, USD41,580. When compared to the

[13] Administrative fees, health related fees and library fees will be charged in addition to the tuition fees.

case in Japan, tuition fees are heavy burdens for those students and their families paying own fees in many of the Pacific Island countries depending on economic states represented by GNI per capita.

As to distance learning, the Open University of Japan (OUJ), specializing in distance learning, charges approximately JPY700,000 for 4 years in total to graduate with bachelor's degrees according to its website[14]. It will make annual average JPY175,000. Tuition fees for the USP for distance learning, FJD4,700 a year, is equivalent to about JPY250,000. The OUJ is less expensive than the USP simply comparing the amounts. Those students enrolled in distance learning don't have to pay other costs for travelling and accommodations that will arise for those studying in Fiji, however, it is revealed that tuition fees themselves are even more costly than a university in Japan in distance learning.

1-2-2 Educational Evaluation

As a regional organization in educational development, the Education Quality and Assessment Programme (EQAP) is a reliable information source, especially in basic education. According to its HP[15] it focuses on four key outcomes to fulfill SPC's development objective of improving the quality of education in the Pacific. Three are key goals that relate to education quality outcomes and the fourth relates to strengthening its knowledge and capacity in order to realize the three key education quality goals.

Education systems in many countries make primary education completion certification a requirement for advancement to secondary education, and secondary education completion certification a requirement for advancement to tertiary education. Thus, the educational evaluation system of the USP member countries must be understood in order to discuss USP as a tertiary education institution in this survey. The education systems of 11 of the 12 member countries (the Marshall Islands being the exception) have been influenced by the UK either directly or indirectly through Australia and New Zealand, wherein national examinations are given at the end of primary and secondary education to certify completion of the corresponding level.

Research[16] conducted by Hisaharu Okuda[17] may be a good source of information on such an educational evaluation system in the Pacific, especially at the secondary level.[18] According to his research, as the Pacific Island nations gained independence from the 1960s to the 1980s, the secondary education completion certification system changed as well.

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14 https://www.ouj.ac.jp/hp/nyugaku/gakubu/tuition.html

15 https://eqap.spc.int/about-eqap

16 Research papers related to the topic are as follows (all in Japanese):
https://mie-u.repo.nii.ac.jp/?action=repository_action_common_download&item_id=12725&item_no=1&attribute_id=17&file_no=1、
https://mie-u.repo.nii.ac.jp/?action=repository_action_common_download&item_id=11969&item_no=1&attribute_id=17&file_no=1

17 Associate Professor, College of Liberal Arts and Science, Mie University, Japan

18 It is very much appreciated that Okuda, who is based in Japan, has been engaged in such research because Japan extends assistance to the basic education sector in the Pacific through construction of school buildings and through capacity development of teachers through the dispatch of volunteer teachers.

Table 1-2-6 Educational Evaluation System of USP Member Countries

Member Countries	Suzerains	Year 12 Certificate	Year 13 Certificate
Fiji	UK	Own national exam	Own national exam
Samoa*, Tonga, Vanuatu, Solomon Islands, Nauru, Kiribati, Tuvalu	UK (NZ)	SPSS→ Own national exam (Australian system in Nauru)	SPFSC since 2004 (Own exam in Tonga, Australian system in Nauru)
Niue, Cook Islands, Tokelau	UK (NZ)	NZ certification system	NZ certification system
Marshall Islands	USA	USA certification system	USA certification System

*The education system in Samoa has an additional year in basic education so that their year 13 is equivalent to year 12 in the other systems.

Generally speaking, a trend towards localization has been observed, from following the educational evaluation system of the UK or New Zealand in colonial times to the creation of a unified regional evaluation system, and from that to each nation having its own national evaluation system. In the course of this shift, the discretion of each country has gotten greater and the use of these opportunities has been promoted, so that countries are able to revise their curricula by adding socio-cultural aspects of their own or developing their own evaluation policy.

The 12 USP member countries can be categorized by the countries that influence them. Niue, the Cook Islands, and Tokelau are still under New Zealand administration in some sectors and education is one of them. The New Zealand educational evaluation system is administered in those three nations. On the other hand, three Micronesian countries[19], including the Marshall Islands where USA administration is effective in some sectors, have adopted the educational evaluation system of the USA.Fiji introduced its own national examinations right after independence.

Secondary school leavers of seven other countries used to sit the New Zealand University Entrance (NZUE) exam because some of them wished to enter universities in New Zealand or Australia. However, NZUE was abolished in response to changes in education in New Zealand in 1985. Upon its abolishment, those seven countries had to seek alternatives for certification for those who completed year 12. It was not feasible for those countries to develop their own examination papers at the time, so to address this challenge, the SPBEA (established in 1980) developed its own examination papers (and assisted in their administration) as a common regional evaluation system independent from the educational evaluation in New Zealand. It was called the Pacific Secondary School Certificate (PSSC). Following this, demand for a regional evaluation for year 13 became steadily higher, and the SPBEA commenced the South Pacific Form Seven Certificate (SPFSC) in 2004. The PSSC continued to be used for many years, but it was abolished in 2013, as by this time most of the seven countries had gained the capacity to organize their own evaluation systems. (Nauru decided to adopt the evaluation system of Australia.) This trend towards development and implementation of each country's own national evaluation system may have been influenced by an increasing recognition among stakeholders of the need to incorporate internal

[19] Palau and the Federated States of Micronesia in addition to the Marshall Islands. Palau and the Federated States of Micronesia are not USP members.

assessment such as regular examinations and daily assignments. It may have been difficult to incorporate the different countries' internal assessments in a regional evaluation system.

It should be also noted that, only three countries, Fiji, Samoa and the Solomon Islands, have universities in their own countries among the 12 USP member countries. Since a secondary education completion certification is a requirement for entry to tertiary education, the Pacific Island nations' own evaluation systems should meet international standards of secondary education completion so they can be recognized by tertiary education institutions overseas as sufficient for entry requirements such in New Zealand and Australia as well as USP.

1-2-3 Post-Secondary Education and Training Options

After completion of secondary education, at least some students seek entry to an institution of higher education and training. USP has of course been one such institution since the time of independence of the member countries, but there are other options in the Pacific as well. As stated in the previous section, there are national universities only in Fiji, Samoa and Solomon Islands administered by the respective government, while the University of Fiji and Oceania University of Medicine having its campus in Samoa are the only tertiary education institutions named "University" in the USP member countries. These are surveyed in this section.

In the Caribbean Sea zone where there is another regional university to be stated in the next chapter, the University of West Indies, is located, there are cases that universities in USA are invited to open physical overseas campuses, for USA as a powerhouse in tertiary education is geographically close[20]. But such a case is not seen in the Pacific[21]. Opportunities for tertiary education provided by the five universities and the USP are highly valuable, considering that they are only a few available institutions in the Pacific in comparison with the Caribbean Sea.

Tertiary education in the Pacific Islands countries serves a purpose of national investment in development of highly trained human resources who are expected to further build their nations socio-economically. Therefore, there are a certain number of students sponsored by their government scholarship[22]. It may be different from general views often heard in Japan that tertiary education is more private and personal investments than those for public purpose so that fees should be borne by students and their families for themselves. In view of this, status of scholarships is surveyed hereinafter. In Fiji,

[20] https://libopac.jica.go.jp/images/report/12252029.pdf. A case of American university campus in Antigua Barbuda is stated as means of bringing visitors for long stay from USA such as students and teaching staff, but there seems to be effect of provision of opportunities for local citizens.

[21] In the JICA report, invitation of a university of USA is described in the context of bringing long staying visitors as students as well as teaching and administrative staff. However, it is reasonable to assume that it has an effect of creating education opportunities for local citizens on the islands.

[22] These countries are limited in Government scholarships due to their small economy more than other developing countries. Therefore, SDG4 "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" aims in target 4.b to "expand higher education scholarships for developing countries", in particular small island developing States as well as least developed countries and African countries.

being one of the USP member countries for reference, numbers of scholarships offered by the Government for tertiary education are offered by discipline to take, to be awarded based on results of the year 13 examination or equivalent of scholarship applicants every year. It is announced that 480 scholarships in total will be awarded in 2022[23]. All three universities including the USP having campuses in Fiji are included in six tertiary education institutions eligible for the Government scholarships. As applications for scholarships require results of secondary education completion examination of the year, a large part of them may be fulltime students who study at universities intensively daytime. It should be also noted that there are parttime students who study after hours and in weekends while working daytime on the other hand, which will be stated later in description of the USP.

Often, students from the South Pacific enter tertiary education institutions in Australia and New Zealand specially from South Pacific while those from the North Pacific such as the Marshall Islands in the Micronesian zone enter institutions in the USA, particularly Hawaii. Further, as you may know, there are some international students from the Pacific region studying at universities in Japan under the scholarship scheme offered by the Ministry of Education, Science and Culture of Japan. Therefore, it is natural to assume that there are a few such students studying abroad in other Asian countries and other regions as well. However, information on these institutions has not been collected in this survey due to limitations on time and location for the field survey.

In addition, in some of the USP member countries there are education and training institutions other than universities offering programmes other than Bachelor programmes as options for secondary education leavers, such as teacher training institutions or nursing institutions. However, these are also not targeted in this survey because of the scarce information available on the Web, which is the only realistic way to collect such information.

Options of education and training pathways available in the Pacific region for those who completed secondary education are surveyed below focusing on universities.

1-2-3-1 Fiji National University (FNU)

Official establishment of Fiji National University was in 2010, and it is the only national university in Fiji. In 2019, total number of students enrolled in five Colleges and a Centre was 26,063, while effective fulltime students (EFTS) of five Colleges excluding the National Training and Productivity Centre (NTPC) was 12,226; among those, 11,249 were citizens of Fiji as the largest population among the USP member countries followed by 370 of citizens of Solomon Islands, and citizens of other countries were all less than 100. Total of 18,656 students (EFTS) were enrolled in bachelor's degree programmes[24]. Although number of students sponsored by scholarships does not appear in Annual Report, share of revenue from tuition fees from private students is below 30%, that from sponsored students is below

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23 https://www.tsls.com.fj/Schemes/Scholarships/NTS-Local

24 FNU Annual Report 2019

two thirds and the rest were regional students according to financial statements. This could be interpreted that a large number of students are sponsored by scholarship[25].

The main campus is located in Nasinu in the vicinity of Suva, the capital of Fiji, on the eastern side of Viti Levu Island, but the College of Education is located at Lautoka campus on the western side of the same island. As the School of Medicine and the School of Nursing were originally established in colonial times but are now colleges under FNU, some disciplines were taught long before the official establishment of FNU. According to its website, the major undergraduate programmes offered are as follows.

Table 1-2-7 Education Programmes Offered by FNU

No.	College	Bachelor's Degree Programme
1-1	College of Engineering, Science and Technology (CEST)	・ Bachelor of Science ・ Bachelor of Urban and Regional Planning (Honours) ・ Bachelor of Information System
1-2	College of Humanities and Education (CHE)	・ Bachelor of Applied Social Science ・ Bachelor of Education ・ Bachelor of Media and Communication ・ Bachelor of Arts
1-3	College of Agriculture, Fisheries and Forestry	・ Bachelor of Science in Agriculture ・ Bachelor of Science in Animal Science ・ Bachelor of Science in Fisheries ・ Bachelor of Science in Forestry
1-4	College of Business, Hospitality and Tourism Studies (CBHTS)	・ Bachelor of Accounting ・ Bachelor of Commerce ・ Bachelor of Hospitality and Hotel Management ・ Bachelor of Laws ・ Bachelor of Library and Information Systems
1-5	National Training and Productivity Centre (NTPC)	No undergraduate programmes offered. Education and training programmes for vocational skills are offered. It is essentially a TVET section. A wide range of programmes are offered, such as in industrial technologies such as the automotive industry, and in financial management, the tourism industry, fashion design, and hairdressing.
1-6	College of Medicine, Nursing and Health Sciences	・ Bachelor of Pharmacy ・ Bachelor of Oral Health ・ Bachelor of Dental Surgery ・ Bachelor of Dietetics and Nutrition ・ Bachelor of Health Services Management ・ Bachelor of Environmental Health ・ Bachelor of Medicine and Bachelor of Surgery ・ Bachelor of Medical Imaging Science ・ Bachelor of Medical Laboratory Science ・ Bachelor of Nursing ・ Bachelor of Health Promotion ・ Bachelor of Public Health ・ Bachelor of Physiotherapy

[25] Tuition fees may differ by education programme also by local students or international students. Therefore, the above calculation is only for reference with available information.

Some Bachelor programmes may have further breakdowns of specialization, e.g., “Bachelor of Science (Biology/Chemistry)”. There are also master’s and PhD programmes offered by some of the above colleges.

1-2-3-2 University of Fiji (also known as Uni Fiji)

The University of Fiji was established in 2004 by a Hindu religious organization. In 2020, total number of students enrolled in five Schools and a Centre was 3,381, among those 2,277 students (EFTS) were enrolled in bachelor’s degree programmes. Number of Fijian students was 2,233 and that of international students was 165, including 155 students from the Pacific region. USP member countries followed by 370 of citizens of Solomon Islands and citizens of other countries were all less than 100.

It is categorized as a private university since it was not founded by the Government, but it still receives grants from the Government. The main campus is located in Lautoka, which is a more commercial city in the west, opposite to the capital Suva. In 2008, a new campus was launched in the vicinity of Suva as well. According to its website, the major undergraduate programmes offered are as follows.

Table 1-2-8 Education Programmes Offered by Uni Fiji

No.	School	Bachelor’s Programme
2-1	Justice Devendra Pathik School of Law	Bachelor of Laws
2-2	School of Business and Economics	Bachelor of Commerce
2-3	School of Humanities & Arts	・ Bachelor of Teaching ・ Bachelor of Arts
2-4	School of Science and Technology	・ Bachelor of Science ・ Bachelor of Environmental Science ・ Bachelor of Information Technology
2-5	Umanand Prasad School of Medicine and Health Sciences	・ Bachelor of Medicine and Bachelor of Surgery (MBBS) ・ Bachelor of Medical Health Science ・ Bachelor of Public Health and Primary Health Care ・ Bachelor of Nursing
2-6	Centre for iTaukei Studies	Bachelor of Arts in iTaukei Language

Some of the Bachelor programmes may have further breakdowns of specialization, e.g., “Bachelor of Commerce in Accounting”. There are also master’s and PhD programmes offered by some of the above Schools.

1-2-3-3 National University of Samoa (NUS)

The National University of Samoa is the sole national university in Samoa, established in 1984. In the first semester in 2021, total number of students enrolled was 3,699, among those 1,642 students were enrolled in bachelor’s degree programmes. 1,646 scholarships including 578 of those awarded by the Government of Samoa were granted. There were 19 international students.[26]

[26] NUS Annual Report 2021

Assistance has been extended by the Government of Japan to NUS on a few occasions, i.e., the Grant Aid Project for Establishing the New Campus for the National University of Samoa (1995-1997), the Grant Aid Project for Upgrading and Extension of Samoa Polytechnic[27] (2005-2006), and the Technical Cooperation Project for Strengthening Technical and Vocational Education and Training Development in Samoa (2006-2008). Another preparatory study is currently under way (as of February 2022) for a proposed Grant Aid Project for facility development of the Faculty of Health Science.

The academic sections include the Faculty of Arts, the Faculty of Business and Entrepreneurship, the Faculty of Education, the Faculty of Science, the Faculty of Technical Education, and the School of Maritime Training and the School of Nursing and Health Science, which are not faculties.

According to its website, major undergraduate programmes offered are as follows.

Table 1-2-9 Education Programmes Offered by NUS

No.	Faculty	Bachelor's Degree Programme
3-1	Faculty of Arts	Bachelor of Arts
3-2	Faculty of Business and Entrepreneurship	Bachelor of Commerce
3-3	Faculty of Education	Bachelor of Education
3-4	Faculty of Nursing and Health Science	・ Bachelor of Health Science ・ Bachelor of Nursing ・ Bachelor of Medicine and Bachelor of Surgery
3-5	Faculty of Science	Bachelor of Science
3-6	Centre for Samoan Studies	Bachelor of Samoan Studies
3-7	Faculty of Technical Education	Bachelor of Technical and Vocational Education and Training
3-8	School of Maritime Training	Education and training programmes for seamen are offered. These are not designed as undergraduate programmes.

Some of Bachelor Programmes may have further breakdowns of specialization. There are also master's and PhD programmes offered by some of the above faculties.

1-2-3-4 Oceania University of Medicine (OUM)

Apart from NUS stated above, there is an institution titled "University" with campus in Samoa, which is Oceania University of Medicine (OUM)[28], which specializes in medicine. It was established by the Oceania University of Medicine Act passed by the Parliament of Samoa in 2002. Close coordination between an American philanthropist and the Government of Samoa led to its establishment.

27 When Samoa Polytechnic (SP), which was an independent TVET institution, was merged and amalgamated with NUS in 2006, facility development was implemented through a Grant Aid and the quality of education and training programmes were strengthened through technical assistance.

28 The website of NUS indicates that OUM has merged with NUS, but the website of OUM does not refer to such a merger at all. It is difficult to ascertain the relations of the two from the available information alone, and it may be necessary to contact both universities to determine what is happening between them.

International accreditation was given by the Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU) in 2010. It is thought that its purpose includes providing medical staff to the USA in addition to the Pacific, as the founder is an American citizen, and indeed according to its website, graduates are practicing medicine in the USA, Canada, Australia, and New Zealand, in addition to Samoa. The distance mode is applied where possible for delivery of the curriculum. Clinical practice is of course required to be qualified as a physician, but this can be done in medical institutions in other countries than Samoa as well which have an agreement with OUM. In other words, students don't have to come to the campus in Samoa except for during the four weeks of obligatory clinical practice in Samoa.

1-2-3-5 Solomon Islands National University (SINU)

Solomon Islands National University (SINU) was established in 2013 by upgrading existing amalgamated education institutions. The main campus is in Kukum, while the largest faculty, the Faculty of Education and Humanities, is at the Panatina campus. The Maritime Academy is at the Ranadi campus. There were neither annual plans nor annual reports available in its website so that information on enrollments, nationalities, fees, etc. was not obtained. Only lists of students granted for new entrants in 2022 were available. According to the lists, 446 were granted for new entries for bachelor's degree programs for four Faculties.

According to its website, the major undergraduate programmes offered are as follows. Some of the Bachelor programmes may have further breakdowns of specialization. No master's programmes are offered yet.

Table 1-2-10 Education Programmes Offered by SINU

No.	Faculty	Bachelor's Degree Programme
5-1	Faculty of Business & Tourism Studies	・ Bachelor of Accounting ・ Bachelor of Business Entrepreneurship ・ Bachelor of Hospitality Business and Events Management ・ School of Tourism & Hospitality Management
5-2	Faculty of Science & Technology	TVET porgrammes in civil engineering is offered, but there are no undergraduate programmes in science and technology offered currently.
5-3	Faculty of Nursing, Medicine & Health Science	Bachelor of Nursing
5-4	Faculty of Agriculture, Fisheries & Forestry	・ Bachelor of Science in Tropical Agriculture ・ Bachelor of Fisheries Studies
5-5	Faculty of Education & Humanities	Bachelor of Teaching
5-6	Maritime Academy	Education and training programmes for seaman are offered that are not designed as undergraduate programmes.

1-2-3-6 Australia Pacific Training Coalition (APTC)

The Australia Pacific Training Coalition (APTC) is a regional programme for human resources development with a high level of commitment to the region. It was initiated by the Government of Australia through PIF in 2007. Although it is not a university, entry requirements include some work experience as well as secondary education completion or the equivalent, so that it is comparable in a sense with the universities in the Pacific. Curricula and assessment standards in Australia have been adopted as they are. Thus, those who complete the APTC programmes automatically gain vocational training qualifications for work in Australia, which is taken into account when applying for entry permits and work permits.

There are people in the Pacific who wish to find jobs overseas, such as in Australia, because of the immature labour market and economy in their own countries. Education and training programmes offered by the APTC are the most efficient path to achieve these wishes. It is attractive especially for those who prefer to earn decent wages from stable employment but not pursue a career in education or research. However, permission to work in Australia is given for only a limited duration currently. Information about extensions of the permits or repeating employments after breaks for a certain duration was not available during this survey.

APTC targets the Pacific Island nations, except for two countries and one region[29] where New Zealand administration is in effect to some extent, and three Micronesian countries[30] where the USA is involved in administration to some extent. Thus, there are eight USP member countries that are eligible. Education and Training programmes are offered on campuses on the relatively larger islands, namely, Fiji, Samoa, Vanuatu, the Solomon Islands, and Papua New Guinea. On campuses in Samoa, education and training facilities and equipment provided for the NUS through projects implemented by the Government of Japan are utilized as well under mutual agreement between the APTC and the NUS.

Frameworks of education and training programmes offered by APTC are different from standard bachelor's or master's degree programmes offered by universities, so that durations those programmes vary. According to the latest Annual Report[31], in 2019 over 1,400 students newly enrolled and 1,353 students graduated with awards of Australian vocational training qualifications. The report states that scholarships from Australian Government are awarded targeting students from smaller island states, women, or people with disabilities. On the other hand, the current situation of reliance on Australian scholarships is raised as an issue from the viewpoint of sustainability. APTC cooperates with an industry organization that aims at industry promotion through vocational skills development, e.g., Fiji Australia Business Council offers scholarships. In addition to scholarships for better performing students, bursary schemes for financial difficulties of their families or employers.

According to the APTC website, the following education and training programmes are offered.

---

[29] Niue, the Cook Islands, and Tokelau

[30] Palau, the Federated States of Micronesia, and the Republic of the Marshall Islands

[31] https://aptc.edu.au/docs/default-source/reports/annual-reports/aptc_annual_report_2018-2019.pdf?sfvrsn=5c0c3f7b_2

Table 1-2-11　Education Programmes Offered by APTC

No.	Department	Qualification
6-1	Built Environment	・ Certificate III in Carpentry ・ Certificate III in Plumbing ・ Certificate III in Wall and Floor Tiling
6-2	Business	Certificate IV in Leadership and Management
6-3	Community Services	・ Certificate III in Individual Support (Ageing, Home and Community) ・ Diploma of Counselling
6-4	Education	・ Certificate III in Education Support ・ Certificate IV in Training and Assessment
6-5	Engineering	・ Certificate III in Air-conditioning and Refrigeration ・ Certificate III in Light Vehicle Mechanical Technology ・ Certificate III in Engineering - Mechanical Trade (Maintenance) Diesel Fitting Pathway ・ Certificate III in Electrotechnology Electrician
6-6	Hospitality & Tourism	・ Certificate III in Commercial Cookery ・ Certificate III in Tourism ・ Certificate III in Hospitality ・ Certificate II in Hospitality

1-2-3-7　Comparison of Faculties or Equivalen

Tertiary education differs from basic education, especially for national universities, for education programmes offered by those will depend on types of human resources for nations to intend to develop, also on types of qualifications with expertise for students to intend to acquire. Categories of education programmes offered by universities described so far are summarized by faculties or equivalent in the following table 1-2-12. Please note that the table was prepared based only on undergraduate programmes.

Table 1-2-12　Faculties or Equivalent of Universities in the Pacific Region

University	Humanities	Law	Commerce	Education	Science	Engineering	Agriculture, fishery and forestry	medicine	Nursing
FNU	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UniFiji	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
NUS	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
SINU	No	No	Yes	Yes	No	No	Yes	No	Yes
OUM	No	No	No	No	No	No	No	Yes	Yes
USP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Source: JICA Study Team

All the universities, except for OUM, have faculties of education to develop teachers, faculties of nursing to develop nurses and faculties of commerce to develop accountants in order to produce specialized human resources in respective areas. On the other hand, only two universities have faculties of law to develop layers and judges and faculties of engineering to develop engineers. The latter, faculties of engineering, is not yet established in some of the universities may be due to high costs of facilities and equipment for engineering education.

CHAPTER 2　CURRENT STATE OF USP

CHAPTER 2 CURRENT STATE OF USP

2-1 University of the South Pacific (USP) Overview

2-1-1 Brief History and Background of Establishment

The University of the South Pacific (USP) was established in 1968 and is now governed jointly by 12 countries and regions. That its governance spreads over international boundaries is rare; there are only a few other universities in the world that are not regulated by the laws of a single country. These include the University of The West Indies[32] (UWI), the University of Central Asia (UCA)[33], and the Asian University of Women[34]. Among these universities, USP is unique in that its highest governance body, the university Council, is mainly composed of representatives, who are mostly the ministers of education or equivalent, of the member countries. Generally speaking, there are no other universities whose councils are composed of ministers of several countries in parallel.

UWI is very similar to USP in its geographical condition, as it is managed by many island nations spread over a particular region of the ocean. Both universities are also similar in their background of establishment, as they are both located in an English language speaking zone where a number of countries and regions are members of the Commonwealth, and both universities were established by an official document signed by the Royal Family of the United Kingdom. The comparison with UWI is made to give an intuitive understanding of the similarities and differences between the two systems when giving an outline of USP.

As to sizes of areas of their ocean zones their member states occupy, but not sizes of areas of their lands, the 12 USP member countries (including Tokelau, which is not an independent country but a dependency of New Zealand) are scattered across an area[35] of about 3.3 million km^2, while the 17 member countries and regions[36] of UWI are spread over an area[37] with a radius of about 1.5 thousand

32 Established in 1948 as an overseas institution of the University College of London in Jamaica. In 1963, affiliation with the University College of London was terminated and the university became independent as a regional university governed jointly by the governments of the member countries.

33 Founded in 2000 as an educational institution under the Aga Khan Development Network with three member countries, Tajikistan, the Kyrgyz Republic, and Kazakhstan. The School of Arts and Sciences (SAS), the Graduate School of Development (GSD), and the School of Professional and Continuing Education (SPCE) compose UCA. SAS is the main school offering education programmes for secondary education leavers. It accepts 85% of total enrollment capacity from the three member countries, while 15% are allocated globally. It also accepts students from central Asian countries other than the three member countries. (https://ucentralasia.org/)

34 The World Bank and the UNESCO Task Force on Higher Education and Society officially published their idea to establish the institution. After some years of preparatory work, the Plan of Operation was published in 2005. In 2006, The Parliament of Bangladesh ratified the *Charter of the Asian University for Women*, which guarantees AUW's status as an international, non-sectarian, and fully independent university with complete institutional autonomy, academic freedom, and exemption from taxes. Women from many Asian countries study at the campus in Bangladesh.

35 Fifty years of flexible learning at the University of the South Pacific 1968–2018, CFL, USP (p. 49).

36 Anguilla*, Antigua and Barbuda, Barbados, Belize, Bermuda*, the British Virgin Islands*, Dominica, Grenada, Jamaica, Montserrat*, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, the Cayman Islands*, the Commonwealth of the Bahamas, Trinidad and Tobago, and Turks and Caicos*. '*' indicates a British Overseas Territory that is not an independent country. All others are members of the Commonwealth.

37 https://www.inderscienceonline.com/doi/pdf/10.1504/IJCEELL.1992.030396

km (with a circle zone area of approximately 7 million km^2).

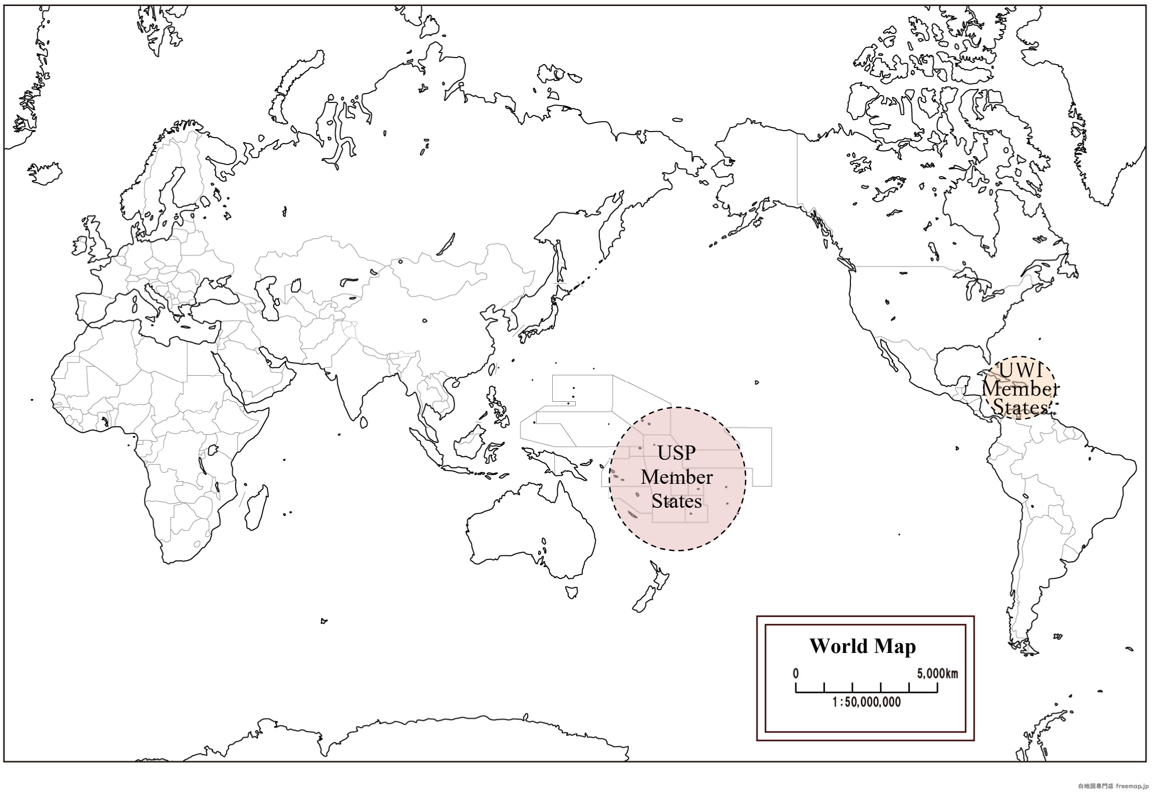


Figure 2-1-1 Comparison of Geographical Coverage for Member Countries of USP and UWI

It is not difficult to see that the area covered by USP is much larger than that of UWI at a single glance of a world map. The ratio is 33 to 7, i.e., USP is about 4 to 5 times larger than UWI in coverage area. That USP is the sole university that covers island nations scattered over such a large area of the ocean must be considered when handling the communication network, which is the main interest of this Survey.

The establishment of USP was officially recognized internationally by the enactment of the Charter and Statutes contained in an Order in Council of Her Majesty Queen Elizabeth II made under her Royal Prerogative powers on 4 February 1970. The Cook Islands, Fiji, Kiribati, Niue, Nauru, Samoa, the Solomon Islands, Tokelau[38], Tonga, Tuvalu and Vanuatu were the members at the time. In 1992, the Marshall Islands joined USP, and these are the 12 member countries of USP today. UWI was officially established by the Royal Charter of the University College of the West Indies (UCWI)[39] by the British monarch's official seal on 5 January 1949, following a decision taken by King George VI on 22

[38] Tokelau is the only USP member that Japan does not recognize as an independent country among 12 USP members. It is recognized as a "region" officially by Japan. The UN recognized it as a non-self-governing territory. For simplicity, this report uses the expression "12 member countries", with "region" omitted unless necessary, hereinafter.

[39] The name of the university was changed to "the University of the West Indies" in 1962.

December 1948[40]. One interpretation is that UWI established tertiary education in the region to respond to the demand for human resources development in areas where British colonies were about to gain independence.

As to global recognition of USP today, it is ranked between 1,001 and 1,200 by Times Higher Education (THE) World University Rankings[41], which is one of university rankings often referred to, among 2,112 universities evaluated. USP announces in its website news that it ranks amongst the top 10% universities while there are 20,000 universities in the world according to UNESCO[42]. The other universities in the Pacific region described in the chapter 1 are not included in the ranking so that USP is the only university that has ranking in it. UWI referred earlier as the international university in the Caribbean Sea is ranked between 401 and 500.

2-1-2 Governance[43]

The legal constitutional documents of USP are its Charter and Statutes. The original Charter and Statutes were enacted in 1970, and they have been amended a few times since then. The Charter contains the objects and powers of the University and provides for its governance. Section 3 of the Charter states:

"The objects of the University shall be the maintenance, advancement and dissemination of knowledge by teaching, consultancy and research and otherwise and the provision at appropriate levels of education and training responsive to the well-being and needs of the communities of the South Pacific."

The original Charter and Statutes were contained in an Order in Council of Her Majesty Queen Elizabeth II made under her Royal Prerogative powers on 4 February 1970. The Order was made for the benefit of the original 11 South Pacific member countries of USP in response to requests from their governing authorities. The Charter incorporated USP as a "Body Politic and Corporate."

Different procedures are stipulated for amendment of the Charter and for amendment of the Statutes. The Council is empowered to amend the Charter by special resolution, but such resolutions are not effective until approved by Queen Elizabeth II, acting upon the advice of her Privy Council in England. On the other hand, the Council is also empowered to amend or repeal the Statutes, also by way of a special resolution. The approval of Her Majesty in Council is not required for this purpose, but any amendment or repeal must be consistent with the Charter.

(1) Council

Under Section 13 of the Charter, the Council is the University's "executive governing body" and is

40 https://www.uwi.edu/alumnionline/tags/royal-charter

41 https://www.timeshighereducation.com/

42 https://www.usp.ac.fj/news/usp-ranked-amongst-the-top-10-percent-of-universities-in-the-world/

43 ADB Report *"SUMMARY DESCRIPTION OF LEGAL STATUS OF THE UNIVERSITY OF THE SOUTH PACIFIC"* was referred. (https://www.adb.org/sites/default/files/linked-documents/42291-024-reg-oth-02.pdf)

"responsible for the management and administration of the revenue and property of the University." The Council meets twice a year, in mid-May and in the first week of November; the May meeting is usually held in a member country upon invitation while the November meeting is usually held in Fiji. As stated earlier, members of the Council include representatives of the member countries who are mostly the ministers of education or equivalent.

A brief overview of the governance of UWI in the Caribbean is given here for reference. UWI currently operates its education delivery through five campuses located in the Caribbean countries. There is a Campus Council at each of the five campuses, while the University Council oversees the whole university as an apex body. This devolved structure seems to differ significantly from that of USP, where the governance structure of USP appears to be more centralized.

Subject to the powers of the Senate (which is the academic authority of the University), the Council is empowered to exercise all of the powers of the University. Day-to-day administration of the University is carried out on behalf of the Council by the Vice-Chancellor, who is the University's chief academic and administrative officer, and on his/her behalf by subordinate officers and staff at the University's various campuses and centers. The Vice-Chancellor reports to the Council on the conduct of this administration.

The membership and functions of the Council are governed by the Statutes. Statute 12 provides that the members of the Council consist of

(i) the Pro-Chancellor (who is the Chair of the Council);
(ii) the Vice-Chancellor;
(iii) one member from each member country other than Fiji and Samoa (which have five and two members, respectively);
(iv) one member appointed by each of the governments of Australia and New Zealand;
(v) the Secretary-General of the Pacific Islands Forum Secretariat or a nominee;
(vi) two professors elected by the University's Senate;
(vii) two other staff members appointed in accordance with the University's Ordinances;
(viii) two student representatives elected in accordance with the University's Ordinances; and
(ix) a maximum of seven additional members co-opted by the Council bearing in mind the desirability of appointing members on the basis of management experience, professional and commercial interests, geographical representation, age and gender balance, and academic experience from outside of the region. Graduation from USP is also considered a desirable trait.

Council members serve terms as follows:

(i) members (and alternate members) appointed by a member government hold office for as long as that government wishes;
(ii) staff members for three years;
(iii) student members for one year (unless they cease to be students earlier than this); and

(iv) co-opted members for a maximum appointed term of three years at a time, and not for more than nine years continuously.

The Statutes provide that the Council may dismiss a member if s/he is declared bankrupt, convicted of an offense that it considers makes the member unfit for membership, misses two consecutive Council meetings without leave, or fails to comply with requirements as to the disclosure of conflicts of interest.

Members of the current Council as of December 2021 are as follows;

Mr. Winston Thompson: Pro-Chancellor & Chair of Council
Professor Pat Walsh: Deputy Pro-Chancellor & Deputy Chair of Council (*Also New Zealand Government Representative)*
Professor Pal Ahluwalia: Vice-Chancellor and President:
Hon. Vaine Mokoroa: Cook Islands Minister for Education
Hon. Alexander Teabo: Kiribati Minister for Education
Hon. Kitlang Kabua: Marshall Islands Minister for Education, Sports & Training
H.E. Lionel Aingimiea: Nauru President & Minister for Education
Hon. Sauni Tongatule: Niue Minister for Education
Hon. Lanelle Tanangada: Solomon Islands Minister for Education & Human Resources Development
Hon. Elehi Kelihiano Kalolo: Tokelau Minister for Education
Hon. Timi Melei: Tuvalu Minister for Education, Youth & Sports
Hon. Samson Samsen: Vanuatu Minister for Education & Training
Hon. Seu'ula Ioane: Samoa Minister for Education, Sports & Culture
Mr. Leasiosiofa'asisina Oscar Malielegaoi: Samoa Chief Executive Officer, Ministry of Finance
Hon. Premila Kumar: Fiji Minister for Education, Heritage & Arts
Dr. Anjeela Jokhan: Fiji Permanent Secretary for Ministry of Education, Heritage & Arts
Mr. Shiri Gounder: Fiji Permanent Secretary for Economy *(Acting)*
Ms. Fay Yee: Fiji Government Representative
Mr. Mahmood Khan: Fiji Government Representative (Also Chair of Audit & Risk Committee)
Hon. Siaosi 'Ofa Ki Vahafolau Sovaleni: Tonga Minister for Education & Training
Professor Caroline McMillen: Australian Government Representative
Mr. Henry Puna: Secretary General, Pacific Islands Forum Secretariat
Ms. Aloma Johannson: Chair of Finance & Resources Committee
Professor Sushil Kumar: Senate Representative
Professor Surendra Prasad: Senate Representative
Mr. Mani Mate: USP Students Association Representative
Mr. Viliame Naulivou: USP Students Association Representative
Dr. Krishna Raghuwaiya: University Staff Representative

Dr. Robin Havea: University Staff Representative
Ms. Petunia Tupou: Co-opted
Mr. Semi Tukana: Co-opted

The term of the Pro-Chancellor, Mr. Thompson, ended in December 2021, and he was succeeded by Hon. Dr. Hilda C. Heine, who was appointed to the Chancellor in 2019, and is the former President of the Republic of Marshall Islands.

According to the Charter, the Chancellor is a titular head of USP, but is not a member of Council and has no power in the management of USP. The Chancellor is usually appointed for a term of from July to June of the following year. The Chancellors of the past 7 years to date are listed below.

Hon. Dalton Emani Makamau Tagelagi, the Premier of Niue (July 2021–June 2022)
His Excellency Lionel Rouwen Aingimea, President of the Republic of Nauru (July 2020–June 2021)
His Excellency David Kabua, President of the Republic of Marshall Islands (13 January 2020–30 June 2020)
Her Excellency Dr. Hilda C. Heine, President of the Republic of Marshall Islands (July 2019–12 January 2020)
President of the Republic of Kiribati (July 2018–June 2019)
President of Fiji (July 2017–June 2018)
Prime Minister of Cook Islands (July 2016–June 2017)
President of Vanuatu (July 2015–June 2016)

The Charter also stipulates that the Pro-Chancellor is the Chair of Council. Pro-Chancellors from the establishment to date are listed below.

Mr. Winston Thompson (1 January 2016–31 December 2021)
Mrs. Fekitamoeloa ‘Utoikamanu (13 April 2015–31 December 2015), Acting
Mr. Ikbal Jannif (1 July 2012-12 April 2015)
Hon. Fiame Naomi Mata’afa of Samoa (2006-30 June 2012)
Hon. Dr Senipisi Langi Kavaliku of Tonga (2000–2006)
Mr. Savenaca Siwatibau of Fiji (1997–1999)
Mr. Ieremia Tabai of Kiribati (1991–1997)
Mr. Henry Naisali of Tuvalu (1985–1990)
Hon. Mosese Qionibaravi of Fiji (1981–1985)
Hon. Dr Senipisi Langi Kavaliku of Tonga (1976–1981)
Masiofo Fetauimalemau Mata’afa of Samoa (1971–1976)

Vice-Chancellor from the establishment to date are also listed below.

Professor Pal Ahluwalia (2019-2023)
Professor Rajesh Chandra (2008–2018)
Professor Anthony Tarr (2005–2007)
Mr. Savenaca Siwatibau (2001–2003)
Mr. Esekia Solofa (1992–2001)
Mr. Geoffrey Caston (1983–1992)
Professor Frank Brosnahan (1982–1983)
Dr. James Maraj (1975–1982)
Dr. Colin Aikman (1968–1974)

The Statutes require the Council to meet at least once a year. In practice, it meets twice a year, in May and November, in different member countries. Special meetings may be convened at the written request of the Pro-Chancellor or at least 10 members of the Council.

A quorum of the Council consists of at least half of the current members, of whom at least eight must be members or alternate members appointed by a regional member government. Decisions of the Council (other than for amendment of the Charter and Statutes) may be made by a simple majority. In practice, decisions of the Council are generally made unanimously or by consensus. A special resolution for the purposes of amending the Charter or amending or repealing a Statute means a resolution passed by a supermajority of not less than three-fourths of the members of the Council, at two consecutive meetings of the Council. The two meetings must be held at least one calendar month apart. It is mandatory that the first passing of a special resolution take place at an actual meeting of the Council. However, the second passing of the special resolution may, unless any member objects, take place by way of circulation of the resolution to all of the members and the approval by signature of three-fourths of the members, in accordance with a procedure prescribed in the Statutes.

(2) Committees and delegation

The Statutes provide for an Executive Committee of the Council and for the establishment of other Committees. The Executive Committee comprises the Pro-Chancellor, the Vice-Chancellor, the Deputy Chair of Council, the chairpersons of other Council committees selected by the Council, at least five members of the Council who were appointed to the Council by member governments, and a maximum of three other Council members appointed by the Council for a term of up to three years. The Executive Committee is required to meet at least once every three months. It may make decisions on behalf of the Council in urgent circumstances where existing delegations are inadequate, but must refer the matter to the Council at the earliest opportunity.

The following Committees including the Executive Committee have been formed under the Council under the current governance structure.

Executive Committee (EC)
Audit and Risk Committee (ARC)
Finance & Investments Committee (FIC)
Remuneration Committee (REMCOM)
Search Committee (for appointment of the Pro-Chancellor)
Legislation Taskforce
Trust Fund
Appointments Committee

The governance structure of USP is shown in the following figure.

Source：USP Annual Report 2020

Figure 2-1-2　Governance Structure of USP

(3)　Senior Management Team (SMT)

The Senior Management Team (SMT) appears in the figure presented above among the Management Committees, and serves in an advisory capacity to the Vice-Chancellor. The SMT does not appear in the Charter or the Statutes. The SMT is comprised of the Vice-Chancellor, all of the Deputy Vice-Chancellors (currently two appointed), the Executive Director of Finance, the Executive Director of People and Workforce Strategy (formerly Human Resources, changed in 2019), and the six Heads of Schools. As observed, the members are top management and the heads of core units. Since SMT appears in USP documents in relation to a range of cases, it seems to be a committee (or a team) that is involved in various important decisions.

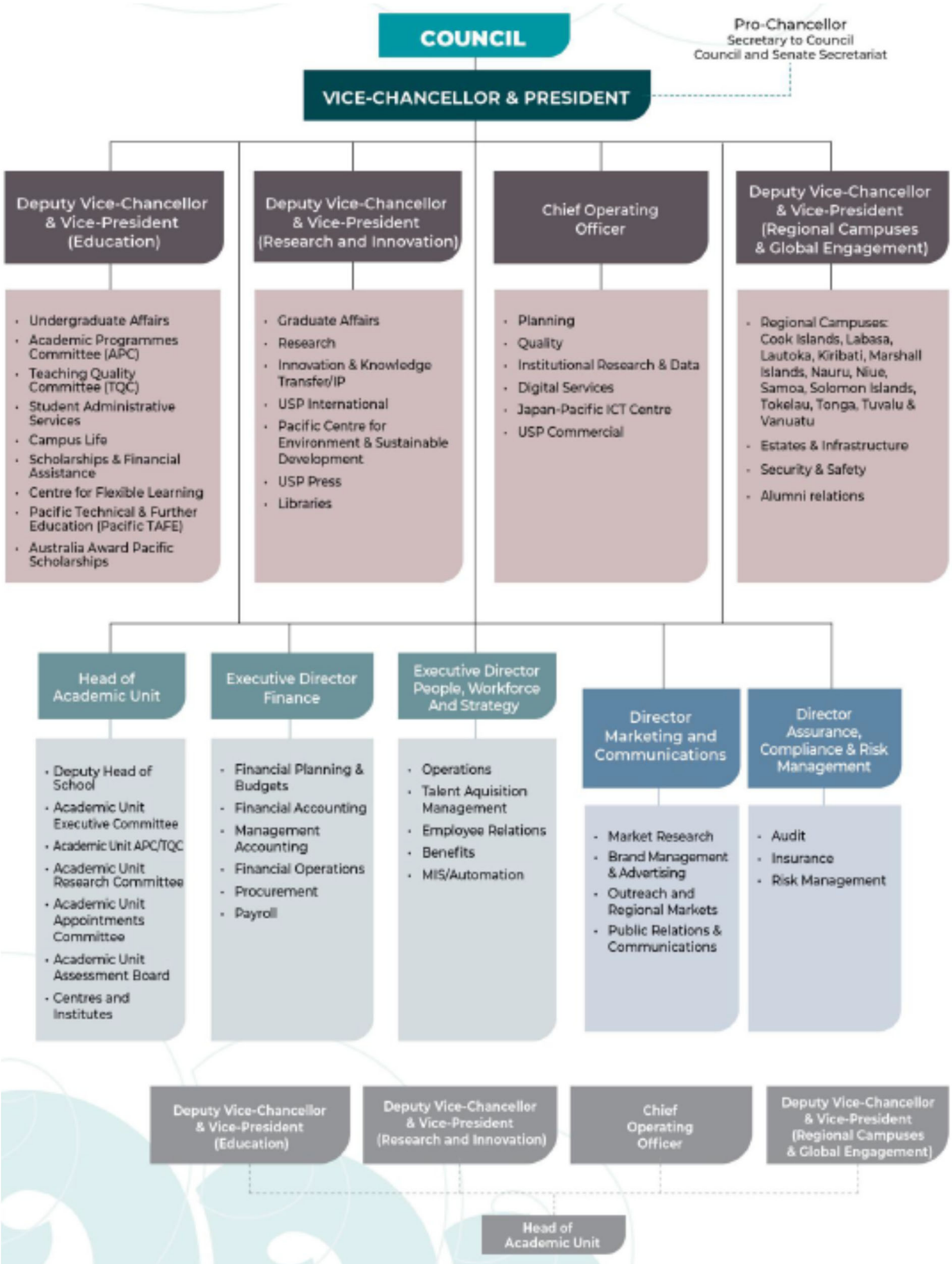
(4) Recent reorganization

There was a major reorganization of USP recently in order to bring about efficiencies in management. It was planned in 2020, then tabled and adopted in principle at the Council Meeting held in November 2020. It became effective in January 2021, the beginning of USP calendar year. The restructuring was a major one, in that the three Faculties and the 17 Schools that were placed under them were abolished and replaced by six Schools, which became the primary organizations in terms of education services and research activities. However, this did not entail an amendment to the USP Charter, which would have required approval from the Privy Council in the UK.

It should be noted that this JICA Survey was conducted at the Laucala Main Campus from November to December 2021, which was before the end of the very first year after the re-organization, so that some official information relating to annual operations under the new organizational structure was not available, such as statistics that would be presented in an annual report, for example, student enrollment by school.

The following figure shows the organizational structure of top management after the restructuring. There were two Deputy Vice-Chancellors and two Vice-Presidents earlier, while there are three Deputy Vice-Chancellors under the new structure.

Although the figure indicates that there should be three Deputy Vice-Chancellors (DVCs) appointed, the DVC for Research and Innovation is vacant at present. The DVC for Education has also not been officially appointed but was in the status of acting at the time of this Survey.

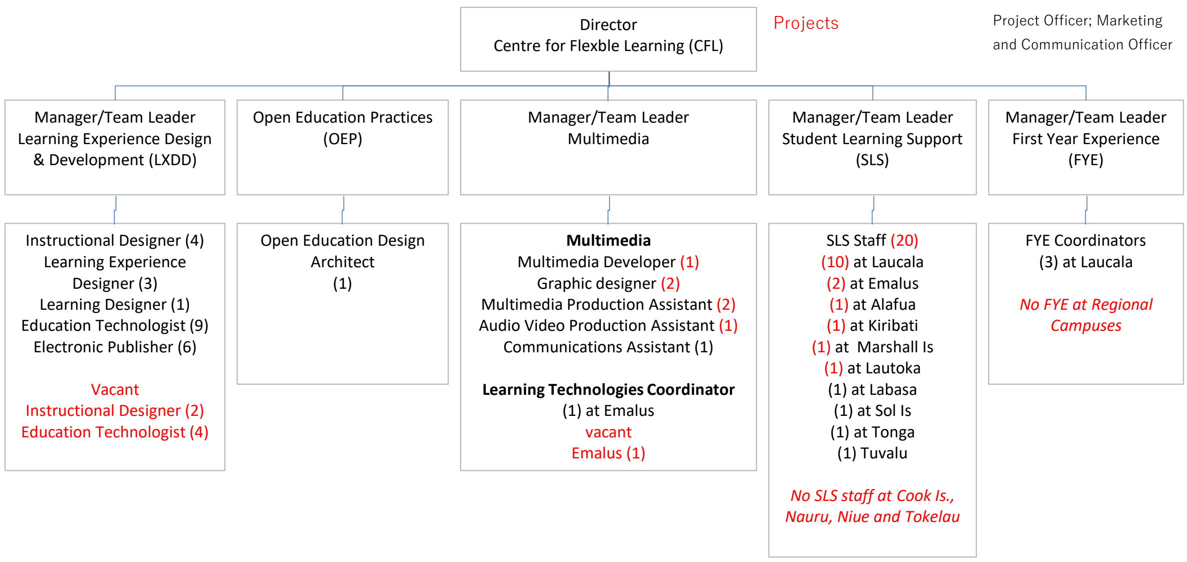


Source: USP Handbook & Calendar 2022

Figure 2-1-3 Overall Organizational Structure

(5) Sections related to Distance Learning and Communication Network

An organogram is shown below of the Centre for Flexible Learning (CFL), which is in charge of the learning design of the distance learning system and utilizes its pedagogical and andragogical expertise.

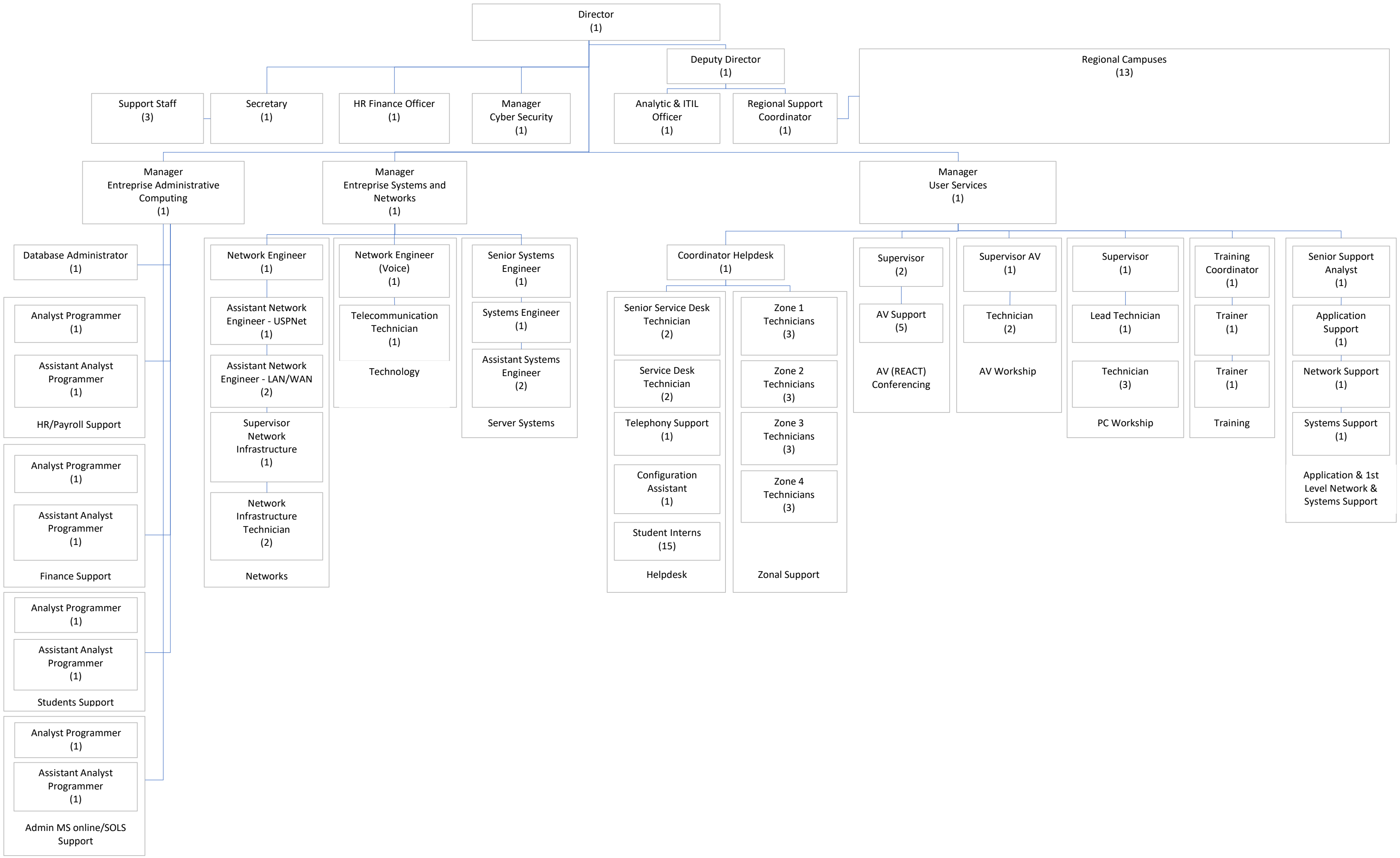


Source: prepared by JICA Study Team based on information collected from the CFL

Figure 2-1-4 Organogram of the CFL

The CFL includes the following sections. Learning Experience Design and Development is in charge of support for learning design in distance education. Multimedia is in charge of the development of audiovisual teaching and learning materials. Student Learning Support (SLS) is in charge of direct support for the educational needs of students registered in distance education courses. First Year Experience is specifically in charge of first year students, who are not yet familiar with USP and tend to have more troubles in study and life at the university than other students. SLS was once placed under the Faculties (which are now Schools), considering the nature of its tasks, which require cooperation with teaching staff to support students. It was placed under CFL after the re-organization at the beginning of 2021.

Next an organogram of the Information Technology Services (ITS), which is in charge of the technical operation and maintenance of the communication network.

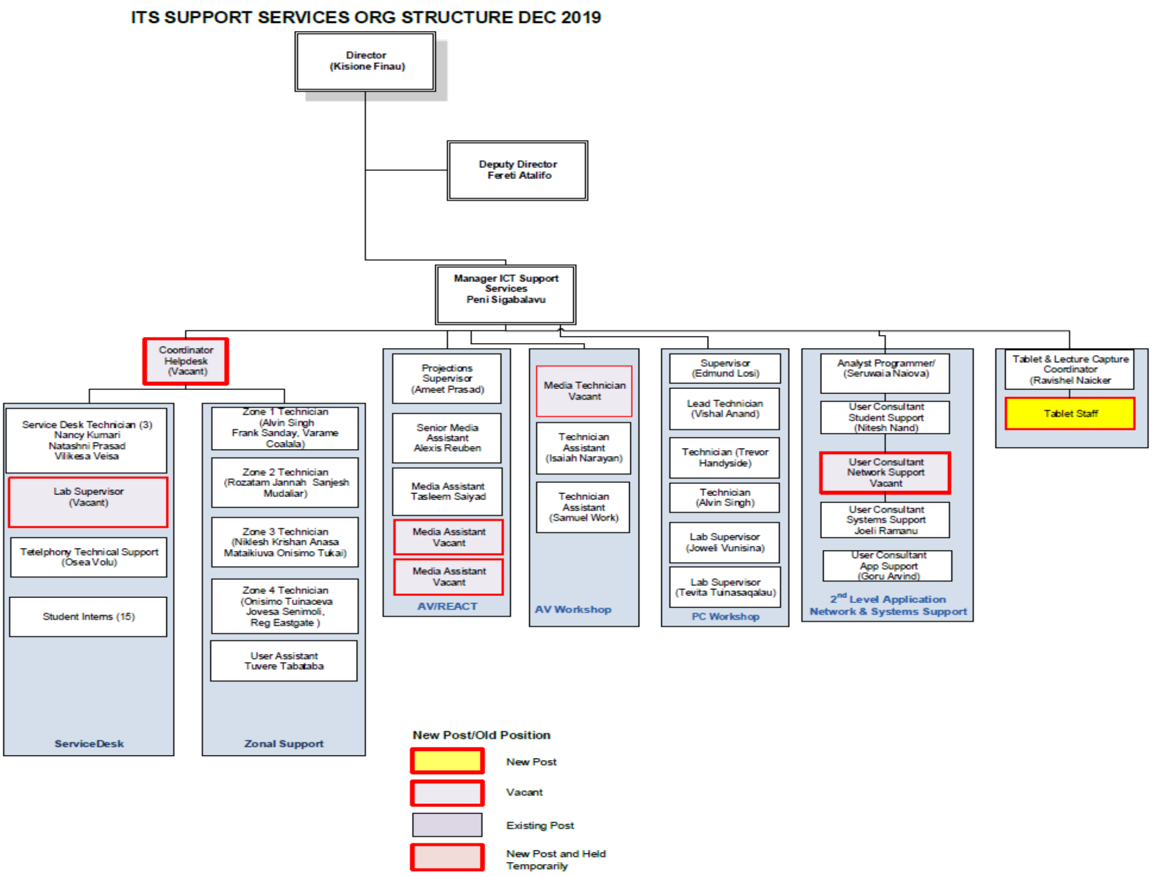


Source: ITS, USP

Figure 2-1-5 Organogram of ITS

ITS comprises the following three sub-sections. ICT Support Services is in charge of general support for all users of the ICT system, including students and staff. Enterprise Systems and Networks Infrastructure is in charge of the operation and maintenance of ICT and the communication network hardware system. Enterprise Administrative Computing is in charge of development as well as operation and maintenance of PC software and applications used by students and staff.

The Director of ITS confirmed that there has been no official amendment after approval of the above structure, while it was learnt during the field survey at the Laucala main campus that some sections such as Moodle Support section and Learning Analytics section have been transferred from CFL to ITS recently. Taking that in consideration, an organogram obtained from Support Service section during the field survey is shown below. It needs to be noted that this may not be an officially approved structure.



Source: USP

Figure 2-6 Organogram of Support Services, ITS (not approved)

2-1-3 Education Programmes

(1) Institutional arrangement for delivery of education programmes

As stated earlier, there were three Faculties with 17 Schools under those Faculties before 2020, and these were reorganized into six Schools with 21 Disciplines under them in the restructuring[44] mentioned earlier. The Schools and Disciplines under the new structure are shown in the table below.

[44] The restructuring may be interpreted as downgrading the Faculties to Schools in the institutional framework.

Table 2-1-1 Overview of Schools under the New Organizational Structure

New Names of Schools	Disciplines	Major Undergraduate Programmes Offered
School of Accounting, Finance and Economics (SAFE)	➢ Accounting & Finance ➢ Economics	Bachelor of Commerce Bachelor of Commerce in Professional Accounting
School of Business and Management (SBM)	➢ Graduate School of Business ➢ Land Management & Development ➢ Management & Public Administration ➢ Tourism & Hospitality Management	Bachelor of Commerce in Hotel Management Bachelor of Commerce in Tourism and Hospitality Management
School of Information Technology, Engineering, Mathematics, and Physics (STEMP)	➢ Civil Engineering ➢ Electrical & Electronics Engineering ➢ Mechanical Engineering ➢ Mathematics and Statistics ➢ Physics	Bachelor of Science Bachelor of Engineering (Civil) Bachelor of Engineering (Electrical/Electronic) Bachelor of Engineering (Mechanical) Bachelor of Networks and Security Bachelor of Software Engineering
School of Agriculture, Geography, Environment, Oceans, and Natural Sciences (SAGEONS)	➢ Marine Studies ➢ Agriculture & Food Technology ➢ Biological & Chemical Sciences ➢ Geography, Earth Science & Environment	Bachelor of Agriculture Bachelor of Geospatial Science Bachelor of Science (Environmental Science) Bachelor of Science (Marine Science) Bachelor of Arts (Environmental Management) Bachelor of Arts (Marine Management)
School of Law and Social Sciences (SoLaSS)	➢ Government, Development & International Affairs ➢ Law ➢ Social Sciences	Bachelor of Laws (LLB) Bachelor of Arts)
School of Pacific Arts, Communication, and Education (SPACE)	➢ Education ➢ Communication ➢ Oceania Centre for Arts, Culture & Pacific Studies	Bachelor of Education In-Service

Source: USP

(2) Education programmes offered

USP offers the various education programmes listed below. It should be noted that some of these are not usually offered by universities.

i) Preliminary Programme

Equivalent to Year 12 (Form 6) in upper secondary education programmes among USP member countries.

ii) Foundation Programme

Equivalent to Year 13 (Form 7) in upper secondary education programmes among USP member countries. It may be referred to as a University Preparatory Year in some contexts.

iii) Undergraduate Programme

The majority of undergraduate programmes are three-year programmes, following the standard system in the UK. There are some four-year programmes. These are offered by all the six Schools. The major undergraduate programmes appearing in the 2021 Handbook and Calendar are listed in the above table. There are other programmes not listed in the table, such as combined Bachelor of Arts programmes, Science or Commerce programmes, and courses in education for teacher qualifications in specific subject areas.

iv) Postgraduate Programmes

Master's programmes and PhD programmes, offered by the six Schools.

v) CVET (Continuing Vocational Education and Training) Programmes

Education and training programmes for acquisition of more practical vocational skills. There are programmes in the areas of tourism and business management.

vi) Workforce Development Training

A programme consisting mainly of short courses for in-service education and training in vocational skills development for the active and potential labor force.

According to a review conducted in 2020[45], 197 education programmes in total were offered at that time. An internal document prepared for the conversion of face-to-face courses to remote delivery in response to COVID-19 in early 2021 provides further information about courses offered. According to that internal information, 498 courses were offered in the 1st semester in 2021. It should be noted that this figure changes from one semester to another since there are a few courses only offered in the 1st semester or 2nd semester.

In addition to the above programmes, some Schools or equivalent sections offer courses that are two years or less in duration and award a diploma below a Bachelor's degree or even shorter certificate

[45] External review of CFL

courses to meet a particular societal demand. The number of students in 2020 is shown in the table below. The figures are not the actual numbers as a head count, but equivalent full-time students (EFTS), which is a unit of measure that defines the calculated (not actual) number of students equivalent to the number carrying the workload of a full-time student. For example, an EFTS workload of 1.0/yr for a student means that the student is equivalent to a full-time student, while an EFTS of 0.5/yr for a student means the student is equivalent to half of a full-time student for the purpose of counting students. Therefore, the actual numbers of students will be larger than these numbers.

Table 2-1-2 Number of Students by Course Level (EFTS)

Course Level	2019	2020
English Language	1.3	0.0
Preliminary	1089.0	861.9
Foundation	2295.3	2500.6
Vocational & Continuing Education	1898.5	1702.7
Degree 100 level	4689.3	5112.3
Degree 200 level	2886.4	3299.4
Degree 300 level	2753.8	2768.7
Postgraduate 400 level	973.0	956.0
Professional Law	140.8	123.0
MBA course	174.0	121.2
Research	280.5	250.3
Total	**17181.9**	**17696.1**

Source: USP Annual Report 2020

In addition to EFTS, actual number of students as headcounts are given in the report as well. Those are shown in table 2-1-3 below. The sum of each prgramme levels is larger than total distinct students in the table because there students who are enrolled in more than one programme.

Table 2-3 Actual Number of Students

HEADCOUNT	2019	2020
Total Distinct Students	31,547	31,096
Sub-Degree Programmes(Skill- based)	5,316	4,956
Pre-Degree Programmes	6,757	5,823
Undergraduate Programmes	16,071	17,019
Post Graduate Programmes	3,191	3,094
Others	1,630	1,625

Source: USP Annual Report 2020

The number of students by School, College, and centre in 2020 is provided in the following table. As stated earlier, it should be noted that because the institutional framework has been restructured, these figures may be of limited use in planning for future development.

Table 2-1-4 Number of Student Enrollments by Academic Section(EFTS)

School, College, Centre	2019	2020
College of Business,Tourism & Hospitality	1216.6	1141.2
College of Arts & Humanities	2089.7	1875.0
College of Science, Technology & Environment	1973.0	2045.4
Faculty of Science, Technology & Environment	76.3	67.2
Graduate School of Busines	174.0	121.2
Oceania Centre of Arts & Culture	344.3	334.0
Pacific Centre - Environment & Development	83.0	97.0
School Agriculture & Food Technology	283.8	278.3
School of Geo, Earth Science & Environment	652.6	702.2
School of Governance, Dev & International Affairs	564.8	619.3
School of Language Arts & Media	858.2	910.1
School Engineering & Physics	506.6	525.3
School of Accounting & Finance	1170.0	1176.2
School of Biology, Chemical Science	479.6	495.2
School of Economics	595.9	623.0
School of Education	1100.9	1065.6
School of Land Management & Development	132.5	155.9
School of Law	1036.2	1151.3
School of Marine Studies	147.2	142.3
School of Management & Public Admin	1283.1	1402.0
School of Social Sciences	447.3	561.5
School of Tourism & Hospitality Management	409.4	465.7
School of Comp, Info & Math Sci.	1556.8	1741.2
Total	**17181.8**	**17696.1**

Source: USP Annual Report 2020

As for the tuition fees of those education programmes, exact amounts cannot be simply calculated as unit fee times number or courses because both unit fees and number of courses differ by course and education programme. Further, they differ by course delivery mode such as face-to-face mode at Laucala main campus or distance learning mode in regional campuses. Considering that, annual tuition fees for three cases are calculated using information from the available USP publication[46].

<u>Bachelor of laws: 32 courses in four years</u>

Face-to-face: FJD22,115 (average annual fees: approx. FJD 5,530), distance learning: FJD18,940 (average annual fees: approx. FJD4,735)

<u>Bachelor of science (double majors in Computer Science and Data Analysis): 24 courses in three years</u>

Face-to-face: FJD16,725 (average annual fees: approx. FJD 5,575), distance learning: FJD14,345 (average annual fees: approx. FJD4,780)

<u>Bachelor of commerce: (double majors in Accounting and Economics): 24 courses in three years</u>

Face-to-face: FJD16,450 (average annual fees: approx. FJD 5,485), distance learning: FJD14,095 (average annual fees: approx. FJD4,700)

46 Handbook & Calendar 2022

Average annual tuition fees for bachelor's degree programmes are approximately FJD5,500 for face-to-face mode while approximately FJD4,700 for distance mode although there are little differences depending on programmes. Comparative analysis between USP and universities in Japan about burdens borne by students when paying their own fees, was made previously in the chapter 1.

(3) Campuses and Centres

Education programmes are offered in the distance education format at various USP campuses and centres in the 12 member countries. Each of the 12 member countries has one regional campus, except for Fiji, which has two regional campuses, Lautoka and Labasa, in addition to the main campus at Laucala. The regional campuses are headed and managed by Campus Directors.

Some countries have centres smaller than campuses for those residing far from the central areas of their countries. Centres are managed by Centre Managers who report to the Director of Regional Campuses. Small centres may be equipped with rooms for online lectures (REACT rooms with the necessary equipment), desktop PCs for students, and a library served by a minimum number of staff.

The number of students by campus and by type of enrollment is shown in the tables below. EFTS is again used here.

Table 2-1-5 Number of Students by Campus (EFTS)

Campus	2019	2020
Cook Islands	51.7	55.3
Fiji - Labasa	626.6	623.7
Fiji - Laucala	10091.9	10356.2
Fiji - Lautoka	1001.7	1023.6
Kiribati	910.2	915.2
Marshall Islands	83.5	91.9
Nauru	32.0	35.9
Niue	21.6	16.9
Samoa - Alafua	284.2	275.6
Solomon Islands	1967.8	2042.2
Tokelau	46.0	48.7
Tonga	528.0	606.3
Tuvalu	159.2	132.1
Vanuatu - Emalus	1377.5	1472.3
Total	**17181.9**	**17695.9**

Source: USP Annual Report 2020

Table 2-1-6 Number of Students by Nationality (EFTS)

Nationality	2019	2020
Cook Islands	45.4	31.0
Fiji	9781.1	9898.4
Kiribati	1290.1	1447.0
Marshall Islands	82.5	89.2
Nauru	51.8	59.5
Niue	18.9	15.4
Samoa - Alafua	322.9	277.1
Solomon Islands	2789.6	2799.1
Tokelau	47.2	37.1
Tonga	777.0	879.8
Tuvalu	317.6	283.6
Vanuatu - Emalus	1446.0	1656.2
International	211.7	222.7
TOTAL EFTS	**17181.8**	**17696.1**

Source: USP Annual Report 2020

Number of students of the Laucala main campus is significantly large comparing to other campuses.

The number of students is also large in Solomon Islands with the next largest population to Fiji among the USP member countries. The composition of number of students by nationality is the same; over the half of total students is occupied by those of Fiji followed those by Solomon Islands. Numbers of students registered under a campus are less than a number of the students of the nation in some countries, which is most likely because those students study outside their own countries, in the Lamcala main campus. On the other hand, there are also some countries such as Cook Islands, where the numbers of students registered under a campus and of its own nation are the other way around. It is speculated because of international students registered under those cumpauses, although it was not clarified in this Survey.

Number of students by type of enrollment are shown in the table 2-1-7 below. Taking in consideration that actual total number of students exceed 30,000 while fulltime students are less than 10,000, it is inferred that more than 20,000 students are parttime students who study and work at the same time. It reflects an important role of USP as a lifelong education institution.

Table 2-1-7 Number of Students by Type of Enrollment (EFTS)

type of enrolment	2019	2020
Full-Time	8,890.1	9,138.4
Part-Time	8,291.6	8,557.5
Total	**17,181.70**	**17,695.90**

Source: USP Annual Report 2020

Number of staff by campus is shown in the following table 2-1-8.

Table 2-1-8 Number of Staff by Campus (2019, 2020)

CAMPUS	Intermediate & Junior		Senior Staff		TOTAL		%	
	2019	2020	2019	2020	2019	2020	2019	2020
Alafua	30	46	14	21	71	67	4.74	4.38
Cook Islands	2	2	2	6	4	8	0.27	0.52
Emalus	37	33	30	47	116	80	7.74	5.23
Kiribati	9	23	8	8	21	31	1.40	2.03
Labasa	10	18	9	10	22	28	1.47	1.83
Laucala	460	597	508	592	1,105	1,189	73.77	72.81
Lautoka	11	16	11	15	24	31	1.60	2.03
Marshall Islands	8	11	18	17	37	28	2.47	1.83
Nauru	3	9	2	4	5	13	0.33	0.85
Niue	2	3	2	3	4	6	0.27	0.39
Solomon Islands	23	32	18	30	43	62	2.87	4.05
Tonga	0	30	0	24	0	54	0.00	3.53
Tokelau	22	0	13	0	38	0	2.54	0.00
Tuvalu	5	2	1	6	8	8	0.53	0.52
Total	**622**	**822**	**636**	**783**	**1498**	**1605**	**100.00**	**100.00**

Source: USP Annual Report 2020

Over 70% of staff are assigned to the Laucala main campus in Fiji. The number of staff in Fiji exceeds three quarters of the total number of staff at USP when all three campuses are considered. It is noted that Alafua campus in Samoa and Emalus campus in Vanuatu, where the Faculty of Agriculture and the Faculty of Law, respectively, were based under the previous institutional framework (in 2020), have a relatively larger proportion of staff. The number of staff in the Solomon Islands, where the number of students is larger, is also high.

(4) Entry requirements

As in other tertiary education institutions, the minimum entry requirement is the completion of secondary education. However, this requirement becomes a little complicated because USP must enroll students from 12 different countries, each with a different secondary education system.

In the past, there was a regional assessment for Year 12 or the Form 6 equivalent in the past, but this is no longer given. There is a Year 13 or Form 7 regional assessment in place today. Therefore, each member country must organize a Year 12 completion certificate. Some do for Year 13 as well. The following information on secondary education certificates recognized by USP is provided in USP's Handbook and Calendar 2022.

Table 2-1-9 Secondary Education Completion Certificates Recognized by USP

COUNTRY	YEAR 12/FORM 6 OR PRELIMINARY LEVEL	YEAR 13/FORM 7 OR FOUNDATION LEVEL
Cook Islands	NZ NCEA* Level 2	NZ NCEA* Level 3
Kiribati	KSSC	South Pacific Form 7
Fiji	Fiji Year 12 Certificate	Fiji Year 13 Certificate
Marshall Islands	No equivalent	RMI Foundation
Nauru	QSCE	QSCE
Niue	NZ NCEA Level 2	No equivalent
Samoa	Samoa Senior Secondary Certificate	NUS Foundation Certificate
Solomon Islands	SISSC	South Pacific Form 7
Tokelau	No equivalent	Form 7
Tonga	TFSC	TNFSC
Tuvalu	TSSC	No equivalent
Vanuatu	VSSC	South Pacific Form Seven Certificate

* NZ National Certificate of Educational Achievement Key: Level Equivalence Level 1: Year 11/Form 5

Level 2: Year 12/Form 6

Level 3: Year 13/Form 7

Source: 2022 Handbook and Calendar

It is observed that the requirement for Year 13 is a Year 12 completion certificate, and the requirement for undergraduate programmes is a Year 13 completion certificate.

2-1-4 Finance

The following tables show the annual incomes and annual expenditures by item in the latest completed financial year at the time of this JICA survey, which began in January 2020, and the previous year for comparison. Student tuition fees are the largest income item, comprising over 40% of the total income.

Table 2-1-10 Annual Incomes (2019, 2020)

Particulars	2020 (FJ$)	2019 (FJ$)
Government contributions	25,147,754	37,562,215
Student tuition fees	80,085,173	79,642,115
Development assistance	54,159,526	30,125,041
Commercial Income	12,874,560	13,662,003
Consultancy income	1,685,137	1,659,709
Other income	7,734,665	10,124,334
Release of deferred income	3,702,911	3,598,411
Unrealised exchange gain	1,782,161	133,355
Interest income	1,082,040	786,575
Total income from continuing operations	188,253,927	177,293,758

Source: USP Annual Report 2020

Table 2-1-11 Annual Expenditures (2019, 2020)

Particulars	2020 (FJ$)	2019 (FJ$)
Staff costs	75,283,315	85,839,723
Operating costs	60,852,374	73,300,134
Interest Expense	551,750	524,005
Depreciation and amortization	14,062,371	12,341,083
Movement in impairment provision – trade and other receivables	4,651,841	2,104,099
Write down/(up) in value of inventories	46,544	-24,441
Unrealised exchange loss	-	322,572
Realized exchange loss	32,551	-
Total expenditure from continuing operations	155,480,746	174,407,175

Source: USP Annual Report 2020

Since USP is in principle governed by its Council composed of 12 member countries in principle, those 12 countries are the primary entities financially responsible for its continuing operation. Money from these countries is allocated in the form of government contributions and government scholarships, which account for a substantial portion of tuitions fees. In addition to the 12 member countries, the governments of Australia and New Zealand, which occupy regular seats in the Council as stipulated in the USP Statutes, also contribute to the recurrent budget as part of the development assistance from development partners.

The breakdown of the 12 member government contributions in the latest completed financial year at the time of this JICA survey, which began in January 2020, and the previous year for comparison are shown in the following table.

Table 2-1-12 Contributions from Member Countries (2019, 2020)

Member Country	2020 (FJ$)	2019 (FJ$)
Cook Islands	155,849	182,083
Fiji	14,336,709	26,613,597
Kiribati	978,718	1,004,602
Marshall Islands	288,345	304,231
Nauru	127,259	130,767
Niue	53,652	53,292
Samoa	1,429,780	1,504,009
Solomon Islands	3,261,386	3,364,109
Tokelau	48,094	54,504
Tonga	1,364,346	1,300,170
Tuvalu	449,485	499,199
Vanuatu	2,654,131	2,551,652
Total	**25,147,754**	**37,562,215**

Source: USP Annual Report 2020

Government contributions are categorized as “student grants” and “campus grants”, shares of which are supposed be 50% each. The Table 2-1-13 shows expected amounts of contributions from each of member countries as a plan for 2019. It is seen that two of the total amounts of two kinds of contributions are equal. It may be noticed that the grand total amount significantly differs from the actual total contributions shown in the above Table 2-1-12 in 2019. That is because the contribution expected for Fiji was not actually disbursed as planned to be state below, as could be realized if the amount of the contribution is compared by country.

Table 2-13 Expected Contributions from USP Member Countries (2019, FJD in thousand)

Member Country	Campus Grant	Student Grant	Total
Cook Islands	80	102	182
Fiji	19,340	15,132	34,471
Kiribati	162	843	1,005
Marshall Islands	220	84	304
Nauru	72	59	131
Niue	49	5	53
Samoa	868	636	1,504
Solomon Islands	403	2,961	3,364
Tokelau	-	55	55
Tonga	278	1,022	1,300
Tuvalu	52	447	499
Vanuatu	1,187	1,365	2,552
Total	22,710	22,710	45,420

Source: Financial documents, USP

The campus grant is calculated by a formula that takes into account the number of students by learning mode (face-to-face or other (flexible mode)), area of study (arts and education, science, technology and engineering, law, and agriculture) course level (undergraduate, postgraduate by coursework and postgraduate by research), while the student grant is based on the economic benefits that flow to each country from having a campus, using budgeted total salaries as a proxy to calculate this component[47].

A significant drop from 2019 to 2020 of over 30% is observed due to the reduction in grants from the Government of Fiji due to its government budget cuts in response to the COVID-19 pandemic[48] and withholding part of its grant during the year. The pandemic continues to affect the economy of Fiji, and consequently as of December 2021 the withholding of grant money by Fiji has continued since the beginning of the Government of Fiji's previous fiscal year[49], which began in August 2020. The annual Plan 2022 being made available at the beginning of 2022 explicitly states two plan options, one with and one without grant payment contributions from the Government of Fiji, which may indicate the state of Fiji's financial stand towards USP.

As stated in the previous chapter, government scholarships account for substantial part of tuition fees of tertiary education institutions in the Pacific region that applies to USP as well. Relevant information to scholarship of USP are not available in its annual reports. Information in the following two tables regarding numbers of scholarships by country and education programme were obtained through a field survey.

47 https://www.usp.ac.fj/finance-unit/finance-information/government-grant/

48 Most Pacific Island nations have managed to keep the pandemic out with very strict border controls. Fiji is the only USP member country that has suffered from repeat pandemic infection incidences.

49 The fiscal year of the Government of Fiji is from 1st August to 31st July.

Table 2-1-14 Number of scholarships by country (2020)

Nationality	Enrolled	Graduated
Cook Islands	2	0
Fiji	6864	1252
International	7	2
Kiribati	525	64
Marshall Islands	1	0
Nauru	4	1
Samoa	53	21
Solomon Islands	791	252
Tokelau	23	2
Tonga	80	27
Tuvalu	106	30
Vanuatu	458	68
Total	**8914**	**1719**

Source: USP

Table 2-1-15 Number of scholarships by education programme (2020)

School	Enrolled	Graduated
PACE-SD	16	3
Pacific TAFE	638	261
Sch of Agri, Geo, Env,Oc&NatSc	1626	292
Sch of InfoTech, EngrMath&Phys	1331	142
School of Accntng, Fince & Eco	1562	295
School of Business &Management	1747	353
School of Law & Social Science	1273	257
School of Pac Arts, Comm & Edu	680	116
Unclassified Studies	41	0
Total	**8914**	**1719**

Source: USP

Nearly 30% of the total students receive scholarship granted by the 12 USP member countries according to the table 2-1-14. Moreover, over 40% of students registered under the schools for the tertiary level programmes receive scholarship according to the table 2-1-15. Terms and conditions of scholarships are decided by each government so that details are unknown. It was heard during the field survey that scholarships from the 11 member countries other than Fiji for their students who travel to Fiji to study, include transport costs such as airfares and allowances for subsistence and accommodations as well as tuitions fees. It was also heard that some of the member country governments collect evaluation results of their scholarship students at every end of semester to judge if a student should continue or quit study and come home right away when the result of the student is not acceptable. This shows their high expectation for scholarship students who are invested to study at USP, and seriousness in monitoring of their studies and in immediate actions for failing cases.

2-1-5 Management Planning Mechanism

USP's regular planning consists of two documents, the Strategic Plan and the Annual Plan. Strategic Plans cover a few years while Annual Plans cover only a single year. Annual Plans may be interpreted as a breakdown of the Strategic Plan for each operational year. All of these plans must be presented and approved by the USP Council.

(1) Strategic Plan

The USP website provides the following Strategic Plans.

Strategic Plan 2006- 2010
Strategic Plan 2010- 2012
Strategic Plan 2013- 2018
Strategic Plan 2019- 2021
Strategic Plan 2022- 2024

The latest Strategic Plan 2022- 2024 just came out, after approval in the Council Meeting held in mid-November. The Vice-Chancellor of the Plan writes the following in his Foreword to the plan, beginning with the header 'Planning Landscape Underpinned by Challenging Economic Context':

'Our last Strategic Plan (SP) 2019-2021 has been characterised by two predominant factors. First has been a fall in our core funding, and second, we have found ourselves gripped in a global COVID pandemic.' As can be observed, the new Plan is greatly affected by COVID-19.

It is understandable that the last Strategic Plan was not fully achieved due to the economic constraints due to the pandemic. The new Strategic Plan will thus take over many of the points from the previous plan, with minor changes, in the following five priority areas:

1. Education
2. Research, Innovation and Partnerships
3. Regional Campuses and Global Engagement
4. Regional Cooperation through the CROP[50] Network
5. Governance and Intelligent Use of Resources

Although education and research are standard areas for operations of universities in general, operation at regional campuses is presented as the 3rd priority area following the two areas, which is an expression of the important role for USP to play with 55 years of continuous experiences in the region for the development of 12 member countries where only a few tertiary education institutions operate. The 4th priority area presented as operation of regional cooperation also shows the same commitment of USP in principle.

As to the 1st priority area that is education, there are seven objectives stated.

1. To inspire our students across all campuses through implementing a world-class curriculum using the most appropriate pedagogical techniques for Pacific learners.

2. To continuously improve the quality of teaching across the University through engaged and passionate staff.

[50] Council of Regional Organizations of the Pacific

3. Strengthen existing pathways, including from sub-degree and pre-degree programmes to undergraduate programmes and then to postgraduate programmes, and develop new pathways with clear articulation, for USP qualifications as well as qualifications from other higher education providers.

4. Improve the quality and equity of student services across all campuses.

5. Create a student community with high ethical standards, empowerment and awareness of health and safety and environmental issues, and respect for others.

6. Introduce new programmes in the area of health.

7. Improve student experience in the post-COVID-19 environment.

Objective 1 highlights use of pedagogical techniques the Pacific learners. It emphasizes measures to be taken for learners in the region with consideration of unique features of the member countries in common such has remoteness, smallness and isolation. In the Objective 2, demands for wide range of education programmes emerge to be offered by USP as a regional educational institution. Further, equity across member countries expressed in Objective 4 shows an importance that every member country should be treated evenly. Objective 7, 'Improve student experience in the post-COVID-19 environment', states 'Expand online education including the greater adoption of Massive Open Online Courses (MOOCs) and live, interactive online courses.' More than in any other tertiary education institution, USP realizes and emphasizes the importance of development in the area of quality online learning.

The following statement is 'Increase innovations in educational technologies, including the enhancement of USP's Learning Management System, Moodle, by incorporating artificial intelligence-based education tools which collect and analyse data on a student's performance.' This indicates USP's commitment to adopting the latest learning technologies, an area in which the need is greater than at any other institution, with many students scattered over the 12 island nations in the Pacific only connected online.

As with any university, USP also places a priority on research as well, as described in Priority Area 2. There are five themes highlighted as follow;

Theme 1: Sustainable, Inclusive and Equitable Economies
Theme 2: Oceans & Climate Nexus
Theme 3: Education, Culture, Health & Wellbeing
Theme 4: Governance, Justice and Equality
Theme 5: Innovation, Empowerment and Sustainability

Theme 3 is 'Education, Culture, Health & Wellbeing', where USP's central role is explicitly stipulated as ‘the development of innovative actions and interventions for the enhancement of educational opportunities and outcomes.’

(2) Annual Plan

The Annual Plan 2022 was published in January 2022[51]. It is in line with the Strategic Plan 2022 and indicates some concrete numeric targets for student enrollment, research publications, and financial revenues and expenditures. Revenues from research for the past are also explicitly stated, which may be an expression of eagerness to strengthen research activities.

Possibly because of the negative impact of the pandemic on finance, the financial plans require a number of pages. A breakdown of three years of the new Strategic Plan in facility development projects is provided. Although the plan introduces new projects for campus development in Tonga[52] and Tuvalu in 2022, it is still in pipeline status, as USP is trying to identify development partners for financing. On the other hand, the Plan states that USP will allocate its own funding for ICT environment development, such as improvement of PC labs for students use and improvement of Wi-Fi at regional campuses and centres. Behind the improvement of distance learning through the communication network being prioritized, there may lie constraints on education delivery modes due to the spread of the pandemic.

(3) Annual Plan 2021, Estates and Infrastructure

The main sections of USP are supposed to develop their own annual plans as well. However, most of these plans are not available on the USP Website. Among these sections, the Estate and Infrastructure Section in charge of fixed assets has made its Annual Plan 2021 available on the USP Website[53]. This plan is in line with the USP Annual Plan 2021 but provides more detailed information. Since this section is in charge of infrastructure development, their plan has all of the projects listed, including those in the pipeline. This plan is very helpful for understanding all of the development project plans drawn up by USP as a whole entity, but does not provide information on the wishes of all of the different sections. All of the proposed projects are categorized under five priority areas under the Strategic Plan 2021. The following are the list of projects under the Priority Area 3, ‘Regional Campuses’.

- Deferred maintenance implementation for buildings and infrastructure at USP’s Alafua campus (19 buildings), USP’s Kiribati campus (4 buildings), and USP’s Solomon Islands campus (4 buildings).
- Finalize the Regional Campuses Organization Structure Framework and Financing Plan.
- Complete the construction of the new REACT Facility Solomon Islands Lawson Tama campus.
- Complete the roof replacement works for USP’s Marshall Islands campus.

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51 https://www.usp.ac.fj/wp-content/uploads/2022/01/USP-Annual-Plan-2022.pdf

52 This plan was prepared before the volcanic eruption in Tongan waters on 15 January 2022 and it does not take into account the damage due to it.

53 https://www.usp.ac.fj/estates-infrastructure/wp-content/uploads/sites/72/2021/08/USP-E___I_AP2021_April_15-1.pdf

- TEFMA Audit and Benchmark Reporting for Alafua, Emalus, and Kiribati.
- Finalize the land agreement for the proposed Labasa and Lautoka campuses.
- Finalize the 10-year maintenance plan for the Alafua and Emalus campuses.
- Begin construction on the Science Lab at Emalus.
- Update accommodation for international students.
- Ensure that all of the Regional Campus Development is aligned to the individual campus development plan.

2-1-6 History of Distance Learning at USP

Before examining the current distance learning and communication network in the following section, a brief history of distance education at USP is given below.

USP commenced delivery of distance education by means of the conventional method of shipping printed materials to students residing in member island nations right after its establishment in 1968. Soon after that, USP applied to participate in the experimental education practices of the newly initiated PEACESAT Project (Pan-Pacific Education and Communication Experiments by Satellite), which initiated offering the use of a communication satellite system, which had completed its official services to the US military in 1971, for education purposes in the Pacific. In 1974, the application by USP was realized and USP named the new satellite communication network assigned for them USPNet. Although USPNet at the time enabled only one-way audio communication, it is not difficult to imagine its impact considering the communication means widely in use in those days. UWI in the Caribbean Sea referred earlier for reference commenced use of communication satellite 1983, which is nine years after operationalization of USPNet[54].

Upon the end of service of PEACESAT in 1985 after a decade of use, USP continued distance education delivery through another satellite communication network, INTELSAT. However, only some USP member countries were able to use the satellite communication network due to limitations of its facilities. In order to address that situation, the Government of Japan together with the Governments of Australia and New Zealand implemented a project to enable all 12 member countries to be connected through a satellite communication network. The new USPNet was commissioned in 2000. Coincidentally, there was a coup in the same year in Fiji, where the USP's main campus is. The other 11 member countries were obliged to urgently bring their students home from Fiji. The newly commissioned USPNet greatly contributed to those returning students being able to continue their studies.

Communication through the Internet was also improving around year 2000. The use of the Internet in general society was gradually expanding. Accordingly, USPNet evolved its technical specifications by adding IP (Internet Protocol), which made it possible to connect to the Internet through USPNet in 2006.

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[54] https://www.inderscienceonline.com/doi/pdf/10.1504/IJCEELL.1992.030396

Communication satellite systems at that time required relatively large parabolic antennas, but these were only installed at USP campuses in the capitals of the member countries, not on the smaller islands, due to difficulties with both installation and maintenance. To address this situation, in 2012 the Government of Japan again assisted USP by providing a new set of satellite communication facilities and equipment to be used in a different bandwidth from that already in use, which requires smaller parabolic antennas than those that were in use. These smaller parabolic antennas were installed at USP centres in remote and isolated islands. This improved the learning environment of students in remote areas.

As stated above, USP began utilizing a satellite communication network in distance education delivery soon after its establishment, and continually strengthened that network for further improvement of its distance learning. In the course of this Survey at the main campus, it was confirmed that USP management and staff widely recognize and highly appreciate the repeated contributions from the Government of Japan.

2-2 Status of Assistance to USP by Development Partners

2-2-1 Status of Japan's Assistance to USP

As shown in the table below, the Japanese government has provided assistance to USP in various ways, especially in the ICT field. (The underlined parts show assistance related to distance learning or communication networks.) In terms of support for USP's distance learning system, the Japanese government has provided assistance for the development of communications satellite facilities (USPNet), the deployment of the Ku-Band system, and a program to dispatch experts in this field to Japanese universities, all of which have been a major foundation for USP's distance learning system today.

Table 2-2-1 History of Japan's Assistance to USP

Type of Support	Year	Project	Summary
Grant Aid	1998	Project for Upgrading of USP-Net Communication System	Upgrading of USPNet Communication System by installation of dedicated satellite communication network equipment (parabolic antenna, wireless equipment, etc.) so VSAT small satellite earth stations could be used in Fiji starting in 2000. Was a project to upgrade Fiji's conventional analog communication lines to digital.
Technical Cooperation	2002 –2005	Project for strengthening programs and networks	- Computer Science (CS) Component: OJT for young teachers by experts and also training in Japan, development of distance learning courses for CS, and strengthening of CS labs - Distance Flexible Learning (DFL) Component: Strengthening of the capacity to develop multimedia materials, developing models for e-learning courses, standardizing course development procedures, and building of a multimedia database to centrally manage multimedia materials. - Information Technology Research and Training (IT R&T) Component: Formulation of procedures for conducting surveys and research, conducting research on the use of IT for socioeconomic development, and planning and implementation of short-term model training courses
Grant Aid	2007 (Phase I) 2008 –2009 (Phase II)	Construction of Information and Communication Technology Centre at University of the South Pacific	Phase I: Construction of Information and Communication Technology Centre (JAPAN-PACIFIC ICT CENTER) Phase II: Construction of multipurpose lecture theatre
Technical Cooperation	2010 –2013	ICT for Human Development and Human Security Project	- New CS/IS bachelor programs offered at SCIMS - USPNet efficiently used and distance learning environment enhanced (Ku-Band deployment) - New ICT technologies utilized and promoted in delivery of distance learning - Operational policy and structure of the Japan-Pacific ICT Center established
Scholarships	2011	Ryoichi Sasakawa Young Leaders Fellowship Fund	The purpose of this programme was to support education of students enrolled in post graduate, Masters and doctoral programmes in the social sciences and humanities with higher potential for leadership in national, regional and international affairs. The fellowship, in the amount of AUD1,146,620.52 covered students' tuition and other mandatory fees, establishment allowance, book allowance, living and lodging allowance, and travel cost from/to home country.
Student Exchange	2012	Japan-Pacific Youth Exchange Project	The Government of Japan, under the former Japan Pacific Youth Exchange Project and current JENESYS programmes allows students Pacific Island Countries, Australia and New Zealand to visit Japan on an annual basis to understand and learn Japanese cultures. This programme is supported through annual financial contributions through the Japanese Ministry of Foreign Affairs and implemented by the University in collaboration with Japanese Overseas Cooperation Association (JOCA).

Type of Support	Year	Project	Summary
Student Exchange	2012 –2013	KIZUNA Project	USP students were invited to Japan and participated in exchange programs, visited disaster-affected areas, and did volunteer activities, etc.
Student Exchange	2013	JENESYS 2.0*	Provided fully funded 9-day study tours to Japan (in Mie prefecture and Tokyo)
Student Exchange	2015 –	The JENESYS Programme	Provided fully funded 7-9 day study tours to Japan for university students between the ages of 18 and 34 enrolled in degree programmes
GGP**	2018	Project for Upgrading of Sustainable Agriculture in Gau Island	Procurement of tractor with farm implements, portable sawmill, and working shed for Discipline of Marine Studies (USP) in Gau Island

*JENESYS: Japan-East Asia Network of Exchange for Students and Youths
**Grant Assistance for Grass-Roots Human Security Projects

2-2-2 Status of Assistance to USP from Other Donors

In addition to Australia and New Zealand, which were involved in the establishment of USP, 13 countries/organizations are listed on USP's website as major development partners/donors. Currently, the assistance provided by these development partners is mainly for capacity building of staff and organizations of USP.

Among the development partners/donors above, the major assistance projects by Australia, New Zealand, the European Union (EU), the Asian Development Bank (ADB), and the People's Republic of China are discussed below.

(1) Austrailia

Australia was amongst the countries that commissioned the establishment of USP in 1968 and has been assisting USP since that time. Since 2010 Australia has generously funded the Strategic Plan (2010–2013 & 2013–2018) priorities through partnership arrangements. The Government of Australia and USP are working towards partnership funding arrangements for the next Strategic Plan for the period 2019–2024.

Some of the key initiatives supported by Australia in the past have included the following. The underlined parts show assistance related to distance learning or communication networks.

1. Establishment of the University Library in 1988
2. <u>Establishment of the USPNet satellite communication system in 1998</u>
3. Construction of the Australia-Pacific Lecture Theatre
4. <u>Australia's Academic and Research Network (AARNet) Internet Link STM-4 Upgrade</u>
5. Australian Awards Pacific Scholarships (AAPS)
6. Enhancing Climate Change Adaptation in Rural Communities of Fiji (ECCA)

7. Future Climate Leaders' Programmes 1 and 2
8. Pacific Legal Information Institute (PacLII)
9. Pacific Islands Centre for Public Administration (PICPA)
10. Support for Conference on the Development of Tertiary Education in the Pacific
11. Coordination of Training for Untrained Teachers–Year One for Vanuatu and Kiribati
12. Pacific Land Programme Scholarships
13. Australian Centre for Agricultural Research (ACIAR) projects for research and scholarships
14. Support for Implementation of the Total Administrative Review Project (TARP)

(2) New Zealand

The University's partnership with New Zealand, like Australia, has been a long-standing one, since the inception of the University. New Zealand was amongst the countries that commissioned the establishment of the University in 1968. It has provided support towards USP's core budget.

Some key project initiatives supported by New Zealand include:

1. The Pacific Regional Initiatives for the Delivery of Basic Education (PRIDE)[55] in collaboration with the European Union
2. Pacific Islands Legal Information Institute (PacLII)
3. The establishment of the USPNet Satellite in 1998[56]
4. Current upgrades to the USPNet Satellite project at USP regional campuses[57].

(3) European Union (EU)

The European Union (EU) has been working with the University to address the needs of the Pacific and also to provide sustainable solutions to development challenges such as climate change, renewable energy, education, public administration, gender equality and other issues the region is facing.

The major USP initiatives assisted by the EU are as follows.

1. The Pacific Regional Initiatives for the Delivery of Basic Education (PRIDE) under the EU's 9th European Development Fund (EDF9)
2. Programmes under the 11th European Development Fund (EDF11) programming based on the Pacific Regional Indicative Programme (PRIP)
3. Intra ACP Project Funding
4. EU Global Climate Change Adaptation (GCCA) Project
5. Pacific Network of Island Universities: Mainstreaming Education for Sustainable

[55] Joint implementation with EU

[56] Joint implementation with Japan and Australia

[57] The details of this project are described in Section 2-3-1 (2).

Development (EDULINK)

6. PACE-Net (Pacific Europe Network for Science and Technology (PACE-Net) Project;
7. Pacific Europe Network for Science, Technology and Innovation (PACE-Net Plus) Project
8. MUNDUS ACP (I/II) Programme Scholarship
9. Caribbean-Pacific Island Mobility Scheme (CARPIMS I/II)
10. Academic Networking, a Gate for Learning Experiences (ANGLE) Project
11. Dynamizing Research and Education for All through Mobility in ACP (DREAM-ACP)
12. Building University Links for Action (BULA)
13. L^3EAP – LifeLong Learning for Energy security, access and efficiency in African and Pacific Small Islands Developing States
14. European Consortium for Pacific Studies (ECOPAS) for EC FP7 Project: Climate change uncertainties: policymaking for the Pacific front
15. Technical and Vocational Education and Training (TVET) component of the Adapting to Climate Change and Sustainable Energy (ACSE) programme
16. Consortium Partnership Agreement (CPA) for CARPIMS III – Caribbean-Pacific Island Mobility Scheme III
17. Transforming Pacific Communities through Good Governance

(4) Asian Development Bank (ADB)

The University enjoys a very collegial relationship with the Asian Development Bank (ADB), and this is exemplified through their history of collaboration as natural partners for the development of the Pacific Islands through investment infrastructure and technical assistance grants for collaborative initiatives and research in areas such as climate change, renewable energy, and economic modeling.

USP's partnership with ADB started in 2009 when the Government of India provided the University with a grant of USD 1 million through ADB for Regional Technical Assistance (RETA) on "The Creation of the Pacific Information Superhighway with The University of the South Pacific Network". This project helped expand USP's information and communications technology (ICT) network across its regional campuses through the installation of the i-Direct system. The technical assistance resulted in the development of a soft loan proposal to improve access to tertiary education in the Pacific through the development of new campuses in Kiribati and the Solomon Islands and improved connectivity of regional campuses. A soft loan of USD 19 million from ADB's Multitranche Financing Facility (MFF) for the Higher Education in the Pacific Investment Program was approved in mid-2012 to support USP in enhancing access to higher education in its 12 Pacific Island member countries by improving the physical environment and learning programmes.

Tranche 1

Tranche 1 of the project financed the construction of a new three-story building (the ground floor is open space as an additional study area) for the new USP Kiribati Campus. The USD 4.975 million new Kiribati Campus was officially opened on November 3, 2015. This is a 1,764 square meter building (with an additional 882 square meters of open space on the ground floor). Construction commenced in late 2014, and was funded through an ADB soft loan.

The three-story building comprises four teaching rooms, a lecture theatre, a library, a book shop, a video-conference room, a computer lab, a science lab, the Atoll Research Centre, College of Foundation Studies and Student Academic Services offices, a Flexible Learning room, and staff offices on the top two floors. The ground floor can be used as an additional study space by students.

Tranche 2

An allocation of USD 15.4 million has been earmarked for Tranche 2 through an ADB soft loan, which is for the construction of the new USP Solomon Islands campus. The construction of this new campus is envisaged to include modern teaching facilities, classrooms, an ICT studio, a library, science laboratories, a student cafeteria, a medical center, dormitories, faculty offices, recreational areas, and administrative facilities. At the end of July 2015, the Solomon Islands Government (SIG) approved the leasing of a 14-acre block of land west of and adjacent to the KGVI School, some seven kilometers east of Honiara (three kilometers west of Honiara International Airport). The design of the campus has been finalized by a USP-recruited architectural consultancy firm. Other related project preparatory works are currently underway and it is envisaged that the project[58] will be completed by the middle of 2023.

The University and ADB signed the Cooperation Agreement to Strengthen Knowledge Collaboration in July 2017, which focusses on five key areas of intervention:

1. The development of the new Solomon Islands Campus
2. Renewable energy initiatives for the greening of USP's campuses, including Vanuatu, Samoa, RMI, Kiribati, Tonga and Fiji
3. Strengthening knowledge collaboration, primarily focusing on ADB's potential contribution towards the University
4. The joint organization of the Pacific Update Conference
5. Strengthening research collaboration and intervention on economic policy issues through efficient support towards and effective operationalization of USP's Centre for Economic Modelling and Policy (CEPM)

(5) People's Republic of China (China)

The People's Republic of China has assisted USP with the establishment of the Confucius Institute at

[58] The Team conducted interviews with USP and confirmed that due to the delay in construction caused by the spread of COVID-19 and other reasons, funding for the project is insufficient, making it difficult to continue.

its main Laucala Campus (CI-USP). It was officially opened in Suva on September 6, 2012. The Confucius Institute at USP was established between USP and the Beijing University of Posts and Telecommunications (BUPT). CI-USP aims to provide educational resources and services in Chinese language and culture, and as of 2019, it has two courses in the online mode. Since the establishment of the Confucius Institute at Laucala Campus, three other Confucius Classrooms have been opened, at the Cook Islands, Lautoka, and Emalus Campuses.

2-3 Current State of and Issues Facing Distance Learning System

2-3-1 Current State of Distance Learning System

(1) Overview of USP distance learning system

The current USP distance learning system is composed of various elements, including a communication network using satellites and submarine fiber-optic cables connecting campuses and centres in 12 member countries, hardware such as satellite communications equipment and server systems, and software such as Moodle and Mahara running on these networks.

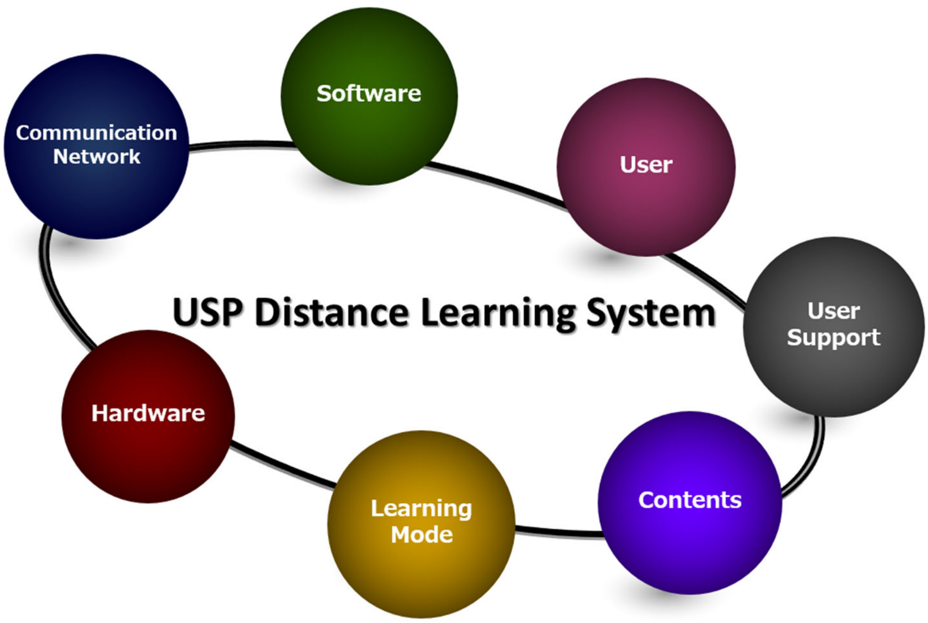


Figure 1-1 Main Components of the USP Distance Learning System

In this study, information was collected mainly from the following seven perspectives in order to understand the current state of the existing USP distance learning system.

- Communication infrastructure (Internet connection via satellite, fiber-optic cable, etc.)
- Hardware (communication equipment, server systems, etc.)
- Software
- Users (students and academic staff)

- Learning mode (course structure, learning mode, etc.)
- Content (video, audio, documents, etc.)
- User support

In the field survey, we confirmed the current state of the system and the issues facing it by conducting interviews with academic staff and students at the Laucala main campus, checking the results of these interviews using questionnaires, observing demonstrations of the system in action, and conducting online interviews with staff and students at several campuses/centres using Zoom. The results of these surveys are presented in (2) through (8) of this section.

(2) Current status of telecommunications infrastructure

To conduct distance learning at campuses and centres in the 12 member countries, a network connecting each country is essential and critical basic infrastructure. Currently, USP operates a network consisting of satellite networks (USPNet) using the C-Band[59] and the Ku-Band[60] and networks via the Internet through a hub station at the Laucala main campus in Fiji. The sites connected by USPNet can access various USP services provided from the data centre at the Laucala main campus, and also have access to the Internet via the Laucala main campus.

The C-Band satellite system, which was introduced in 2000 with the joint support of Japan and other countries, has been in operation for more than 20 years, and the satellite communication system equipment, including the parabolic antenna of the hub station at the Laucala campus, has aged significantly. The quality of the video and audio has been becoming worse, and this has been hindering the smooth operation of the remote learning system. In response to this, New Zealand has been providing assistance in updating the equipment. Although the updating at some sites has been delayed due to the spread of COVID-19, the hub station and all remote stations are covered by the assistance and installation is expected to be completed by the end of 2022. There is no change in the network configuration, but it is thought that the efficiency of signal transmission and reception has been improved with the introduction of the latest model equipment.

On the other hand, while the indoor Ku-Band equipment has been updated in line with the above-mentioned aid from New Zealand, the outdoor equipment has been continuously in use since its introduction in 2010, in a project supported by Japan.

In this survey, in order to understand the current state of the network infrastructure, we conducted surveys of the following: 1) each campus/centre where the network is being deployed, 2) the logical connections of the network, and 3) the physical connections of the network and equipment. The details

59 The C-Band is a microwave frequency band corresponding to centimeter waves in the 6 GHz band (4-8 GHz; 37-75 mm wavelength). It is used for communication satellites, fixed wireless, radio access and radar.

60 The Ku band is a microwave frequency band in the frequency range of 12-18 GHz. It is used for satellite communications and satellite broadcasting.

of the survey are shown in the table below.

Table 2-3-1 Survey of Network Infrastructure and Communication Equipment

No.	Target	Survey Contents
1	Campus structure/distance learning environment	structure of distance learning centres, distance learning environment, main communication tools used, and requirements for the network
2	Network configuration	results of the survey on the logical connection configuration of the USP network
3	Physical connection between locations	actual connections between locations and the results of the survey of existing facilities

1) Campus structure/distance learning environment

a) Campuses/centres

USP provides distance education through 13 remote campuses, 12 remote centres, and two outreach commons in the 12 member countries, centreed on the Laucala main campus in Suva, Fiji. All the sites are connected by the network shown below, and under normal conditions before the coronavirus pandemic, most of the lectures were held and delivered at the Laucala campus, the exceptions being the former Faculty of Law in Vanuatu and the former Faculty of Agriculture in Samoa. USP uses a remote class delivery system called REACT and uses the Lecture Capture system to record face-to-face lectures to deliver recorded classes.

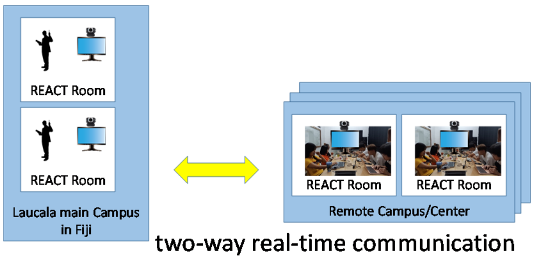


Figure 2-3-2 REACT

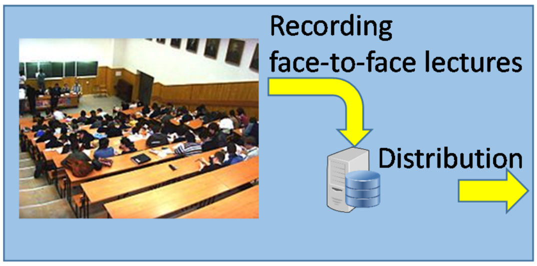


Figure 2-3-3 Lecture Capture

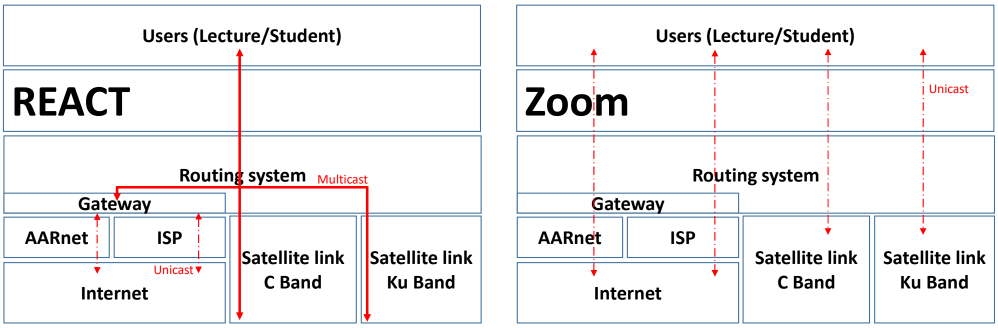
b) Communication tools for distance learning

When considering the communication infrastructure for distance education, it is important to understand real-time communication tools such as ZOOM, since they occupy a large percentage of the communication network.

When distance education started in the 1960s using narrow-band satellite links, lectures and tutorials were conducted using audio only, without the use of large data-capacity video. After the installation of the C-Band satellite communication system in 2000 with support from the Japanese, New Zealand, and Australian governments, two-way video communication became possible on campuses in all 12 countries.

The REACT system is a remote learning system that enables two-way communication on satellite lines with limited capacity. As shown in the figure below, the REACT system utilizes multicast technology, which enables a single packet[61] to transmit signals to multiple recipients in response to an outgoing message from a user in order to realize two-way communication over narrow bandwidth communication lines. However, since the REACT system uses multicast, it can only be used within the WAN via USP satellite lines, and needs to be converted to unicast via a gateway in the routing system for distribution to remote campuses/centres via the Internet.

On the other hand, conference systems such as Zoom which have been used in the public and private sectors in recent years use unicast technology that sends out packets to each communicator, and although the data capacity required for communication lines is larger than that of multicast, it can be used freely in networks, including in the Internet environment.



Source: JICA Study Team

Figure 2-3-4 Comparison of Communication Tools

As a two-way real-time communication system for distance education, the REACT system enables a decentralized educational system. However, it is an intensive system, where both teachers and students have to go to a campus. The Zoom system, on the other hand, can be considered a nonintensive system, where there are no spatial restrictions for either teachers or students as long as a network connection and terminals are secured.

61 A packet is a small block of information passing through a communication line or network in which data is divided into sections of a certain length and control information such as source and destination is added.

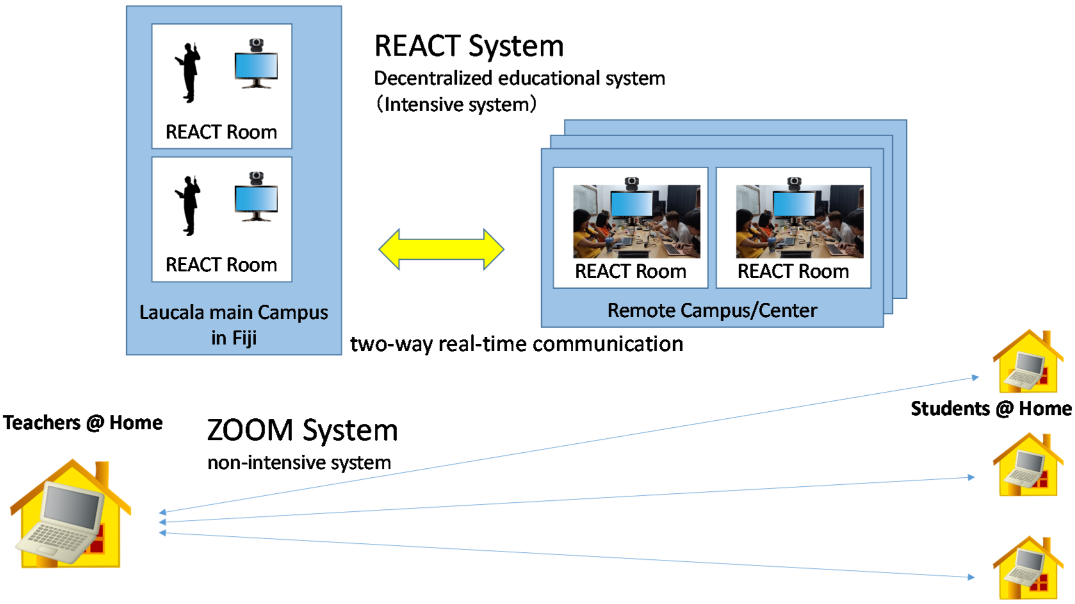


Figure 2-3-5 Decentralized Educational System and Nonintensive System

Before the coronavirus pandemic, lectures were held remotely between faculty members on the REACT system side of the Laucala campus and students gathered on the REACT system side of several remote sites.

The REACT system required lectures to be conducted from the Laucala campus. However, due to the spread of COVID-19 in Fiji, a lockdown was imposed around Suva City[62], restricting access to the campus and forcing both faculty and students to conduct the lectures at home. Thus, all lectures were shifted to Zoom.

c) Network infrastructure required for the use of communication tools

Optical fiber cables, including submarine cables, are being laid worldwide, and consequently the communication environment is improving. Utilizing this, the development of rich content that requires large amounts of data and commodity applications that handle such content are being promoted in a wide range of fields. Content and applications and the communication environment are improving in such a way that each enhances the other. Commodity software is being used by many users and is frequently updated and improved in quality. As a result, excellent software based on broadband data transmission has become common. The use of such commodity software means that other communication lines will need to be upgraded to a broadband environment similar to the Internet.

On the other hand, the REACT system used by USP is custom-made software that enables two-way real-time communication for distance education over satellite links with limited transmission capacity. REACT is built as a dedicated system for distance learning, so it is easy to use for distance learning, but

[62] The other 11 member countries had strict entry control measures in place to control the infection, and no restrictions on internal movement were enacted.

as it is custom-made software, USP itself needs to perform the updates when necessary.

In general, when ready-made general-purpose software becomes available, there is a shift in many fields toward the introduction of general-purpose software that can be updated continuously, rather than creating custom-made software and updating it as needed. This trend also applies to communication tools for distance education. This means that the communication links for this distance education will need to have a bandwidth as high as the Internet.

However, when considering a distance education system for USP, it is important to take into account the environment of the 12 island countries and the limitations on the communication infrastructure that can be realized, in addition to the development of the communication infrastructure and the software to be used there.

2) Network configuration

The following figure is a diagram of the USP network. The network configuration of USP consists of a WAN via Internet service providers and a WAN using C-Band and Ku-Band satellite lines called USPNet, with the main campus in Laucala as the hub.

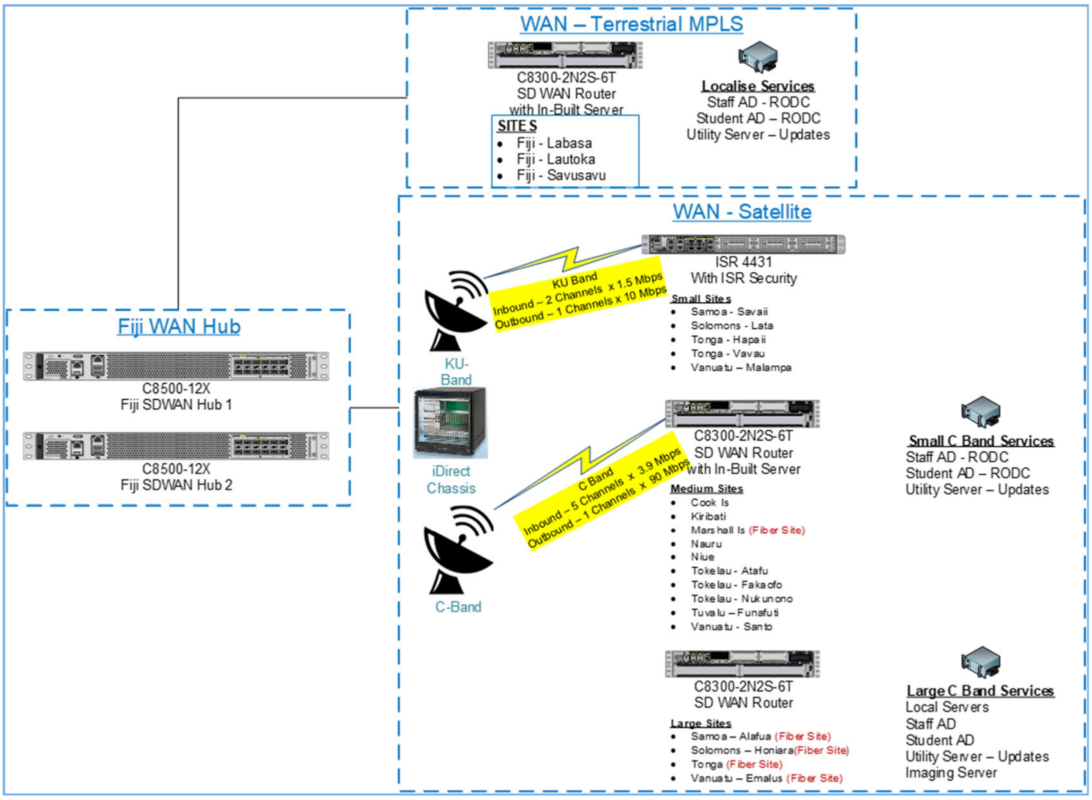
At the campuses/centres where high-speed Internet services using optical submarine cables are available as communication lines (including Fiji, Tonga, and Samoa, among others), the WAN has been configured using network connections via ISPs. The capacity of these campuses/centres depends on the contract with the ISP, as shown in Table 2-3-3, but at minimum the necessary capacity for distance education is secured as part of the communication infrastructure. In order to improve the communication environment, the contract with the ISP needs to be updated.

On the other hand, the campuses/centres that have not yet been connected by submarine fiber optic cable have a WAN connected through USPNet. USPNet provides two-way communications between the network hub at the Laucala main campus and each campus/centre via a satellite modem called iDirect.

For each of these USPNet-connected campuses/centres, all Internet access other than lectures provided by the Laucala campus is routed through the hub at the Laucala campus.

The hub station at the main campus in Laucala is required to have a high reliability due to its network configuration, and all the network equipment there has a redundant configuration and an uninterruptible power supply to ensure the reliability of the entire network.

On the other hand, most of the other campuses/centres do not have redundant communication facilities and backup power supplies.



Source: ITS, USP

Figure 2-3-6 USP Network Diagram[63]

Thus, both connections via ISPs with the necessary capacity and USPNet are used as communication lines to support distance education at USP, and satellite lines with limited transmission capacity are also used as important networks. In order to effectively utilize this entire network as infrastructure for distance education, USP uses a technology called quality of service (QoS), which marks and prioritizes each packet in a computer network.

The QoS settings in the USP are shown in the table below. The list is in descending order of priority from the top of the table. When using real-time communication services which cannot tolerate delays in distance education, such as REACT and Zoom, the communication service is given the highest priority, and other services such as web access are given a lower priority. It can be confirmed that the limited communication line capacity is used effectively as distance education infrastructure.

[63] MPLS (Multi-Protocol Label Switching) is a technology for high-speed transmission processing in which short codes called labels are assigned to packets, etc., within a specific network.

Table 2-3-2 List of QoS for Effective Use of Satellite Communications

QoS Profiles	Upstream		Downstream	
	Service	**Comments**	**Service**	**Comments**
Multicast	tcp	REACT Multicast	tcp	REACT Multicast
NMS	tcp	iDirect System	tcp	iDirect System
Real Time	tcp & udp	REACT Server	tcp & udp	REACT Server
	tcp & udp	Zoom Alias Control 1	tcp & udp	Zoom Alias Control 1
	tcp & udp	Zoom Alias Control 2	tcp & udp	Zoom Alias Control 2
	tcp & udp	Zoom Control 1	tcp & udp	Zoom Control 1
	tcp & udp	Zoom Control 2	tcp & udp	Zoom Control 2
	tcp & udp	Zoom MMR 1	tcp & udp	Zoom MMR 1
	tcp & udp	Zoom MMR 2	tcp & udp	Zoom MMR 2
	tcp & udp	Zoom MMR 3	tcp & udp	Zoom MMR 3
	tcp & udp	Zoom MMR 4	tcp & udp	Zoom MMR 4
	tcp & udp	Zoom MMR 5	tcp & udp	Zoom MMR 5
	tcp & udp	Zoom MMR 6	tcp & udp	Zoom MMR 6
	all	VOIP Gateway 1	all	VOIP Gateway 1
	tcp	Sanctum	tcp	Sanctum
	tcp & icmp	PRTG Monitoring	tcp & icmp	PRTG Monitoring
	all	WAAS Central Manager	all	WAAS Central Manager
	all	iCinga NOC	all	iCinga NOC
	all	VOIP Gateway 2	all	VOIP Gateway 2
	tcp & udp	DNS Resolution	tcp & udp	DNS Resolution
	udp	Radius Authentication	udp	Radius Authentication
Banner ERP	tcp:8443	BAN APP Server 01	tcp:8443	BAN APP Server 01
	tcp:9443	BAN Auth Server	tcp:9443	BAN Auth Server
	tcp:8443	BAN APP Server 02	tcp:8443	BAN APP Server 02
Intranet Plus	tcp	MS AD & Exchange	tcp	MS AD & Exchange
	tcp	Staff SOLS	tcp	Staff SOLS
	all	Identity Services Engine	all	Identity Services Engine
	tcp	MIS Online	tcp	MIS Online
	tcp	MS ADFS	tcp	MS ADFS
	tcp	Student Gmail Authentication	tcp	Student Gmail Authentication
	tcp	AAGO	tcp	AAGO
	tcp	Uni Portal	tcp	Uni Portal
	tcp	Admissions & Resumption Portal	tcp	Admissions & Resumption Portal
	tcp	F5 - Student SOLS	tcp	F5 - Student SOLS
	tcp	F5 - USP Website	tcp	F5 - USP Website
	tcp	F5 - MS Exchange Server	tcp	F5 - MS Exchange Server
	tcp	ServiceDesk Services	tcp	ServiceDesk Services
Intranet	all	Blanket Rule	all	Blanket Rule
Internet	all	Blanket Rule	all	Blanket Rule

Source: ITS, USP

3) Physical connection between locations

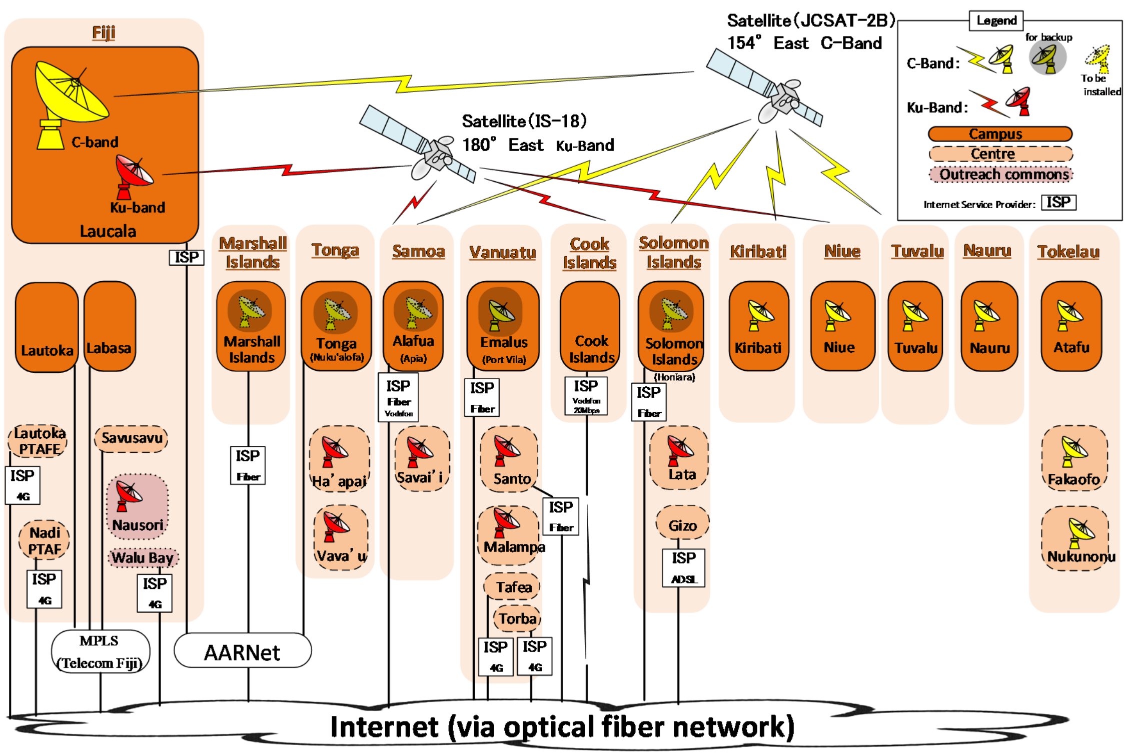
USP's network connections are shown in Figure 2-3-7. As shown in the figure, there are campuses/centres located in each of the 12 countries. As mentioned in Section 2-1, Fiji has three campuses, while the other countries have one campus each.

The upper part of Figure 2-3-7 shows the satellite link, or USPNet, where the yellow parabolic antenna indicates the C-Band satellite link and the red parabolic antenna indicates the Ku-Band satellite link. The lower part of the figure shows the communication network via ISP.

As mentioned above, the Laucala campus is the hub of the WAN for both USPNet, shown at the upper side in the figure, and connection via Internet, shown at the lower side in the figure.

Each campus is connected to the hub station mainly through USPNet's C-Band satellite link, although there are some ISP connections. Each centre is connected to the hub station through Ku-Band links, except for the C-Band satellite connection in Tokelau and some ISP connections in Fiji and the Solomon Islands. In this way, the C-Band satellite links mainly connect the campuses in each country, and the Ku-Band satellite links connect the centres in a complementary manner.

In the Marshall Islands, which has the C-Band parabolic antenna shaded in gray in the figure, the communication network for the distance education infrastructure is the Internet via ISP, and the satellite line will be used as a redundant backup line.



Source: JICA Study Team

Figure 2-3-7 Existing USPNet Network

As mentioned above, all Internet access for each campus/centre connected by USPNet is done through the hub station at the Laucala main campus. In addition, in order to effectively utilize the limited transmission capacity of satellite lines as communication infrastructure for distance education, QoS technology is used, and real-time communication, which cannot tolerate delays, is given highest priority, and other Internet uses are given lower priority. As a result, the performance for Internet access may not be sufficient. In such cases, the remote centre itself secures a connection via ISP and uses it as a complementary connection. In this case, the remote centre has its own connection through an ISP for supplementary use. This connection is separate from the WAN for the distance education infrastructure of the USP described above.

(3) Current status of hardware for telecommunications infrastructure

USP's existing network connections are listed in Table 2-3-3. The fiber column shows the status of fiber-optic cable installation as of January 2022 for each country (island) and city. For Tokelau and Kiribati, information on the Southern Cross Next cable, which is scheduled to be in service by the end of 2022, is also included.

Table 2-3-3 Detailed Information on USPNet Network

Country	Fiber		City	Campus	Centre	Outreach Commons	Type	Satellite system information						Bandwidth (Mbps)		Total number of terminals	Number of REACT Rooms	Remarks
	Country	city						Band	Station ID	Power	Antenna Diameter	Year of installing	Supporting countries	Up	Down			
Fiji	✔	✔	Suva	Laucala			HUB	C	FJI-SUV-004	200 W	7.6 m	(2022)	NZ	90	17	1088	2	2000 JPN installed
							HUB	Ku			4.5 m	2010	JPN	21	2			
							Optical Fiber Cable (AARNet)							100	100			
						Walu Bay	ISP (4G)							(4G)		20	0	
		✔	Nausori			Nausori	Remote	Ku		4 W	1.8 m	2010	JPN	2	21	25	1	
		✔	Labasa	Labasa			Optical Fiber Cable (MPLS Telecom Fiji)							20	20	80	2	
					Labasa PTAF		ISP (4G)							(4G)		0	0	
		✔	Savusavu		Savusavu		Optical Fiber Cable (MPLS Telecom Fiji)							10	10	27	2	
		✔	Lautoka	Lautoka			Optical Fiber Cable (MPLS Telecom Fiji)							40	40	139	2	
		✔	Nadi		Nadi PTAF		ISP (4G)							(4G)		15	0	
Samoa	✔	✔	Apia	Alafua			Remote	C	SMO-API-004	10 W	6.3 m	(2022)	NZ	Backup		84	2	
							Optical Fiber Cable (Bluesky Fiber)							22	8			
		✔	Savai'i		Savai'i		Remote	Ku		3 W	1.8 m	2010	JPN	2	21	10	1	
Vanuatu	✔	✔	Port Vila	Emalus			Remote	C	VUT-PTV-002	10 W	4.5 m	2021	NZ	Backup		173	2	
							Optical Fiber Cable (Gov Fiber)							80	20			
			Santo		Santo		Remote	C	VUT-PTV-009	5 W	3.8 m	2006		replaced		10	1	Not in use
							Remote	Ku		3 W	1.8 m	2010	JPN	2	21			
							Optical Fiber Cable											Only for Internet access
			Tafea		Tafea		ISP (4G)							(4G)		5	0	
			Malampa		Malampa		Remote	Ku		3 W	1.8 m	2010	JPN	2	21	10	1	
			Torba		Torba		ISP (4G)							(4G)		5	0	
Cook Is.	✔	✔	Rarotonga	Cook Is.			ISP (Bluesky Fiber)							80	20	48	1	
Kiribati	✔ (Plan)		Tarawa	Kiribati			Remote	C	KIR-TAR-002	10 W	4.5 m	2020	NZ	17	90	41	2	
Niue	✔	✔	Alofi	Niue			Remote	C	NIU-ALO-002	10 W	4.5 m	2020	NZ	17	90	17	1	
Tonga	✔	✔	Nuku'alofa	Tonga			Remote	C	TON-NUK-002	10 W	4.5 m	(2022)	NZ	Backup		67	2	2000 JPN installed
							Optical Fiber Cable (AARNet)							100	100			
		✔	Na'apal		Na'apal		Remote	Ku		3 W	1.8 m	2010	JPN	2	21	15	1	
		✔	Vava'u		Vava'u		Remote	Ku		3 W	1.8 m	2010	JPN	2	21	15	1	
Marshall Is.	✔	✔	Majuro	Marshall Is.			Remote	C	MHL-MJO-003	10 W	4.5 m	(2022)	NZ	Backup		50	2	2000 JPN installed
							Optical Fiber Cable(NTA Fiber /AARNet)							80	20			
Solomon Is.	✔	✔	Honiara	Solomon Is.			Remote	C	SLM-HON-003	10 W	4.5 m	(2022)	NZ	Backup		112	1	2000 JPN installed
							Optical Fiber Cable (ISP Fiber)							100	30			
			Gizo		Gizo		ISP (ADSL)							ADSL			0	
			Lata		Lata		Remote	Ku		3 W	1.8 m	2010	JPN	2	21	5	1	
Tuvalu	✔ (Plan)		Funafuti	Tuvalu			Remote	C	TUV-FUN-002	10 W	4.5 m	2019	NZ	17	90	30	1	2000 JPN installed
Nauru	✔ (Plan)		Yaren	Nauru			Remote	C	NRU-YAR-002	10 W	4.5 m	2018	NZ	17	90	32	1	
							ISP(Digisel)											Only for Internet access
Tokelau	✔ (Plan)		Atafu	Tokelau			Remote	C	TKL-ATA-001	10 W	4.5 m	2021	NZ	17	90	12	1	
			Fakaofo		Fakaofo		Remote	C	TKL-Fakaofo	10 W	4.5 m	2015	OwnBGT	17	90	16	1	
		✔	Nukunonu		Nukunonu		Remote	C	TKL-Nukunonu	10 W	4.5 m	2015	OwnBGT	17	90	5	1	

Source: ITS, USP

Items with (2022) as their year of installation have had their installation work delayed due to COVID-

19, but the work is scheduled to be completed in 2022. The data communication capacity of each campus/centre is shown with the sending side as "Up" and the receiving side as "Down". From the number of terminals and REACT systems, we can estimate the approximate load on the network, i.e., the amount of transmission capacity required for the network.

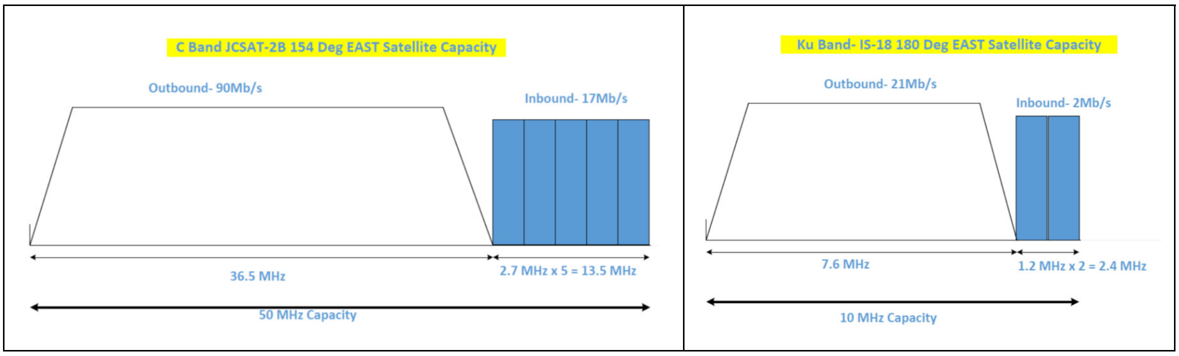
For Internet connections via ISPs, the Australian Academic Research Network (AARNet), Telecom Fiji's MPLS connection, and other connections provided by ISPs are used. AARNet provides connectivity to Fiji's Laucala campus, Tonga, and the Marshall Islands. The Marshall Islands is connected to AARNet via Guam via an ISP. Telecom Fiji's MPLS provides high-speed Internet access to Lautoka Campus, Labasa Campus and Savusavu Centre in Fiji.

There are also other ISPs, including fiber-optic broadband connections such as Alafua Campus in Samoa, Emalus Campus in Vanuatu, and Honiara Campus in the Solomon Islands, as well as 4G connections in other centres.

For the C-Band satellite links, the renewal of all the centres is expected to be completed in 2022 with the support of New Zealand, although some of the installations have been delayed due to the coronavirus pandemic.

For the Ku-Band satellite links, the indoor equipment has been updated in line with the above support from New Zealand, but the outdoor equipment such as parabolic antennas has not been updated since 2010, when it was introduced with the support of Japan.

The following figure shows the transmission capacity of the C-Band and the Ku-Band of the USP satellite links.



Source: JICA Study Team

Figure 2-3-8 Capacity of Satellite Link Transmission

In the C-Band, the frequency band used for satellite communications has been expanded from 15 MHz to 50 MHz in conjunction with the New Zealand-supported equipment renewal project, and the data transmission capacity is 90 Mbps outbound and 17 Mbps inbound from the hub station, so there is currently no shortage of capacity for online distance education classes.

The Ku-Band has a frequency bandwidth of 10 MHz, with a data transmission capacity of 21 Mbps outbound and 2 Mbps inbound from the hub station. In the Ku-Band, the frequency band was doubled from 5 MHz in September 2020, and the transmission capacity was increased after revising the link budget, which is a parameter related to satellite communication, but the transmission capacity is still poor compared to the Internet and C-Band satellite lines.

The need for off-campus access to the USP network and USP servers became an urgent issue due to the coronavirus pandemic, which restricted faculty, staff, and students from entering the Laucala main campus in Fiji. USP covers the data charges for accessing the USP servers via the networks of Vodafone and Digicel, the two telecommunication companies that provide mobile data communication in Fiji, and provides faculty, staff, and students with off-campus access to the USP network at no personal cost, although the issue of connecting terminals for individual use remains. This service is provided only within Fiji. As mentioned above, the USP data centre is located at the Fiji Laucala main campus, so outside of Fiji it is difficult to provide the same service, as the connection must go through an IXP (Internet exchange point), which is an interconnection point for exchanging communications between nations. Therefore, this has not been implemented. Thus, most of the students outside of Fiji are connected to the USP network from a campus or a centre. The exceptions are a few students who can afford the cost of an Internet connection.

USP is an on-premises operation, which means that the data centre where the servers used to provide the various services are installed is located in a USP facility. Although migration to a cloud system was considered, it was not implemented due to the cost, and the system is currently operated in the on-premises form. The data centre is located on the Laucala campus, as is the network hub station. The data is backed up to Tonga campus storage via AARNet's broadband network on a regular basis every day at midnight, and in the event of a failure, the backup data is restored to a backup device.

Servers in the data centre, as well as the network equipment, are configured with redundancies and equipped with uninterruptible power supplies to ensure the reliability of the computer system as a whole. In terms of security, which is important for computer systems, each time a non-USP-owned terminal is connected to the USP network, the connecting terminal downloads a special application that scans the terminal to confirm its safety. All services are tied to a login portal, and VPN login is used to ensure security when necessary.

Although the use of offline media such as USB storage media is generally regarded as having a high risk of virus infection, the connection of USB storage media to a USP-owned PC is permitted for the use of data that is downloaded and taken home for study. This data is called an OPP (offline print package). The USP-owned terminals are secured with antivirus software.

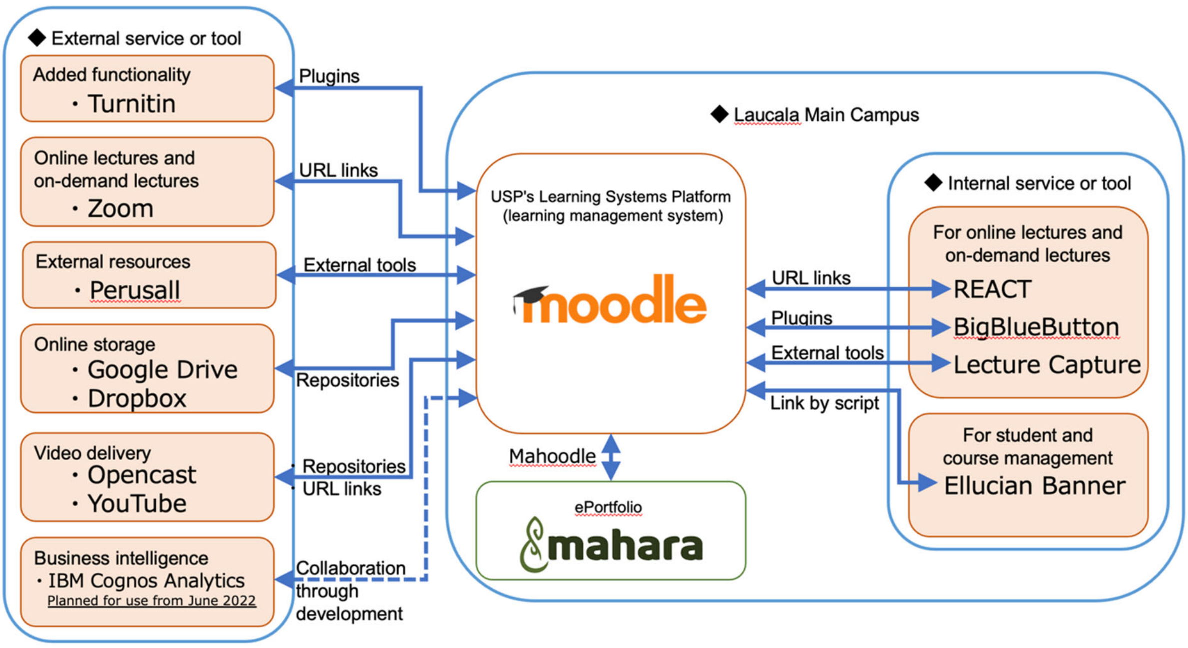
Thus, it can be said that USP has a high level of security awareness and has taken measures to provide a reliable environment to serve as infrastructure for distance education.

(4) Use of existing software

1) Overview of the software for USP's existing distance learning system

The current USP distance learning system consists of USP's Learning Systems platform, called USP Moodle, a class support system using the learning management system Moodle[64], and other software, internal services, and external services. This configuration is comparable to the eLearning environment built and operated by a typical university in Japan. In addition to allowing students and academic and administrative staff s to perform standard operations such as view eLearning materials, watch lectures on demand, download materials, submit assignments, take online tests, and conduct questionnaires and surveys, the system is also linked to the academic affairs system and a plagiarism checking tool[65], which is essential for Japanese universities. Recently, a proctoring plug-in that automatically acquires an image of the examinee and judges whether the exam is acceptable or not has been introduced and is being used. Mahara, an ePortfolio, has also been included and is being used in some courses.

The figure below shows the configuration of USP Moodle and the software, internal services, and external services used in the distance learning system and how they work together.



Source: JICA Study Team

Figure 2-3-9 Configuration of USP Moodle and Integration between USP Moodle and the Software, Internal Services, and External Services Used in the Distance Learning System

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64 Moodle is used by more than 300 million users in 241 countries around the world and is operational at about 180,000 sites. Source: https://stats.moodle.org/

65 A tool that matches information on the Internet and paper databases with your own written papers and quantifies the similarity.

The following table describes the integration between USP Moodle and related software and services.

Table 2-3-4 Integration of USP Moodle with Other Software and Services

Feature	Description
Plugins	Plugins are modules that add functionality to Moodle. Many plug-ins are available for free from Moodle's official website, and some are available for a fee. In USP Moodle, plug-ins are mainly used for integration with other services.
External tools	Moodle must interoperate with external services and tools in accordance with a standard called LTI[66*1].
Repositories	One of the features of Moodle is the ability to access certain types of file sources.
URL links	URL links can be displayed to integrate with Moodle
Collaboration through development	Integration can be realized by the dedicated API[67] and developing plug-ins.
Link by script	Ellucian Banner and Moodle can be integrated by running a script.
Mahoodle	Mahoodle is a way to integrate Moodle and Mahara, providing a single sign-on and content transfer between Moodle and Mahara.

Source: JICA Study Team

USP's distance learning system provides a wide range of tools and services for online communication, such as online lecture delivery to remote locations, tutorials, and workshops. In addition to REACT, which can provide two-way video/audio conferencing via USPNet (a satellite line), and Lecture Capture, which can record a lecture, combine it with material for projection, encode it as a video file, and deliver it as an on-demand lecture from Moodle, the system offers a variety of other services. The latest web conferencing services, such as BigBlueButton and Zoom, can support the various environments of USP's users (students, staff, etc.), such as the various network connections and devices used by these users.

2) Using the software

The following table describes the platforms, internal and external services, and software used in the current USP distance learning system and how they are used at USP.

[66] Learning Tools Interoperability: A standard protocol developed by the IMS Global Learning Consortium. Learning systems can call external systems by specifying methods that follow the LTI specifications.

[67] Application programming interface: Refers to the specification of the interface used by software components to exchange information with each other.

Table 2-3-5 Use of Software in the Current Distance Learning System

Category	Software	Software Description
Learning management system	Moodle	Moodle is a learning management system designed to provide educators, administrators, and learners with a single, robust, secure, and integrated system that creates a personalized learning environment, with many of the features necessary to implement online education at universities, high schools, and other educational institutions. It is suitable for building and operating online education environments. Since it is open source, users are free to download, use, modify, and further distribute it under the GNU GPL[68].
ePortfolio	Mahara	Mahara is an open-source ePortfolio and social networking system. An ePortfolio is a web application that allows users to record and share evidence of their studies and projects over a lifetime, storing and recording digitized documents and files such as study logs, artwork, and research papers. As a social networking system, it also provides interaction with other users via networks and online community formation. It is currently being used in about 25 courses at USP.
Online and on-demand lectures	REACT (Remote Education and Conferencing Tool)	Interactive online lectures, including video and audio, can be delivered to multiple campuses/centres via USPNet. Lecture delivery and attendance are done in rooms (called REACT Rooms) equipped with dedicated equipment. With the COVID-19 pandemic preventing staff and staff from entering the Laucala main campus, the REACT Rooms on campus are not being used for classes at this time.
	BigBlueButton	Open-source software for delivering online lectures. Lectures are recorded and can be delivered as on-demand lectures via Opencast and taken from USP Moodle. The server for operation is located at the Laucala main campus, but its use is currently limited due to the lack of hardware resources.
	Lecture Capture	A system that can record a lecture, synthesize the material for projection, and convert it into audio and video files. The video files are stored in the storage included with the device that recorded the lecture and delivered through Opencast via USP Moodle as on-demand lectures. Lecture Capture requires special hardware. It is possible to obtain lecture timetable data from Ellucian Banner, the teaching system, and automatically schedule lectures accordingly.
	Zoom	A cloud service for delivering online lectures. Lectures are recorded and delivered through Opencast via USP Moodle as on-demand lectures. Accounts and schedules are managed by ITS. At the moment, it is mainly used as an alternative to REACT.
Student and course management	Ellucian Banner	This system manages course information and course registration information. It is integrated with USP Moodle, and the following registration and update information is automatically and regularly delivered. ・Registration information from Student Online Services (SOLS), sent to USP Moodle - Once a day ・Registration information from the Moodle collector table, sent to the course shell - Every hour ・Course registration/renewal - For three weeks at the beginning of each semester, sent to USP Moodle
Add function	Turnitin	A plagiarism checking service that matches reports and assignments submitted by students with information on the Internet, thesis databases, and other students' submissions, and quantifies the similarity.

68 GNU General Public License: A type of license that stipulates the terms and conditions for the use of software. It is mainly used for the development and distribution of free software.

Category	Software	Software Description
Online storage	Google Drive	Used to store video content.
	Dropbox	Used as a place to submit assignments.
Video content delivery	Opencast	An open-source video management system. It automates the capture, processing, management, and delivery of video. Most of the on-demand lectures recorded by Lecture Capture, BigBlueButton, and Zoom are delivered by this system.
	YouTube	Video distribution platform. Used to deliver video content.
External resources	Perusall	Social e-reader. In addition to eBooks, documents, and web pages, video and audio can also be used as content. Students can add annotations and comments to content specified by academic staff or to eBooks that they have purchased themselves, and share them with other students and academic staff, or use them to submit assignments.
Business intelligence	IBM Cognos Analytics	BI (business intelligence) software that uses AI to automatically determine the type of data uploaded and how the data should be aggregated and categorized. It can also automatically select the analysis method.

Source: JICA Study Team

Photo 2-3-1
Lecture Capture Facility at Laucala Main Campus

Photo 2-3-2 Operation Console of Lecture Capture

3) Features used in USP Moodle

Moodle is a learning management system with many features necessary for online education in educational institutions such as universities and high schools. It is suitable for building and managing online educational environments.

This section describes the features used in USP Moodle.

Table 2-3-6 Features Used in USP Moodle

Feature	Description
Course	A course usually consists of a single or multiple activities and resources, and users associated with the course, such as academic staff, students, TAs, and tutors, are registered with the course. You can register a summary, an icon image, course conditions, a course duration, completion conditions, and categories to which the course belongs.
Activity	The various activities that take place in a course, such as reviewing SCORM[69] content, reviewing web content, taking quizzes, submitting assignments, participating in chat forums, taking surveys, referring to glossaries, etc., are called activities. For each activity, grading conditions, completion/pass/fail conditions, prerequisites, etc., can be set.
Resources	Items that a academic staff can use to support student learning, such as files, links, and documents, are called resources.
Role	Moodle allows you to set permissions for each user based on their role. This set of permissions is called a role. Roles can be assigned to specific users in contexts such as courses, activities, and categories, and can be used to control what is displayed on the screen and whether or not it can be operated. Also, custom roles can be created based on the standard preset roles.
Non-standard plug-ins	Plug-ins that are not implemented in the standard Moodle, but can be added to increase functionality or to work with external services.

Source: JICA Study Team

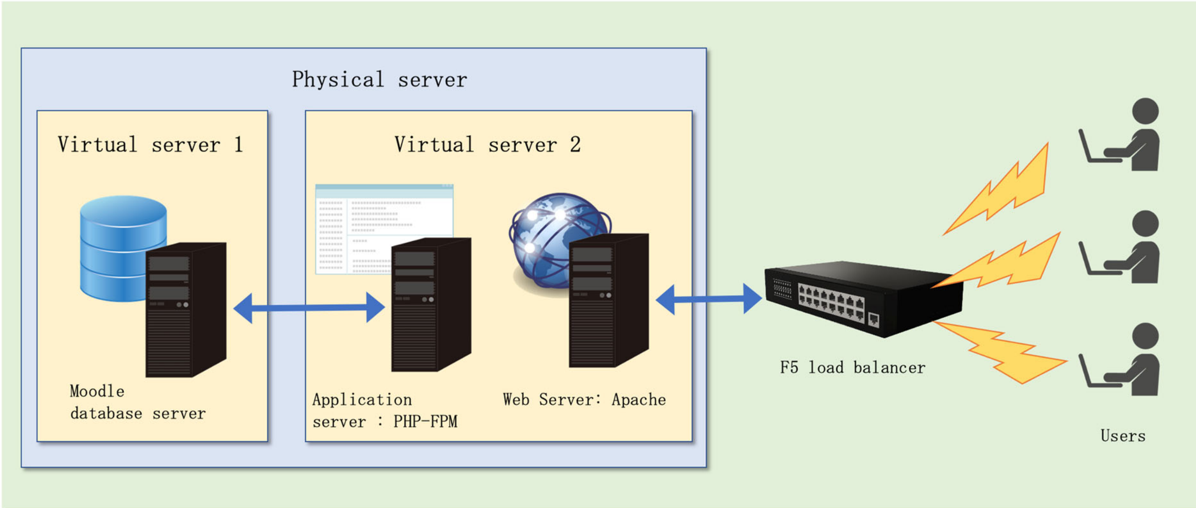
See Appendix-5 for details of the features currently in use in USP Moodle.

This file details the activities, roles, and non-standard plug-ins currently used in USP Moodle. Further, you can check what course components, user permissions, and features have been added in addition to the standard Moodle features.

4) The server configuration that USP Moodle is running on

USP's distance learning system uses many web applications, including Moodle, and it is important to build a hardware system, such as a web server and a database server, that is appropriate for the content and scale of the web applications. The figure below shows the current hardware system configuration for USP Moodle.

[69] Sharable Content Object Reference Model: Standards and specifications used in web-based eLearning.



Source: Prepared by the JICA Study Team based on materials provided by ITS, USP.

Figure 2-3-10 Current USP Moodle Hardware System Configuration

As shown in the figure above, the web server (Apache) and the application server (PHP-FPM) are placed in the same virtual server[70]. The F5 load balancer is used for security reasons, so only the IP address of the F5 load balancer is accessible from the outside. The configuration of the server on which USP Moodle runs is shown in the table below.

Table 2-3-7 Server Configuration for Running USP Moodle

Item	Quantity	Specifications	Remarks
Web server and application server	1	OS: CentOS 8.3, cores: 16, RAM: 128 GB, and storage/disk: 3.2 TB	Deployed in a virtual server running on Nutanix HCI
Moodle database server	1	OS: CentOS 8.3, cores: 16, RAM: 128 GB, and storage/disk: 1.2 TB	Deployed in a virtual server running on Nutanix HCI
Load balancer	1	F5 load balancer Model: BIG-IP i5800	Two hardware appliances with high availability and security

Source: Prepared by the JICA Study Team based on materials provided by ITS, USP.

Table 2-3-8 Server Configuration and Versions of Moodle, Middleware, etc.

Item	Name	Version
OS	CentOS Linux	8.3
Web server	Apache HTTP Server	2.4
Database	Maria DB	10.3.17
Application server	PHP-FPM	2.4
LMS	Moodle	3.9
Other	PHP	7.3.25

Source: Prepared by the JICA Study Team based on materials provided by ITS, USP.

ITS is planning to upgrade Moodle to version 3.11 in December 2022. This will require the cooperation of USP through the Centre for Flexible Learning (CFL) and the approval of the Technology

[70] A virtual server is a system that allows multiple operating systems (OS's) to run on a single server and operate as multiple servers.

Enhanced Learning and Teaching Committee (ITeL) and the Communications and Information Technology Committee (CITC).

5) Checking the configuration software in the USPConnect concept document

The JICA Study Team confirmed the details of the USPConnect concept document (Appendi-8) that triggered this study with USP officials during the field survey. The concept document was prepared by the former Director of the CFL, and the concept presents a proposal to achieve “the transition to online learning and teaching at USP” through the integration of a wide variety of software/technologies and the use of existing ICT environments (e.g. USPNet). However, it was not approved through formal procedures within USP, and it was not known to the people in the departments related to distance education (CFL and ITS).

Therefore, the JICA Study Team reviewed the usage and future implementation plans of the software and external services described in the concept document during a workshop with CFL staff held on Thursday, December 2, 2021. The table below shows the results.

It was found that more than half of the software and external services described in the USPConnect concept document are already being used in the current USP distance learning system, mainly Moodle. In terms of scale, the realization of said concept can be sufficiently achieved by USP itself, and the necessity and appropriateness of support from Japan is considered to be small.

Table 2-3-9 Confirmation of USPConnect concept document

Category	Purpose of use	Software	Status of use	Comments by the JICA Study Team
1. Learning management	Learning management system	(1) Moodle	✓	Moodle is a learning management system designed to provide educators, administrators, and learners with a single, robust, secure, and integrated system that creates a personalized learning environment. It is a learning management system suitable for building and operating an online education environment. It is open source, so users can freely download, use, modify, and further distribute it under the GNU GPL license.
	ePortfolio	(2) Mahara	✓	Mahara is an open-source ePortfolio and social networking system. An ePortfolio is a web application that allows users to record and share evidence of their studies and projects over a lifetime, and to store digitized documents and files such as learning logs, artwork, and research papers. In addition, as a social networking system, it provides interaction with other users via networks and online community formation. It is currently being used in 25 courses at USP.
	Learning analysis	(3) Motomo		Open-source web analytics software designed to track user activity on a website. It can be integrated with Moodle via plug-ins.
		(4) IBM Cognos Analytics		Besides the software applications and external services currently in use, the only other tool currently being considered for implementation is IBM Cognos Analytics, a BI tool for statistics and analysis. Currently, IBM Cognos Analytics is not used with USP Moodle, but we are considering using IBM Cognos Analytics to analyze Moodle usage by department, grade level, and campus. According to ITS, preparation of the necessary hardware and this software for operation with USP Moodle are expected to be completed by June 2022.
		(5) Early Warning System	✓	Learning analytics is a software algorithm used to predict or detect unknown aspects of the learning process based on historical data and current behavior. Learning analytics uses descriptive (what happened)/predictive (what will happen next)/diagnostic (why it happened)/normative (do this to improve) analysis to perform early warning triggers, such as identifying and notifying students who have not recently accessed a course or who have not yet accessed a course. At the moment, USP is doing some of the above using the "analytics" feature of Moodle.
	Synchronization tools	(6) REACT	✓	Interactive online lectures, including video and audio, can be delivered via USPNet to multiple campuses/centres. Lecture delivery and attendance take place in a room (REACT Room) equipped with special equipment. Since it is necessary to gather in a REACT Room to take classes, it is not suitable for the current COVID-19 situation and is not being used at this time. The online lecture delivery method started to shift from REACT to Zoom in April 2021 when students were not allowed to enter the campus due to the COVID-19 lockdown, and REACT is not in use at this time (December 2021). In addition, shifting the delivery of online lectures from Zoom to Webex in the future is being considered. There is also the possibility that online lectures via REACT will be resumed, depending on the future status of COVID-19, and that some services and tools related to online lectures such as Zoom and BigBlueButton may be changed.
		(7) BigBlueButton	✓	Open-source software for delivering online lectures. The lectures are recorded and delivered through Opencast via USP Moodle as on-demand lectures. The server for operation is located at the Laucala Main Campus, but its use is currently limited due to the lack of hardware resources.

Category	Purpose of use	Software	Status of use	Comments by the JICA Study Team
		(8) Poodll		A plugin for submitting assignments as audio files. When submitting an assignment, functions that cannot be realized with standard Moodle, such as automatic scoring and saving to an external server, are implemented.
	Plagiarism and theft check	(9) Turnitin	✓	A plagiarism checking service that matches reports and assignments submitted by students with information on the Internet, thesis databases, and other students' submissions, and quantifies the similarity.
	Cloud services	(10) Google Apps	✓	Among Google Apps, only Google Drive is used as online storage.
		(11) ownCloud	✓	Google Drive for students and USP's own cloud storage service Mana for USP staff.
	Educational system	(12) Ellucian Banner	✓	Course information and registration information is managed as an educational system. The system is integrated with USP Moodle, and the following registration and update information is automatically and regularly delivered. Registration information from Student Online Services (SOLS), sent to USP Moodle - once a day Registration information from the Moodle collector table, sent to the course shell - every hour Course registration/renewal - For three weeks at the beginning of each semester, sent to USP Moodle
2. Content management	Media platform	(13) Opencast	✓	An open-source video management system that automates video capture, processing, management, and distribution. Most of the lectures recorded by Lecture Capture, BigBlueButton, Zoom, etc. are delivered through this system.
		(14) Alfresco		Content management system (portal site framework).
	OER (Open educational resources)	(15) edu-sharing		A repository for the collaborative management and use of objects such as Moodle courses.
		(16) Joomla		A system for centralized management of homepage images, text, design, and layout information from a web browser. Used only as a teaching material.
		(17) Pressbooks		A content management system (CMS) designed for book production, based on WordPress and capable of exporting content in a variety of formats for eBooks, webbooks, and print.
3. Information sharing	SMS gateway	(1) Kannel		WAP and SMS gateways. Used to serve short messages (SMS's), WAP push service messages, and mobile Internet connections.
	Social media	(2) Facebook		Moodle is not integrated with Facebook or Twitter (below), but they can be used as a means of communication between students and between students and staff. They are not used formally.
		(3) Twitter		Same as above.
		(4) YouTube	✔	Video distribution platform. Used to deliver video content.
	Library management system	(5) Greenstone	Not used	A book management system that manages the library collection, and borrowing, returning and reserving of books. Currently, USP is using Symphony as its book management system. It is not currently integrated with the distance learning system and there are no plans to do so.
		(6) Spydus	Not used	Same as above.

Source: Prepared by the JICA Study Team based on the responses to the questionnaire to USP.

6) Evaluation of current status of USP Moodle

In order to enhance and improve the distance learning system in the future, the current status of USP Moodle was evaluated using the following criteria, and the effectiveness of the system was measured. The overall evaluation of USP Moodle by the JICA Study Team was positive. The detailed results of the evaluation of USP Moodle are presented below.

Table 2-3-10 Evaluation of the Current Status of USP Moodle

Category	Issue	Appraisal standard	Grade	Reason
System	Backward compatibility	Does it support version upgrades?	B	Moodle supports version upgrades, but since USP Moodle is customized, the customizations need to be verified after a version upgrade.
	Customizability	Can I customize it?	A	Moodle is open source, so anyone can customize it under certain conditions.
	Integration with other systems	Can it be integrated with other systems?	B	Can be integrated, but development may be needed.
	Mobile support	Is it compatible with mobile devices?	A	· Responsive design is used. · Able to use Moodle mobile apps.
Security	Security during authentication	How secure is the authentication process?	B	LDAP is used to authenticate in Moodle.
	Security support	What security measures are taken?	B	Encryption by SSL/TLS certificate is implemented.
Performance	Connectivity	Is the connection good and stable?	B	The connection to Moodle itself is fine, but the comfort level depends on the connection environment.
	Response time	How long does it take to react after an operation?	C	Depends on the connection environment. Reference: Wi-Fi connection (2 Mbps) C Mobile DATA/LTE communication (50 Mbps) B
	Downloading	Is it comfortable to download documents?	C	Depends on the connection environment. Reference: Wi-Fi connection (2 Mbps) C Mobile DATA/LTE communication (50 Mbps) B
	Playback of internal video content	Does video in Moodle play properly?	C	Video content may pause during playback.
	Playback of external video content	Can I play videos on Google Drive and YouTube?	C	· Google Drive videos may pause due to loading while playing · YouTube is generally fine.
	Online lectures	Can I participate in online lectures?	B	Lecture Capture and Zoom recorded lectures can be viewed as on-demand lectures via Opencast.
Usability	Operability	Is it easy to operate?	B	It is not as intuitive as a GUI, but the interface structure is well organized.
	User interface	Is the user interface easy to understand?	B	Changing the appearance makes it easier to understand.
	Site navigation	Can you easily find the information you need?	B	The use of blocks makes it easier to find information.
	Course structure	Is the structure of the courses and the arrangement of the activities easy to understand?	C	In some courses, a screen was so long from top to bottom that it was difficult to understand.
	Help	Are user guides and other help content available?	C	· Help content is sufficient. · With no keyword search available, it was extremely difficult to locate the content you wanted to read.

Category	Issue	Appraisal standard	Grade	Reason
Content	Quality	How is the quality of the content?	B	Sufficient.
	Multimedia support	Is rich content such as H5P or SCORM being used?	C	Most of the content currently in use consists of standard slideshows, videos, and documents.
	Mobile support	Is the content compatible with mobile devices?	B	· Responsive design adopted. · Video content can be played normally.

Judgment: A: very good, B: good, C: good enough, D: needs improvement
Source: JICA Study Team

USP Moodle was basically built by taking advantage of the standard features and interface of Moodle, and any customizations or other changes have been kept to a minimum, focusing on integration with related services.

The user interface is a simple, organized, text-based interface with a custom theme based on the Moodle standard theme (design template), which is easy enough to use. In recent years, however, there has been an increase in the number of learning management systems that have excellent usability. Many have a website-like UX[71] with a high level of design and intuitive operation through a GUI[72]. Excellent usability of web systems contributes to ease of use, efficiency of operation, and user satisfaction, which in turn improves the effectiveness of online education, so there is room to consider improving the design and the UI of USP Moodle to achieve a high usability.

In addition, user guides and other help content has been prepared, but it was difficult to find, as it was not centralized. For example, it is linked to on the Moodle home screen, posted as course activities, or linked to on the USP website. In a web system such as a learning management system, it is important for users to be able to obtain answers to questions, confirmations of operations, information on troubleshooting, etc., whenever they need it. Therefore, it is necessary to reexamine the means and structure of providing help content and to inform users about it.

It should be noted that, although it is not a problem with USP Moodle itself, low-performance ratings were observed due to the network. The JICA Study Team used the USP guest Wi-Fi (around 2 Mbps) and cell phone tethering (around 50 Mbps) at the Laucala Main Campus to check access to Moodle, operation response, downloading of materials, and viewing of videos. However, the USP guest Wi-Fi was not generally comfortable to use, as it took a long time to download materials and there were pauses and loading delays when watching videos.[73] The cell-phone tethered connection also had delays when watching videos.

Connectivity problems have been cited not only at the Laucala Main Campus, but also at other campuses/centres (see section (5) below). In addition to the communication capacity, communication speed, and line conditions of the communication line (satellite line, AARnet, ISP, etc.) to which USP

[71] The "user experience" of using a product or service, operating a system, etc.

[72] Graphical user interface: A user interface that is characterized by its graphical (visual) nature, using computer graphics and pointing devices.

[73] An Apple MacBook Pro (2.4 GHz Core i5/16 GB memory) was used for verification.

subscribes, there are various other possible causes of problems, such as the communication network settings (QoS), communication line usage, software used, and performance of the receiving communication terminal.

Therefore, as described later in Chapter 6, we propose to first conduct a network monitoring survey to quantify the load that is actually being placed on the network, and then consider measures to be taken.

(5) User Usage

This section describes how the users of USP Moodle, i.e., staff, and students, use Moodle. By analyzing how users are using Moodle, we were able to determine how to improve the platform to make it more efficient and effective, and thus easier for staff, and students to use.

1) Number of active users

The number of registered users of USP Moodle as of Tuesday, November 30, 2021, is as follows:

Total number of registered users: 43,444[74]

Number of students: 31,096
Number of academic staff: 358

Source: USP 2020 Annual Report

The specifications of the server that will run and operate Moodle are determined on the basis of the number of users using Moodle, i.e., the number of registered users accessing Moodle at the same time.

For an educational institution such as a university, it is usually assumed that about 10% of registered users will be accessing the site at the same time. If we assume that about 4,300 people will be accessing the site at any given time, we can conclude that the specifications shown in Table 2-3-7, "Server Configuration for Running USP Moodle", are reasonable.

2) Online survey of students and staff

This survey was originally planned to be conducted through distribution and tabulation of questionnaires and face-to-face interviews, but due to the spread of the COVID-19 infection, it was conducted online. Although we did not receive many responses due to the fact that the survey period included students' final exams as well as Christmas (summer vacation) and year-end/New Year holidays in the Pacific region, responses and comments that can be used as a reference were obtained. The outline of the survey are shown below. (See Appendix-6 and -7 for details of the survey results)

[74] The number of registered users of USP Moodle includes the number of users who have been registered as users in the past but are currently Suspended and the number of users other than students and staff members involved in operation and management, It differs from the total number of students and staff members listed below.

a. Purpose of the online survey

The online survey was conducted with the following objectives:

- Understand how users use the distance learning system.
- Investigate users' literacy in operating the distance learning system.
- Obtain users' impressions and opinions about the distance learning system.

b. Survey items for the online survey

The survey items for the online survey are listed below.

- User attributes
- Connection environment and connection status
- Proficiency level in software operation
- Opinions about and expectations for online learning
- Usability of distance learning system
- Opinions on distance learning system
- Cell phone operators used in each region

c. Overview of the online survey

Period: November 25, 2021–January 14, 2022

Survey target: Users who use USP Moodle as staff or students

Survey method: Online survey using Google Forms

Notification method: E-mailed to survey targets via USP-owned mailing system

d. Results of the online survey

- Number of responses

Staff: 10; Students: 42 (as of January 12, 2022)

Table 2-3-11 Number of Respondents by Campus/Centre

Campus/Centre	Number of students	Number of staff
Emalus campus (Vanuatu)	5	0
Laucala main campus	23	10
Nauru campus	2	0
Samoa campus	2	0
Solomon Islands campus	3	0
Tonga campus	4	0
Tuvalu campus	1	0
Labasa campus	2	0

Source: JICA Study Team

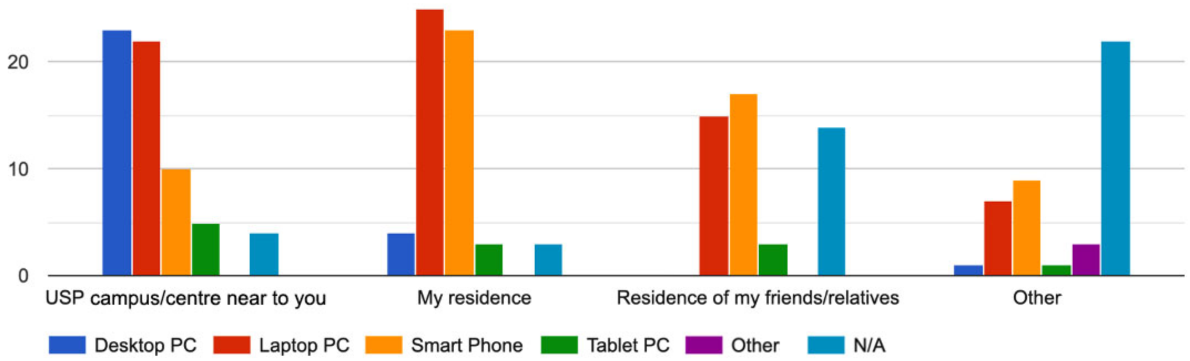
● Summary of responses

User Attributes

- User attributes are omitted in this report.

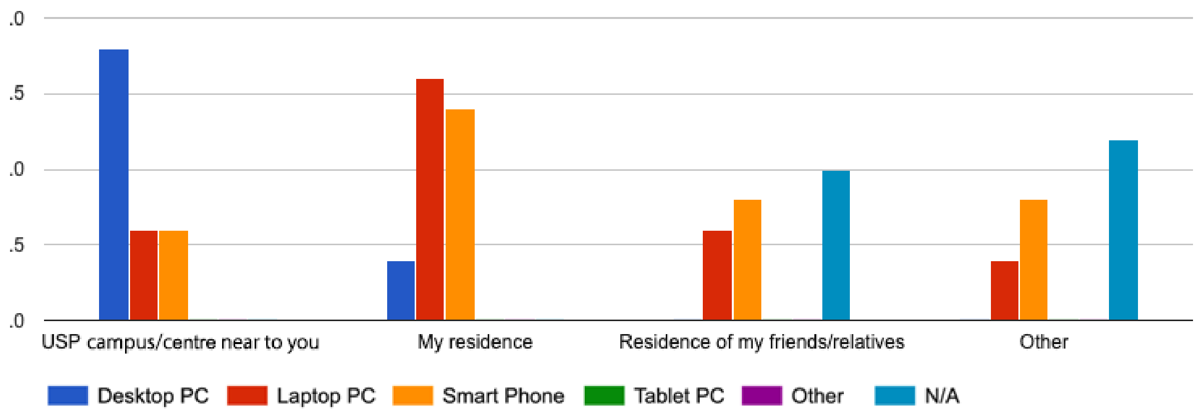
Connection environment and connection status

- 88.1% of the students accessed the distance learning system daily or every other day, and 100% of the staff accessed the system daily.
- The connection locations and devices used are shown below.



Source: JICA Study Team

Figure 2-3-11 Location of Students' Connection to the Distance Learning System and Devices Used



Source: JICA Study Team

Figure 2-3-12 Location of staffs' Connection to the Distance Learning System and Devices Used

- Students were almost evenly split between mobile (data) connection and Wi-Fi connection as the means of connection, and staff were almost evenly split between mobile (data) connection, Wi-Fi connection, and wired LAN.
- For connection status, all of the staff answered "always connected without frustration" or "good in

general, but gets slow sometimes," while 23.8% of the students answered "always slow" or "slow in general except for certain times".

Proficiency level in software operation

- When asked about their understanding of the operation of the software, tools, and services associated with the distance learning system, all staff responded that their understanding of the system was "understand very well" or "understand enough"; 83.3% of the students answered "understand very well" or "understand enough", while 16.7% answered "do not understand much". The reasons given for the latter answer were "due to lack of technology skills in using software" and "as I do not have much information about the software".

Usability of distance learning system

- 80% of the staff said they use the online user guide "a few times a month" or "a few times a semester" and 20% said “never”, while 52.4% of the students said they use it "almost every day" or "a few times a week".
- When asked if the online user guide was useful, 20% of the staff answered "not useful at all" or "not very useful," while 92.9% of the students answered "very useful," "useful mostly," or "useful sometimes".
- When asked "What kind of user guide do you think would be useful?", most of the staff answered "able to contact the help desk by phone" and "face-to-face training", while most of the students answered "online documentation", "video manuals", and "online training via Zoom".
- When students were asked about the viewing conditions of lectures via on-demand video and online lectures via Zoom, 38.9% of the students with lectures via on-demand video and 57.5% with online lectures via Zoom answered that they had "some problems," "problems," or "too many problems". The most common reasons given were "connection ends abruptly," "audio interruptions," and "video interruptions".

Opinions about and expectations for online learning

- All of the staff and 90.4% of the students responded that online learning was "very helpful" or "helpful".
- In response to the question "What do you expect from online learning?", the respondents answered "access from anywhere," "flexibility in learning," "delivery of more on-demand lectures," and "positive learning outcomes".
- In response to the question "What would further enhance online learning?", the responses included "consider new tools, provide appropriate support," "good internet connection for all students and staff," "need better connectivity for students," and "improve IT training for staff and students".

Opinions on distance learning systems

- In response to the question "What do you think about the ease of use of the distance learning system?", all the staff answered "always easy to use," "mostly easy to use," or "easy to use," and 90.5% of the students answered "always easy to use" and "mostly easy to use".
- For the "usefulness and convenience of the distance learning system," staff cited "comfortable operation speed," "classes without going to the campus," and "easy access," while students cited "classes without going to the campus," "easy access," and "the ability to obtain necessary information anytime and anywhere".
- For the challenges and inconveniences of the distance learning system, staff mentioned "difficulty in communicating with students and other staff ", "slow", and "no one to help", while students mentioned "difficulty in communicating with other students and staff ", "very slow", "do not have device to access", and "no one to help".

e. Online survey discussion

More than 90% of both staff and students answered that the distance learning system was "helpful" and "easy to use," and the level of understanding of operation of the system was also high for both staff and students, but many students were dissatisfied with the connectivity and network speed.

The level of understanding of operation of the system was high for both staff and students. However, some students answered “do not understand much”, and more than 50% of the students used help content such as user guides "almost every day" or "a few times a week". The need to strengthen user support through help content is considered to be high.

On the other hand, many students commented that it was difficult to communicate with other students and staff. Therefore, it is necessary to introduce and utilize communication tools as a means of communication via the distance learning system such as social networking services (SNS) such as Facebook and Twitter, which are currently not officially used at USP, and Teams, which is one of the components of Office 365 provided to students at USP.

In the future, when submarine cables are laid to increase the speed and capacity of the network, it will be possible to conduct research on the use of XR[75] technology in the Metaverse[76] environment for distance education systems, and to implement the results of this research.

The above environment will allow students and staff to participate in online classes and workshops via avatars and communicate with each other remotely via virtual rooms set up at each campus/centre, providing a more immersive learning experience that takes advantage of both face-to-face and online learning. The system can also be used on PCs and mobile devices, but the sense of immersion and unity will be reduced compared to XR devices.

[75] Cross-reality: A generic term for technologies such as VR (virtual reality), AR (augmented reality), and MR (mixed reality).

[76] A three-dimensional virtual space and its services built in a computer or computer network that is different from the real world.

Regarding the network performance required for the Metaverse environment, the following table shows the network performance required when "VRChat"[77], which is currently running as social VR[78], is used in Japan.

Table 2-3-12 Network Performance Requirements for "VRChat" in Japan

Item	Minimum requirements	Requirements for normal use
Network speed (downstream)	30 Mbps	100 Mbps or more
Ping[79] value	50 ms or less	15 ms or less
Packet loss[80]	5% or less	0%

Source: JICA Study Team

The actual network speed (downlink) measured by JICA Study Team during the field survey was around 2 Mbps for GuestWiFi in the Laucala main campus and around 50 Mbps for mobile DATA / LTE (4G) communication. As the Metaverse concept itself is based on the assumption that it will operate in a 5G[81]environment, the introduction and operation of the Metaverse environment at USP will require more time.

From the results above, the following three points are considered to be the first issues that need attention.

・Improvement of connectivity and network environment
・Provision of appropriate user support
・Promotion of online communication

3) Interviews with students

Interviews with students outside of the Laucala main campus were conducted online at the following dates and times.

・Wednesday, December 15, 2021, 11:00 a.m.–12:30 p.m. (JST)
Participating campuses and number of participants: Lautoka: 2
・Thursday, December 16, 2021, 11:00 a.m.–12:30 p.m. (JST)
Participating campuses and number of participants: Solomon Islands: 2, Nauru: 4, Niue: 1
・Friday, December 17, 2021, 11:00 a.m.–12:30 p.m. (JST)
Participating campuses and number of participants: Marshall Islands: 6, Tonga: 1, Vanuatu: 3

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77 A VR network service that allows you to communicate with others in a virtual space. https://hello.vrchat.com/

78 A generic term for a social networking service metaverse that allows users to communicate via avatars in a space composed of 3DCG (VR space).

79 Refers to the response rate of communication sent from the device to the host server.

80 The loss of packets that are forwarded over a network for some reason.

81 The Fifth Generation Mobile Communications System: A wireless communication system that satisfies the IMT-2020 specifications defined by the International Telecommunication Union (ITU). High speed with high capacity, low latency, and multiple simultaneous connections are defined as required elements.

a. Interview results

<u>Connection to the network</u>

- The overall connection situation is generally not good.
  - ➢ It takes time to connect to the desired website or USP Moodle.
  - ➢ Video content takes a long time to load. Playback sometimes stops in the middle.
  - ➢ Zoom and BigBlueButton often have image delays/stops and audio degradation in online lectures.
  - ➢ Connectivity and connection speed deteriorate depending on location and time of day.
- In some countries, with the support of mobile operators, connection to USP Moodle via the operator's network is free of charge; USP bears part of the cost.
- The Wi-Fi at each campus/centre is generally good, so students who own laptop computers can come to each campus/centre and connect to the campus network and USP Moodle via Wi-Fi.
- Some students who are not able to go to the respective campuses/centres use tethering on their own smartphones to connect to USP Moodle. The cost of purchasing data from mobile operators is high for students[82].

<u>What devices do you own?</u>

- Only a small number of students own their own laptop computer.
- Students who receive scholarships have a high rate of self-ownership of laptop computers, likely because they can raise the purchase cost from the scholarship money.

<u>Facilities at each campus/centre</u>

- There are several desktop computers for students to use in rooms called PC labs at each campus/centre.
- There are some campuses/centres where almost half of the desktop PCs permanently installed in the PC lab are not working properly.

Photo 2-3-3 PC Lab at the Labasa Campus

Photo 2-3-4 PC Lab at the Savusavu Centre

[82] For Vodafone Fiji's Giga 25 plan, FJD 25 for 125 GB (valid for 30 days).

Usability of USP Moodle

- When asked about the usability of USP Moodle, almost all of the students responded that they had no complaints about the operation of USP Moodle or about taking the course.
- Students responded that it takes a while to connect and log in to USP Moodle, but once you are connected and logged in, it operates smoothly.

Comparison between Zoom and REACT

- Zoom is convenient because you can connect to it anywhere as long as you have a device and an Internet connection.
- Zoom may have image delays or stoppage and audio degradation, depending on the connection environment.
- REACT's audio is clearer and easier to hear than Zoom's.

b. Discussion of interview results

For students taking courses in blended or online mode, the challenge is network connectivity and the availability of devices and means of network connection, including PCs and smartphones.

The above issues are also important for students taking courses in face-to-face mode.

The best method to deal with these issues will differ for each campus/centre depending on the changes in the usage status of each campus/centre due to COVID-19. However, in anticipation of the strengthening of the network using submarine cables that will be deployed in the future, it is important to improve the availability and daily connectivity/operability of USP Moodle and related software and services that make up the distance learning system, while also making use of the current tools that can effectively utilize satellite lines (USPNet) such as REACT.

On the other hand, many of the respondents were satisfied with the operation of USP Moodle and the course itself. However, this may be because they have little or no experience with other learning management systems or web services with similar functions and cannot compare and evaluate them. There is still room for improvement in USP Moodle compared to other web services that are easier to use and have a better UX.

(6) Learning modes

1) Learning modes of the course

At USP, there are four learning modes that can be selected to take a course. The learning modes that can be selected vary from course to course and campus to campus, and each learning mode defines the delivery method and the components used, but there may be some overlap in functionality among the learning modes. A course offered in face-to-face mode may also have selected online and multimedia components, and similarly a course offered in print or blended mode may include tutorials delivered face-to-face by tutors and academic staff at a campus/centre, or online. An overview of each learning mode is given below.

Table 2-3-13 Summary of Learning Modes

Mode	Overview
Blended	Courses offered in the blended mode blend online and face-to-face learning, and are sometimes referred to as hybrid mode courses. In the blended mode, 30-79% of the course material content is delivered online. Discussions are usually conducted online, but some face-to-face activities such as question-and-answer sessions between students and academic staff or tutors are also done.
Face-to-face	Courses offered in the face-to-face mode have up to two hours of face-to-face lectures per week and also have face-to-face tutorials during the semester, which may include the following: ・Moodle (usage amount: 1-29%) ・Other forms of learning technology such as mobile learning[83]
Online	Courses offered in online mode deliver more than 80% of the content online and usually do not have face-to-face lectures. All multimedia components of online courses are provided via USP Moodle.
Print	Courses offered in the print mode do not provide weekly face-to-face lectures or tutorials. In the print mode, courses are offered in a flexible learning format that can be adapted to various learning environments. Learning materials are provided through a combination of printed materials such as: - Introduction and assignments (books) - Textbooks - Course or study guides (books) - Other printed materials developed by course development staff or subject matter experts and the Course Design and Development (CDD-CFDL) team Print mode courses may also include the following: ・Most include online tutorials conducted through REACT ・Some courses may offer face-to-face tutorials with tutors at each campus/centre, but this is generally not the case ・Moodle (usage rate: 1-29%) ・Other forms of learning technologies such as mobile learning ・Multimedia materials such as DVDs and CDs

Source: 2021 Handbook and Calendar

Table 2-3-14 Number of Students Registered by Learning Type (EFTS)

	2019	2020	FY2020 Ratio
Blended	5,169.3	4,753.4	27.3%
Face-to-face	6,076.3	6,617.2	37.4%
Online	3,032.4	3,431.7	19.2%
Print	2,903.7	2,893.6	16.2%

Source: USP 2020 Annual Report

2) About the courses offered

An overview of the courses offered at USP is provided in the University Handbook and Calendar available on the USP website. The handbook also contains requirements and regulations for the

[83] Refers to a system that allows students to learn anywhere, including on the go using mobile devices (especially smartphones).

university and each department, and is used as a reference when students register for courses.

In addition to information such as the course code, course title, prerequisites, and course description, the course outline contains information about which delivery mode is offered to which campus each semester.

Although there are no clear rules for the assignment of learning modes to courses, most of the courses offered in face-to-face mode are held at the Laucala main campus. Other than that, each campus/centre conducts courses offered in blended mode, online mode, and print mode.

There are also courses that are offered in a combination of blended mode and print mode, or courses that are offered in the face-to-face mode in the first semester and in the print mode in the second semester.

UU100 Communications & Information Literacy

Prerequisites: Admission into Undergraduate Programme
Semester 1: B at L and O at C **Semester 2:** B at L and O at C

UU100 is one of the four compulsory generic courses being offered by USP and is to be taken in the first year of full-time study and before enrolling in 200 and 300 level courses. The aim of this course is to ensure that all incoming students develop knowledge and competence in the use of computers and information resources. The course covers fundamental concepts of computers and their applications and addresses the broader imperative for students to develop the capacity to effectively locate, access, evaluate and use information effectively.

UU114 English for Academic Purposes

Prerequisites: Admission into Undergraduate Programme
Semester 1: F at L, K, TON & E and O & P at C **Semester 2:** F at L, K, TON, E & LTK and O & P At C

By the end of this course students will be expected to have achieved a proficiency in academic writing, reading and speaking sufficient to support their language needs in courses in the humanities, social sciences or sciences and in future professional tasks. The course is designed with sufficient flexibility to cater for the practical language requirements of students studying in all of the above areas. UU114 is one of the core courses for undergraduate students admitted to studies from 2010 and is to be taken in the first year of full-time study and before enrolling in 200 and 300 level courses.

Figure 2-3-13 Example of a Handbook and Calendar Course Outline

Delivery mode description
- F = Courses offered in face-to-face mode
- P = Courses offered in print mode
- B = Courses offered in blended mode
- O = Courses offered in online mode

Delivery destination notation

CI	Cook Islands campus	SAM	Samoa campus
E	Emalus campus	SI	Solomon Islands campus
K	Kiribati campus	TOK	Tokelau campus
LAB	Labasa campus	TON	Tonga campus
L	Laucala main campus	TU	Tuvalu campus
LTK	Lautoka campus	C	All campuses
NA	Nauru campus	C*	All campuses except Laucala
NAN	Nadi centre	C**	All campuses except Emalus
NI	Niue campus	C***	All campuses except Laucala/Emalus
RMI	Marshall Islands campus	P*	Print materials mode for school-based foundations

The code for each course is determined by the following rules.

For prep courses, basic courses, and some certification courses

3-letter prefix + 2-digit number

The first two letters of the prefix indicate the field of education and research, the third letter indicates the course, and the 2-digit number indicates the course number.

Notation Example: GEP02 Preliminary Geography B: Human Geography

[GE = Geography] + [P = Preliminary] + [02 = Course Number].

AFF01 Basic Accounting A

[AF = Accounting] + [F = Foundation] + [01 = Course Number].

For degree courses and graduate courses

2-letter prefix + 3-digit number

The two letters of the prefix indicate the research field, the first number indicates the course level, and the second two numbers indicate the course number.

Course Level

1 = 100 level: 1st year of bachelor's program

2 = 200 level: 2nd year of bachelor's program

3 = 300 level: 3rd year of bachelor’s program

4 = 400 level: Graduate certification, graduation, master's program

6 = 600 level: Graduate level supervised research project

7 = 700 level: Graduate level master's thesis

8 = 800 level: Graduate level doctoral dissertation

Notation Examples:

AF100 Introduction to Accounting & Financial Management for the Non-Specialist

[AF = Accounting] + [1 = First year of undergraduate program] + [00 = Course number].

DG301 Leadership, Governance & Human Rights Internship

[DG = Development/Governance] + [3 = 3rd year of bachelor's program]

+ [01 = course number].

There are also other course codes that are defined by special rules.

(7) Teaching materials

1) Teaching materials used in distance learning systems

The following table shows the teaching materials currently being used in the USP distance learning system.

Table 2-3-15 Teaching Materials Used in the Distance Learning System at USP

Classification	Overview	Appearance	Bidirectionality
MS Office files	Files created with MS Office applications ・Word, Excel, PowerPoint	C	D
PDF	Electronic document files (Portable Document Format) generated by Adobe Acrobat, etc.	C	C
Online lectures	Synchronous lectures with Zoom, BigBlueButton, and REACT	B	A
Video files	Video files such as mp4, mov, 3gp, etc. ・Video recordings of online lectures ・Recorded video can be edited with video editing software	B	C
Audio files	Audio files such as mp3, wav, PodCast, etc.	n/a	D
Web content	Static content[84] created as a Moodle activity, such as books, pages, etc.	C	D
External resources	・External web page ・External video distribution service such as YouTube	B	C
eLearning content	・H5P content created with HTML5 ・Content created with iSpring[85] or other educational content creation software	A	B
Multimedia	Educational content distributed on DVD and CD	B	B
Books and printed materials	Textbooks, materials, etc., mainly used in print courses Available by mail or download from USP Moodle	n/a	D
Other	・Communication via chat and forum ・Feedback and surveys with questionnaires ・Glossaries of terms	n/a	B

Judgment: A: very good, B: good, C: good enough, D: needs improvement
Source: JICA Study Team

The following trends can be seen in the teaching materials used in USP's distance learning system.

1. The documents used in the lectures are used almost verbatim.
2. There is no interactive content such as quizzes and content that responds to student actions.
3. Most of the video recordings of online lectures have a playback time of more than one hour.
4. There is almost no educational content that is compatible with mobile devices.

84 Content that is displayed as fixed content prepared in advance on the server, rather than content generated by a program on the web server at the user's request (dynamic content).

85 Educational content creation software that allows you to export PowerPoint files as eLearning content.

The design and structure of teaching materials used in face-to-face classes can be changed and restructured for online learning and interactive online teaching content so that it responds to student actions and provides immediate feedback on quiz responses, contributing to improved understanding and learning motivation. In addition, by creating teaching material content that automatically responds to student input so that it can also be used on mobile devices, students will be able to learn in any location and at any time.

In order to increase the amount of interactive and mobile-compatible teaching content, it is important to create an environment in which staff and content creators can create interactive and mobile-compatible teaching content themselves. For this purpose, the following is needed.

- Educational content creation software and software necessary for production, and hardware on which to run it
- Equipment for recording video, audio, and other materials
- Training that allows staff and content creators to learn the knowledge and methods necessary for production
- Human resources capable of teaching the knowledge and methods necessary for production

It is also more effective to subdivide the teaching materials, because concentrated learning in a short period of time (5 to 15 minutes) is more effective in retaining the learning content than learning continuously for 60 minutes or more.

When reorganizing materials after subdivision, it is necessary to redesign them from the perspective of learning design and instructional design[86] according to the learning objectives and content of the course that uses the materials.

However, if the learning content falls into one or more of the following categories, subdivision is not necessarily effective, so in these cases it is necessary to combine existing materials with other materials or to devise a special delivery method.

- If a detailed explanation is needed
- When a long time is required to acquire the knowledge
- For group discussions and other content that promotes learning through dialogue

(8) User support

Currently, user support for the use of the USP distance learning system is provided by the following means.

[86] A method for designing the entire learning system, from learning methods to effectiveness measurement, based on the purpose of learning, rather than just designing the learning content.

1) Online documentation

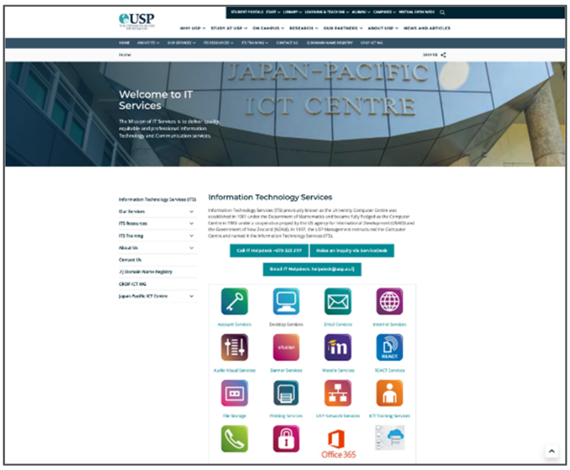
The following online manuals can be referred to from the USP website or USP Moodle. These online manuals or the information in them may also be included in the courses as parts of activities.

- Moodle user guide (students, staff)
- ePortfolio toolkit
- Turnitin manual (students and academic staff)
- Perusall guide
- A guide to the software and services used in distance learning systems such as Zoom and REACT

2) Help desk

Help desk services are provided by ITS. In addition to inquiries about the software and services used in Moodle and other distance learning systems, support is also provided for ICT-related issues such as networks, terminals, and audio equipment. Students and staff can contact the help desk by phone, e-mail, or through the service desk, and face-to-face support is also provided.

Some distance learning system support is also provided by Student Learning Support (SLS) and the Office of First Year Experience (FYE).



Source: USP Web site

Figure 2-3-14 USP Web Site ITS Page Screen

Source: JICA Study Team

Photo 2-3-5 Laucala Main Campus Help Desk Counter

2-3-2 Challenges for Distance Learning System

(1) Challenges for communication network infrastructure

An evaluation of the current status of USP's network infrastructure and data centre for distance education for the 12 island country members is shown in the table below. The improvement of the data capacity of the Ku-Band satellite link and the construction of a secondary hub to avoid the concentration of the data centre in one place can be considered as areas for improvement. In addition, USP is currently maintaining and managing its communications infrastructure appropriately, including proper operation of the infrastructure through QoS and ensuring system reliability through redundancy, but communications technology is rapidly evolving. In the future, technical training will continue to be necessary in order to incorporate the latest technology and to maintain and manage the communication infrastructure that supports the distance education connecting the 12 island country members.

Table 2-3-16 Summary of the Current State of the Network Infrastructure

Items			Conditions
Communication Network	Internet (Optical Fiber)		The data capacity required for distance education is secured. The data transmission capacity depends on the contract with the ISP.
	Satellite Link	C-Band	Conditions are at the same level as the Internet, and there is sufficient capacity to serve as the distance learning infrastructure provided by USP.
		Ku-Band	The minimum transmission capacity necessary for two-way real-time communication is secured, but the transmission capacity is expected to be increased to increase the number of real-time communications and to increase the capacity for services with low communication priority.
Data Centre	Computer System and Network Routing System		The data centre at the Laucala main campus houses the server systems, which provide various services that affect the entire distance education infrastructure provided by USP, as well as the routing system that controls the network. All major equipment installed in this data centre has redundancies and is equipped with an uninterrupted power supply to ensure sufficient reliability. On the other hand, since the data centre that supports the network infrastructure is located in one concentrated location at the Fiji Laucala main campus, there is a risk that the entire system will go down if the campus is damaged in a disaster. At each campus/centre, where equipment troubles do not affect all of the network infrastructure, most of the equipment is operated without redundancies, and the power supply is not backed up.
	Security		USP's network management engineers are highly security conscious. All services are tied to a login portal, with VPN login as required to ensure security. External computer connections to the USP network are also properly managed.

a) Expansion of Ku-Band satellite link capacity

Keeping a good connection environment between the remote campuses/centres located in the 12 member countries is indispensable for USP to proceed with distance education. The campuses/centres connected via the Internet as shown in the figure below all have sufficient line capacity. Since the line capacity is based on the contract with the ISP, the contract needs to be updated if expansion is going to occur.

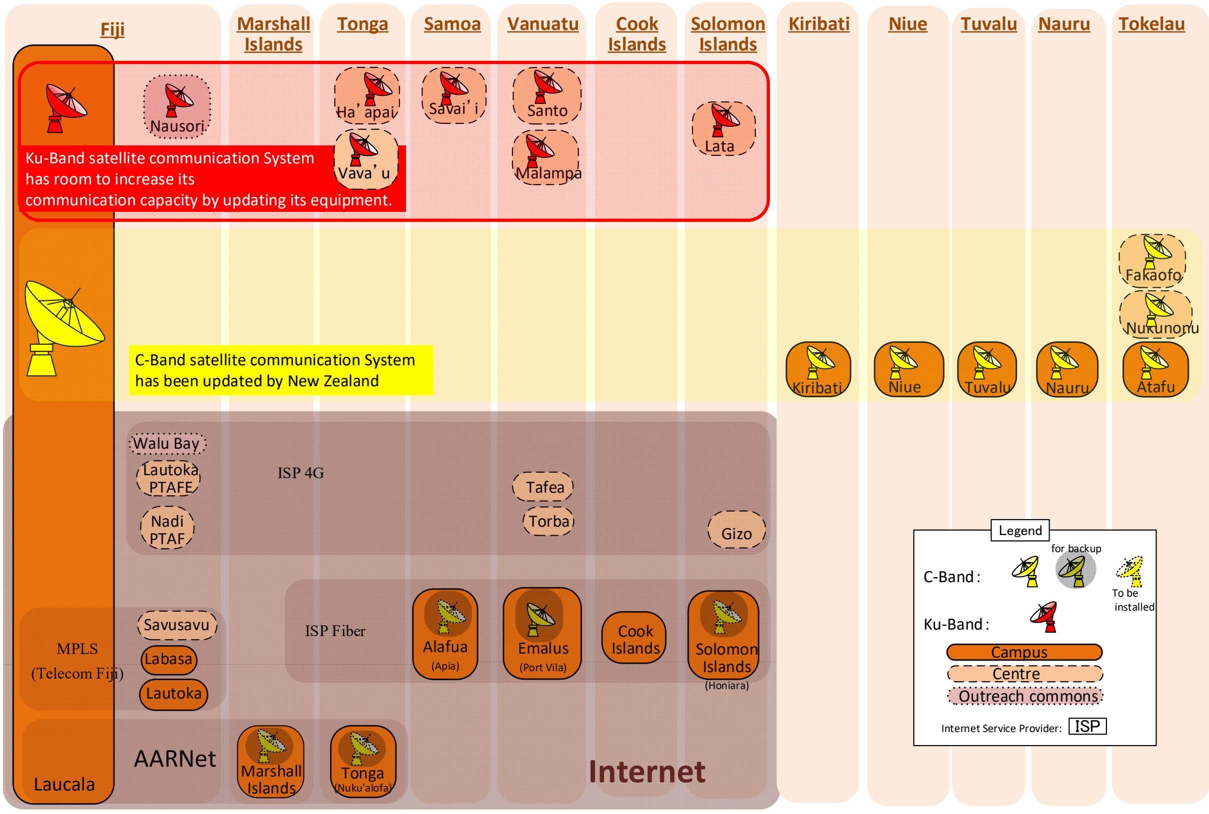


Figure 2-3-15 USP Network Infrastructure Categories

Two systems, a C-Band system and a Ku-Band system, are in operation for the satellite links, and the C-Band system has already been updated in the project implemented by New Zealand. As shown in Figure 2-3-15 above, the downstream bandwidth from the hub station is 90 Mbps, so the infrastructure is sufficient for distance education applications.

On the other hand, the six remote centres and one outreach commons in five countries connected by Ku-Band have doubled the frequency bands used for satellite communications in 2020 in order to increase their capacity. However, as shown in Figure 2-3-8, the downstream capacity from the Fiji hub station is 21 Mbps and the upstream capacity is 2 Mbps, which is less than the Internet and the C-Band satellite circuits.

The trend for the network infrastructure for distance education is to shift to Internet connections provided by ISPs using an optical submarine cable when one is connected to the site. New installation of optical submarine cables is also being promoted at the remote centres connected by Ku-Band. However, in the case of remote centres where optical submarine cables are not currently installed, satellite links will play an important role as network infrastructure for the time being.

For example, in Vanuatu, submarine cable has been laid only to Efate Island, where the capital Port Vila is located, so that centres located on other islands cannot benefit from the optical fiber network.

In some cases, such as at the Emalus Campus in Vanuatu, fiber-optic cables have already been installed, and an ISP connection is mainly used, with the C-Band satellite line as a backup for redundant lines to increase reliability.

USP has doubled the frequency bandwidth used for Ku-Band satellite communications in 2020 to increase the data transmission capacity. In general terms, in satellite communications, data is modulated for transmission and transmitted over radio waves, and by increasing the modulation level, the transmission capacity can be increased while keeping the same frequency bandwidth. However, since there is a trade-off between the modulation level and robustness in transmission, the modulation level cannot be easily increased to secure transmission capacity.

The increase in the network capacity of such remote centres will be important in reducing the digital divide, as this extra capacity can be used as a backup even after the fiber-optic network is in place, as in the case of the C-Band. The current Ku-Band used at USP transmits at an 8 PSK[87] modulation, but 16 PSK and even 32 PSK, which can double the transmission capacity, have been developed for practical use.

A technical review of the link design, called the link budget, by the satellite communication service provider is required to determine whether or not increasing the PSK is feasible. A technical review of the link budget was requested from Intelsat, with whom USP has a contract for Ku-Band satellite communications, but there has not yet been enough time to obtain results. Further, SKY Perfect JSAT is the satellite communication service provider with which USP currently has a contract for C-Band service, and since they also provide Ku-Band service, a study of the link budget when using their satellite was requested. However, SKY Perfect JSAT's advantage is wide coverage, and it was found that in order to provide this, it would be difficult to increase the transmission capacity by increasing the modulation.

The parabolic antennas and other outdoor equipment[88] used for Ku-Band satellite communications have been in use for 12 years since their introduction in 2010, and will need to be renewed soon considering their general lifetime of about 15 years. It is important for the technical review by Intelsat to continue, as this review can help determine the possibility of increasing the transmission capacity.

b) BCP measures/decentralizing hub stations.

As shown in Figure 2-3-6, USP's communication network consists of a WAN via the Internet and the USPNet satellite WAN, both of which are centred at a hub at Fiji's Laucala main campus. In USPNet, both the C-Band and the Ku-Band are centred on the satellite hub station at the Laucala campus. All network access, including the connection between the two WANs and the Internet connection from USPNet, is through the Laucala campus. All services provided by USP are provided from the data centre at the Laucala campus.

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87 PSK is a phase-shifting technique that represents a signal by discontinuously changing the phase of the carrier wave.

88 The indoor equipment has been renewed in line with the ongoing C-Band satellite communication equipment renewal project supported by New Zealand.

The data in the data centre is backed up every day at midnight in Tonga via AARNet, and in the event of a failure, the backup data is restored to an alternative server for recovery. In this way, the hub station network and data centre facilities are configured with redundancy, and they are also equipped with an uninterrupted power supply. This ensures high reliability so they can function as the infrastructure for providing distance education to the 12 member countries.

On the other hand, if the hub station suffers damage due to a natural disaster, the infrastructure of the entire network will cease to function. The South Pacific region, where the Laucala campus is located, is at risk of earthquakes, volcanic eruptions, cyclones, and tsunamis, and from the perspective of a business continuity plan (BCP), it is necessary to avoid concentrating the hub functions in one location. It is also necessary to enhance the reliability of the distance education infrastructure, including taking measures against natural disasters. Further, since it takes time to restore the system from a data backup, establishment of a secondary hub similar in function to the current hub is desirable.

Although USP has recognized the need for a secondary hub in the meeting with Deputy Vice-Chancellor, no concrete plan has been made to set a time frame for its introduction.

c) Training of engineers

The network that supports USP's distance education is infrastructure that enables two-way real-time communication between 12 island countries using the Internet and satellite links, and is supported by advanced state-of-the-art technology. The engineers who manage the USP network use QoS technology to make effective use of the limited data transmission capacity, but since these communication technologies are constantly evolving, it is necessary to keep up with the latest technologies in order to build and maintain an optimal network, and technical training to develop new network engineers and keep existing network engineers up to date is an urgent issue.

USP recognizes the importance of training engineers and conducts training as appropriate, but further enhancement of training is desirable.

(2) Learning environment issues

Based on the results of the online survey, interviews with ITS, and workshops with CFL, the JICA Study Team identified the issues listed in the table below.

Table 2-3-17 Issues Related to Distance Learning Systems

No	Issue	Details of the issue and consideration of countermeasures
1	Connection problems	According to the results of the online survey, over 30% of students are dissatisfied with their connection to the distance learning system. About 40% of the respondents had problems viewing on-demand video lectures, and about 60% of the respondents had problems connecting to Zoom and stabilizing the connection. 30% of staff and 33.1% of students answered “slow” as the inconvenient part of the distance learning system. Each service and tool of the distance learning system, especially Moodle, depends on the quality of the network, such as its connectivity and stability, and in some cases, learning opportunities may be lost if the network is of insufficient quality. In light of the above, we propose in Chapter 6 that connectivity for users, especially students, is in need of improvement, and that measures need to be considered after collecting relevant information through network monitoring.
2	Provide appropriate user support	According to the results of the online survey, all the staff answered that they understood the operation of the application software of the distance learning system, but 16.7% of the students answered that they did not understand it very well. 52.4% of the students answered that they use the user guide almost every day or a few times a week, which suggests that the user guide is used on a daily basis and that there is a high need for it. On the other hand, 20% of staff and 7.2% of students answered that user guides are not very useful. When asked what types of user guides they would find useful, the most common responses were video manuals, online training via Zoom, face-to-face training, and contacting the help desk by phone. As indicated above, students are using the online user guides more frequently and requesting different support methods, such as video content and support via Zoom, so the user support system needs to be restructured and the means of providing support reexamined to provide user-centered support.
3	Overloading of the Moodle system	When Moodle was migrated to version 3.9 at the beginning of 2021, there was an overload problem, but it was dealt with by adjusting the Apache and PHP-FPM configuration parameters appropriately and adding more CPU cores to the web server. In the future, when ITS updates the server device and middleware, or upgrades the Moodle version, the settings of Moodle and the middleware will revert to their default values, and overload and other problems may occur again, so prior confirmation of the settings is necessary.
5	Content design	Some of the current content for teaching materials is not compatible with mobile devices, and we have confirmed that some of the content does not display properly or operate correctly during the course. In addition, staff involved in content production may not understand the latest information on content production, media, authoring methods, etc. Therefore, it is important to provide up-to-date information on content production methods, media, and tools for creating educational content (including educational content for mobile devices); support the creation of an environment in which content creation and development using these tools can be practiced; provide the necessary human resources for this purpose; and continuously develop human resources.
6	Building a content creation environment	While a physical production environment such as a studio with hardware such as cameras and lighting is important, it is necessary to build an environment that enables more efficient production of high-quality educational content by sharing past content files and audio, video, and other assets and using them to enable group authoring by multiple staff members in their respective roles.

Source: Prepared by the JICA Study Team

2-3-3 Comprehensive analysis of the current status and challenges of distance learning systems

In the previous sections, the current state of distance learning at USP and possible measures to be taken for improvement were clarified. USP commenced distance learning right after its establishment in 1968 with printed material, then after only six years began using satellite communications, so that USP has accumulated much experience in distance learning. It should be noted that the challenges described so far are those that have been faced through decades of continued practice, which may be interpreted as by-products of the positive outputs from operation of distance learning by USP.

The challenges for facilities and equipment may be assessed objectively by confirmation of quantity and status of functionality of them. On the other hand, the information gathered on challenges faced by learners in distance education, beyond those involving facilities, tends to be qualitative because of the limited duration and the timing of the field surveys, which were given during the end of year examination period[89]. Under these circumstances, the Survey Team believed it to be appropriate to verify and analyze this qualitative information through an exchange of views with the USP staff directly involved in distance learning. Accordingly, the Team organized workshops, which were not initially planned, jointly with the section of CFL in charge of support for distance learning, with a particular focus on pedagogical and andragogical expertise.

Some of the information obtained from the workshop was in the form of statements such as *"XXX exists, but YYY does not."* The statements did not focus only on those things that hinder achieving the objective, but on those things that may promote achieving the objective as well. The Team adopted SWOT analysis to sort the information gathered. The following table is the SWOT analysis of the information gathered through the workshop. In SWOT analysis in general, the distinction between internal aspects that an organization can control and external aspects that the organization can't control is important and necessary. Since the target organization of this Survey is USP as an entity, the target organization for SWOT analysis was set as USP as a whole, not CFL, which is a single section of USP.

[89] The USP school year starts in January. The field surveys were conducted from mid-November to December, which overlapped with the end of the USP school year and final examinations.

Table 2-3-19 SWOT Analysis of Flexible Learning at USP

	Promoting	**Hindering**
Internal	***Strengths*** ✓ Having campuses in 12 countries with communication network for FL ✓ Having School of Education to engage in education research ✓ Having School of S&T to collaborate in FL system development ✓ SAS, CFL and ITS has accumulated user support experiences in given environment ✓ JICA implemented technical cooperation with ID development components (around 2010)	***Weaknesses*** ✓ Communication network system is limited in both satellites and fiber cables for various factors ✓ Currently no FL (ID) research conducted by School of Education ✓ No institutional framework for involvement of School S&T in FL ✓ Learners support is not well organized in one stop service (confusing so easy to get lost and give up) ✓ Type of FL learning material is limited ✓ OER is not really in place nor well integrated between CFL and Library ✓ Mobile learning is not initiated ✓ CFL is not updated with the latest FL technology
External	***Opportunities*** ✓ COVID 19 created demand for strengthening distance learning (highlighted in Strategic plan) ✓ Mobile phones are becoming affordable for students ✓ Optic Fibre cables are to be laid gradually across islands slowly though ✓ Satellite communication technology has advanced to cater better for those Islands having no optic fibre connection	***Threats*** ✓ COVID 19 messed up learning not only F2F but others due to lecturers' working from home ✓ Facility for multi-media learning material development lost in fire accident (communication building) ✓ Possible digital divide caused by availability of optic fiber connections

Further SWOT analysis was attempted with an applied methodology combining internal and external aspects, shown in the table below. The analysis was executed to provide insights for discussion of the future objective for USP's distance learning introduced in the following Chapter.

Table 2-3-20 Further SWOT Analysis Combining Internal and External Elements of Flexible Learning at USP

	Strength	Weakness
Opportunities	**Opportunities x Strength** ✓ Activate research in FL in collaboration with schools with relevant expertise using already established communication network Regional Campuses/Centres ✓ Streamline student support services provided through own devices (smart phone)	**Opportunities x Weakness** ✓ Deliver FL using advanced technology in selected campuses connected with optic fibre for piloting advanced education and research purpose. ✓ Enhance FL through mobile devices (smart phone) by introducing material development technology learning
Threats	**Threats x Strength** ✓ Ease digital divide with Ku-band communication system which USP is equipped with physical and human resources.	**Threats x Weakness** ✓ Prepare for emergency such as pandemic prevalence and also natural disasters periodically attack pacific islands.

CHAPTER 3 FUTURE OBJECTIVE FOR DISTANCE LEARNING SYSTEM

CHAPTER 3 FUTURE OBJECTIVE FOR DISTANCE LEARNING SYSTEM

The current state of distance learning at USP, including the problems and challenges it faces, was given in the previous chapter. With this current state as a starting point, the future objective for the distance learning offered by USP is discussed in this chapter.

3-1 Outline of Future Objective

As clarified in the SWOT analysis presented at the end of the previous chapter, USP is a unique tertiary education institution in which distance education is a necessary delivery mode for education programmes, due to its being composed of 12 small and remote island nations spread out over the Pacific region. In fact, a conventional distance education delivery method involving shipping of printed materials to the islands where students resided was adopted right after the establishment of USP in 1968, and education via satellite communications was adopted in 1974[90], which at the time was advanced communication technology for distance education. In response to demands to expand the satellite communication network, development partners, including Japan, together established satellite communication facilities in all 12 member countries in 2000 so that all of the member countries could enjoy distance education using a dedicated satellite communication network. It may be noted that the Internet was still in an emerging stage at this time and that communication through the Internet was very limited (for example, to exchanges of text). Considering that, it is easy to understand the impact that the satellite communication network had on USP.

After year 2000, submarine fiber-optic cables are connected to some of the USP member nations, and these cables enable real-time delivery of audio and visual material. However, some of the USP member countries are not yet connected by submarine cables, and for some of the small and remote islands there are currently no future installation plans. Further, the fees for Internet users remain high, particularly considering the socio-economic status of the region, although they have been predicted to gradually get lower as the Internet continues to expand globally. This implies that a parallel operation of a dedicated satellite communication network and the Internet through submarine fiber-optic cables must be accepted, at least for the near future. In fact, the current situation could actually be better for risk avoidance[91], and the New Zealand Government is currently updating some of USP's satellite communication facilities, as stated in the previous chapter.

USP has been accumulating rich experiences in distance learning and has been seeing progress in its use of communications technology through its continued use of distance learning since its establishment. For the practice of distance learning delivery using communication facilities are updated and improved

[90] PEACESAT（Pan-Pacific Education and Communication Experiments by Satellite）

[91] You may recall that the volcanic eruption in the waters off of Tonga on 15 January 2022 damaged the submarine fiber-optic cables there and that Tonga was disconnected from the Internet, which caused delays in the initial actions for assistance to Tonga from the international community.

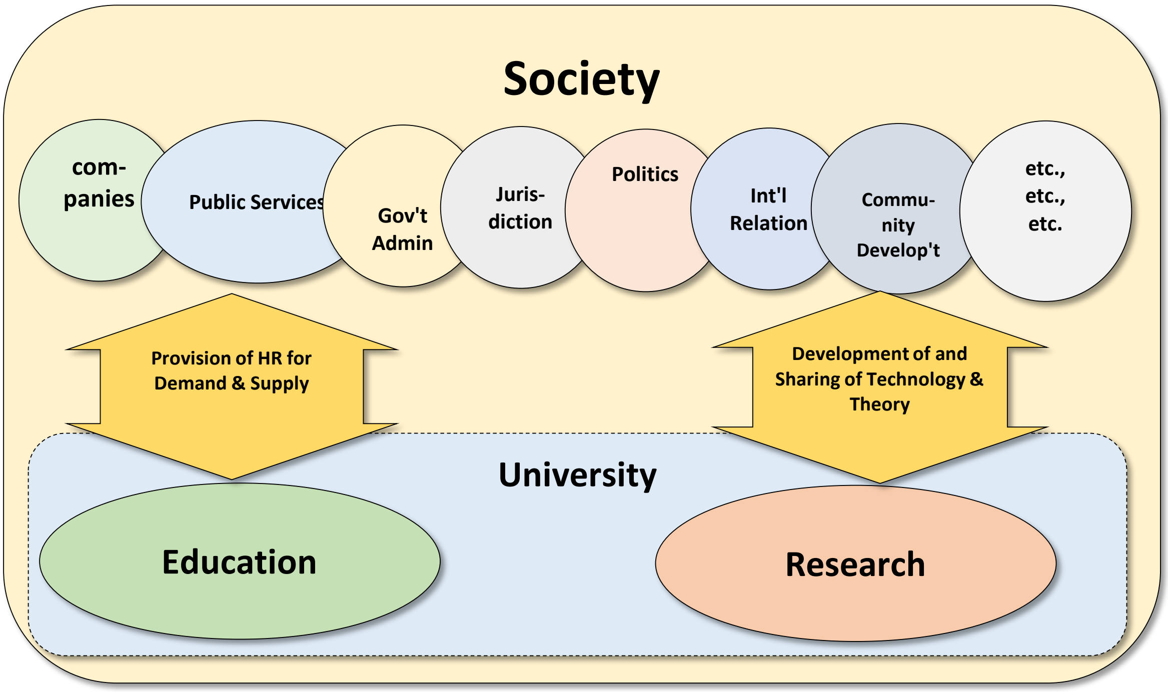
continually as technology advances, learning design including remote tutorial methods, on-demand learning materials development, assignment and assessment methods unique to distance learning, etc., has been crucially important. The Centre for Flexible Learning (CFL) plays a critical role in the provision of practical support with the expertise they've accumulated in education technology for the distance learning) also plays an important role in their provision of operation and maintenance services for the holistic communication network system connecting all of the campuses and centres in the 12 countries.

A brief review of the assistance that has been extended to USP by Japan may help with further analysis. As stated earlier, the grant-in-aid project *"University of the South Pacific Communication System Improvement Plan (completed in 2000)"* was implemented by the Japanese Government in collaboration with the Australian Government and the New Zealand Government. It enabled the use of satellite communications in the delivery of distance education to all 12 of the USP member countries for the first time. It was followed by the *"Project for Construction of an Information and Communication Technology Center at the University of the South Pacific (completed in 2008)",* one of the components of which was upgrading of USP's communication network facilities and equipment, which are managed by ITS. This project contributed to the strengthening and improvement of facilities and equipment.

On the other hand, the Technical Cooperation Project *"Project of the Information and Communication Technologies (ICTs) Capacity Building at the University of the South Pacific (2002-2005)"* provided technical assistance to develop and improve the computer science education programmes at USP in order to respond to the demands for ICT human resources in the region. There were components of this project aiming at the improvement of distance learning delivery methodology also in the area of computer sciences, but there were no other education programmes involved in these project activities. Computer science programme was only one of programmes which the USP actually offered for wide range of disciplines as a general university with variety of Faculties. Another Technical Cooperation Project, the *"USP-JICA ICT for Human Development and Human Security Project (2010-2013)"*, continued to assist in the development of education programmes and courses in the area of computer science. There was also a component for provision of satellite communication facilities (Ku band) with supplemental capacity development of ITS in the project. Furthermore, intervention in distance learning was conducted as well, wherein the use of Moodle as a learning management system (LMS) adopted by USP was promoted. The use of Moodle such as submission of assignments was confirmed during the field survey as well. However, this intervention did not include improvement of the quality of education through effective utilization of Moodle with expertise unique in eLearning, which is now desired to be assisted.

It is reasonable to believe that assistance for the improvement of the quality of distance learning by the establishment of an institutional framework with the CFL as a core section should come next after the above-mentioned projects, which are appropriate after completion of upgrading of communication facilities and equipment, strengthening the relevant technical sections, and establishment of the foundations for ICT human resources development through development of education programmes in the computer sciences in the past. This is consistent with the results of the SWOT analysis in the previous chapter.

Universities are generally given the mission of contributing to society through both education functions and research functions. The mission of the education function is to educate the populace and supply the necessary human resources for their society, and the mission of the research function is to develop and provide technologies, theories, etc. to contribute to their society. The following figure illustrates this concept.

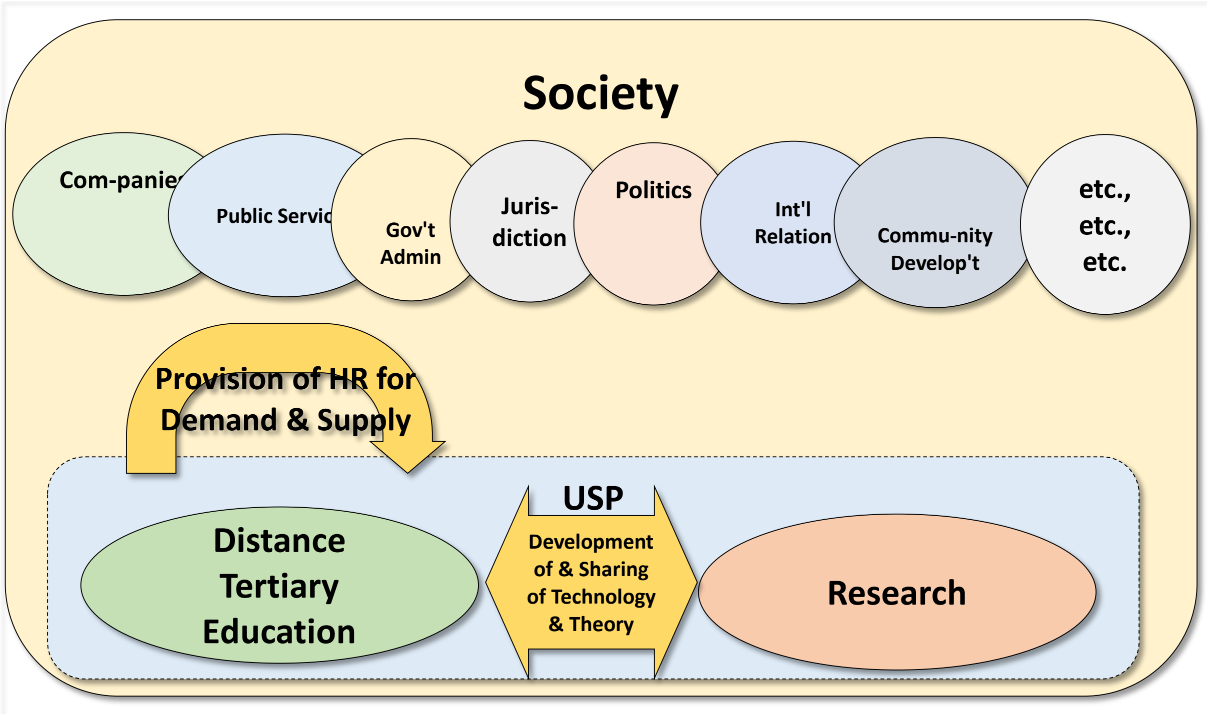


Source: JICA Study Team

Figure 3-1-1 Mission of Universities for Society in General

In other words, universities contribute to their society in two different ways, supplying of human resources and provision of research outcomes (such as technologies or theories).

For the purpose of analysis, we will focus on distance tertiary education here. USP itself is a distance tertiary education institution, and there may be human resources demands within USP; thus, technologies and theories in distance learning as outcomes of research activities could be used in the distance tertiary education offered by USP itself. USP thus has both aspects of providing education and of performing research in the field of distance tertiary education. Internal circulation of the two aspects within USP itself may be possible. The following figure illustrates the concept of education and research with a focus on distance tertiary education at USP.



Source: JICA Study Team

Figure 3-1-2 Internal Circulation of Distance Tertiary Education within USP

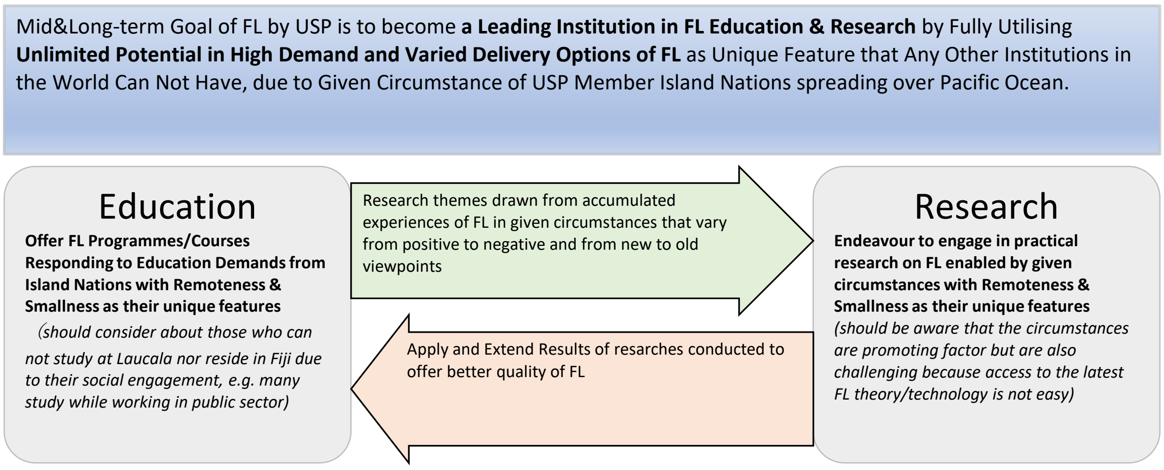
Revisiting USP's current practices, although distance tertiary education is offered for all 12 of its member countries, research in distance learning has not been highlighted either institutionally or strategically. The recently published "Strategic Plan for 2022–2024" describes research as a 2nd priority (Research, Innovation and Partnership), after education as the 1st priority. Although "education" here involves research in education as well, it basically refers only to research into basic education teacher training[92]. It is of course reasonable and necessary to continue to include this in USP's mid-term strategy since USP contributes to the supply of basic education teachers widely in the region through its teacher development programmes. However, the holistic research of distance tertiary education is currently not found at USP explicitly.

With this in mind, the Survey Team conducted two joint workshops with CFL staff.[93] Result of SWOT analysis on distance education offered by USP, which is output of the 1st workshop is shown in the chapter 2. As a result of 2nd workshop through discussions on findings including the SWOT analysis from the Survey Team and the experiences of CFL, it was concluded that research activities in the area of distance education based on field practices are necessary in order to improve the quality of distance education.

[92] It states "improving delivery of pre-service and in-service teacher training, and the development of innovative actions and interventions for the enhancement of educational opportunities and outcomes."

[93] The first workshop was held in Laucala main campus on Thursday, 2 December 2021, and the second workshop was held on Wednesday, 26 January 2022. See attached reports on the workshops.

Research will be first undertaken with themes possibly with the latest advanced technology derived from USP's education practice. Then possible application of approaches from the research outcomes in distance learning will be applied and extended within USP. For the distance education offered by USP, intervention by development partners is desired to create a synergy through institutional development to enhance positive spiral circulation between "distance education delivery and distance education research". In short, the future objective for the distance education offered by USP is to establish a reputation in the distance education community regionally and nationally as education and research institution in the area of distance education. The following figure depicts concept of this objective.



Source: JICA Study Team

Figure 3-1-3 Concept of Future Objective for Distance Education by USP

This future objective is feasible, as there already exist several entities within USP that provide the necessary resources to attain this vision, including ITS providing technical support in distance education, the School of Education where teacher education and research are undertaken, the CFL, which has staff who have expertise in distance education, and the School of Information Technology, Engineering, Mathematics and Physics, with a mandate to perform education and research at ICT. Although actual measures for the realization of the future objective are given after this section, three areas for intervention may be mentioned at this point: further strengthening communication-related facilities managed by ITS; development of new education programmes, possibly under the supervision of the School of Education, to produce human resources in distance education; and the addition to and strengthening of the research by CFL with new portfolio in distance learning, which is currently the main entity that provides support for delivery of distance learning.

This future objective is a joint proposal developed by CFL and the Survey Team through joint workshops. In due course, CFL submitted the reports of the workshops including the joint proposal to the DVC in charge of education who oversees CFL. CFL informed the Survey Team that DVC gave his feedback that "USP will review the report and consider possibilities for realizing the joint proposal by CFL and JICA Study Team."

3-2 Measures to Meet the Challenges Faced by USP's Distance Learning System

In this section, measures to meet the challenges faced by distance learning at USP will be discussed. The delivery modes for distance education described previously can be divided into two categories: print-mode delivery in which printed learning materials are shipped (posted) to students, and online-mode delivery in which satellite communication networks and/or the Internet via submarine fiber-optic cables are used. (Offline on-demand learning is included in the online-mode delivery category for simplification.) The challenges facing print-mode delivery include time spent for the shipping of printed materials, difficulties in providing timely instruction to students on difficult topics, and keeping up the motivation of students when they are learning alone without lecturers or a cohort of friends.

The online-delivery mode where electronical communication technology is effectively used, could in principle provide solutions to these challenges. In view of this, USP initiated conversion of delivery modes of existing courses into online mode with the Strategic Plan 2013 – 2018[94] under the former VC. However, the initiative didn't continue in the succeeding Strategic Plan 2019 – 2021. Trends of number of students by delivery mode is shown in the table below. The number of students with online mode and blended mode significantly increased from 2014 to 2018, but such increases are not observed after 2019. Face-to-face mode and print mode did not show indicative changes either.

Table 3-1-1 Trend of Numbers of Students by Course Delivery Mode (EFTS)

Mode	2014		2018		2019		2020		2021	
Face-to-face	7,153	49.2%	7,538	38.4%	6,913	36.9%	6,602	37.4%	7,199	38.7%
Blended	1,089	7.5%	4,492	22.9%	5,460	29.2%	4,733	26.8%	4,582	24.6%
Online	979	6.7%	3,252	16.6%	3,320	17.7%	3,432	19.4%	3,832	20.6%
Print	5,318	36.6%	4,341	22.1%	3,031	16.2%	2,893	16.4%	2,987	16.1%
Total	14,539	100.0%	19,623	100.0%	18,724	100.0%	17,660	100.0%	18,600	100.0%

Source: prepared by JICA Study Team from USP documents

A current USP teaching staff members in computer science who has an experience in online courses as a USP student in the past, reflected on the above initiative from 2013 to 2018 in Flexible Learning Footprints[95], 50 years anniversary publication of the USP in 2018. He stated, "Going back to my fully online courses, I see that due to connectivity issues, almost 40% of my students are unable to complete their course work components offered through Moodle. This causes unnecessary confusion and calls by students to switch back to either face to face delivery or print mode. However, I am now able to provide more online support via Skype and Moodle chat in my courses and though adoption is slow, students are beginning to realize its vast potential." It is understood that there were reflections on hurried conversion of delivery modes when an issue of online connectivity was persistent. It is inferred that conversion of delivery modes was not explicitly spelled out in the succeeding Strategic Plan due to

[94] https://www.usp.ac.fj/wp-content/uploads/2021/07/strategicplan2013-2018.pdf

[95] https://orep.usp.ac.fj/edu-sharing/components/render/bd95bfdf-5ff4-492d-a14a-400639af4c0f

implications gained by these experiences and reflections while it still emphasized improvement of online learning. The other member of teaching staff also stated in the publication that "DFL (Distance and Flexible Learning) education should be designed and purpose built, it was delightful to have the opportunity, resources and professional assistance to work up truly well-designed materials for conversion into print and other forms, and to be able to concentrate on using the interactive capabilities of Moodle for encouraging student engagement." It suggests the necessity of overall pedagogical reviews on course designs when converting to online delivery mode, such as learning material developed specifically for online learning or effective use of interactive functions of Moodle. Such tasks for adjustment of course contents to online learning assisted by CFL were not appropriately done due to insufficient resources for the hurried conversion. Further, the succeeding plan may be affected by surrounding environment for online learning such as poor connectivity, shortages of learning material development instruments or inadequate use of functions of Moodle.

The above implies that measures to deal with the challenges faced by online-mode delivery are necessary. Online-mode delivery has two aspects, the communication environment through which students connect to the learning environment, and learning design, which is about designing the environment so that students are able to learn effectively when connected to resources.

The former mainly requires improvement in hardware solutions such as communication facilities and equipment, and securing communication connections and digital devices for each student. In addition, there may be challenges in finding and sufficiently training staff to operate the hardware systems. Measures to meet these challenges are relatively simple, although there are possible limitations in funding. To address this, the new Strategic Plan96 and Annual Plan97 state inputs regarding these by own resources of USP.

Solutions to the challenges facing learning design must first address the setting up of software environments, such as the Learning Management System (LMS) and add-on applications, or adopting additional learning material development tools. USP is already using Moodle as an LMS, so that base environment is already in place. Necessary measures to improve this would include first identifying additional supportive applications , then installing them with the appropriate settings and customizations for Moodle and each user. At this stage, the facilities and software systems for learning material development may need to be prioritized.

Before the fire in the Communications Building in 2018, the CFL had been involved in education technology support for distance education for a long time (although its name has changed many times), so they did have the minimum facilities and equipment necessary for their effective work at that time. However, most of their facilities and equipment were lost in the Communication Building fire, as they

[96] Priority Area 5: Governance and Intelligent Use Of Resources, Objective 2: Provide an ICT platform for Digital Transformation to support world-class education, research and innovation and administration.

[97] The University has planned $2 million to continue implementation of the new computer strategy, establishing the right number and mix of student lab requirements, putting in more wireless provisions to facilitate the use of more laptops for students, and moving all staff to laptops to support a more open office concept.

had their offices there. Since then, the CFL has been forced to work without proper facilities such as their REACT room (real-time distance lecture delivery multicasting facility) or their soundproof studio for developing audio visual learning materials. These functions and many others have been moved to temporary workspaces, and the plan for the full restoration of these functions has not yet been decided upon, with options for inputs from donors still on the table. The decision for the actual plan for restoration must be made as soon as possible. In conjunction with this, assistance by JICA is proposed in the chapter 4.

Sections that can be involved in realizing the future objective for distance learning stated above already exist, so that composition of sections itself is not a challenge. Measures to be taken in the next stage would include establishment of a collaborative and complementary organizational framework for these sections, so that they can work together to realize the future objective. There is still a possibility that the capacities and experience of the staff as well as the number of staff in those sections will be insufficient for the realization of the future objective. Therefore, the capacities and experience of these staff member and sections need to be determined in order to assess the possible need for prior capacity development before commencement of the project.

3-3 Communication Environment Expected to be Required

In this section, the JICA Study Team examines the communication network environment that will be necessary to realize the future vision for distance learning described previously. As already mentioned, the communication environment for the 12 member countries of USP is already in place, but this section discusses possible further improvements.

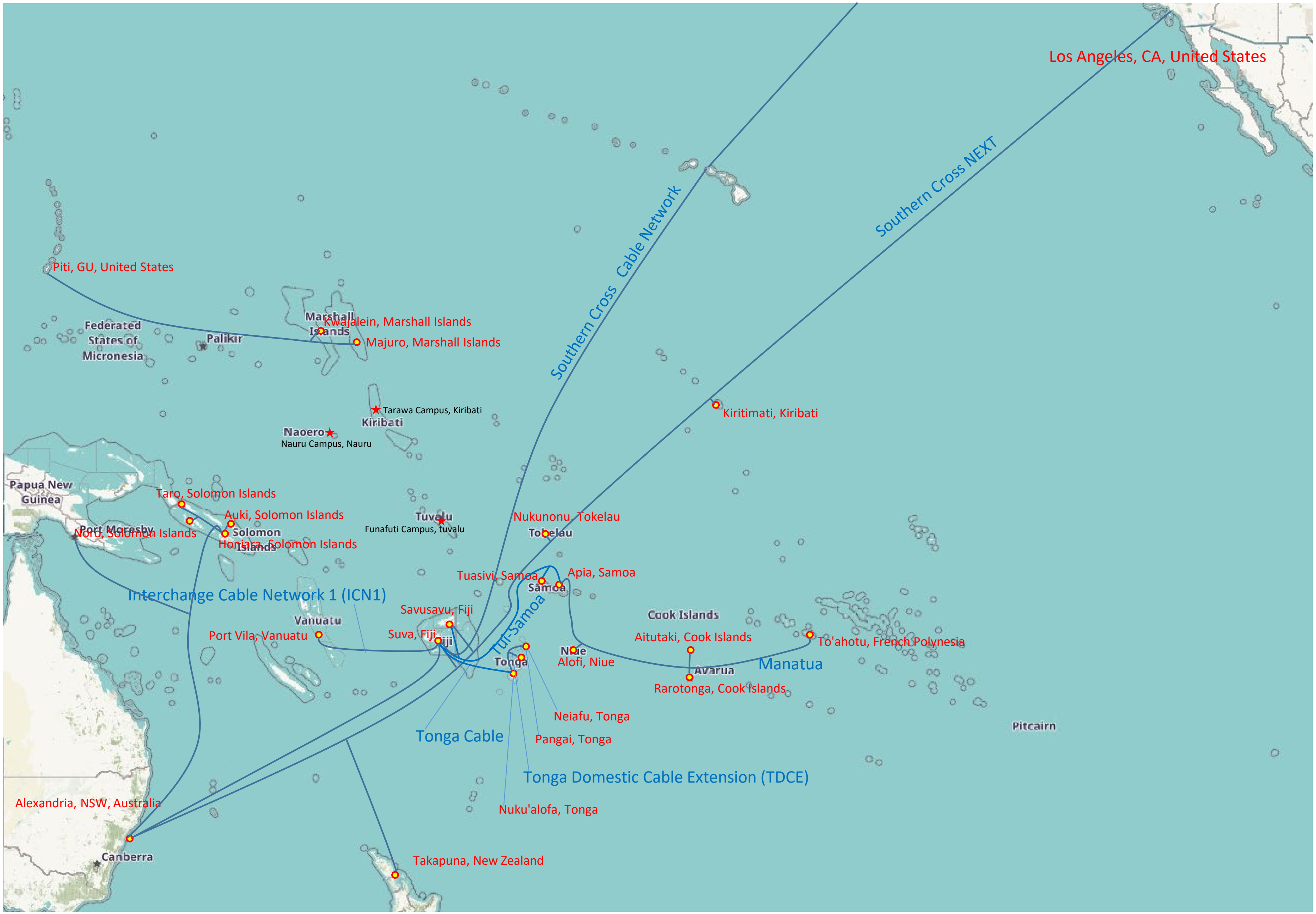
(1) Fiber-optic network

The status of fiber-optic cable installation for the 12 member countries of USP is shown in Figure 3-3-1. The installation of fiber-optic submarine cables is progressing in the South Pacific island countries, and will be completed for 10 of the 12 member countries of USP with the completion of the Southern Cross Next cable to Tokelau and Kiribati which is scheduled to start service in 2022. (The connections of the Southern Cross Next cable are to Nukunono Island, where Tokelau's Nukunono Centre is located, and to Kiribati's Kirisimati Island as for Kiribati, there is no connection to Tarawa, the capital city where the USP Kiribati campus is located.) These countries are expected to start providing broadband network services with Fiji as a hub, connected to Australia and the United States. The remaining two, Tuvalu and Nauru, will be connected. The World Bank decided in 2019 to provide Tuvalu with USD 29 million in support to improve Internet connectivity, including the installation of submarine fiber-optic cables, and the assistance from Japan, Australia and the United States is planning to install fiber-optic cables to Nauru and Tarawa in Kiribati. Thus, it is expected that all 12 countries will have broadband network connectivity via submarine fiber-optic cables in the near future.

However, these fiber-optic submarine cables are mainly routed to the islands where the capitals and major cities of each country are located, and there are no concrete plans to route them to other islands. Among the island countries of the world, the Pacific Island countries are characterized by the fact that they consist of many small islands and are scattered over a wide area. It is estimated that the cost of laying fiber-optic submarine cable is about 3 billion yen per 1,000 km, and the maintenance cost is said to be more than 100 million yen per year. Thus, it is expected to be some time before fiber-optic submarine cables are laid to places outside of the capital cities and largest cities of the islands.

As shown in Figure 3-3-1, which shows the status of fiber-optic submarine cable installation as of 2022 (including the provision of service to Tuvalu and Tokelau by the Southern Cross Next cable), there are no known plans for the installation of fiber-optic submarine cables to some of the islands where USP centres are located. Thus, although a broadband Internet environment is being developed in the Pacific Island countries with the laying of fiber-optic submarine cables, for the time being the USPNet satellite link remains essential infrastructure for USP's distance learning to remote campuses/centres. In particular, Ku-Band satellite links are important because of their small size and suitability for connecting small remote areas.

As described above, there is a trend to utilize broadband networks by fiber-optic submarine cable as communication infrastructure, but the importance of redundant lines as basic infrastructure has been re-recognized. In the USP, USPNet satellite links are important not only as a link to remote areas where fiber-optic submarine cables are not installed, but also in terms of securing redundant links to fiber-optic submarine cables. The USP, as a public institution, having its own communication link could provide a lifeline for the society of the affected area in times of disaster. In addition to its original contribution to society through education and research, the USP has the potential to contribute as a lifeline for communication in the future.

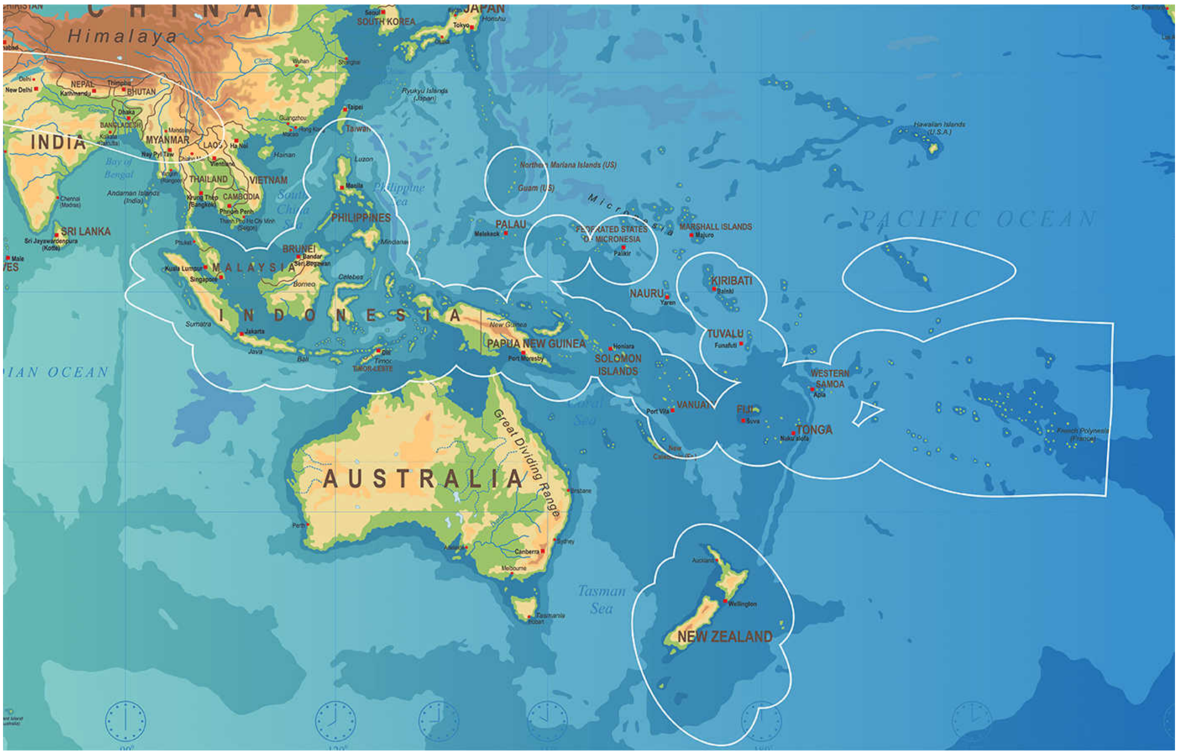


Source: JICA Study Team

Figure 3-3-1 Major Fiber-Optic Cable Installations for the 12 USP Member Countries

(2) Satellite communication（Ka-Band satellite communication）

While fiber-optic submarine cables are being laid in the South Pacific, Singapore's Kacific started providing Ka-Band communication services in 2020, with the aim of providing broadband networks to non-urban areas in the Asia-Pacific region. The receiving facility can provide up to 25 Mbps (20 Mbps downlink + 5 Mbps uplink) using a parabolic antenna of around 1 m. The figure below shows the coverage of Kacific's Ka-Band service, including non-urban areas, for the 12 member countries of USP.



Source: Website of Kacific (https://kacific.com/)

Figure 3-3-2 Ka-Band (Kacific1) Coverage

USP's distance learning communication network consists of submarine fiber-optic cable Internet links connecting major campuses in member countries, and C-Band satellite links and Ku-Band satellite links connecting smaller remote sites, to create a distance learning communication infrastructure. The C-Band satellite links use frequencies around 4-6 GHz and require relatively large parabolic antennas for reception, but have the advantage of being less affected by rainfall. On the other hand, the Ku-Band uses frequencies around 10–13 GHz and can be received with relatively small parabolic antennas, but is vulnerable to reception problems caused by rainfall. Ka-Band satellite links are also small, but use even higher frequencies and are considered to be even more sensitive to rainfall. A comparison table of satellite link systems is shown below

Table 3-3-1 Comparison table for satellite link

Frequency Band	Frequency(GHz)	Facility (Approximate Parabolic antenna size in the Pacific Region)			Signal weakening due to rainfall
C-Band	4-6	Large	Hub:	5 – 8 m	Small
			Remote:	4 – 6 m	
Ku-Band	10-13	Relatively small	Hub:	4 – 6 m	Relatively large
			Remote:	1 – 2 m	
Ka-Band	26.5-40	Same as Ku-Band			Large

Source: JICA Study Team

In conjunction with the use of broadband Internet provided by the installation of fiber-optic submarine cables, there is room for consideration of other options for communication lines outside of the urban areas.

(3) Communication cost comparison

Table 3-3-2 shows the actual communication costs paid by USP and the estimated unit cost per bit for each communication type. The unit cost per bit was calculated by dividing the communication cost by the sum of the data capacity of the lines included in each communication type; for AARNet and ISP, the data capacity is the capacity of the link between two points, but for satellite lines, it is the capacity of the hub station. Twelve remote stations are linked by the C-Band and seven remote stations by the Ku-Band. Considering that the coverage includes a large number of remote stations and areas where fiber-optic submarine cables have not been laid, the unit cost of communication is reasonable.

Table 3-3-2 USP's Communication Cost and Estimated Bit Cost

Connections	Fee/year (FJD)	cost/ bit	Band width (Mbps)			Remarks
			Total	Up	Down	
AARNET Connectivity & Usage	673,223	1,499	500			
			200	100	100	Connection between **Laucala Campus** and AARNET
			200	100	100	Connection between **Tonga** Campus and AARNET
			100	80	20	Connection between **Marshall Is.** Campus and AARNET
FINTEL Gateway Charges	76,501					
Regional WAN - Satellite Capacity	1,694,611	13,035	130			
			107	90	17	C-Band (JCSAT-2B 154 Deg East, 50Mhz)
			23	21	2	Ku-Band (IS-18 180 Deg East, 10MHz)
Regional WAN - Submarine Fibre Optic Links (PTP) & ISP Links	1,393,771	5,361	260			
			30	22	8	Internet connection for **Alafua Campus/Samoa**
			100	80	20	Internet Connection for **Emalus Campus/Vanuatu**
			130	100	30	Internet Connection for **Slomon Is. Campus/ Slomon Is.**
Regional WAN - Fiji Campuses	361,183	2,580	140			
			40	20	20	Internet Conection for **Labasa Campus (MPLS Telecom Fiji)**
			20	10	10	Internet Connection for **Savusavu Centre(MPLS Telecom Fiji)**
			80	40	40	Internet Connection for **Lautoka Campus(MPLS Telecom Fiji)**
Telephony -TFL, Vodafone, Digicel	102,500		-	-	-	The cost for students to access USP servers in Fiji via Vodafon and Digicel at free of charge.
Total	**4,301,788**					

FINTEL: Fiji International Telecommunications Limited

FINTEL provide USP with Southern Cross Cable Network (SCCN) Capacity and Network Access services which include landing capacity and facilities interconnection services.

On the other hand, if contracts with ISPs are to be promoted in the future in conjunction with the laying of fiber-optic submarine cables, a separate contract will be required for each link to an individual base, which will also incur costs. Since satellite links cost money regardless of the number of remote stations, increasing the number of ISP contracts while still using satellite links will increase the cost.

In addition, when considering the enhancement of the communication network, it is necessary to consider the overall balance with respect to transmission capacity. As mentioned above, the communication network is currently configured with the Laucala main campus in Fiji as the hub. If the communication network of each campus/centre other than the main campus is switched to a broadband network provided by an ISP, an increased amount of communication data will be sent to the hub station at the Laucala main campus. Therefore, the communication network of the hub station at the Laucala main campus will need to be further enhanced in line with the enhancement of the communication network at each campus/centre. As for the construction of the communication network, in the case of the fiber-optic network, a contract with an ISP is required for each connection link, which also incurs its own costs.

Thus, as communication network infrastructure to support USP's distance learning, the current configuration of using broadband Internet lines via fiber-optic submarine cables and USPNet satellite links for sites outside the broadband service area is considered to be a reasonable solution.

3-4 Framework for Realization

In order to realize the future objective, it will be necessary to review the existing internal institutional framework to establish a collaborative and complementary framework for the various departments involved.

For ITS, given that its mandate for technical operations and maintenance of communications facilities and hardware systems is relatively clear, its role would simply need to be clarified during the initial planning stages of any activities being implemented to realize the future objective.

For the School of Education (SoE), a thorough discussion of the institutional framework among stakeholders will be necessary, as the SoE does not currently offer holistic education programmes for distance learning nor does it engage in research as priority area in distance learning. There are options other than involving the SoE in the institutional framework, taking into consideration its given mandate as well as its organizational culture. Another option may be giving the CFL the function of an education institute and allowing it to offer a newly developed education programme in distance education. This programme could be a postgraduate programme, and not necessarily be offered as an undergraduate programme. It would be productive to discuss all of the possible options for the involvement of the SoE that are on the table flexibly and without bias among all of the internal stakeholders, as various factors may have an influence, such the SoE's organizational culture, their accumulated experience, and the mandates currently in place from USP management. The same procedures for consultative discussion given above should be used for consideration of the involvement of the SoE in research in distance education.

The CFL seems to be the most appropriate section to lead the quality education and research in distance learning, considering its accumulated experience and the expertise of currently assigned staff.

Finally, the current activities of the School of Information Technology, Engineering, Mathematics and Physics seem to include technical research and development in the relevant areas, so that it would not be too difficult to involve them if agreement among stakeholders is reached at an early stage.

The involvement of the internal departments of USP in the realization of the future objective has been discussed so far. To initiate this realization, the proactive participation of all three Deputy Vice-Chancellors (DVCs) will be a key factor, namely the DVC for Education (the current appointment is as acting), the DVC for Research and Innovation (currently vacant), and the DVC for Regional Campuses and Global Engagement, with whom regional students who are recipients of distance education are registered.

Next, the external framework will be given. Although USP already has various elements relevant to distance education internally, USP must still be institutionally exposed to external development in order to gain the latest information and present what is happening in the Pacific to the world, since the technologies and theories in the area of distance learning make frequent progress, driven by developed countries. This understanding that the development of distance education cannot be simply carried out within USP only must be shared as the basis of the future objective. An external framework that is worth considering is the collaborative partnership with Kumamoto University (KU) in Japan that dispatched academic staff for capacity development in distance learning in the previous JICA Technical Cooperation Project mentioned earlier. The terminal evaluation of the previous project recommended the establishment of a partnership between USP and KU by such means as signing an MoU after the completion of the project. This partnership has not yet been realized, however, though it is not due to any serious obstacles, but simply because the recommended partnership was not in the original project design and there was no systematic monitoring system in place for such recommendations in the terminal evaluation after the end of the project. It should be possible to establish such a partnership between the two universities with support from JICA and the Ministry of Foreign Affairs of Japan.

It is also important to actively participate in international societies and associations of the distance learning community to achieve mid and long-term development goals. KU could advise USP in such attempts by drawing on their existing relations with various organizations globally.

3-5 Feasibility of Including Support from Other Donors

As described in Section 2-2, development partners/donors such as New Zealand, Australia, ADB, etc. had provided support not only for capacity building, but also for construction of new campuses and procurement of satellite communication equipment. Therefore, if the project proposed in this report is consistent with the cooperation policy of the donor, they may be able to provide support.

3-6 Steps Toward the Realization of the Future Objective

As stated so far, various activities need to be planned and implemented to realize the future objective. The expected steps to be followed are outlined below.

Step 1: Short-term recommendations for USP

In order to design a detailed plan for realization of the future vision for USP, further information that could not be obtained in the field survey due to its limited duration and timing needs to be collected and thoroughly analyzed. This will be elaborated on in Chapter 6.

Step 2: Development of facilities

Issues of facilities and hardware identified in this Survey as well as the short-term recommendation for USP in Step 1 above should be addressed first. Because the field survey was only conducted in Fiji, issues related to communication that are common among or unique to the other 11 USP member countries should be compiled and addressed at an early stage.

Further, the office space and facilities for distance education where CFL was able to exercise its specialty function that were lost in the fire need to be recovered urgently. It would be quite effective for Japan to address this urgent issue through a grant aid scheme. Details are described in the following chapter.

Step 3: Detailed project design and preparation of establishment of institutional framework

Considering all of the assistance extended by Japan to USP in the past, it is most appropriate for Japan to assist USP with the implementation of a Technical Cooperation Project in order to realize the future objective. Prior to the implementation of the project, a field survey to form the details of the design of the project should be conducted. During the detailed design survey, the need to establish an institutional framework (as stated earlier) needs to be explained in order to obtain understanding and commitment to action from USP.

Step 4: Intervention by implementation of the Technical Cooperation Project

When all of the above steps are completed (the earlier the better for USP), experts should be dispatched to help USP develop the capacity in education and research in distance education through the implementation of a Technical Cooperation Project. In the meantime, mid- and long-term strategies should be developed and shared through continual discussions among stakeholders, and these strategies and discussions should be incorporated into the official planning documents and USP's budgetary planning as preparatory actions. It would be effective to first implement development of distance education research capacity and conduct intensive research, and then to implement development of education programmes for human resources development in distance education.

Starting with conducting intensive research is strategically rational as well, because it would be reasonable to first conduct research into advanced technologies because there may already be much existing research on widely used existing technologies and some of those existing technologies may disappear from the education market soon illustrated in the figure in the right. On the other hand, it would also be reasonable to adopt existing technologies that are commonly used and extend widely in distance learning in USP, because advanced technologies may have little preceding practice to learn from and may also be costly. Therefore, it would be appropriate that circulation between education and research starts from pilot verification with advanced technology as the research theme and then apply the lessons learned from the research to USP's education practices.

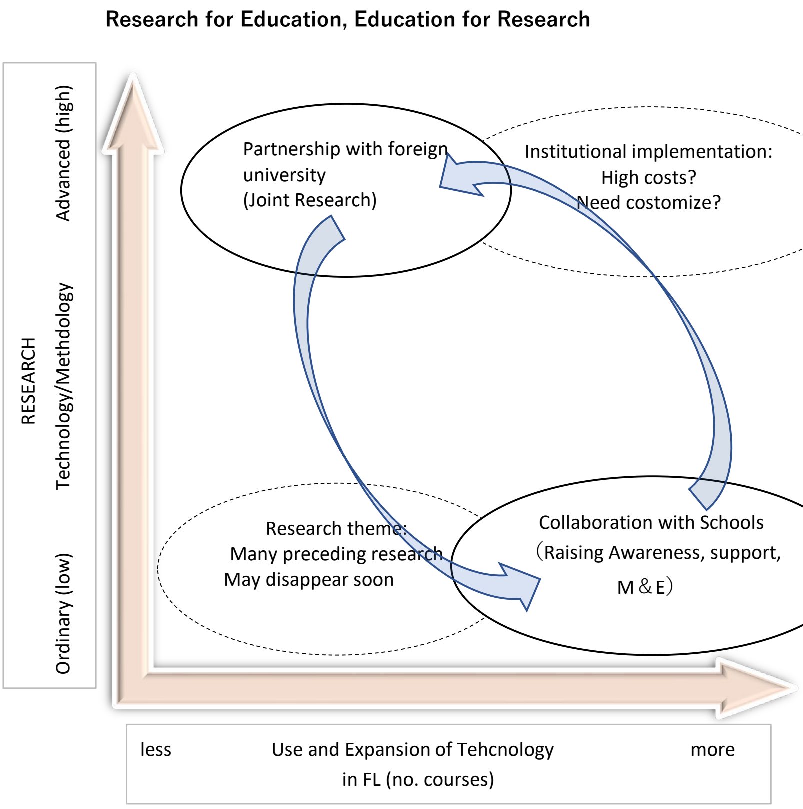


Figure 3-6-1 Flow of Research in Technology and Application of Research Results

Step 5: Establishment of sustainable framework after completion of the project

When all of the above steps are successfully completed, it is expected that USP will be better recognized as an institution of distance education practice and research. To further develop their reputation, USP should continue to strengthen their partnerships with universities in Japan as well as their participation in international societies.

CHAPTER 4 RECOMMENDATIONS FOR COOPERATION BETWEEN JICA AND USP

Chapter 4 RECOMMENDATIONS FOR COOPERATION BETWEEN JICA AND USP

4-1 Infrastructure-Related Support

In order to overcome the above-mentioned issues and to realize the future objective for the distance learning system, the Team proposes that JICA should provide infrastructure support to USP in the form of constructing a communications building and implementing a secondary hub station, as outlined in the following two sections.

(1) Construction of a communications building

Prior to its loss, the Communications Building was an important part of USP's student support and distance education programs, and it is essential for the realization of the above mentioned future plans. In addition, after the fire in 2018 as described below in "a) Current operations", the various departments that were housed in the building were forced to operate in a dispersed and reduced space that has been reduced to less than half of its original size, and use REACT in a dispersed conference room in a separate building, which is functionally restricted thus, speedy restoration is necessary.

a) Overview of the Communications Building before burning down

The Communications Building was a three-story reinforced concrete structure, and each floor had a floor area of approximately 1,000 square meters. The completed drawings are shown below.

The departments that were housed in the Communications Building are as follows:

3rd floor: CFL (Centre for Flexible Learning); support for planning and implementation of distance education
2nd Floor: CFS (College of Foundation Studies); university prep department[98]
1st Floor: SAS (Student Administration Service); student support services such as course registration

The CFL had two REACT rooms on the third floor, as well as a 40-square-meter soundproof recording studio with a sub-control room for recording. It also had an annex called the Media Annex, which was used as a multipurpose hall. The annex was saved from destruction, but is now being used as office space for departments other than the CFL and will not be able to return to being used as it was.

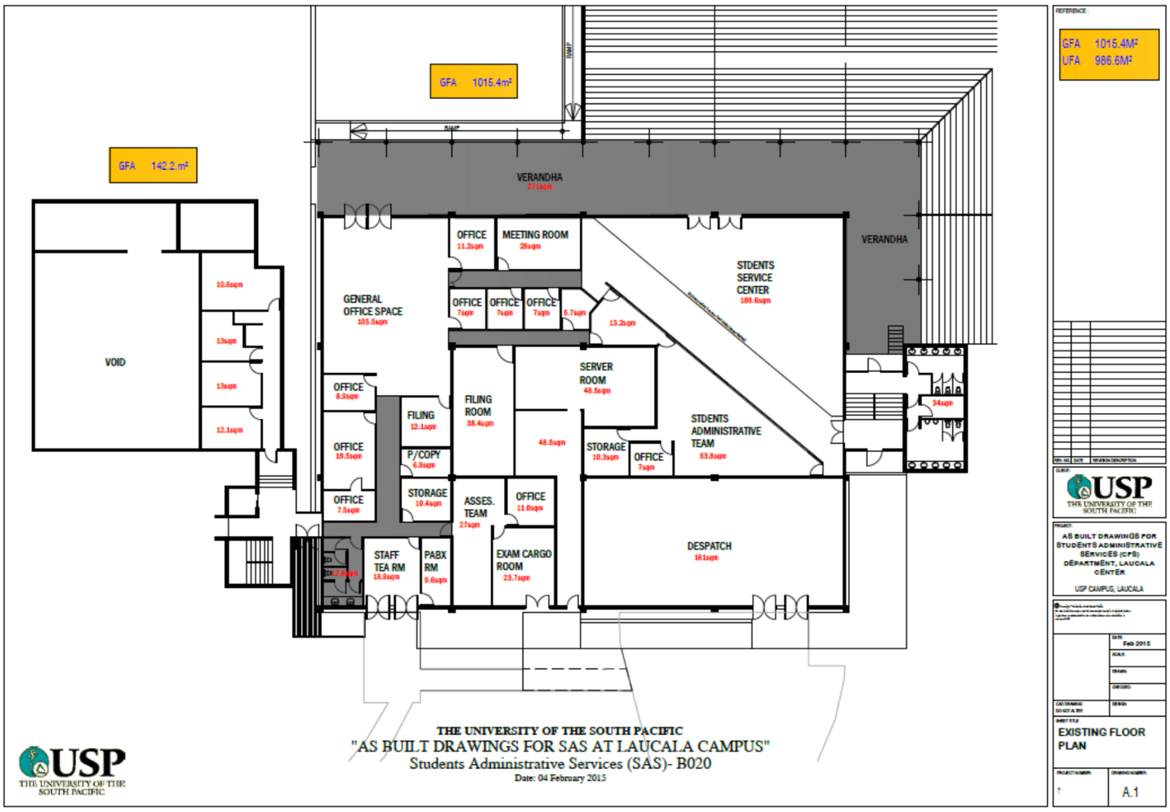
[98] In the new structure starting in 2021, the department will be merged with the Technical Education and Training Department to become the department in charge of pre-college equivalent courses offered by the Pacific TAFE Department.

Source: USP

Figure 4-1-1 3rd Floor Layout (CFL)

Source: USP

Figure 4-1-2 2nd Floor Layout (CFS)



Source: USP

Figure 4-1-3 1st Floor Layout (SAS)

b) Current operations

The CFL, which occupied the third floor of the Communications Building, now occupies the building next to the ITS building, which was originally used as the Education Curriculum Response Centre of the School of Pacific Arts, Communication and Education. The Media Annex, which used to be a multi-purpose hall, is now unavailable as it is being used as an office space for other departments that lost their space in the fire.

A conference room in the building where ITS is located is being used for REACT. The function of the recording studio has been lost, which hinders the creation of content for educational materials.

The CFS from the second floor and the SAS from the first floor are also being operated in reduced office spaces dispersed throughout the campus. Before the fire, the operations of the SAS had already been dispersed around the campus and were not limited to just the Communications Building, but the destruction of the Communications Building has nonetheless disrupted it provision of services to students.

c) Outline of the proposed reconstruction of the Communications Building

Beyond simply restoring the building to the same scale as the previous Communications Building, additional functions necessary for current operations and for realization of the future vision mentioned above will be considered. It is assumed that the new building will be 20% larger than the lost Communications Building, i.e., it will be a three-story building with about 1,200 square meters on each floor. There will also be additional functions included in the new building. An overview and priorities are shown in the table below.

Table 4-1-1 Overview and priorities for communication building

Floor	Main rooms and functions	Priority
3rd (CFL)	CFL office Small rooms (approx. 12㎡) 20 rooms Middle rooms (approx. 15㎡) 4 rooms Large rooms (approx. 20㎡) 2 rooms CFL office area (approx. 200㎡) Meeting room (approx. 40㎡) 1room REACT room（approx. 12㎡) 4rooms Large Studio with control room (approx. 80㎡) Small Studio with control room (approx. 60㎡) Others (Corridors, toilets, etc.)	High
2nd (CFS)	CFS office Small rooms (approx. 12㎡) 20 rooms Middle rooms (approx. 15㎡) 4 rooms Large rooms (approx. 20㎡) 2 rooms Computer Lab (approx. 120㎡) 2 rooms Teaching assistance office area (approx.. 200㎡) Meeting room (approx. 40㎡) 2rooms Reception（approx. 50㎡) Meeting space (approx. 20㎡) Others (Corridors, toilets, etc.)	Middle
1st (SAS)	SAS office Small rooms (approx. 12㎡) 10 rooms Middle rooms (approx. 15㎡) 2 rooms Large rooms (approx.. 20㎡) 2 rooms Student Service centre (approx. 200㎡) Student Administrative area (approx.. 100㎡) Server room (approx. 50㎡) Staff area (approx. 150㎡) Meeting room (approx. 40㎡) Others (Corridors, toilets, etc.)	High

Source: JICA Study Team

- **Studio facilities**

The Communications Building before its demise was equipped with a 40-square-meter soundproof studio, but with future content production using virtual reality (VR)[99] technology in mind, a main studio of about 50 square meters and a smaller studio of about 30 square meters has been proposed.

For the main studio, a soundproof studio with a 50-square-meter studio floor and a 30-square-meter

[99] A technology that allows users to feel as if they are actually in a space by using special goggles to project a 360° image that covers the human field of vision.

sub-control room was proposed in order to handle a virtual studio system in which the background is replaced with computer graphics and in order to expand the degrees of freedom in content production. For the studio floor, we propose to secure a ceiling height of two floors to increase the flexibility of production and to install a full lighting system that will greatly improve the quality of the content. For the small-scale studio, we propose a 30-square-meter soundproof studio floor and a 30-square-meter sub-control room with a ceiling height of one floor and simple lighting.

USP provides distance learning to 12 member countries, and research on improving the quality of distance learning is being conducted, but there is still room for improvement in terms of learning content. It is hoped that the use of these studios and the creation of learning content that makes full use of video will contribute to improving the quality of distance learning.

- **Recovering and enhancing the REACT room**

As mentioned in section 2-3-1(2)b), access to the Laucala main campus is restricted due to the coronavirus pandemic, and the use of REACT for two-way real-time communication in distance education has been replaced by Zoom. However, a system that can efficiently realize two-way real-time communication between the REACT system on the hub side and the REACT system on the remote campus/centre side with limited data transmission capacity is very useful. Given that this is the state of the current communication infrastructure at each campus/centre, the effective use of REACT is important for USP. However, only two REACT rooms are currently available to deliver lectures at the Laucala main campus. Yet, with the increase in satellite link capacity, the number of lectures through REACT that could be conducted at the same time has doubled. Thus, it has been proposed to build two additional REACT rooms. Faculty members commented in interviews that when REACT was in operation before the coronavirus pandemic, it was difficult to get reservations for the REACT rooms, so additional REACT rooms are essential to overcome this problem.

- **Expansion of distance education research**

The CFL is the centre of planning and implementation support for the realization of distance learning in the challenging environment of the 12 USP member island countries. After strengthening the research function in the distance learning system, as mentioned in the plans in Chapter 3, it will be important to expand distance learning research with a view to establishing an independent distance learning research centre in the future, in order to sustain and expand the results of the Technical Cooperation Project and to promote research on distance learning systems in harsh environments.

Reconstruction of the Communications Building will contribute to the expansion of distance learning research at CFL, as it acts as a direct counterpart to the Technical Cooperation Project on distance learning.

In line with the above Communications Building reconstruction, the following projects are proposed to realize the future vision for the distance learning system, to overcome the challenges facing USP, and to expand distance learning.

Project 1: Renewal of Ku-Band satellite facilities

As explained in Chapter 2, the USPNet C-band system, which was first built with the support of Japan, Australia, and New Zealand, has been updated with the support of New Zealand, but the outdoor equipment of Ku-Band system, which was also introduced with the support of Japan, has been in place for 12 years and needs to be updated, as the typical update cycle is about 15 years. Although plans are underway to lay fiber optic submarine cables to Nauru and Tarawa in Kiribati, in a situation where no concrete plans can be confirmed for the laying of optical submarine cables to the islands where small remote centres are located, satellite links remain very important for the time being.

Having distance learning infrastructure at small-scale learning centres greatly contributes to bridging the digital divide. The transmission capacity for these centres can also be expanded as equipment is upgraded.

Project 2: Improvements to the REACT system

REACT is currently in operation using multicast technology to realize two-way real-time communications on satellite networks with limited transmission capacity. However, as time has passed since its introduction, there is still room for improvement in the user interface. For the time being, it has been proposed to update REACT, which plays an important role in distance education in an environment with limited transmission capacity.

Project 3: Integration of SAS (Student Administrative Services)

At USP, SAS is a large organizational unit that provides all administrative services related to students, such as enrollment, course registration, student information record management, examination administration, and completion and graduation related services. Even before the fire that destroyed the Communications Building, the functions of SAS were not integrated but rather were scattered throughout the campus, but after the fire, they became even more scattered, hindering the provision of services to students. SAS is the first point of contact with USP for students, and is their portal of entry. It is proposed to centralize this function and to integrate the other distributed functions of SAS to increase convenience.

In the 2021 Annual Plan of the Asset Management Division of USP, which was introduced in Chapter 2, “Education” is given as the first priority area. Under this heading of “Education”, there is a description of this new construction plan for SAS at the top of the list of further planned projects, and a master plan has already been prepared by an engineering consultant. However, since it is expected to be a large-scale project, there is still no prospect of raising funds to implement it.

(2) Establishment of secondary hub station

As shown in Figure 2-3-6, the USP communication network consists of a WAN via the Internet and a USPNet satellite WAN centred on a hub station at the Laucala main campus.

In USPNet, both the C band and the Ku band are centred on the satellite hub station at the Laucala main campus. All network access, including the connection between the two WANs and the Internet connection from USPNet, is through the Laucala main campus.

In addition, all services provided by USP are hosted by the data centre on the Laucala main campus. As mentioned in Chapter 2, the hub station network and data centre facilities have redundancies and are equipped with an uninterruptible power supply, ensuring a high reliability as infrastructure for providing distance education to the 12 USP member countries.

However, if the hub station is damaged by a natural disaster, the entire network infrastructure will cease to function. Countries in the Pacific region, where the Laucala main campus is located, need to be prepared for earthquakes and tsunami disasters, as evidenced by the underwater volcanic eruption in Tonga on January 15. From a business continuity plan (BCP) perspective, the construction of a secondary hub is proposed to maintain the network infrastructure in the event of a disaster and to enable early recovery.

When considering a candidate site for a secondary hub, broadband access via fiber-optic submarine cable is a mandatory requirement, but in addition, less vulnerability to natural disasters is also an important factor. The Tonga campus was connected by broadband line via AARNet, but there are concerns about the vulnerability of the campus due to the undersea volcanic eruption and tsunami mentioned above. USP has suggested the Alafua campus in Samoa as a candidate. A connection via fiber-optic submarine cable has been secured, but the current capacity is 30 Mbps (total for both directions), which is insufficient for a hub station. The capacity can be increased by changing the contract with the ISP. Further study is needed to determine candidate sites for the secondary hub station.

(3) Estimated budget cost

The table below shows the estimated costs for infrastructure-related support shown above, as well as important assumptions regarding each item, matters that need to be confirmed for project formation, and expected outcomes.

Table 4-1-2 Estimated costs and expected outcomes of infrastructure-related support

No.	Items	Estimated costs	Important assumptions and matters that need to be confirmed	Expected outcomes
1	Construction of a communications building * Refer to 4-1(1)	Total amount of the support: 1,420 mil JPY (=①+②+ Contingency budget 5%) Breakdown ① Construction cost: 1,152 mil JPY (=320 K JPY (price per square meter) x 3,600m^2) ② Consulting Service fee: 200 mil JPY In the case of loose ground at a level that requires pile work or large-scale development, an estimated additional 100 million JPY will be added to ① above. Elevators cannot be confirmed in the burned building, but if necessary, add about 20 million to ① above.	It is assumed that construction will take place at the existing building location, but if construction is to take place at a different location, the location must be determined and a ground survey conducted.	Improving the quality of distance learning offered by USP and expanding distance learning research
2	Renewal of Ku-band satellite facilities * Refer to 4-1(1) Project 1	Total amount of the project: 83 mil JPY (=①+②) Breakdown ① Outdoor equipment for Hub station : 20 mil JPY ② Outdoor equipment for remote stations : 63 mil JPY (=9 mil JPY (unit price for each remote station) x 7sites)	It is necessary to study the link budget by the satellite communication service provider in conjunction with the improvement of outdoor equipment, and to study the enhancement of data transmission capacity by increasing modulation, etc. When renewing parabolic antennas, it is necessary to confirm whether the existing foundation can be used.	Improving the reliability of aging satellite communication facilities
3	Improvements to the REACT system * Refer to 4-1(1) Project 2	Total amount of the project: 9.9 mil JPY (=①+②+③+④+⑤) Breakdown ① requirement definition: 1.5 M/M(SE) 2.4 mil JPY ② Design: 1.5 M/M (SE) 2.4 mil JPY ③ Programing: 3.0 M/M (PG) 3.0 mil JPY ④ Test: 1.5 M/M (PG) 1.5 mil JPY ⑤ Installation: 0.5 M/M (SE) 0.6 mil JPY	Confirmation of the use of the intensive learning system using satellite links with limited data transmission capacity	Improving the quality of distance learning using the intensive learning system
4	Integration of SAS (Student Administrative Services) * Refer to 4-1(1) Project 3	Included in above No.1	Organize the services that SAS offers that will be integrated.	Improve services provided by USP to students
5	Establishment of secondary hub station * Refer to 4-1(2)	Total amount of the support: 1,200 mil JPY (=①+②+③) Breakdown ① C-Band, Ku-Band satellite link hub system equipment (Outdoor/Indoor) (600mil JPY) ② Data centre equipment (420mil JPY) ③ Constriction of the building (180mil JPY)	Status of data line by fiber optic submarine cable, less vulnerable to natural disasters	Improving the reliability of USP communication infrastructure against natural disasters

Source: JICA Study Team

4-2 Technical Cooperation Assistance

The future mid- and long-term objective for USP stated in the previous chapter is to gain regional and international recognition in the distance education community as an education and research institution in the area of distance education. USP, with its unique circumstances as a university with 12 island nation members spread out in the Pacific Ocean, already has the necessary organizational features to realize this objective, such as CFL and ITS, which together have been leading and supporting distance education, and schools such as the School of Information Technology, Engineering, Mathematics and Physics and the School of Education, each of which may contribute to the development and delivery of distance education. In order to initiate endeavors to achieve this objective, however, it is crucially important to bring in and absorb external expertise so education and research activities can be conducted based on the establishment of firm relations with external supporting institutions. With this in mind, assistances to be extended by the Government of Japan are proposed below.

(1) Technical Cooperation Project

One possible indicators for gaining recognition as an education and research institution may be to join an international society or association related to distance education and actively present research papers. Taking into consideration that strengthening research capacity by intensive new recruitment of researchers is not realistic in view of the current state of financial management status of USP, USP should instead find opportunities to establish collaborative relationships with international institutions such as universities that are active in education and research in the area of distance education and to gain knowledge and skills for research activities from external research expertise by possibly using USP campuses as fields of practice of distance education in education research, so that USP's research capacity in distance education will be steadily enhanced and the future objective described in Chapter 3 can be achieved.

Moreover, it would be ideal to create a supportive implementation environment to achieve the future objective for USP's distance learning, such as an accountable but flexible financial management system which enables prompt and timely procurement of relatively small items, for instance additional peripheral equipment or PC applications for teaching and learning material development. It may be difficult to amend original specifications to adjust to findings in the middle of activities in the relatively large-scale infrastructure development projects described in the previous section. Also, flexible and prompt decision-making procedures are desired, as these would enable immediate action to be taken to handle problems that generally emerge specially in the early stages of project implementation that would usually have to be handled in lengthy procedures within rigid systems managed and regulated by the USP Senate in general USP research activities not in special projects.

Considering all of the above, it is highly reasonable to provide technical assistance to help realize the future objective for USP's distance education through JICA's Technical Cooperation Project scheme. In Japan, there are universities that have expertise in distance education and which are actively participating in international societies and recognized by community related to distance education. The Technical Cooperation Project scheme may create an ideal implementation environment with prompt decision making on small-scale procurements and minor amendments of project activities. In addition, JICA has ample experience in providing assistance for USP's distance education. The accumulated experience in partnering USP with Japanese resources well recognized by USP suggests good advantages of assistance to be extended by JICA in this area.

Based on the above, a draft of the framework for the Technical Cooperation Project to assist USP in achieving the future objective for distance education is given below. Please note that the draft project framework is based on information collected through this Survey. There should be further detailed information gathering and in-depth analysis with flexible approaches for improvement if the following designs are considered for actual implementation.

Draft Technical Cooperation Project

Title (tentative): Technical Cooperation Project for Research Capacity Development in Flexible Learning at USP[100]

Super goal:

USP contributes to human resources development first regionally and then internationally through its education and research activities.

Overall goal:

Human resources developed through education and research of USP contribute to respond to demands of highly trained human resources by the Pacific region through support for tertiary education institutions including USP in provision of quality education and research.[101]

Indicator 1: USP present papers at international societies x time a year.
Indicator 2: USP offers master's (PhD) degree programme in flexible learning.

Project purpose:

USP responds to demand for highly trained human resources by the Pacific region by improving and strengthening exiting education programmes through research in flexible learning

Indicator 1: The CFL of USP conducts X research (target number to be decided) on flexible learning, including field activities piloting in USP campuses and centres in the 12 USP member countries, with special emphasis on their unique features as island nations, and present Y times (target number to be decided) their findings internationally.

[100] Alternative title may be "Project for Strengthening the Flexible Learning of USP through Research Activities"

[101] The term "flexible learning" is used here because that is standard term for USP for "distance learning", although "flexible learning" may refer to a wider range of types of learning than "distance learning" depending on a context.

Indicator 2: The CFL of USP, together with the relevant schools of USP, offer flexible learning to meet the needs of students with pass rate as Y% (target number to be decided) and average grade Z% (target number to be decided) for selected X programmes (target number to be decided).

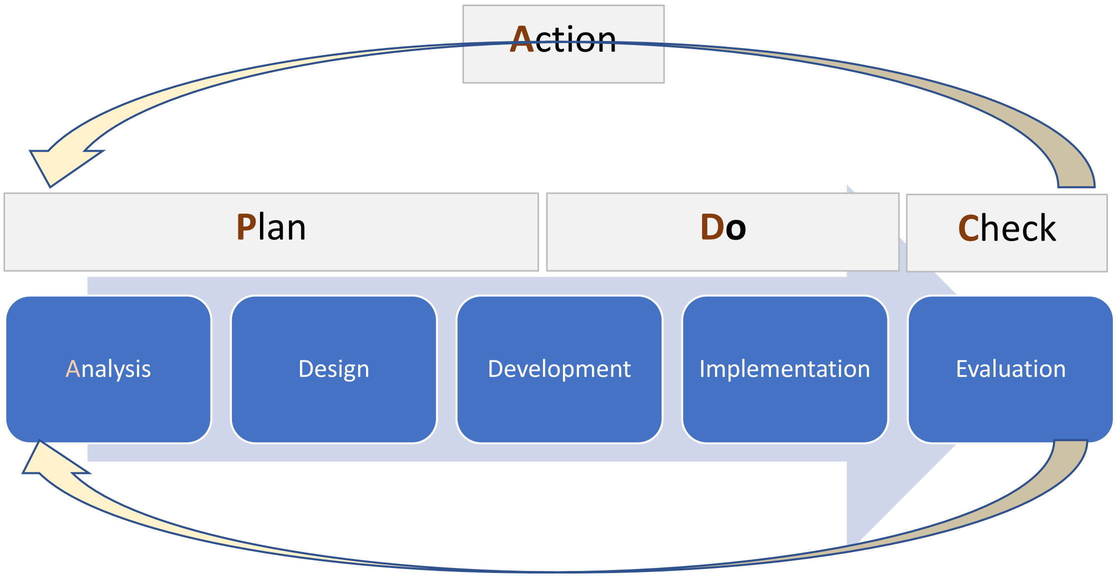
Outputs

Title	Output	Indicators
1. Research Plan	Set and agree in appropriate research themes in selected pilot programmes for each of the following five steps of the ADDIE Model	Themes for research of X (target number to be decided) education programmes are selected and approved by the Senate
2. Analysis	The CFL takes part in analysis of the need for education programmes with expertise in learning design	Gap analyses report is prepared to analyze gaps between demand from the society and contents of current education programmes
3. Design	The CFL is given a mandate for advisory and confirmation in the production of the learning design framework (objectives and assessment) of education programmes	Course descriptors of the selected education programmes are revised based on the gap analysis
4. Development	The CFL support teaching and learning material development that effectively utilizes authoring tools	Course material are developed with use of new functions of authoring tools either newly introduced or existing
5. Implementation	The CFL advise in learner support based on data on learnings of learners (formative assessment of delivery (implementation) of 15- (or 30-) week courses)	Responses of positive reaction exceed xx% (target number to be decided) in evaluation of user support by students
6. Evaluation	The CFL advise on the use of the results of the learning evaluation are to be used in the next step (registration of courses of next level in the following semester, participation in labour market, etc.) (formative assessment)	Responses of positive reaction exceed xx% (target number to be decided) in evaluation of portfolio application[102] by students
7. Research Papers	The CFL present research papers international society	Themes for research of X (target number to be decided) education programmes are selected and approved by the Senate

The ADDIE Model, which stands for analysis, design, development, implementation and evaluation, is applied in the Output from steps 2 to 6. It is a common concept in instructional design and is often used in distance education, though it is a general theory and may be used in any type of education and training. It is sometimes described as a PDCA cycle[103] for education and training. The ADDIE Model is used here to categorize elements of the education and training cycle, although there are some new theories and models proposed for education and training that include a timeline. The following figure visualizes the concept of the ADDIE Model in comparison to the PDCA cycle.

[102] Mahara can be used for it has been already introduced at USP.

[103] The plan-do-check-act cycle for carrying out change, often used in business for the continuous improvement of processes and products.

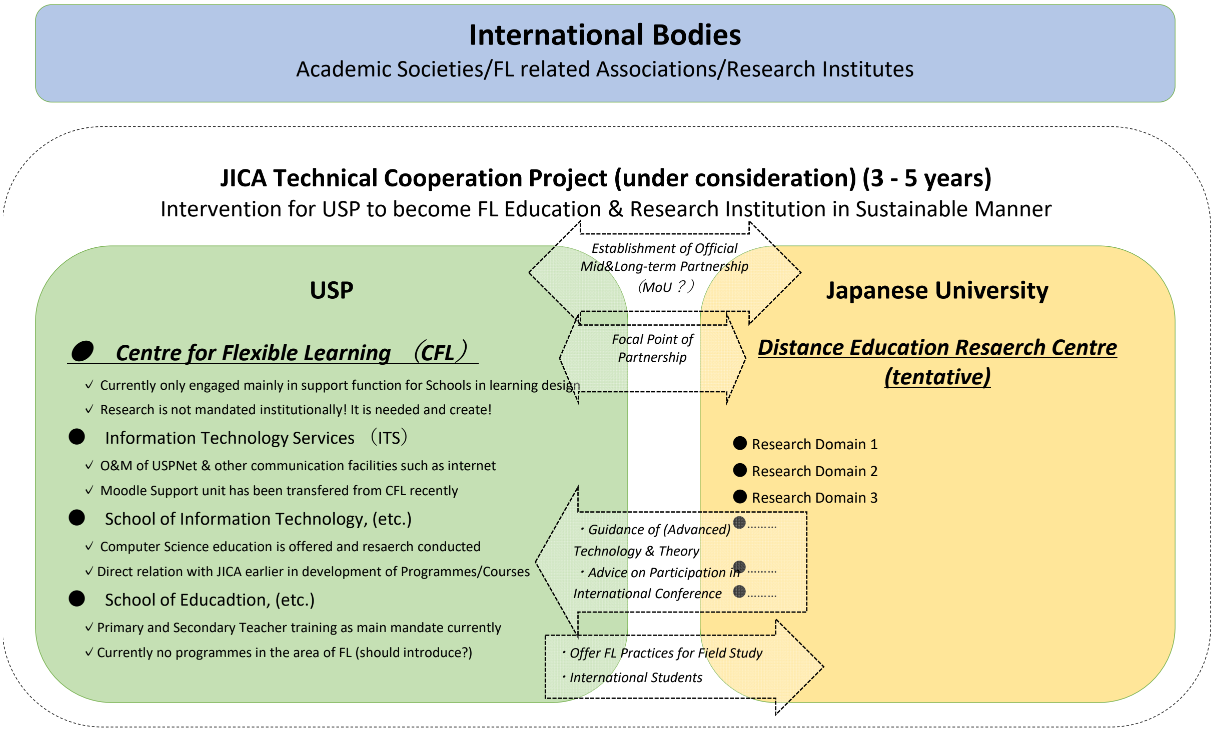


Source: Prepared by JICA Survey Team with reference to relevant reference publications

Figure 4-2-1 Concept of Education and Training Cycle in the ADDIE Model

As for themes for research, results of SWOT analysis may be referred. For instance, as learner support in output5 "Implementation", it is possible that an element of SWOT analysis for "opportunity x strength", "Streamline student support services provided through own devices (smart phone)" as a pilot, then verify its effectiveness as pedagogical and andragogical research theme. And metaverse referred in the chapter 2 that are difficult to realize in most of regional campuses with present connectivity, could be tried in regional campuses where connectivity is faster such as in Fiji or Marshall Islands and Tonga that are connected with optic fibre cable. For instance, as output 4 "Development", an element of SWOT analysis "opportunity x weakness", "Deliver FL using advanced technology in selected campuses connected with optic fibre for piloting advanced education and research purpose" may be attempted metaverse to verify its effectiveness although it can't be implemented due to the weakness of facility in most of campuses. The result may be presented to stakeholders concerning communication environment so as to contribute to regional development by accelerating further communication system development. Moreover, an element of the result of the SWOT analysis "threat x strength", "Ease digital divide with ku band communication system which USP is equipped with physical and human resources" may be attempted. Design of a course that have some student study through Ku band system as output 3 "Design" is done with research purpose, then scientific comparative analysis between students using C band and those using Ku band of effectiveness of learning to be conducted with their various attributes as output 6 "Evaluation", in order to provide decision makers with valuable information based on field research for formulation of investment strategy in communication infrastructure development to tackle issues of digital divide as "threat".

As stated earlier, continual technical support is expected to be provided from universities in Japan with expertise in distance education through the establishment of collaborative partnerships. In view of sustainable development of distance learning offered by USP after the completion of the project, the relationship between the two parties expected to be established is illustrated in the following figure. Towards the end of the project, it may be worth considering upgrading the CFL to a group of semi-autonomous centres or institutes with mandates for research, a structure commonly seen in universities in Japan and other nations.



Source: Prepared by JICA Survey Team

Figure 4-2-2 Relationship between the Two Parties (Universities) Expected to be Established through Project Implementation

The proposed project focuses on research in flexible learning and the application of research findings to the general delivery of existing flexible learning programmes and courses. However, it is not realistic to target all of the existing programmes. The project should select a few programmes and/or courses for pilot activities to ensure effective and efficient implementation. To further scale up to other programmes and courses, it is critically important to take into account lessons learned in the course of implementation and suggestions for future applications and expansion drawn from stakeholders.

(2) Subsequent Technical Cooperation Project

The possibility of including a role for human resources development in distance education was also touched upon earlier. More specifically, new programmes in flexible learning could be developed and delivered, such as a Bachelor of Education (specialized in flexible learning) or a Master of Education (specialized in flexible learning). It would be appropriate to defer discussion of this component until near the end of the proposed project above, however, for several reasons: the development of new programmes and official approval by the necessary authorities for new programmes require tremendous input and effort; the demand for such human resources not only within USP but regionally has not been clarified yet; and perhaps most importantly, the availability of internal resources at USP for the development and delivery of the programmes is unclear at this point, as the research has not yet been undertaken and the research capacity is not yet mature. The following figure shows the suggested sequence for the above project and the subsequent project.

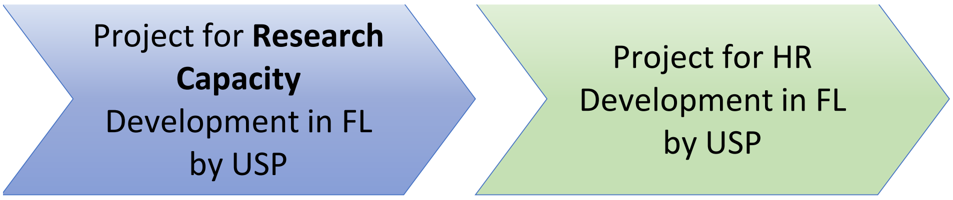


Figure 4-2-3 Sequence of Projects for the Subsequent Project

This sequence reflects the expectation that there will be international students and researchers who think *"I want to study flexible learning at USP!"* or *"I want to be engaged in research at USP!"* when USP gains wide international recognition in research activities in the area of flexible learning as a result of implementation of the first project.

(3) Scholarship Scheme

Assistances for strengthening and improvement of quality of distance learning through implementation of the two technical cooperation projects were proposed so far. Nest, a possibility of assistance on a smaller scale than technical cooperation is stated as an alternative below.

It has been explained that minimum requirements for strengthening and improvement of distance learning through activation of research are already met. However, some of the present CFL staff have not obtained postgraduate degrees in disciplines in education while some others have been awarded PhD or master's degrees including a staff member who was given opportunity to study in Kumamoto University under the preceding technical cooperation project. According to the CFL, while USP teaching staff engaged in education and research are required to have master's degree or higher as one of standard criteria for recruitment, other staff are not so including the CFL staff. Considering this, development of individual capacity of those staff members by provision of scholarship scheme is an option in order to generate foundation for future implementation of a technical cooperation project on a large scale if such a project would be difficult for JICA to commence soon. It is believed that there are various scholarship schemes provided by New Zealand and Australia in the Pacific as well. Therefore, while coordination with these countries may be necessary, it will be still effective for Japan to initiate intensive capacity development of human resources in distance learning of USP taking its assistances extended in the past into consideration.

For reference, USP academic staff are entitled to sabbatical as being done in other universities, however, the CFL staff are currently not eligible for that although there were cases of sabbatical for them in the past. It implies that it is not easy for the CFL staff to study in postgraduate programmes abroad only with their own resources, so that expectation for scholarship granted by international assistances is high. It is noted that expansion of number of scholarships for enrolment in higher education for developing countries is stipulated in SDG (Sustainable Development Goals) Target 4b, explicitly for small island developing States as well as least developed countries and African countries. It suggests that the priority for the Pacific Island states to achieve this target is higher among all developing countries.

As a possible sequence of assistances, it may be effective to first provide scholarships for postgraduate programmes in Japan for capacity development as foundation, which will also enhance creation of relationships with Japanese universities, then implement a technical cooperation project that requires a certain time from detailed project design to commencement of activities following official approval procedures.

CHAPTER 5 SUPPORT FOR THE DX SECTOR IN FIJI

Chapter 5 SUPPORT FOR THE DX SECTOR IN FIJI

5-1 Current Situation

5-1-1 Trends and Possibilities of Digitalization

(1) Digitalization in the world

The pursuit of digitalization has become a global phenomenon. The word "digitization" refers to is foundational integration connecting the physical and the virtual by applying evolving technologies including various applications of AI (Artificial intelligence), ICT (Information Communication Technologies) or IoT (Internet of Things), which enables visualization, learning, monitoring, automation, and many other things applicable in both the public and private sectors. From the appearance of the relevant technologies in 2010s, the old-fashioned tech legacies were replaced into digital ways in public services by nation or municipal governments, business activities, and lifestyles by individuals. At the same time, the digitalization is bringing a further gap between those capable of digitalization and those incapable.

(2) Potential of Digitalization in Fiji

The key of digital technologies lies in its universality or genericity, which means that their areas of application are not limited to certain specific public or private activities. The required step would be starting from individual needs and considering whether there are any applicable technologies in solving them. Therefore, many applicable approaches by digitalization or digital technologies to work on the prioritized areas in Japan's Assistance policy for Fiji which includes Environment/Climate change can be expected.

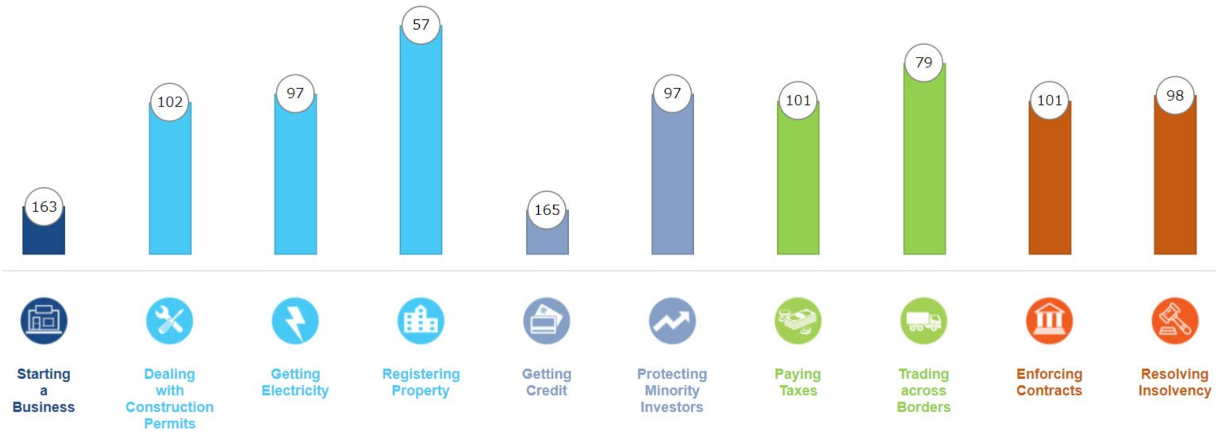
(3) Digitalization in Japan

As for Japan, various policies and national strategies including iconic e-Japan Strategy promoted directly or indirectly digitalization from 2000s along with development of relevant legal systems including establishment of the Basic Act on Cybersecurity. Despite the big leap of improvement in telecommunication condition in Japan, there appears to be very limited progress in utilization of ICT or potentially beneficial data with digital technologies. To push the momentum of digitalization, the Digital Agency was established, and relevant rules and regulations are continuously updated for improvement, and digital talents are on demand in the public sector, which indicate how much Japan prioritizes digitalization as an important national strategy.

(4) Digitalization in the Public sector

In comparison with the private sector where pressures or rationality from competition promote digitalization, the public sector is likely to be slow to accept digitalization, which also means that there appears to be many rooms to embrace effects or benefits of digitalization. Considering the current undeveloped ICT condition of Fiji, there would not be much of persistent legacy system or custom which can be obstacles to digitalize public activities. Therefore, digitalization in Fiji is expected be relatively easy to try.

The progress or degree of digitalization in the public sector also is taken as one of the indicators of the business environment for new business entrants. The Doing Business ranking which the World Bank annually conducts indicates the easiness to do business in certain nations, based on which the companies considering new market entry evaluate difficulty or complexity to start businesses there. The scoring partially contains criteria related to digitalization, which indicate that digitalization of public activities would beneficially work for private activities and eventually for national competitiveness. According to the latest World Bank annual ratings, Fiji is ranked 102 among 190 nations in the ease of doing business, around the middle range of all the nations, which can be interpreted as existence of rooms to improve for the business environment and digitalization is one of the approaches.



Source: Doing Business 2020, World Bank Group

Figure 5-1-1 Individual component of Fiji's ranking in Ease of doing-business

(5) Digitalization in the Private sector

Digitalization in a business context mainly means the process of applying digital technology to reinvent business models and transform a company's products and customer experiences, and that of innovating products creating new value and connecting people with things, insights and experiences. The word "Digital Transformation (DX)" particularly refers to an application in complex and organic ways which many of companies are pursuing for strengthening competitiveness. Newly appearing technologies are available, functional, quick, customizable, affordable and continue emerging. It has become essential parts of corporate strategy to adopt these digital technologies for surviving in this era. From the macro-economic standpoint, the degree or penetration of digitalization in the private sector is one of barometers calculating national competitiveness.

(6) New Threats

Along with the global digitalization momentum, we are also inevitably facing new threats. The representative threat is cyberthreat growing in scale and complexity, which has become one of the biggest concerns for both public and private sectors. Generally, digitalization can be categorized to two natures, offense and defense, where their balance and coexistence are crucially important. The reality is that the less attentions are paid to the defense, which includes cybersecurity. Recently, a rising number of sophisticated attacks are poured to both public and private sectors of every country, where Fiji is not an exception. Though Fiji has been developing cybersecurity infrastructure so far, the cyberattack in 2021 resulted in damages to some of public services, and it took a while to be fully restored.

5-1-2 The Current situation of Digitalization in Fiji

(1) Overview

In Fiji, there are countless rooms of improvement by applying digital technologies and solutions. Generally, old fashioned manpower-based activities are prevailing in the both public and private sectors rather than utilizing available options, most of them would be replaceable with existing digital technologies or solutions. Recently, there are a few emerging cases of digitalization.

(2) Government-centred Initiatives (Case of digitalFIJI)

The latest and most notable digitalization in Fiji is digitalFIJI, which is a programme to implement a number of government applications, enhance the overall ICT infrastructure and build and develop capacity in digital transformation in the government. digitalFIJI is managed through the Digital Government Transformation Office to create better online services, establish the necessary governance structure for the digital transformation and ensure the long-term and sustainable impact of the digital transformation programme in Fiji.

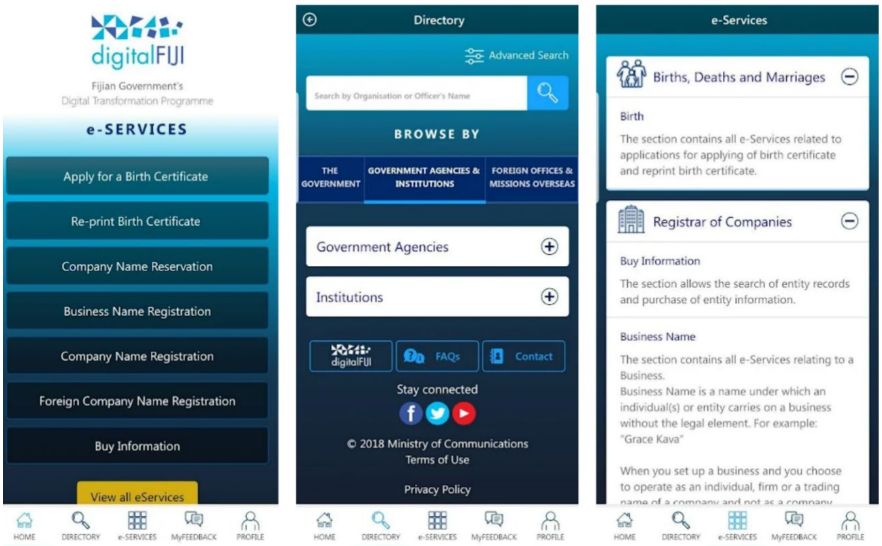


Figure 5-1-2 Displays of digitalFIJI

Responses to the recent pandemic of Covid-19 has positive effects to speed up the adoption of digital technologies that may otherwise take several years or even a decade. Since its first appearance in 2019, Covid-19 spread globally in an astoundingly quick pace, and the World Health Organization (WHO) announced its pandemic in March 2020. Unexceptionally, Fiji had increasing number of infection and was forced to lock down for certain period to prevent further spread and infection. This lockdown certainly affected the entire nation including public services though, this restriction resulted in accelerating digitalization in many areas as a way to sustain livings and economic activities. Digital technologies actually worked to sustain these activities in a different way during and after lockdown where distancing and remote works are socially mandatory. This indicates the fact that pandemic accelerated digitalization in many areas of Fiji.

1) Activity-monitoring application (Case of careFIJI)

The most representative case of digitalization accelerated by Covid-19 is careFIJI, a mobile application for tracking developed by the Government of Fiji to assist the Ministry of Health and Medical Services, is the representative and latest example of digitalization in Fiji. This application was launched to monitor and track the ongoing Covid-19 pandemic in Fiji. Most of shops, hotels, restaurants, and buildings have stickers or posters with QR codes with which those in Fiji are required to submit their locations (Check-in, Check-out) by reading through careFIJI. The mobile app is available on Google Play and the App Store, and has literally become part of routines in life. The Survey Team also complied with this rule and used careFIJI during the survey in Fiji.

Figure 5-1-3 Displays of careFIJI

Figure 5-1-4 The Promoting site for careFIJI by the Government

Figure 5-1-5 Posters of careFIJI for Check-In/Check-Out (Hotels in Suva)

2) Mobile Payment application (Case of M-PAiSA)

Another representative case is M-PAiSA, a mobile application by Vodafone Fiji. M-PAiSA is an easy method of remote and contactless payment, receiving and sending cash balances instantly and remotely from different places around the nation. In Fiji where there are limited bank account holders and only a few ATMs, this product became very popular and saw an exponential growth in the year 2021 with the closure of borders and restrictions of movement in Fiji. M-PAiSA was also used to distribute grants from the Government of Fiji to their people in a smooth and quick manner during the time of pandemic. This application eased various costs in terms of time, labor and money and mitigated the infection risks. Therefore, M-PAiSA is one of the successful digitalization.

Figure 5-1-6 Signboard of M-PAiSA in Suva

3) Central Bank Digital Currency

Central bank digital currencies are gaining traction globally, while Fiji is part of this trend. As part of Japanese support in the financial infrastructure development, Tokyo-based startup launched study and survey for transaction between financial institutions, current penetration of cashless services, and eventually feasibility of this scheme in Fiji from 2021.

5-2 Challenges

5-2-1 Survey

The Survey Team conducted field surveys to comprehend local challenges or need for the purpose of developing future supports on digitalization in Fiji. Since digitalization is applicable to both public and private sectors, the survey targeted both of them.

(1) Survey methodology

The Survey Team sent questionnaires to ministries in the public sector to ask mainly about the current relevant actions, challenges, problems, obstacles or bottlenecks for digitalization. The question contents or structure of questionnaire have both multiple-choice questions and narrative questions, and was customized for each target organization to avoid excessively generic questioning.

In addition to the above questionnaire, the Survey Team conducted interviews individually to each and every respondent to the questionnaire in person or remotely via internet conference tools. The interviews went deeper to the answers in questionnaire while asking for the diversified to Figures related to digitalization to comprehend wide range of hints for future supports on digitalization for Fiji.

Photo 5-2-1　Interview to Ministry of Economy

Photo 5-2-2　Interview to Fiji Broadcasting Company

(2) Research by Questionnaire: Public Sector

The Survey Team sent questionnaires to the below-listed organizations through JICA Fiji Office. The answers were collected from some of those ministries.

- Ministry of Communications
- Ministry of Economy
- Ministry of Commerce, Trade, and Tourism
- Ministry of Education, Heritage and Arts
- Ministry of Fishery
- Ministry of Waterways and Environment
- Ministry of Local Government
- Ministry of Employment, Productivity and Industrial Relations
- Ministry of Agriculture
- Digital Government Transformation Office
- Department of Energy
- Investment Fiji

(3) Research by Interviews: Public Sector

The Survey Team conducted interviews to the below-listed public organizations mainly for the purpose of crystalizing challenges or needs mentioned in the above questionnaires to extract hints for JICA's further supports.

- Ministry of Economy
- Ministry of Education, Heritage and Arts
- Ministry of Waterways and Environment
- Department of Energy
- Investment Fiji

(4) Research by Interviews: Others

The Survey Team conducted interviews to the below-listed other-typed organization for the purpose of comprehending existing challenges or needs from the wide range of sectors including the private sector or academia.

- Local companies, local entrepreneurs [Multiple]
- Local Japanese companies [Multiple]
- Academia [Multiple]

(5) Other Research

In addition to the above researches, the Survey Team sent questionnaires to alumni of Japan Overseas Cooperation Volunteers (JOCV) who were previously assigned to Fiji for the purpose of comprehending local challenges or needs from Japanese standpoints.

- Alumni of JOCV for Fiji [Multiple]

5-2-2 Survey Result

Main challenges or needs on digitalization are as below. The common response was that each and every respondent express general but strong and solid interests in digitalization, knowing abstractly its potential benefits, while all of them express their expectation to Japan for supporting to overcome their challenges and needs.

(1) Lack or Shortage of IT/Digital talents

The dominant response in the survey was the lack or shortage of digital talents, those who comprehend and apply digital technologies into practice. All of the respondents have certain knowledges on information system though, there are only a few or no one who can utilize digital technologies internally or for their areas of responsibilities.

Long-lasting outflowing talents to the overseas was another challenge mentioned commonly from the respondents. Though many English-speaking fresh graduates are supplied from universities, many of them including digital talents are likely to choose the overseas such as Australia, New Zealand, USA or UK in the pursuit of better employment opportunities and livings. The recent excessive demand of digital talents in a global scale is making the situation of resource shortage even worse.

<u>Quotations from Interviews</u>

"We strongly expect digital technologies though, we just have those in IT System. There are no one who can apply digital technologies and think creatively for utilizing it."
[Ministry of Education, Heritage & Arts]

"We don't have resources specialized in digital things. Only the Ministry of Communications may have those resources though, but we do not have them."
[Multiple]

(2) Fragile Cybersecurity infrastructure, Shortage of Cybersecurity talents

Many of the respondents mentioned the necessity to have sound cybersecurity considering the rising concerns and risks of cyberattacks. The recent cyberattack reminded them of the importance of cybersecurity as the prerequisite infrastructure for digitalization. The Shortage of Cybersecurity talents is another thing pointed out by the respondents.

Shortage of cybersecurity talents is another response frequently raised in the questionnaires and interviews, which is induced by the recent cyberattack in 2021. The analysis and recovery took several days, and full recovery of governmental functions took several weeks since the initial cyberattack. This cyberattack occurred wok-from-home style got common, which resulted in huge influences on daily operations of organizations. While there is a regional initiative such as Pacific Cyber Security Operational Network (PaCSON), their activity is currently limited to information sharing within the membership nations, and does not include cybersecurity talent development.

<u>Quotations from Interviews</u>

"Cybersecurity is prerequisite for digitalization." [Multiple]
"Recent cybersecurity incidents impacted our operation so much. Especially, many of our staff are working from home though, this attack forced us to change the remote work. Cybersecurity is one of the key agendas in promoting digitalization in Fiji." [Ministry of Economy]
"We don't have enough digital talents nor cybersecurity talents in our organizations. We just have IT professionals, while we are not sure how many of them are capable of cybersecurity."
[Multiple]

(3) Energy Management

From Department of Energy, the effective energy management and its optimization are the challenge mentioned. The recent rising and fluctuating oil price or energy price is one of the biggest risks for Fijian economy. Climate change and global warming are one of the top priorities in the region as well as for Fiji. In fact, the Prime Minister of Fiji expressed the sense of urgency and necessity to collaboratively work for these issues in COP26. They showed strong interests in good practices of energy management in Japan, including home energy management systems (HEMS), factory energy management systems (FEMS), as well as building energy management systems (BEMS).

<u>Quotations from Interviews</u>

> *"Climate change is the biggest challenge which Fiji is facing. The energy management is the thing we are highly committed to work on. It is great if Japan brings their advanced energy management know-hows or technologies into Fiji." [Department of Energy]*

(4) Disasters by Climate change

The Survey Team received the responses showing strong interests in disaster measures and prevention, such as flood mitigation or Tsunami, especially after flood caused by cyclones and tsunami caused by volcano eruption in Tonga. The recent climate change is said to directly or indirectly trigger extreme weathers, and the respondents including Ministry of Waterways & Environment embrace big concerns of this extreme weather and following disasters. In fact, there are many technologies available to gauge, evaluate, detect, prepare, and prevent these disasters before it actually causes damages. Another benefit to unman or automate disaster measure is that we can ease risks or dangers embedded in ongoing manpower-based measures. As for Japan, many digital tools including IoT devices are becoming common in coping with disaster risks and dangers.

Source: Fiji Times

Photo 5-2-3 Floods caused by Cyclones in 2022

Quotations from Interviews

"We would like supports for flood mitigation from Japan, believing that many technologies can be used for efficient and effective flood control. Currently, we mainly rely on manpower though, there are risks and dangers in the works." [Ministry of Waterways & Environment]

(5) Limited number of companies with digital technologies

The Survey Team received a response pointing out the shortage of companies with advanced digital technologies in Fiji from Investment Fiji, which promotes investments and entrants from the overseas to Fiji. The progress of digital technologies is generally realized in the private sector such as startups or emerging companies. The limited number of them with these technologies eventually affect stand-alone digitalization of the Fijian economy.

Quotations from Interviews

"We would like to have those with advanced digital technologies from the overseas to Fiji. At present, there are some local startups though, few are those with digital technologies. The business environments in Fiji continues improving gradually, and there are many fresh graduates capable of English and IT skill from universities including USP."

[Investment Fiji]

"Other than multi-national companies, the Fijian economy is dependent on existing industries like tourism. We need incubation for giving fresh air to the current industrial structure, and having companies from the overseas is necessary. We appreciate it we can have this opportunity."

[Ministry of Economy]

(6) Regional Polarization of Telecommunication

The Survey Team received the strong concerns of the situation of telecommunication in rural areas, as well as common response about widening digital divide between city areas and rural areas. Digitalization is often referred to with its positive benefits though, this can widen economic gaps within one nation. No matter how great certain digital technologies are, they cannot be fully utilized or can be totally useless unless telecommunication is available. There were also responses pointing out shortage of digital devices such as smartphones or tablets as obstacles for nation-wide digitalization from some respondents. In the particular case of digital infrastructure development in Japan, there were always companies with certain relevant technologies and solutions even from a development planning process. In comparison, such proactive involvement by companies is literally rare, while companies operate only in the areas where they can find profitability or certain business benefits, resulting in the imbalance by area. Therefore, it is the public sector who can play an effective role in mitigating such imbalance.

Quotations from Interviews

"We would like Japan to support improving telecommunication in rural areas, including funding or provision." [Multiple]

"There is polarization between areas with internet access and those without it. Limited telecommunication infrastructure in rural areas is our biggest headache when providing digital education. While we are launching remote educations in internet, the students living in rural areas cannot have the access due to the lacked telecommunication there."

[Ministry of Education, Heritage and Arts]

"Limited telecommunication is one of the obstacles hindering business activities in rural areas. Without improvement of this telecommunication, the gap between city areas and rural areas will be bigger, and no companies will operate there. Solving this divide will be necessary for nation-wide competitiveness." [Investment Fiji]

5-3 Possibility of assistance by JICA

Based on the survey result, the following themes would be worth considering as the possible assistance areas for Fiji.

(1) Nurturing Digital talents (Capacity-building)
(2) Assessment of Cybersecurity Effectiveness, Relevant Capacity-building
(3) Environment/Climate change
(4) Incubation & Entrepreneurship support
(5) Improvement of Telecommunication

Considering that human resources with appropriate digital capabilities will be prerequisite for realizing the effective digitalization in Fiji, the short-term priorities should be given to (1). Once these talents are ready, there would be more doable digitalization options. In parallel, (2) is another option to take in the short-term considering the sense of urgency to be well-prepared for the growing cyberthreats.

(1) Nurturing Digital talents (Capacity-building)

The premise of digitalization of certain organizations is existence of talents with appropriate literacy and capabilities to apply digital technologies. Regardless public or private sector, the common challenge for most of organizations is the quantitative and qualitative shortage of such digital talents. Considering the evolution speed of digital technologies and its growing complexity, this talent shortage has to be filled with a sense of urgency. Otherwise, Fiji will be left behind by the other digitally advanced nations. As the kickstart or first step, capacity-building to nurture digital talents is the most effective and necessary actions to take.

1) Capacity-building for Public officials

To fill in the demand gap of digital talents within Fijian government, it appears to be effective to provide capacity building for the next and following generations of digital talents in each organization.

<u>Challenges to Solve</u>

- Limited capabilities to apply digital technologies for policy planning and internal use mainly caused by lacked relevant literacy

<u>Expected benefits or impacts</u>

- Accelerated utilization of digital tools in government
- Efficiency and effectiveness of public services
- Accelerated digitalization within government
- Applications of digitalization into policy planning
- Embedded talent development mechanism, etc.

<u>Model</u>

Type:	Technical Cooperation
Main targets:	Ministry of Communications
	Digital Government Transformation Office
Periods:	24 months (2022 June ~ 2024 May)
Headcounts:	6 people

- Chief [Project Management]
- Search & Analysis [Digitalization] #1
- Search & Analysis [Digitalization] #2
- Development of Lecturing & Training materials
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis	4 months
- Development of Lecturing & Training materials	6 months
- Lecturing & Training	14 months

Lecturing & Training modules:

- Recent global trends
- Basics of digitalization
- Good/Best practices of digital government or E-government
- Pros & Cons of digital government or E-government
- Good/Best practices of GovTech (Government Technology)
- Incident cases in the overseas, and lessons learned

- Cautions & Risks of digital government or E-government
- Free discussion/Workshops for participants' own organizations
- Continuous learning and self-improvement

Further Survey Areas

- Existing capacity building measures for public officials, methodologies, training contents
- IT/Digital talent list, pipelines, etc.

Estimates

Total 238.8 mil JPY

2) Capacity-building for Teachers (Education)

Education sector in Fiji has been firmly adopting digital tools in providing school education to students, which played important roles in sustaining education even during the pandemic of Covid 19. With the support of foreign nations, the Ministry of Education, Heritage and Arts worked on curriculum which includes digitalization related themes and nurturing new teachers equipped with digital literacy. Educational institutions including schools play a crucial role not only in using digital technologies for education but also in nurturing young talents with digital literacy. Accordingly, those in the educational institutes such as teachers are expected to have certain level of digitalization. The fact is that the existing teachers with such literacy are limited since they were neither taught nor trained on digitalization, which was explicitly and strongly raised by the Ministry of Education, Heritage and Arts as their remaining concern.

Challenges to Solve

- Limited literacy of teachers in using digital technologies in practice
- Limited literacy of teachers in teaching digitalization to their students

Expected benefits or impacts

- Accelerated utilization of digital tools in education
- Efficiency and effectiveness of educational service
- Strengthened digital literacy, etc.

Model

Type:	Technical Cooperation
Main targets:	Ministry of Education, Heritage & Arts Educational Institutes
Periods:	24 months (2022 June ~ 2024 May)
Headcounts:	6 people

- Chief [Project Management]
- Search & Analysis [Digitalization] #1
- Search & Analysis [Digitalization] #2
- Development of Lecturing & Training materials
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis	4 months
- Development of Lecturing & Training materials	6 months
- Lecturing & Training	14 months

Lecturing & Training modules:

- Recent global trends
- Basics of digitalization
- Good/Best practices of digitalization in Education
- Good/Best practices of Digital education tools
- Good/Best practices of Ed-Tech (Educational Technology)
- Pros & Cons of digital technologies
- Cautions & Risks of digitalization in Education
- Incident cases in the overseas, and lessons learned
- Free discussion/Workshops for participants' own organizations
- Continuous learning and self-improvement

Further Survey Areas

- Existing capacity building measures for teachers, methodologies, training contents
- IT/Digital talent list, pipelines, etc.

Estimates

Total 238.8 mil JPY

(2) Assessment of Cybersecurity Effectiveness, Relevant Capacity-building

In addition to human resources with sufficient digital literacy, effective cybersecurity is another prerequisite and fundamental of digitalization, without which successful digitalization cannot be achieved. To prepare for and overcome the rising threats of cyberattack, there is an urgent need to establish effective cybersecurity in Fiji.

1) Cybersecurity Functionality Assessment

The sufficiency of cybersecurity can be evaluated from its effectiveness of underlying interactive structures and mechanism as well as rules in a specific organization or a group of organizations. Dysfunction of these structures or mechanisms can make cybersecurity ineffective or meaningless. Therefore, it would be worth assessing the functionality of cybersecurity to extract immaturity or vulnerability to improve for effective cybersecurity.

Challenges to Solve

- Structural or systematic immaturity/vulnerability for cybersecurity in organizations

Expected benefits or impacts

- Solid foundation of digitalization
- Safe and sound cybersecurity
- Continuous protection against growing cyberthreats
- Embedded cybersecurity mechanism
- Protection of rights and properties, etc.

Model

Type:	Technical Cooperation
Main targets:	Ministry of Communications
	Digital Government Transformation Office
Periods:	24 months (2022 June ~ 2024 May)
Headcounts:	6 people

- Chief [Project Management]
- Search & Analysis [Cybersecurity Functionality] #1
- Search & Analysis [Cybersecurity Functionality] #2
- Search & Analysis [Cybersecurity Functionality] #3
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis (incl. Walkthroughs)	18 months
- Development of Lecturing & Training materials	2 months
- Lecturing & Training	4 months

Lecturing & Training modules

- Experiments of email spoofing
- Result of email spoofing & Analysis
- Recent global trends

- Basics of cybersecurity, latest trends
- Case studies of cyberattacks in the overseas
- Good/Best practices of cybersecurity in the overseas
- Cautions & Risks of cybersecurity
- Incident cases in the overseas, and lessons learned
- Experiments
- Free discussion/Workshops for participants' own organizations
- Continuous learning and self-improvement

Further Survey Areas

- Current cybersecurity measures
- Status of cyberattacks (Internal/Cross-border)
- Incident cases
- Relevant rules & regulations, guidelines
- Manuals, directions, etc.

Estimates

Total 322.1mil JPY

2) Cybersecurity Capability Assessment

In addition to satisfaction of structures and mechanism, the sufficiency in terms of human resources is also indispensable for realizing the effective cybersecurity. Therefore, it would be worth assessing the capabilities of those in charge of cybersecurity.

Challenges to Solve

- Limited cybersecurity capability of resources in organizations

Expected benefits or impacts

- Solid foundation of digitalization
- Safe and sound cybersecurity
- Continuous protection against growing cyberthreats
- Embedded cybersecurity mechanism
- Protection of rights and properties, etc.

Model

Type: Technical Cooperation

Main targets: Ministry of Communications

Digital Government Transformation Office

Periods: 24 months (2022 June ~ 2024 May)

Headcounts: 5 people

- Chief [Project Management]
- Search & Analysis [Cybersecurity capability] #1
- Search & Analysis [Cybersecurity capability] #2
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis (incl. Walkthroughs) 12 months
- Development of Lecturing & Training materials 4 months
- Lecturing & Training 8 months

Lecturing & Training modules

- The same with the one in the above 2)

Further Survey Areas

- Cybersecurity measures
- Status of cyberattacks (Domestic/Cross-border)
- Incident cases
- Relevant rules, regulations and guidelines
- Relevant manuals, directions, etc.

Estimates

Total 259.6mil JPY

3) Nurturing Cybersecurity talents (Capacity-building)

In parallel with digital talents, talents with cybersecurity literacy and capability are another prioritize area. The mechanism for nurturing cybersecurity talents in the following generations is strongly needed.

Challenges to Solve

- Limited cybersecurity talents in terms of both quantity and quality

Expected benefits or impacts

- Solid foundation of digitalization
- Safe and sound cybersecurity
- Continuous protection against growing cyberthreats
- Embedded cybersecurity mechanism
- Protection of rights and properties, etc.

Model

Type: Technical Cooperation

Main targets: Ministry of Communications
Digital Government Transformation Office

Periods: 24 months (2022 June ~ 2024 May)

Headcounts: 6 people

- Chief [Project Management]
- Search & Analysis [Cybersecurity] #1
- Search & Analysis [Cybersecurity] #2
- Development of Lecturing & Training materials
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis 4 months
- Development of Lecturing & Training materials 6 months
- Lecturing & Training 8 months

Lecturing & Training modules

- Experiments of email spoofing
- Result of email spoofing & Analysis
- Recent global trends
- Basics of cybersecurity, latest trends
- Case studies of cyberattacks in the overseas
- Good/Best practices of cybersecurity in the overseas
- Cautions & Risks of cybersecurity
- Incident cases in the overseas, and lessons learned
- Free discussion/Workshops for participants' own organizations
- Roleplaying & Simulation
- Experiments
- Continuous learning and self-improvement

Further Survey Areas

- Cybersecurity actions (Education, training, simulation, interna/external assessment, etc.)
- Status of cyberattacks (Domestic/Cross-border)
- Cybersecurity talent list, pipelines, etc.

Estimates

Total 173.9mil JPY

(3) Environment/Climate change

Environment/Climate change is one of the prioritized assistance themes for Fiji where digital solutions including IoT are applicable. The examples are as below.

1) Flood risk monitoring and alerting for Residents' safety & security

The recent climate change is said to cause extreme weathers around the world. As for Fiji, flood occurred by extreme rainfalls along with high tide is one of possible disasters to pay attention and prepare for. Fiji embraces several major rivers which may possibly cause massive floods threating residents and communities. As a way of mitigating flood risks and following damages, it is technologically possible to measure water levels of these river constantly, send water level data to the administrator, monitor its changes, detect flood risks from the tracked data, and activate alerts for preparation or evacuation. Recent IoT technologies and devices turned existing manual management and monitoring so far into a more efficient, safe and secured way. Furthermore, by connecting this IoT-based management and monitoring with alerting system, it is expected to realize quick and precise alerting to those in risk areas.

Challenges to Solve

- Limited resilience against natural disaster risks by global climate change
- Limited resilience against heavy rainfalls triggered by global climate change
- Labor loads, inaccuracy and inefficiency by manual management & monitoring

Expected benefits or impacts

- Mitigation of direct disaster risks triggered by climate change and indirect risks
- Protection of rights and properties, etc.

Model

Type: Technical Cooperation
Main targets: Ministry of Waterways & Environment
Ministry of Communications
Periods: 24 months (2022 June ~ 2024 May)
Headcounts: 8 people

- Chief [Project Management]
- Search & Analysis [Flood management] #1
- Search & Analysis [Flood management] #2
- Asset & Equipment Installation [Water gauges]
- Asset & Equipment Installation [Data transmitter]
- Asset & Equipment Installation [Software]
- Lecturing & Training #1

- Lecturing & Training #2

Schedule:

- Search & Analysis 6 months
- Asset & Equipment Installation 10 months
- Lecturing & Training 8 months

Lecturing & Training modules

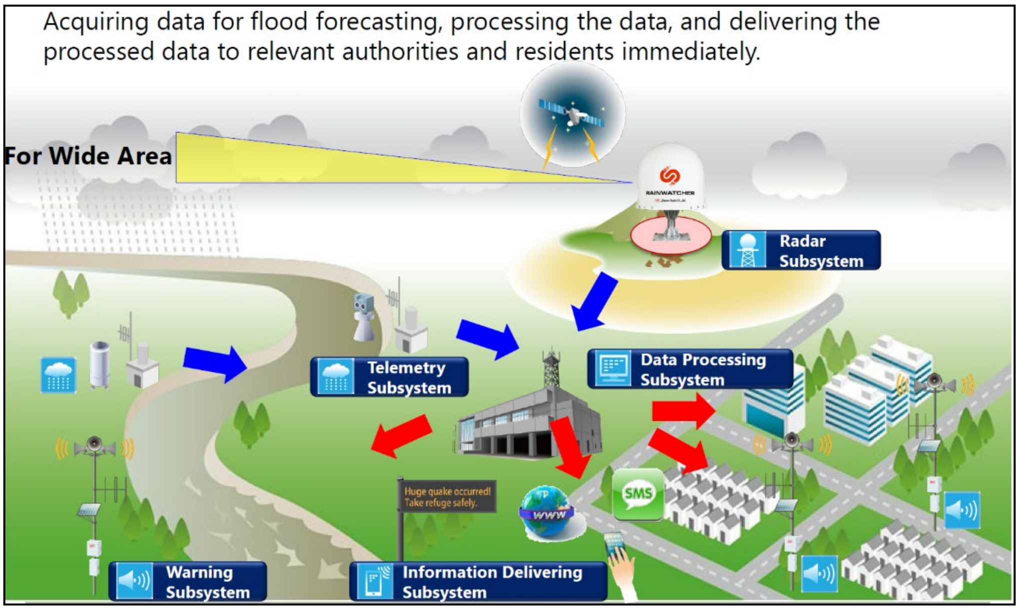
- Global trend of natural disasters and climate change
- Basics of software and its usage
- Fieldwork
- Management & Monitoring methodology
- Risk detection methodology
- Roleplaying & Simulation

Further Survey Areas

- Current management/monitoring status
- List of facilities/equipment in operation, its utilization status
- Current risk map, areas of high risk
- Communication structures (routes), tools
- Relevant trainings or simulations
- Relevant rules and regulations, etc.

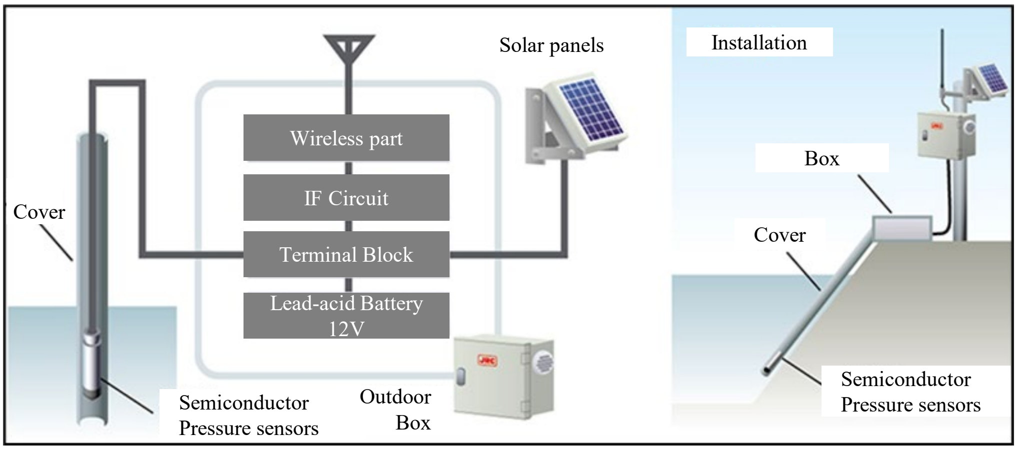
Estimates

Total 294.3mil JPY



Source: Japan Radio co., ltd.

Figure 5-3-1 Flood Risk Monitoring System Overview



Source: Japan Radio co., ltd.

Figure 5-3-2 Structure of water gauges

2) Flood alerts by smartphones

Data-based or data-driven management and monitoring by digital tools are useful in predicting and preparing for disasters, which eventually lead to necessary actions. For example, water gauges installed in the riverside to monitor water level and alert when detecting the symptoms of potential disasters, which can lead to alerting via smartphones.

Challenges to Solve

- Limited resilience against natural disaster risks by global climate change
- Limited resilience against heavy rainfalls triggered by global climate change
- Labor loads, inaccuracy and inefficiency by manual management & monitoring

Expected benefits or impacts

- Mitigation of direct disaster risks triggered by climate change and indirect risks
- Protection of rights and properties, etc.

Model

Type: Technical Cooperation

Main targets: Ministry of Waterways & Environment
Ministry of Communications

Periods: 24 months (2022 June ~ 2024 May)

Headcounts: 7 people

- Chief [Project Management]
- Search & Analysis [Natural disaster risks by region]
- Search & Analysis [Evacuation & Withdrawal]
- Application & System Development #1
- Application & System Development #2

- Experiments & Trials #1
- Experiments & Trials #2

Schedule:

-	Search & Analysis	10 months
-	Application & System Development	10 months
-	Experiments & Trials	4 months

Further Survey Areas

- Current management/monitoring status
- List of facilities/equipment in operation, its utilization status
- Current risk map, areas of high risk
- Communication structures (routes), tools
- Relevant trainings or simulations
- Relevant rules and regulations, etc.

Estimates

Total 249.5mil JPY

3) Digitalization of maintenance for disaster prediction and prevention

Natural disasters can bring direct threats while causing indirect threats including destruction of surrounding infrastructures such as roads or bridges immediately or afterwards. To prepare for these indirect threats of dangers, continuous maintenance by monitoring with visualized data are ideally needed for prediction and prevention, where digital tools are available, effective and cost-efficient. Japan has been supporting infrastructures for Nadi River in Fiji so far, in which such digitalization can be utilized for flood mitigation.

Challenges to Solve

- Limited resilience against natural disaster risks by global climate change
  (esp. Limited resilience of basic infrastructures and facilities)
- Labor loads, inaccuracy and inefficiency by manual management & monitoring

Expected benefits or impacts

- Data recording of infrastructure monitoring
- Effective management by transparency and data sharing
- Prevention of accidents
- Safety and security in infrastructures
- Management cost reduction
- Social economic and social foundation, etc.

Model

Type: Technical Cooperation

Main targets: Ministry of Waterways & Environment

Ministry of Communications

Ministry of Local governments

Periods: 24 months (2022 June ~ 2024 May)

Headcounts: 8 people

- Chief [Project Management]
- Search & Analysis #1
- Search & Analysis #2
- Search & Analysis #3
- Development &localization of Monitoring software #1
- Development &localization of Monitoring software #2
- Experiments & Trials #1
- Experiments & Trials #2

Schedule:

- Search & Analysis 10 months
- Development &localization of Monitoring software 10 months
- Experiments & Trials 4 months

Further Survey Areas

- Current management/monitoring status
- List of facilities/equipment in operation, its utilization status
- Accident cases, incident cases
- Relevant rules and regulations, etc.

Estimates

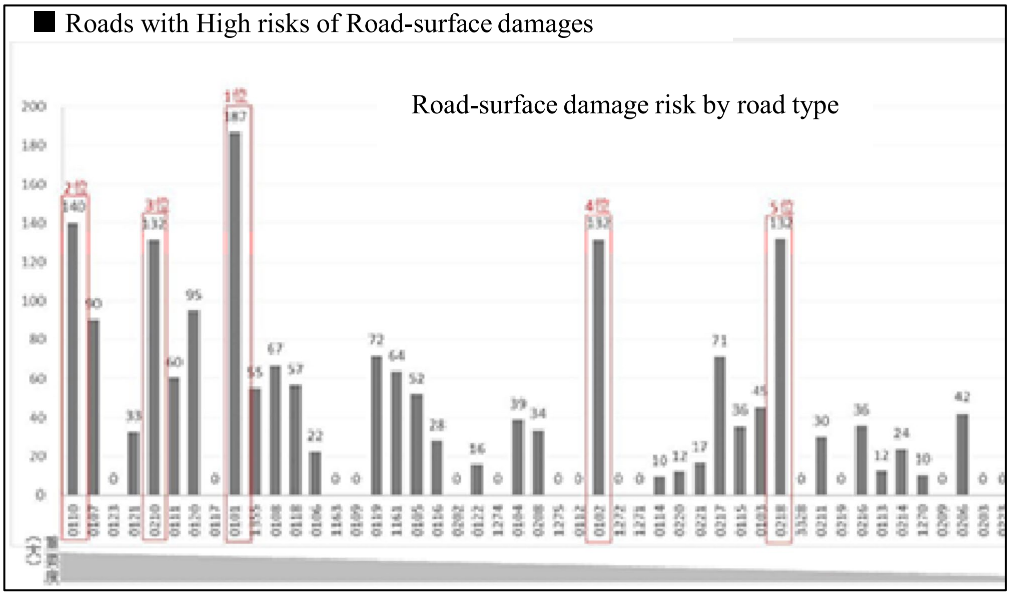
Total 294.3mil JPY

Source: Yachiyo engineering co. ltd.

Figure 5-3-3 Data management (Left), Data-driven management (Right)

Source: Yachiyo engineering co. ltd.

Figure 5-3-4　Location search (Left), Recording facility information (Right)



Source: Yachiyo engineering co. ltd.

Figure 5-3-5　Evaluation & Detection of Damaging risks

4) Detection & Monitoring of Marine debris

Safety and security of ocean traffic and transportation is crucial in Fijian society and economy. So far Japan has been supporting Fiji in large-sized waste disposal, marine debris can also be the target of scope for support considering risks and dangers of marine debris floating around the islands of Fiji which may hinder or damage the ocean traffic and transportation. Since existence of marine debris also ruin appearances and impressions of Fiji as an attractive travel destination, management of marine debris is also important for the primary tourism industry of Fiji. To make things worse, global climate change is or may be affecting sea tide, so it is becoming even more tricky to monitor and forecast how marine debris move around the Fijian islands, which makes manual detection and monitoring of debris by manpower harder. Therefore, here is the point where digital technologies equipped with radars and system can play an effective and efficient role to detect and monitor marine debris.

Challenges to Solve

- Obstruction to safe and secure ocean traffic
- Obstruction to stable ocean transport

Expected benefits or impacts

- Safety and security in ocean traffic & distribution
- Accelerated ocean traffic & distribution
- Economic productivity, national economic competitiveness, etc.

Model

Type: Technical Cooperation

Main targets: Ministry of Waterways & Environment
Ministry of Communications

Periods: 30 months (2022 June ~ 2024 October)

Headcounts: 10 people

- Chief [Project Management]
- Search & Analysis [Ocean current & Marine debris] #1
- Search & Analysis [Ocean current & Marine debris] #2
- Search & Analysis [Telecommunication & Transmitter]
- Asset & Equipment Installation [Radars] #1
- Asset & Equipment Installation [Radars] #2
- Asset & Equipment Installation [Monitoring software] #1
- Asset & Equipment Installation [Monitoring software] #2
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis 10 months
- Asset & Equipment Installation 12 months
- Lecturing & Training 8 months

Lecturing & Training modules:

- Global trend of natural disasters and climate change
- Basics of marine debris
- Risks & Dangers of marine debris
- Accident cases related marine debris
- Basics of software and its usage
- Fieldwork
- Management & Monitoring methodology
- Risk detection methodology

- Roleplaying & Simulation

Further Survey Areas

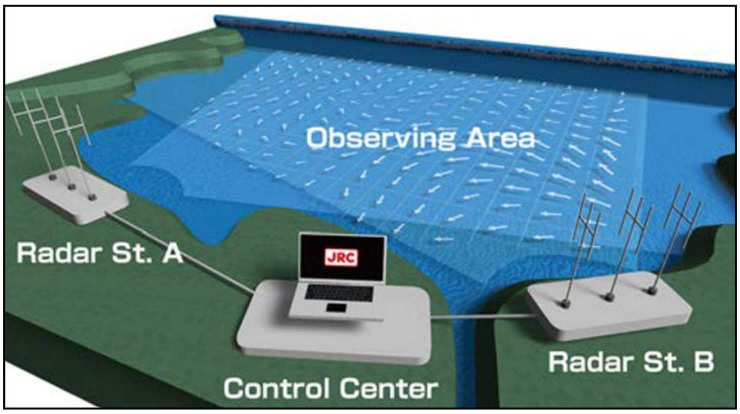
- Current management/monitoring status
- List of facilities/equipment in operation, its utilization status
- Accident cases, incident cases
- Relevant rules and regulations, etc.

Estimates

Total 442.3mil JPY

Source: Japan Radio co., ltd.

Figure 5-3-6 Radars for marine debris in seashore



Source: Japan Radio co., ltd.

Figure 5-3-7 Radars for marine debris in seashore (Illustrative)

5) Energy Management (Factories, Buildings, Homes)

While environment/climate change is one of the prioritized areas of assistance by Japan, this is also one of the pillar policies of Fijian government, accordingly the area of energy management is of the biggest interest of Fiji. Furthermore, being dependent on imported energy sources, energy management is essential for economic activities as well and environmental protection. Since the effects of energy management system for factories, homes and buildings have been proven in Japan already, it would worth installing such energy management system into Fiji.

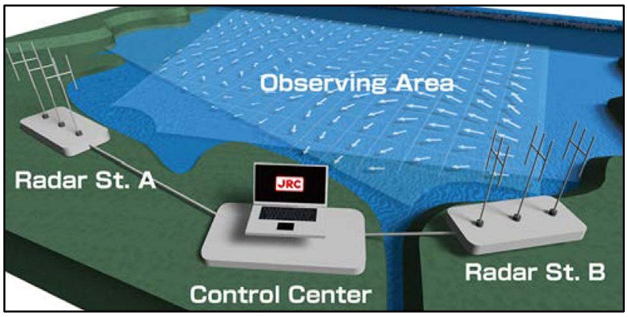
- Roleplaying & Simulation

Further Survey Areas

- Current management/monitoring status
- List of facilities/equipment in operation, its utilization status
- Accident cases, incident cases
- Relevant rules and regulations, etc.

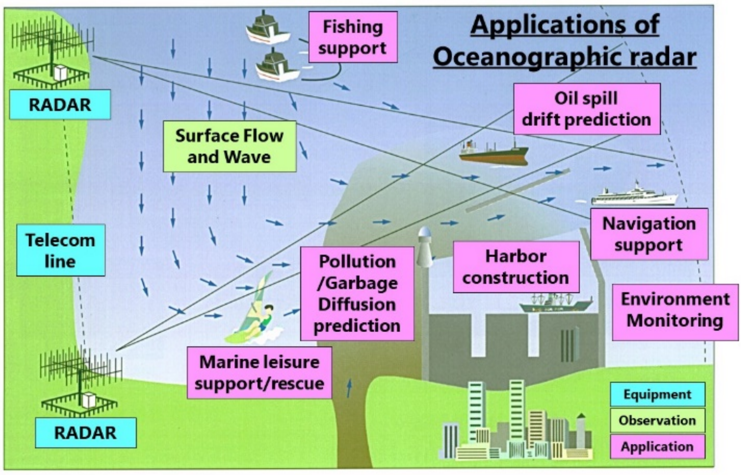
Estimates

Total 442.3mil JPY



Source: Japan Radio co., ltd.

Figure 5-3-6 Radars for marine debris in seashore (Illustrative)



Source: Japan Radio co., ltd.

Figure 5-3-7 Utilization of Radars for marine debris in seashore (Illustrative)

5) Energy Management (Factories, Buildings, Homes)

While environment/climate change is one of the prioritized areas of assistance by Japan, this is also one of the pillar policies of Fijian government, accordingly the area of energy management is of the biggest interest of Fiji. Furthermore, being dependent on imported energy sources, energy management is essential for economic activities as well and environmental protection. Since the effects of energy management system for factories, homes and buildings have been proven in Japan already, it would worth installing such energy management system into Fiji.

Challenges to Solve

- Inefficient energy use and corresponding cost burdens
- Labor loads, inaccuracy and inefficiency by manual management & monitoring

Expected benefits or impacts

- Optimized energy use, reduction of greenhouse gas emission
- Economic productivity, national economic competitiveness
- Achievement of national commitment to climate change, etc.

Model

Type: Technical Cooperation

Main targets: Department of Energy

Periods: 20 months (2022 June ~ 2024 May)

Headcounts: 7 people

- Chief [Project Management]
- Search & Analysis [Energy management] #1
- Search & Analysis [Energy management] #2
- System & Equipment installation [FEMS, BEMS, HEMS, etc.] #1
- System & Equipment installation [FEMS, BEMS, HEMS, etc.] #2
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis 6 months
- System & Equipment installation 12 months
- Lecturing & Training 2 months

Lecturing & Training modules

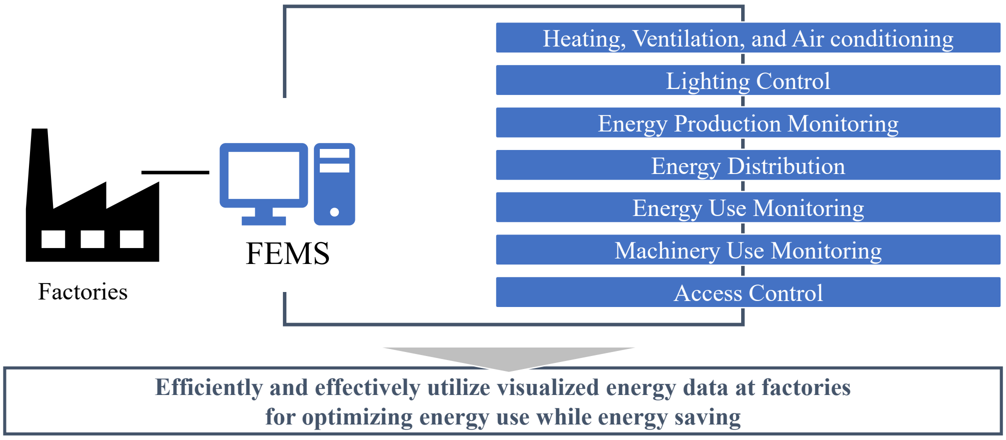
- Recent world trends on climate change, and actions by nation
- Basics of Energy management
- Good/Best practices of energy management, and morel cases
- Pros and Cons of Energy management systems
- Cautions and risks of Energy management systems

Further Survey Areas

- Energy use condition of public building
- Current energy management systems
- List of energy management systems in operation at public buildings, etc.

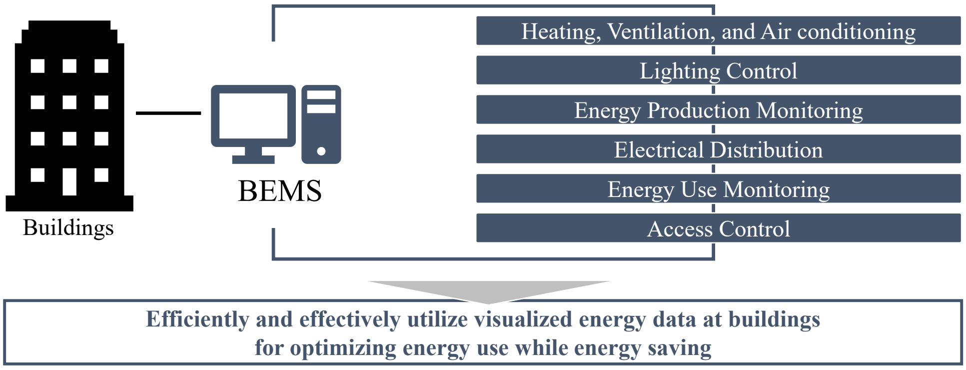
Estimates

Total 231.9 mil JPY



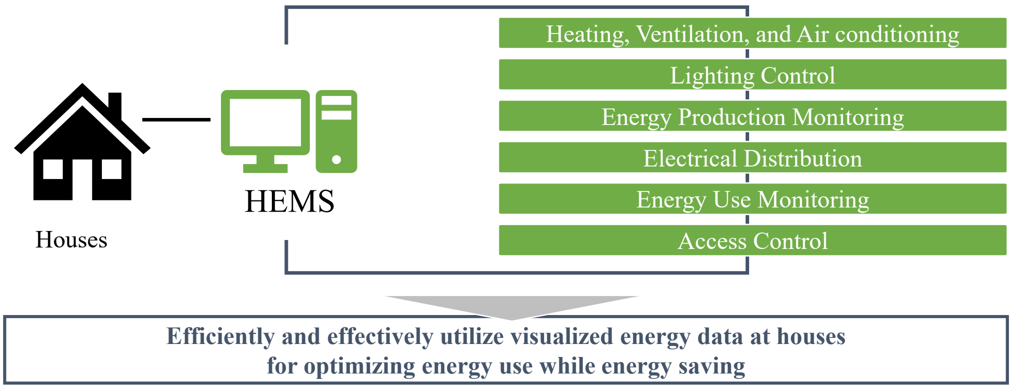
Source: JICA Survey Team

Figure 5-3-8 Overview of FEMS (Factory Energy Management System)



Source: JICA Survey Team

Figure 5-3-9 Overview of BEMS (Building Energy Management System)



Source: JICA Survey Team

Figure 5-3-10 Overview of HEMS (Home Energy Management System)

(4) Promotion of Incubation & Entrepreneurship

To transform the existing industrial structures to the new ones which can generate national competitiveness, the ecosystem supporting incubation or entrepreneurship are indispensable foundation.

1) Strengthening Incubation support function

To establish an incubation-friendly ecosystem in Fiji, it would be worth developing supportive functions within existing organization or new ones separately by Collaborating with relevant ministries, commercial agencies, educational institutes including universities.

Challenges to Solve

- Limited innovations & entrepreneurships
- Outflowing talents sustaining innovation and technological development

Expected benefits or impacts

- Creation of innovative technologies and new industries
- Economic productivity, national economic competitiveness
- Prevention of talent outflows, etc.

Model

Type:	Technical Cooperation
Main targets:	Investment Fiji
	Fiji Chamber of Commerce & Industry
Periods:	24 months (2022 June ~ 2024 May)
Headcounts:	6 people

- Chief [Project Management]
- Search & Analysis, Planning #1
- Search & Analysis, Planning #2
- Setup & Launching #1
- Setup & Launching #2
- Setup & Launching #3

Schedule:

- Search & Analysis	4 months
- Planning	8 months
- Setup & Launching	12 months

Further Survey Areas

- Existing business matching by public organizations, commercial organization, or educational organizations

- List of investment attraction measures, etc.

Estimates

Total 301.2 mil JPY

2) Business Matching

For nurturing local companies including startups which sustaining digitalization, it would be worth suggesting continuous promotion of business matching to connect these local companies with potential investors or business partners by organizing real or online matching events. It is desirable to organize by collaborating with local commercial institution such as chamber of commerce.

Challenges to Solve

- Limited matching or communication opportunities for local businesses including startups with potential business partners or investors

Expected benefits or impacts

- Creation of innovative technologies and new industries
- Inward transfer of technologies, knowhow, and knowledge
- Economic productivity, national economic competitiveness, etc.

Model

Type: Technical Cooperation

Main targets: Investment Fiji
Fiji Chamber of Commerce & Industry

Periods: 15 months (2022 June ~ 2024 May)

Headcounts: 7 people

- Chief [Project Management]
- Search & Analysis、Event planning & Marketing #1
- Search & Analysis、Event planning & Marketing #2
- Event organization #1
- Event organization #2
- Event organization #3
- Recording & Publication

Schedule:

- Search & Analysis 9 months
- Event planning & Marketing 13 months
- Recording & Publication 2 months

Further Survey Areas

- Existing business matching by public organizations, commercial organization, or educational organizations
- List of investment attraction measures, etc.

Estimates

Total 297.8 mil JPY

3) Digital Nautical Chart (Electronic nautical chart)

Maritime infrastructure plays a crucial role for social economy and national securities for Fiji, which has been working on to install a digital nautical chart as part of maritime soft-infrastructures so far. This digital nautical chart is expected to realize safety and security of ocean traffic and transportation, as well as productivity with automation, by which Fiji can comply with requirements for IMO member nations. Furthermore, digital nautical charts are applicable for many purposes, automated sailing, self-optimization of renewable electricity generation by machine learning, productivity and safety in fishery, and so on. At present, Fiji made a digital nautical map for the port of Suva with the supports from foreign nations, while that for the port of Lautoka and other major ports are not yet fully made. Though Fiji is not yet capable of making, editing, or updating digital nautical map without supports, technology or know-how transfer from Japan to Fiji would be effective in realizing further capability on this theme.

Challenges to Solve

- Limited nautical charting capabilities
- Threats to safe, secure and stable ocean traffic and transportation
- Preparation and protection for tsunami and other natural disasters
- Utilization of marine resources

Part 1: Support for Digital Nautical Chart (Electronic Navigation Chart)

Support for updating digital nautical charts (Electronic navigation charts) and paper-type ones for Lautoka port and Yasawa areas, and conducting hydrographical survey with aviation laser bathymetry and Mallow multibeam echo sounder

Expected benefits or impacts

- Independent capability to have nautical charts meeting requirement of international standards
- Safe and secure ocean traffic & distribution, etc.

Model

Type: Technical Cooperation

Main targets: Fiji Hydrographic Service, Fiji Navy

Periods: 24 months (2022 June ~ 2024 May)

Headcounts: 8 people

- Chief [Project Management]
- Search & Analysis, Data collection [Nautical chart] #1
- Search & Analysis, Data collection [Nautical chart] #2
- Search & Analysis, Data collection [Nautical chart] #3
- Communication & Negotiation with Relevant organizations #1
- Communication & Negotiation with Relevant organizations #2
- Lecturing & Training #1
- Lecturing & Training #2

Schedule:

- Search & Analysis, Data collection 20 months
- Lecturing & Training 4 months

Lecturing & Training modules

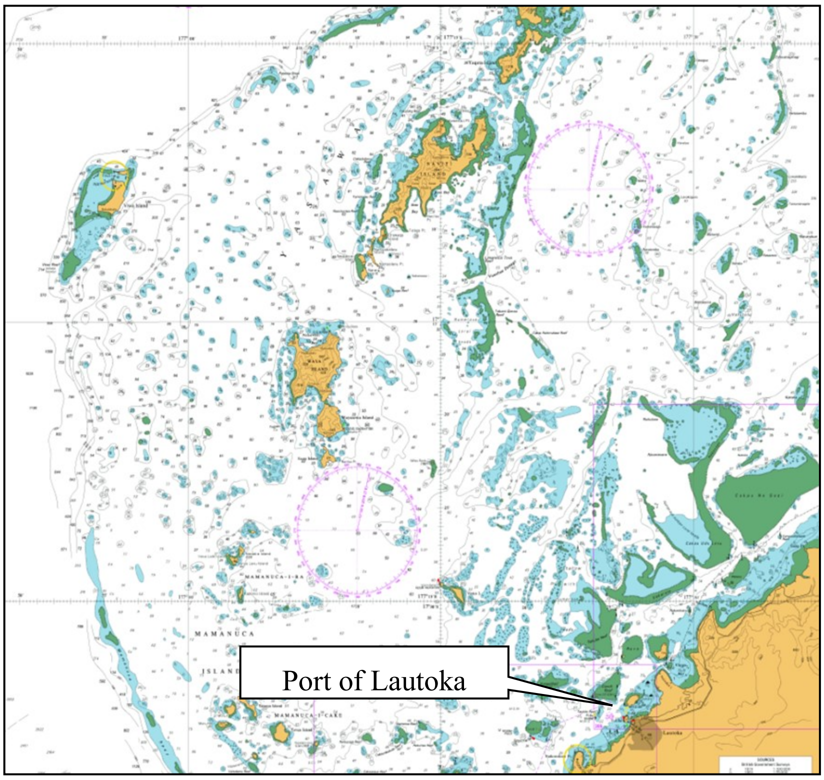
- Search & analysis methodology, data collection, update methodology
- Control point/Level survey methodology
- Satellite data acquisition & analysis methodology
- Editing methodologies for hard/electronical nautical chart
- Seabed terrain modeling methodology
- Good/Best practices of utilizing digital nautical charts
- Cautions & Risks

Further Survey Areas

- Publication and distribution procedures electronic navigation charts
- Rules and regulations for data analysis and processing for DEM
- Current coverage of electronic navigation charts
- Practical needs for electronic navigation charts, etc.

Estimates

Total 467.6 mil JPY



Source: Aero Asahi Corporation.

Figure 5-3-11 Map of Lautoka area

Part 2: Support for digital nautical chart and DEM seamlessly connecting land and sea areas

Building support for coastal geospatial base data integrating data of land and sea areas

Expected benefits or impacts

- Publication and distribution of electronic navigation charts
- Preparation and protection for tsunami, climate change, potential oil spills
- Comprehension of fishery areas
- Safe and secure marine leisure
- Utilization of DEM for constructing harbors and fishing ports
- Foundation of ocean data
- Utilization in exploitation for ocean resources
- Protection for national rights such as territorial waters or EEZ, etc.

Model

Type: Grant

Main targets: Fiji Hydrographic Service, Fiji Navy
Ministry of Lands & Mineral Resources,
National Disaster Management Office

Soft components: Relevant education and trainings

Further Survey Areas

- Publication and distribution procedures electronic navigation charts
- Rules and regulations for data analysis and processing for DEM
- Current coverage of electronic navigation charts
- Practical needs for electronic navigation charts, etc.

Estimates

Total 1,030.0 mil JPY

(5) Improvement of telecommunication

1) Local telecommunication

To realize nation-wide digitalization effectively, the existing huge divide between city areas and rural areas is one of the biggest obstacles, which indicates necessity to improve telecommunication quality. Therefore, improvement including installation of telecommunication towers in rural areas for better telecommunication condition would be one of the suggestions to take.

Challenges to Solve

- Telecommunication divide between city areas and rural areas
- Gaps in living, economies, and educations occurred by telecommunication divide

Expected benefits or impacts

- Disparity correction in telecom conditions by comprehensive telecom networks
- Quality of life or business environment for those living in remote areas, etc.

Model

Type:	Grant
Main targets:	Ministry of Communications
	Ministry of Local governments
Period:	30 months (2022 June ~ 2024 October)
Headcounts:	11 people

- Chief [Project Management]
- Search & Analysis [Regional telecommunication] #1
- Search & Analysis [Regional telecommunication] #2
- Search & Analysis [Regional telecommunication] #3
- Asset & Equipment Installation [Telecommunication towers] #1
- Asset & Equipment Installation [Telecommunication towers] #2

- Asset & Equipment Installation [Telecommunication towers] #3
- Asset & Equipment Installation [Telecommunication towers] #4
- Adjustment #1
- Adjustment #2
- Adjustment #3

Schedule

-	Search & Analysis	10 months
-	Asset & Equipment Installation	15 months
-	Adjustment	5 months

<u>Further Survey Areas</u>

- Current coverage of telecommunication facilities such as telecom towers installed by the public sector or the private sector
- Priorities by region for telecom infrastructure
- Requirements and specifications of telecom towers, etc.

<u>Estimates</u>

To be evaluated

2) Remote air traffic control systems for airports in remote areas

Recent digital tools made remote air traffic controlling in airports possible, which is applicable in airports located in remote areas. For instance, this remote controlling is achievable by installing relevant facilities and equipment (Remote control fixed cameras, telecommunication devices, multilateration system, airport surface detection equipment, or weather forecast systems, etc.) and monitoring systems, which eventually realizes efficient and integrated air traffic control across the nation.

<u>Challenges to Solve</u>

- Costs and burden for air traffic controlling operations in airports in remote airports
- Information sharing across airports
- Scattering quality in air traffic controlling

<u>Expected benefits or impacts</u>

- Efficient air traffic controls
- Management cost reduction
- Integrated management of relevant information, etc.

Model

Type: Grant

Main targets: Department of Civil Aviation
Airports Fiji Limited

Period: 30 months (2022 June ~ 2024 October)

Headcounts: 12 people

- Chief [Project Management]
- Search & Analysis [Air traffic control, telecom, etc.] #1
- Search & Analysis [Air traffic control, telecom, etc.] #2
- Search & Analysis [Air traffic control, telecom, etc.] #3
- Search & Analysis [Air traffic control, telecom, etc.] #4
- Procurement & Installation of facilities & equipment #1
- Procurement & Installation of facilities & equipment #2
- Procurement & Installation of facilities & equipment #3
- Procurement & Installation of facilities & equipment #4
- System installation, adjustment, & preparation #1
- System installation, adjustment, & preparation #2
- System installation, adjustment, & preparation #3

Schedule

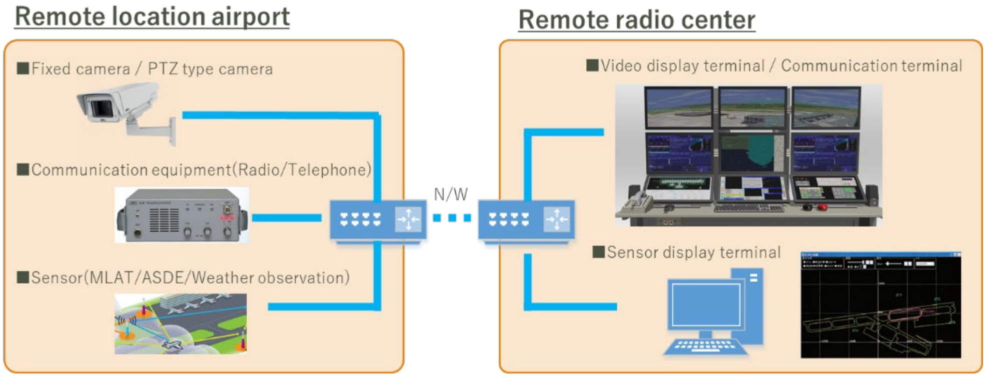
- Search & Analysis 12 months
- Procurement & Installation of facilities & equipment 16 months
- System installation, adjustment, & preparation 5 months

Further Survey Areas

- Current air traffic operation by airport
- Air traffic controlling system in operation, its utilizations
- Human resources in charge of air traffic control, their responsibilities, functions, their utilizations
- Operation manuals by airport, etc.

Estimates

Total 805.0 mil JPY



Source: Japan Radio co., ltd.

Figure 5-3-12 Structure of Remote air traffic controlling system

(6) Summary of proposals

Table 5-3-1 summarizes the proposals on DX raised in the paragraphs (1) to (5).

Table 5-3-1 Project cost, further survey areas, and expected impacts by proposal

No.	Item	Project Cost Estimation	Further Survey Areas	Expected Impacts
1	Capacity-building for Public officials Technical Cooperation	Total 238.8 mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 217.1mil JPY ① Project Management:1 ppl×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2 ppl×4months (Rank 3)≒ 25.2 mil JPY ③ Development of Lecturing & Training materials: 1 ppl×6months (Rank 3) ≒ 18.9 mil JPY ④ Lecturing & Training: 2 ppl×14months (Rank 3)≒ 88.2mil JPY Other Expenditure: Subtotal 21.7mil JPY	・ Existing capacity building measures for public officials, methodologies, training contents ・ IT/Digital talent list, pipelines, etc.	・ Accelerated utilization of digital tools in government ・ Efficiency and effectiveness of public services ・ Accelerated digitalization within government ・ Applications of digitalization into policy planning ・ Embedded talent development mechanism, etc.
2	Capacity-building for Teachers (Education) Technical Cooperation	Total 238.8mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 217.1mil JPY ① Project Management:1 ppl×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2 ppl×4months (Rank 3)≒ 25.2 mil JPY ③ Development of Lecturing & Training materials: 1 ppl×6months (Rank 3) ≒ 18.9 mil JPY ④ Lecturing & Training: 2 ppl×14months (Rank 3)≒ 88.2mil JPY Other Expenditure: Subtotal 21.7mil JPY	・ Existing capacity building measures for teachers, methodologies, training contents ・ IT/Digital talent list, pipelines, etc.	・ Accelerated utilization of digital tools in education ・ Efficiency and effectiveness of educational service ・ Strengthened digital literacy, etc.
3	Cybersecurity Functionality Assessment Technical Cooperation	Total 322.1mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 292.8mil JPY ① Project Management: 1 ppl×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis (Walkthroughs. Excluded): 3 ppl×18months (Rank 3)≒ 170.2mil JPY ③ Development of Lecturing & Training materials: 2 ppl×2months (Rank 3)≒ 12.6mil JPY ④ Lecturing & Training: 2 ppl×4months (Rank 3) ≒ 25.2 mil JPY Other Expenditure: Subtotal 29.3mil JPY	・ Current cybersecurity measures ・ Status of cyberattacks (Internal/Cross-border) ・ Incident cases ・ Relevant rules & regulations, guidelines ・ Manuals, directions, etc.	・ Solid foundation of digitalization ・ Safe and sound cybersecurity ・ Continuous protection against growing cyberthreats ・ Embedded cybersecurity mechanism ・ Protection of rights and properties, etc.

No.	Item	Project Cost Estimation	Further Survey Areas	Expected Impacts
4	Cybersecurity Capability Assessment Technical Cooperation	Total 259.6mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 236.0mil JPY ① Project Management: 1ppl×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis (Walkthroughs. Excluded): 2ppl ×12months (Rank 3) ≒ 75.6mil JPY ③ Development of Lecturing & Training materials: 2ppl ×4months (Rank 3) ≒ 25.2 mil JPY ④ Lecturing & Training: 2ppl ×8months (Rank 3)≒ 50.4mil JPY Other Expenditure: Subtotal 23.6mil JPY	・ Cybersecurity measures ・ Status of cyberattacks (Domestic/Cross-border) ・ Incident cases ・ Relevant rules, regulations and guidelines ・ Relevant manuals, directions, etc.	・ Solid foundation of digitalization ・ Safe and sound cybersecurity ・ Continuous protection against growing cyberthreats ・ Embedded cybersecurity mechanism ・ Protection of rights and properties, etc.
5	Nurturing Cybersecurity talents (Capacity-building) Technical Cooperation	Total 173.9mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 158.1mil JPY ① Project Management: 1ppl ×18months (Rank 2) ≒ 63.6 mil JPY ② Search & Analysis: 2ppl ×4months ≒ 25.2 mil JPY ③ Development of Lecturing & Training materials: 2ppl ×6months (Rank 3) ≒ 18.9 mil JPY ④ Lecturing & Training: 2ppl ×8months (Rank 3)≒50.4mil JPY Other Expenditure: Subtotal 15.8mil JPY	・ Cybersecurity actions (Education, training, simulation, interna/external assessment, etc.) ・ Status of cyberattacks (Domestic/Cross-border) ・ Cybersecurity talent list, pipelines, etc.	・ Solid foundation of digitalization ・ Safe and sound cybersecurity ・ Continuous protection against growing cyberthreats ・ Embedded cybersecurity mechanism ・ Protection of rights and properties, etc.
6	Flood risk monitoring and alerting for Residents' safety & security Technical Cooperation	Total 294.3mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 267.5mil JPY ① Project Management:1ppl ×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2ppl ×6months (Rank 3)≒ 37.8 mil JPY ③ Asset & Equipment Installation : 3ppl×10months (Rank 3) ≒ 94.5mil JPY ④ Lecturing & Training: 2ppl ×8months (Rank 3)≒ 50.4mil JPY Other Expenditure: Subtotal 26.8mil JPY	・ Current management/monitoring status ・ List of facilities/equipment in operation, its utilization status ・ Current risk map, areas of high risk ・ Communication structures (routes), tools ・ Relevant trainings or simulations ・ Relevant rules and regulations, etc.	・ Mitigation of direct disaster risks triggered by climate change and indirect risks ・ Protection of rights and properties, etc.
7	Flood alerts by smartphones Technical Cooperation	Total 249.5mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 226.8mil JPY ① Project Management: 1ppl ×24months (Rank 2)≒ 75.6mil JPY ② Search & Analysis: 2ppl ×10months (Rank 3)≒ 63.0mil JPY ③ Application & System Development: 2ppl×10months (Rank 3)≒63.0mil JPY ④ Experiments & Trials: 2ppl ×4months (Rank 3)≒ 25.2 mil JPY Other Expenditure: Subtotal 22.7mil JPY	・ Current management/monitoring status ・ List of facilities/equipment in operation, its utilization status ・ Current risk map, areas of high risk ・ Communication structures (routes), tools ・ Relevant trainings or simulations ・ Relevant rules and regulations, etc.	・ Mitigation of direct disaster risks triggered by climate change and indirect risks ・ Protection of rights and properties, etc.

No.	Item	Project Cost Estimation	Further Survey Areas	Expected Impacts
8	Digitalization of maintenance for disaster prediction and prevention Technical Cooperation	Total 294.3mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 267.5mil JPY ① Project Management:1ppl ×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 3ppl× 10months (Rank 3)≒ 94.5mil JPY ③ Development &localization of Monitoring software: 2ppl ×10months (Rank 3)≒ 63.0mil JPY ④ Experiments & Trials: 2ppl ×4months (Rank 3)≒ 25.2 mil JPY Other Expenditure: Subtotal 26.8mil JPY	・ Current management/monitoring status ・ List of facilities/equipment in operation, its utilization status ・ Accident cases, incident cases ・ Relevant rules and regulations, etc.	・ Data recording of infrastructure monitoring ・ Effective management by transparency and data sharing ・ Prevention of accidents ・ Safety and security in infrastructures ・ Management cost reduction ・ Solid economic and social foundation, etc.
9	Detection & Monitoring of Marine debris Technical Cooperation	Total 442.3mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 402.1mil JPY ① Project Management:1ppl ×30months (Rank 2)≒ 106.0 mil JPY ② Search & Analysis: 3ppl× 10months (Rank 3)≒ 94.5mil JPY ③ Asset & Equipment Installation: 4ppl× 12months (Rank 3)≒ 151.2mil JPY ④ Lecturing & Training: 2ppl ×8months (Rank 3) ≒ 50.4mil JPY Other Expenditure: Subtotal 40.2mil JPY	・ Current management/monitoring status ・ List of facilities/equipment in operation, its utilization status ・ Accident cases, incident cases ・ Relevant rules and regulations, etc.	・ Safety and security in ocean traffic & distribution ・ Accelerated ocean traffic & distribution ・ Economic productivity, national economic competitiveness, etc.
10	Energy Management Technical Cooperation	Total 231.9mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 210.8mil JPY ① Project Management: 1ppl ×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2ppl ×6months (Rank 3)≒ 37.8 mil JPY ③ Asset & Equipment Installation: 2ppl ×12months (Rank 3)≒ 75.6mil JPY ④ Lecturing & Training: 2ppl ×2months (Rank 3)≒ 12.6mil JPY Other Expenditure: Subtotal 21.1mil JPY	・ Energy use condition of public building ・ Current energy management systems ・ List of energy management systems in operation at public buildings, etc.	・ Optimized energy use, reduction of greenhouse gas emission ・ Economic productivity, national economic competitiveness ・ Achievement of national commitment to climate change, etc.
11	Strengthening Incubation support function Technical Cooperation	Total 301.2mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 273.8mil JPY ① Project Management: 1ppl ×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2ppl ×4months (Rank 3)≒ 25.2 mil JPY ③ Development of Teaching materials: 2ppl ×8months (Rank 3)≒ 50.4mil JPY ④ Lecturing & Training: 3ppl× 12months (Rank 3)≒ 113.4mil JPY Other Expenditure: Subtotal 27.4mil JPY	・ Existing incubation support measures by public organizations, commercial organization, or educational organizations ・ List of incubation related organizations, its utilization, etc.	・ Creation of innovative technologies and new industries ・ Economic productivity, national economic competitiveness ・ Prevention of talent outflows, etc.

No.	Item	Project Cost Estimation	Further Survey Areas	Expected Impacts
12	Business Matching Technical Cooperation	Total 297.8mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 270.7mil JPY ① Project Management:1ppl ×24months (Rank 2)≒ 84.8 mil JPY ② Search & Analysis: 2ppl ×9months (Rank 3)≒ 56.7mil JPY ③ Event planning & Marketing, Event organization: 3ppl×13months (Rank 3)≒ 122.9mil JPY ④ Recording & Publication: 1ppl ×2months (Rank 3)≒ 6.3mil JPY Other Expenditure: Subtotal 27.1mil JPY	・ Existing business matching by public organizations, commercial organization, or educational organizations ・ List of investment attraction measures, etc.	・ Creation of innovative technologies and new industries ・ Inward transfer of technologies, knowhow, and knowledge ・ Economic productivity, national economic competitiveness, etc.
13	Support for Digital Nautical Chart (Electronic Navigation Chart) Technical Cooperation	Total 467.6mil JPY (=Personnel Expenditure + Other Expenditure *Facility/Equipment Excluded.) Personnel Expenditure: Subtotal 425.1mil JPY ① Project Management: 1ppl ×24months (Rank 2)≒ 84.8mil JPY ② Search & Analysis, Data Collection: 3ppl×20months (Rank 3)≒ 189.1mil JPY ③ Coordination: 2ppl ×20months (Rank 3) ≒ 126.0mil JPY ④ Lecturing & Training：2ppl ×4months (Rank 3)≒ 25.2 mil JPY Other Expenditure: Subtotal 42.5mil JPY	・ Search & analysis methodologies for information of nautical charts ・ Data collection methodologies for information of nautical charts ・ Updating methodologies for information of nautical charts ・ Methodologies of reference point survey ・ Leveling methodologies ・ Methodologies of data collection and analysis for determining land area, sea area and coastline by satellite images ・ Monitoring methodologies of tides and trends ・ Analysis methodologies of ocean data for tide tabled and trend forecast ・ Editing methodologies of paper charts and electronic navigation charts ・ Graphic drawing methodologies for shallow sea bottoms ・ Best practices in the overseas, mode cases, etc.	・ Independent capability to have nautical charts meeting requirement of international standards ・ Safe and secure ocean traffic & distribution, etc.
14	Support for DEM Grant	Total 1,030mil JPY Breakdown Electronic navigational chart for Yasawa area (app. 25,000km^2)≒700.0mil JPY Seamless DEM for Viti Levu area ≒ 250.0mil JPY Consulting service cost≒80.0 mil JPY * soft component included (e.g. relevant education and training)	・ Publication and distribution procedures electronic navigation charts ・ Rules and regulations for data analysis and processing for DEM ・ Current coverage of electronic navigation charts ・ Practical needs for electronic navigation charts, etc.	・ Publication and distribution of electronic navigation charts ・ Preparation and protection for tsunami, climate change, potential oil spills ・ Comprehension of fishery areas ・ Safe and secure marine leisure ・ Utilization of DEM for constructing harbors and fishing ports ・ Foundation of ocean data ・ Utilization in exploitation for ocean resources ・ Protection for national rights such as territorial waters or EEZ, etc.

No.	Item	Project Cost Estimation	Further Survey Areas	Expected Impacts
15	Local telecommunication Grant	Total: To be evaluated Breakdown Telecom towers: To be surveyed further Relevant facilities/equipment: To be surveyed further Consulting service cost≒50.0 mil JPY～200.0 mil JPY	・ Current coverage of telecommunication facilities such as telecom towers installed by the public sector or the private sector ・ Priorities by region for telecom infrastructure ・ Requirements and specifications of telecom towers, etc.	・ Disparity correction in telecom conditions by comprehensive telecom networks ・ Quality of life or business environment for those living in remote areas, etc.
16	Remote air traffic control systems for airports in remote areas Grant	Total 805.0 mil JPY Breakdown Video display terminal/Communication terminal≒125.0 mil JPY Sensor display terminal≒125.0 mil JPY Fixed camera/ TZ camera≒100.0 mil JPY Communication equipment≒100.0 mil JPY Sensors(MLAT/ASDE/weather forecast) ≒250.0mil JPY Consulting service cost≒ 105.0mil JPY * soft component included (e.g. relevant education and training)	Current air traffic operation by airport Air traffic controlling system in operation, its utilizations Human resources in charge of air traffic control, their responsibilities, functions, their utilizations Operation manual by airport, etc.	・ Efficient air traffic controls ・ Management cost reduction ・ Integrated management of relevant information, etc.

Reference: JICA Survey team

CHAPTER 6 LIMITATIONS ON THE SURVEY UNDER THE COVID-19 PANDEMIC

Chapter 6 LIMITATIONS ON THE SURVEY UNDER THE COVID-19 PANDEMIC

The Survey period including Christmas (summer vacation), and the fact that it was not possible to travel to any USP member countries other than Fiji to conduct the field survey due to the spread of COVID-19.

Therefore, in this chapter, the Team provides the following suggestions for analysis, evaluation, and verification of matters that were able to achieve only limited confirmation in the survey due to the aforementioned constraints related to time, people, and transportation. The Team believes that these suggestions will be useful for JICA when considering the details of its support for the USP distance learning system in the future.

(1) Analysis of the expected impact of the establishment of new centres

The possibility of creating new centres under the supervision of regional campuses was raised by USP management during the debriefing on the field survey on December 8, 2021. It is likely true that with more centres more students on remote islands could study within the proximity of their residences. However, the cost effectiveness of such an undertaking must be thoroughly assessed since there may exist other higher priority development tasks aimed at enhancing student learning.

In this regard, it is recommended that thorough data collection and analysis be done on the expected impact of the establishment of new centres in specific locations, including the number of students who would choose to study there.

(2) Network monitoring to assess connectivity

During the field survey by the Team in November, 2021, various USP officials pointed out connectivity problems as an issue for the distance learning system. Various factors in addition to the capacity, speed, and line conditions of the communication line (satellite line, AARnet, ISP, etc.) that USP subscribes to are possible causes of the problem, including network settings (QoS), communication line usage, software used, and the performance of the user’s devices (such as smart phones, laptops, etc.).

The actual connectivity of students at each campus/centre should be measured during the busy period of the USP semester to obtain information on the usage of communication lines and the load on the network. This will help the Team and USP make decisions on overall priorities and on measures to improve connectivity.

Therefore, it is recommended that communication network monitoring be conducted during the busy period of the USP to measure the connectivity of students at each campus/centre.

(3) Formulate a long-term renewal plan for telecommunications infrastructure

In this survey, the Team collected information on the age of the existing equipment of the communication infrastructure used by the USP's distance learning system, and examined the necessity of updating the equipment. As shown in Chapter 4, it is recommended to upgrade the outdoor equipment of Ku-Band satellite system in view of the 15-year design life of general satellite equipment. However, the USP's distance learning system also uses submarine optical cables, ISPs, and mobile phone network, and satellite links are just one of its communication infrastructure.

For this reason, it is recommended that detailed information on each communication infrastructure used by the USP, such as the optical submarine cable installation plan described in Chapter 3, broadband network services provided by telecommunication companies in each country, and the costs associated with the use of these services, be collected, and that a long-term and comprehensive update plan of the communication infrastructure for the USP distance learning system be formulated.

(4) Examining the effects of the different learning modes

USP currently offers the following four (4) learning modes: face-to-face mode, blended mode, online mode, and print mode. In face-to-face mode, an online (or offline) learning environment is usually not required, but COVID-19 has forced academic staff and students to use Zoom.

For the print mode, the focus is on the needs of students in USP member country regions that do not have the infrastructure for online learning. However, the USP Strategic Plan 2022-2024 encourages further adoption of teaching and learning technologies, and it is expected that some of the courses in the print mode will be shifted to the online mode.

In order to capture all of these different modes of learning in a comprehensive manner, it is recommended that the effectiveness of each mode of learning be examined.

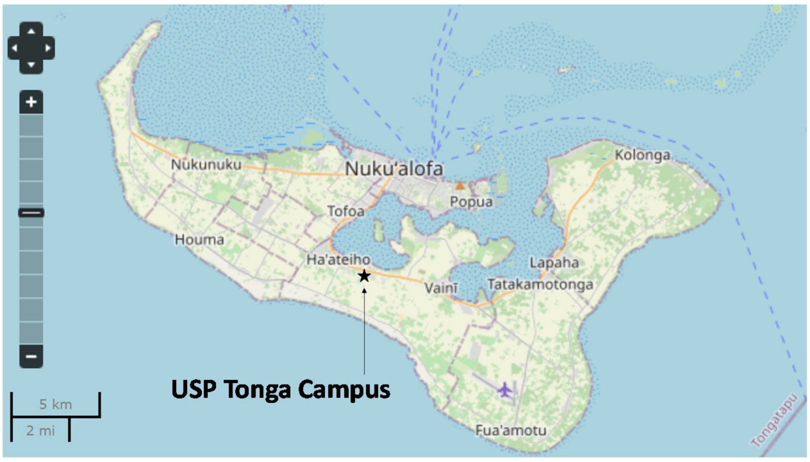
(5) Consideration of potential secondary hub sites

As described in Chapter 4, as part of the business continuity plan (BCP), the Team is considering the construction of a secondary hub to back up the functions of the satellite hub station and data centre at the Laucala main campus. Possible candidate sites include Tonga, Samoa, and the Marshall Islands, where optical submarine cables have been laid. It will be necessary to collect information on the facilities, equipment, personnel of each campus, surrounding environment, and services provided by local ISPs, and to consider countermeasures for disasters such as tsunamis and earthquakes before proceeding with the study.

Since the destination of this survey was limited to Fiji due to the spread of the COVID-19 pandemic, the Team conducted a remote field survey

[104] of the Tonga campus, one of the three candidate sites mentioned above, using local hired personnel. The results of this survey are described below.

As shown in Figure 6-1-1, the Tongan campus is located in the centre of Tongatapu Island, about 1 km inland from the coast facing the bay. The elevation of the campus is 12 m above sea level, which is relatively low, so there is concern about damage from tsunamis and storm surges caused by earthquakes in the nearby seas[105].



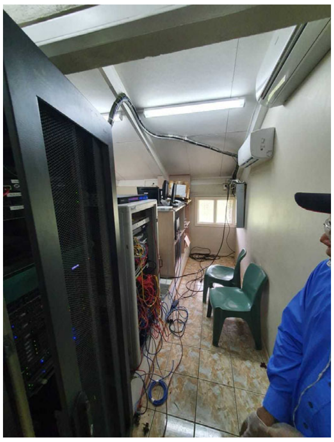
Source: JICA Study Team

Figure 6-1-1 Location of Tonga Campus

The server room is currently equipped with an uninterruptible power supply and a generator to ensure backup power. As for the air conditioning system, two air conditioners are switched every week to ensure backup for air conditioning. The available space in the server room is about 3.2 m x 5.2 m, which allows for the installation of some additional equipment, but is insufficient for the installation of equipment on a scale similar to that of a secondary hub. However, it is possible to secure space for the construction of a second hub building on the campus.

Source: JICA Study Team

Photo 6-1-1 Tonga campus



Source: JICA Study Team

Photo 6-1-2 Server room in Tonga campus

[104] On February 7, 2022, a site visit to the USP Tonga campus and an interview with Mr. Nofofonua Hakaumotu, IT Officer, were conducted.

[105] After the eruption of the submarine volcano on January 15, 2022, there was no tsunami on the campus and the only damage was volcanic ash.

(6) Confirmation of Damage[106] to USP campuses/centres due to Tonga undersea volcanic eruption

As mentioned in Chapter 3, a communication failure has occurred due to damage to two optical submarine cables caused by the eruption of the Hunga Tonga-Hunga Ha'apai volcano about 65 km northwest of Nuku'alofa, the capital of Tonga. According to Tonga Cable Limited (TCL), the damage to the optical submarine cable occurred at a point about 37 km from Nuku'alofa for the international submarine cable between Fiji and Tonga (the Tonga Cable), and at a point about 47 km from Nuku'alofa for the domestic cable extension between Tongatapu and Ha'apai (the Tonga Domestic Cable Extension).

As for the USPNet satellite link, the C-Band satellite communication system at the Tonga campus was being upgraded with the support of New Zealand, but the installation was delayed due to COVID-19, so the system is not operational. However, the Ku-Band satellite communication system at the Vavau and Ha'apai centres, which are on remote islands far from Tongatapu, are working and the Laucala main campus is able to communicate with both centres.

The restoration of optical submarine cables usually takes two to four weeks, if a working vessel can be secured. It has been reported that the cable maintenance company is in Papua New Guinea and will be leaving soon to go to the site via Samoa, but due to the ongoing volcanic activity, it is not clear if they will be able to get close enough to the site to perform the repair work.

Mobile phone services in Tonga are provided by two mobile carriers, Digicel and TCC, and Digicel appears to have regained international coverage, although its capacity is limited by its own backup international satellite link. It is unclear whether TCC has a satellite backup facility, and calls from Japan have not been connected.

Broadcom 87.5, the Tongan distributor of Kacific Satellite's Internet service, headquartered in Singapore, has been reporting on local videos uploaded by its staff[107]. The Ka-Band satellite line of the Kacific satellite is capable of broadband communication, and it is possible to communicate with Tonga via Broadcom.

The Government of Tonga signed a 15-year usage agreement with Kacific Broadband Satellites Group after the 2019 fiber-optic submarine cable cutting incident, but the agreement has not been fulfilled due to contractual problems. It appears that the restoration of the international connection by the Tongan government, TCC, and TCL using Kacific's satellite has not progressed since the optical submarine cable disruption caused by the volcanic eruption.

The above information on the damage caused by the submarine volcanic eruption, the status of the post-disaster operation of the communication infrastructure, and the government's response will serve as a reference for each USP campus/center's emergency response in the event of a disaster. Therefore, it is

[106] This section describes the information collected by the survey team from websites and other sources as of January 22, 2022, regarding the damage caused by the disaster mentioned above.

[107] The company's FM broadcast (in Tongan) can be heard live at the following website. http://radio.garden/listen/letio-tonga-broadcomm-87-5-fm/qBckiWlE

recommended that the BCP (Business Continuity Plan) of each campus/centre be updated after analyzing the collected information (redundancy of communication and power supply facilities, review of the organizational structure in case of emergency, etc.).

Appendices

Appendix 1 Member List of JICA Study Team

1. Member List of JICA Study Team

JICA Study Team

Name	Work Assignment	Position
Yosuke IKEDA	Chief Consultant /Distance Learning System	Yachiyo Engineering Co., Ltd.
Kazuhiko HARIKAE	Deputy Chief Consultant /Communication Network	Yachiyo Engineering Co., Ltd.
Sugashi NAGAI	Tertiary Education	Koei Research & Consulting Inc.
Takumi KAWAI	Digital Technology 1	Yachiyo Engineering Co., Ltd.
Takehiko TANABE	Digital Technology 2	Yachiyo Engineering Co., Ltd.

Appendix 2 Study Schedule

2. Study Schedule

No.	Date	Day	Yosuke IKEDA	Kazuhiko HARIKAE	Sugashi NAGAI	Takumi KAWAI	Takehiko TANABE	Stay at
			Contents of Field Survey					
In charge of			Chief Consultant /Distance Learning System	Deputy Chief Consultant /Communication Network	Tertiary Education	Digital Technology 1	Digital Technology 2	
Number of survey days			36	36	36	15	36	
1	7-Nov	Sun	Flight [Narita 09:40 →16:30 Singapore 22:50 →Auckland 13:45 +1]					On flight
2	8-Nov	Mon	Flight [Auckland 17:05 →19:05 Nadi]					Nadi
3	9-Nov	Tue	・Meeting with JICA Fiji Office, Meeting with USP (Explanation of Inception Report)					Nadi
4	10-Nov	Wed	・Kick-off Meeting with USP Management (VC, DVC (Ed)、DVC (Regional Campus)、CFL、ITS、Development Cooperation Unit) ・Meeting with JICA Fiji Office, Meeting with USP (DX in Fiji, Other Donor Information, etc.)					Nadi
5	11-Nov	Thu	・Meeting regarding DX Survey with Mr. Taniguchi (Free Bird Institute) ・Finalization of Questionnaire					Nadi
6	12-Nov	Fri	・Finalization of Questionnaire					Nadi
7	13-Nov	Sat	・Finalization of Questionnaire					Nadi
8	14-Nov	Sun	・Finalization of Questionnaire					Nadi
9	15-Nov	Mon	Move [Nadi → Suva], Courtesy call to JICA Fiji Office					Suva
10	16-Nov	Tue	・Meeting with USP Management (Dir. CFL、Dir. ITS、D'ty Dir. ITS, Development Cooperation Unit) ・Meeting with Ministry of Economy (Mr. Kamal)	・Meeting with USP Management (Dir. CFL、Dir. ITS、D'ty Dir. ITS, Development Cooperation Unit)	・Meeting with USP Management (Dir. CFL、Dir. ITS、D'ty Dir. ITS, Development Cooperation Unit)	・Meeting with Ministry of Economy (Mr. Kamal) ・Meeting with Ministry of Education, Arts & Heritage	・Meeting with USP Management (Dir. CFL、Dir. ITS、D'ty Dir. ITS, Development Cooperation Unit)	Suva
11	17-Nov	Wed	・ITS Facility Tour	・ITS Facility Tour	・Meeting with PacREF Coordinator ・Meeting with Pacific TAFE ・ITS Facility Tour	・Meeting with Researchers on Digital Literacy (Multiple academias) ・Meeting with USP Cyber Security Dep .・Meeting with Local Entrepreneurs	・ITS Facility Tour	Suva
12	18-Nov	Thu	・Meeting with ITS ・Meeting with DVC (Ed)	・Meeting with ITS ・Meeting with DVC (Ed)	・Meeting with MoEHA (PS) ・Meeting with ITS ・Meeting with DVC (Ed)	・Meeting with Local Entrepreneurs	・Meeting with ITS ・Meeting with DVC (Ed)	Suva
13	19-Nov	Fri	・Meeting with FBC	・Meeting with FBC	・Meeting with FBC ・Meeting with APTC	・Meeting with FBC ・Meeting with Ikkyu ・Meeting with Daikoku ・Meeting with FreeBird Institute Move [Suva → Nadi]	・Meeting with FBC	Suva, Nadi
14	20-Nov	Sat	・Internal meetings, organizing materials			Move [Nadi 09:00 → 12:55 Sydney 16:10 → 21:20 Singapore 23:55 →]	Same to Chief Consultant	Suva, on flight
15	21-Nov	Sun	・Internal meetings, organizing materials			Flight [→ Narita 07:30]	Same to Chief Consultant	Suva
16	22-Nov	Mon	・Meeting with CFL				・Meeting with CFL	Suva
17	23-Nov	Tue	・Meeting with DVC (Regional Campuses)			・Meeting with Department of Energy (Zoom)	Same to Chief Consultant	Suva
18	24-Nov	Wed	・Meeting with Dir. Infrastructure ・REACT Demonstration by ITS			・Meeting with Investment Fiji (Zoom)	Same to Chief Consultant	Suva

※The red box indicates the quarantine period after entry into Fiji.

No.	Date	Day	Contents of Field Survey					Stay at
			Yosuke IKEDA	Kazuhiko HARIKAE	Sugashi NAGAI	Takumi KAWAI	Takehiko TANABE	
In charge of			Chief Consultant /Distance Learning System	Deputy Chief Consultant /Communication Network	Tertiary Education	Digital Technology 1	Digital Technology 2	
Number of survey days			**36**	**36**	**36**	**15**	**36**	
19	25-Nov	Thu	Distance Learning Survey	USPNet Survey	Tertiary Education Sector Survey		Distance Learning Survey	Suva
20	26-Nov	Fri	Distance Learning Survey	USPNet Survey	Tertiary Education Sector Survey		Distance Learning Survey	Suva
21	27-Nov	Sat	･Internal meetings, organizing materials					Suva
22	28-Nov	Sun	･Internal meetings, organizing materials,			･Internal meetings, organizing materials	Same to Chief Consultant	Suva
23	29-Nov	Mon	Move [Suva → Savusavu] ･Savusavu Sub-sentre & Labasa Campus Move [Labasa → Suva]			・ Meeting with Local Entrepreneurs (Zoom)	Same to Chief Consultant	Suva
24	30-Nov	Tue	Preparing Field Report	Preparing Field Report	Meeting with Mr. Iresh		Same to Chief Consultant	Suva
25	1-Dec	Wed	･Meeting Mr. Iresh (Development Partners) ･Meeting with ITS	Preparing Field Report	･Meeting Mr. Iresh (Development Partners) ･Meeting with ITS	・ Meeting with Local Entrepreneurs (Zoom)	･Meeting with ITS ･Meeting with CFL staff (Irene)	Suva
26	2-Dec	Thu	Mini workshop with CFL	Mini workshop with CFL	･Mini workshop with CFL ･Meeting with Student Association		Same to Chief Consultant	Suva
27	3-Dec	Fri	Preparing Field Report	Preparing Field Report	･Meeting with CFL Staff (Mr. Evan)		・ Meeting with CFL Staff (Mr. Evan)	Suva
28	4-Dec	Sat	･Organizing materials, Preparing Field Report				Same to Chief Consultant	Suva
29	5-Dec	Sun	･Organizing materials, Preparing Field Report				Same to Chief Consultant	Suva
30	6-Dec	Mon	･Discussion with USP, Preparing Field Report	･Discussion with USP, Preparing Field Report	･Meeting with Dir. Finance, Uni Fiji ･Meeting with (formaer) Scholarship		Same to Chief Consultant	Suva
31	7-Dec	Tue	･Discussion with USP, Preparing Field Report	･Discussion with USP, Preparing Field Report	･Meeting with Finance Dept., USP ･Summarizing WS w/ CFL		Same to Chief Consultant	Suva
32	8-Dec	Wed	Debriefing to USP Management (VC)	Debriefing to USP Management (VC)	･Meeting with Library staff ･Debriefing to USP Management (VC)		･Meeting with Library staff ･Debriefing to USP Management (VC)	Suva
33	9-Dec	Thu	･PCR Test ･Reporting to JICA Fiji Office				Same to Chief Consultant	Suva
34	10-Dec	Fri	Meeting with DVC (Ed, RC) Reporting to Embassy of Japan Wrap up with Dir of CFL (Dr. Chand) , Move [Suva → Nadi]				Same to Chief Consultant	Nadi
35	11-Dec	Sat	Flight [Nadi 08:30→11:40 Auckland 15:30 → 21:10 Singapore 23:55 →]				Same to Chief Consultant	On flight
36	12-Dec	Sun	Flight [→ Narita 07:30]				Same to Chief Consultant	-

Appendix 3 List of Parties Concerned in the Recipient Country

3. List of Parties Concerned in the Recipient Country

Name and Affiliation	Position
The University of the South Pacific (USP)	
Professor Pal Ahluwalia	Vice-Chancellor and President
Dr. Giulio Masasso Tu'ikolongahau Paunga	Deputy Vice-Chancellor (Regional Campuses, Estates & Infrastructure)
Professor Jito Vanualailai	Deputy Vice-Chancellor Education (Acting)
Mr. Kisione Wesley Finau	Director, Information Technology Service（ITS）
Mr. Fereti Atalifo	Deputy Director, Information Technology Service（ITS）
Mr. Marika Qalomai	Information Technology Service（ITS）
Mr. Peni Sigabalavu	Information Technology Service（ITS）
Mr. Josese Ravuvu	Information Technology Service（ITS）
Ms. Seini Wainikesa	Information Technology Service（ITS）
Dr. Rajni Chand	Director, Centre for Flexible Learning（CFL）
Dr. Irene Mary Chief	Centre for Flexible Learning（CFL）
Mr. Evan Naqiolevu	Centre for Flexible Learning（CFL）
Mr. Pita Tuisawau	Instructional Designer（CFL）
Mr. Mojito Jione	Learning Experience Designer（CFL）
Mr. Mohammed Hussein	Learning Experience Designer（CFL）
Mr. Nitendra Gounder	Education Technologist（CFL）
Ms. Sarome Seeto	PA to Director（CFL）
Dr. Kaylash Chaudhary	School of Computing, Information and Mathematical Sciences
Dr. Bibhya Sharma	School of Computing, Information and Mathematical Sciences
Mr. Iresh Asil Lal	Manager, Development Cooperation
Mr. Ruveni Gacala	Scholarship Officer (SAS)
Ms. Anushka Maharaj	Research Student Coordinator (Research Office)
Ms. Rahkel Mercy	Executive Officer, Office of the Vice-Chancellor & President
Mr. Kolinio Boila	Executive Director, Finance
Mr. Mervyn Lepper	Director, Estates and Infrastructure
Mr. Peceli Kiliraki	Strategic Assets and Planning
Ms. Susan Sela	Director, Pacific TAFE
Ms. Rosalia Fatiaki	Head of College, College of Foundation Studies, Pacific TAFE
Mr. Filipe Jitoko	Coordinator, PacREF
Ms. Elizabeth C. Reade Fong	University Librarian, Library
Ms. Judith Titoko	Senior Librarian Technical Services, Library
Mr. Gyaneshwar Narayan	Library Systems Manager, Library
Mr. Daniel Brown	Electronic Resources Librarian, Library
Mr. Emosi Vakarua	Secretary General, USP Students Association
Mr. Ahemad M. Shah	Accountant, Labasa Campus
Mr. Asesela Vitukawalu	ICT User Support, Labasa Campus

Mr. Sanjeev Sharma	SAS Coordinator, Labasa Campus
Mr. Sairusi Lui	Savusavu Centre Coordinator
Ms. Usha Lal	Savusavu Centre Clerical Assistant-SAS/Finance
Mr. Waisale Vakaloloma	Savusavu Centre Library Office
Mr. Shaheen Ali	Student, Lautoka Campus
Mr. Maverick Seda	Student, Solomon Island Campus
Mr. George Joram	Student, Nauru Campus
Mr. Jona Saturu	Student, Niue Campus
Mr. Paul Robert	Student, Marshall Island Campus
Ms. Lesieli	Student, Tonga Campus
Mr. Benjamin Sdrugu	Student, Emalus (Vanuatu) Campus

Ministry of Education, Heritage & Arts

Anjeela Jokhan	Permanent Secretary
Sandeep Singh	Technical Division
Serupepeli Udre	Director Assets Manager
David Ali	Executive Officer

Ministry of Economy

Kamal Gounder	Coordinator

Education Quality and Assessment Programme

Dr. Michelle Belisle	Director
Mr. Agustin de la Varga	Principal Advisor

Australia Pacific Training Coalition

Ms. Janelle Chapman	Executive Director
Mr. Gareth McGrath	Country Director-Fiji/Tuvalu (Acting)
Ms. Susan Bateup	Training Delivery Innovation Manager (Acting)
Mr. Arthur Sokimi	Programme Facilitator-Strategic Engagement

Department of Energy

Mr. Jeke Vakaloloma Pai	Technical Division
Mr. Mikaele Belena	Technical Division
Mr. Deepak S. Chand	Technical Division
Mr. Taniela Q. Tabuya	Technical Division
Jonati M. Delaimoala	Technical Division
Waisale WV. Vulagi	Technical Division

Ministry of Waterways & Environment

Mr. Salvin Sumit Anand	Technical Division / Department of Waterways

Investment Fiji

Mr. Asesh Chand	Investment & Trade Advisor

University of Fiji

Mr. Ravineet Sami	Executive Director, Finance, Planning and Development

Fiji National University

Dr. William May	Dean of College of Medicine, Nursing and Health Sciences
Dr. Pritika Reddy	Department of Computing Science and Information Systems
Dr. Ronil Chand	Department of Computing Science and Information Systems

New Zealand Foreign Affairs & Trade

Ms. Olivia Benton-Guy	Policy Officer (Digital), Development Economy and Prosperity Division (DEVECO)
Ms. Amy Mcateer	Lead Advisor, Education, New Zealand Aid Programme

New Zealand Embassy, Tokyo

Mr. David Gaston	First Secretary

Youth Fiji

Mr. Shanil Chettty	Founder

Free Bird Institute Limited

Mr. Hiroshi Taniguchi	Chairman Chief Executive Officer

Daikoku

Mr. Hayasi Takashi	-

Embassy of Japan in Fiji

Mr. Iwano Taisuke	First Secretary Development Cooperation
Mr. Tazawa Hiroki	Second Secretary Economic and Development Cooperation
Mr. Tanaka Yoshiaki	Second Secretary Development Cooperation

JICA Fiji Office

Ms. Amaike Mayumi	Resident Representative
Ph.D. Suzuki Kazunobu	Deputy Resident Representative
Mr. Eguchi Yuma	Assistant Resident Representative

Mr. Namba Shigeki	Project Formulation Advisor Regional Infrastructure

JICA Headquarter

Mr. Shinya Tamio	Pacific and Southeast Asia Division 6, Southeast Asia and Pacific Department
Mr. Minato Yusuke	Pacific and Southeast Asia Division 6, Southeast Asia and Pacific Department
Mr. Kuniyoshi Watanabe	Pacific and Southeast Asia Division 6, Southeast Asia and Pacific Department

Appendix 4　Field Report
(Field Survey on the Distance Learning System and Communication Network of the University of the South Pacific)

DATA COLLECTION SURVEY
FOR
THE DISTANCE LEARNING SYSTEM AND COMMUNICATION NETWORK OF THE UNIVERSITY OF THE SOUTH PACIFIC
IN
THE PACIFIC REGION

FIELD REPORT

December 8, 2021

Final version updated on December 22, 2021

Prepared and Submitted by:	Acknowledged by:
Yosuke IKEDA	Professor Pal Ahluwalia
Chief Consultant	Vice-Chancellor and President (VC&P)
JICA Project Team	The University of the South Pacific
(Yachiyo Engineering Co., Ltd.)	

JICA SURVEY TEAM
(Joint Venture of Yachiyo Engineering Co., Ltd.
and Koei Research & Consulting Inc.)

Table of Contents

1. Introduction

This Field Report is to establish mutual understandings among JICA Project Team (hereinafter referred to as "the Team") for the Data Collection Survey for the Distance Learning System and Communication Network of the University of the South Pacific in the Pacific Region (hereinafter referred to as "the Survey") and The University of the South Pacific (hereinafter referred as "USP") and relevant organizations on the technical and engineering aspects for the distance learning system of USP. This has been also prepared by the Team based on the results of the field survey and discussions with the USP and relevant organizations.

The Team had been dispatched to Fiji and conducted the field survey in the Laucala campus from November 16, 2021 to December 10, 2021. Through the filed survey, the Team collected information from USP to confirm and consider the following items:

(1) The current situation of Distance Learning System in USP and the future plans as the USP Connect concept,

(2) The infrastructure, services and software components required to realize the USP Connect concept and

(3) Needs and issues in above 2. that are necessary to realize the USP Connect and possibility of support by JICA for it.

Since all the information as described in this report will be integrated into the final report which JICA will publish, the contents indicated in this report are thus unfinished and tentative. Hence, JICA is not committed any of these proposed supports for the USP written in this report.

2. Outline of USP

2-1 Brief History and Background of Establishment

Today, the University of South Pacific (USP) is known as an university jointly established by some pacific island nations, 12 countries and region more specifically, which is very unique that not ruled by laws of one country. But it did not start in such manner if going back to its history.

Pacific island states were not yet independent until Western Samoa (name changed to Samoa in 1999) gained independence in 1962 from UN Trusteeship. Age of colonialism was coming to an end, however, various island states were already moving towards gaining independency in 1960's. Human resources development for independent nations in both public and private sectors is crucial element considering that expatriates from Western countries were to be replaced by local human resources in a nation government as well as private sector development. I.e., there was an essential need for establishing education and training institutions to produce such human resources for those island states. Under such a circumstance, the University of South Pacific (USP) was established in 1968 by Western stakeholders in the region such as Australia, New Zealand and UK.

After two years of the establishment, Charter and Statute were enacted by the name of Her Majesty Queen Elizabeth II of United Kingdom, when Cook Islands, Fiji, Tonga and Nauru in addition to Samoa were only independent nations in the Pacific region. But by the end of year 1980, Kiribati, Niue, Solomon Islands, Tuvalu and Vanuatu became independent that count for 10 member countries of 12 of those today. As for two other members of USP, Marshall Islands came into more independent status in 1986 when Compact Agreement passed United State Congress and joined USP in 1992 while Tokelau is still considered to be governed by New Zealand by now and not yet independent.

2-2 Governance

T The highest legal constitutional documents of USP are its Charter and Statutes, the original Charter and Statutes were contained in an Order in Council of Her Majesty Queen Elizabeth II made under her Royal Prerogative powers on 4 February 1970. The Charter incorporated USP as a "body politic and corporate." The Order was expressed to be made by Her Majesty for the benefit of the original 11 South Pacific member countries of the University and in response to requests from their governing authorities since the twelfth, the Marshall Islands, became a member later. They have been amended for a few times although an amendment of the Charter requires the Privy Council of UK and the latest version were those amended in 2009. The Charter contains the objects and powers of the University and provides for its governance. Section 3 of the Charter states:

The objects of the University shall be the maintenance, advancement and dissemination of knowledge by teaching, consultancy and research and otherwise and the provision at appropriate levels of education and training responsive to the well-being and needs of the communities of the South Pacific.

2-2-1 The Council

Under Section 13 of the Charter, the Council is the USP's "executive governing body" and is "responsible for the management and administration of the revenue and property of the University.” Subject to the powers of the Senate (which is the academic authority of the University), the Council is empowered to exercise all of the powers of the USP.

Day-to-day administration of the USP is carried out on behalf of the Council by the Vice-Chancellor and President, who is the University’s chief academic and administrative officer, and on his/her behalf by subordinate officers and staff at the University’s various campuses and centers. The Vice-Chancellor and President reports to the Council on the conduct of this administration.

The membership and workings of the Council are governed by Part 4 of the Statutes. Statute 12 provides that the members of the Council consist of

(i) the Pro-Chancellor and Chair of the Council;
(ii) the Vice-Chancellor and President;
(iii) one member from each member country other than Fiji and Samoa (which have 5 and 2 members, respectively);
(iv) one member appointed by each of the governments of Australia and New Zealand;
(v) the Secretary-General of the Pacific Islands Forum Secretariat (or nominee);
(vi) two professors elected by the University’s Senate;
(vii) two other staff members appointed in accordance with the University’s Ordinances;
(viii) two student representatives elected in accordance with the University’s Ordinances; and
(ix) a maximum of seven additional members “co-opted by the Council bearing in mind the desirability on the Council of various things such as management experience, professional and commercial interests, graduates, geographical representation, age and gender balance and academic experience from outside of the region.”

The Statutes require the Council to meet at least once a year. In practice, it meets twice a year in May and November in different member countries. Special meetings may be convened at the written request of the Pro-Chancellor or at least 10 members of the Council.

The Current Council Members are as follows;

Mr Winston Thompson : Pro-Chancellor & Chair of Council

Professor Pat Walsh : Deputy Pro-Chancellor & Deputy Chair of Council (Also New Zealand Government Representative)

Professor Pal Ahluwalia: Vice-Chancellor and President:

Hon. Vaine Mokoroa: Cook Islands Minister for Education

Hon. Alexander Teabo: Kiribati Minister for Education

Hon. Kitlang Kabua: Marshall Islands Minister for Education, Sports & Training

H.E. Lionel Aingimiea: Nauru President & Minister for Education

Hon. Sauni Tongatule: Niue Minister for Education

Hon. Lanelle Tanangada: Solomon Islands Minister for Education & Human Resources Development

Hon. Elehi Kelihiano Kalolo: Tokelau Minister for Education

Hon. Timi Melei: Tuvalu Minister for Education, Youth & Sports

Hon. Samson Samsen: Vanuatu Minister for Education & Training

Hon. Seu’ula Ioane: Samoa Minister for Education, Sports & Culture

Mr Leasiosiofa'asisina Oscar Malielegaoi: Samoa Chief Executive Officer, Ministry of Finance

Hon. Premila Kumar: Fiji Minister for Education, Heritage & Arts

Dr Anjeela Jokhan: Fiji Permanent Secretary for Ministry of Education, Heritage & Arts

Mr Shiri Gounder: Fiji Permanent Secretary for Economy (Acting)

Ms Fay Yee: Fiji Government Representative

Mr Mahmood Khan: Fiji Government Representative (Also Chair of Audit & Risk Committee)

Hon. Siaosi 'Ofa Ki Vahafolau Sovaleni: Tonga Minister for Education & Training

Professor Caroline McMillen: Australian Government Representative

Mr Henry Puna: Secretary General, Pacific Islands Forum Secretariat

Ms Aloma Johannson: Chair of Finance & Resources Committee

Professor Sushil Kumar: Senate Representative

Professor Surendra Prasad: Senate Representative

Mr Mani Mate: USP Students Association Representative

Mr Viliame Naulivou: USP Students Association Representative

Dr Krishna Raghuwaiya: University Staff Representative

Dr Robin Havea: University Staff Representative

Ms Petunia Tupou: Co-Opted

Mr Semi Tukana: Co-Opted

In addition to the Council members, the USP Statutes also stipulates the position of the Chancellor of USP. The Chancellor is the titular head of the University. The term for the Chancellor is one year usually from July to June in the following year. The following are the Chancellors in the past few years.

Hon. Dalton Emani Makamau Tagelagi, the Premier of Niue, (July 2021 - June 2022)

His Excellency Lionel Rouwen Aingimea, President of the Republic of Nauru (July 2020 – June 2021)

His Excellency David Kabua, President of the Republic of Marshall Islands (13 January 2020 – 30 June 2020)

Her Excellency Dr Hilda C. Heine, President of the Republic of Marshall Islands (July 2019 – 12 January 2020)

President of the Republic of Kiribati (July 2018 – June 2019)

President of Fiji (July 2017 – June 2018)

Prime Minister of Cook Islands (July 2016 – June 2017)

President of Vanuatu (July 2015 – June 2016)

The following are the Pro-chancellor and the Chair of the Council in the past decade. According to USP management, the former Chancellor Her Excellency Dr. Hilda C. Heine has been agreed and selected for the Pro-chancellor for the next three years term starting January 2022.

Pro-chancellor and Chair of the Council

Mr Winston Thompson (1 January 2016 – 31 December 2021)

Mrs Fekitamoeloa 'Utoikamanu (13 April 2015 – 31 December 2015), Acting

Mr Ikbal Jannif (1 July 2012-12 April 2015)

Hon Fiame Naomi Mata'afa of Samoa (2006-30 June 2012)

2-2-2 Senior Management Team

To be described.

2-2-3 Committees and Delegation

The Statutes provide for an Executive Committee of the Council and for the establishment of other Committees. They also provide that the Council can delegate its functions by resolution to the Vice-Chancellor, the Executive Committee, or any other Committee. The Executive Committee is required to meet at least once every 3 months. It may make decisions on behalf of the Council in urgent circumstances where existing delegations are inadequate, but must immediately refer the matter to the Council.

The Executive Committee comprises the Pro-Chancellor and the Chair of the Council, the Vice-Chancellor and President, the Deputy Pro-Chancellor and Chair of Council, the chairpersons of other Council committees selected by the Council, at least five members of the Council who were appointed to the Council by member governments, and a maximum of three other Council members appointed by the Council for a term of up to 3 years.

2-2-4 Recent Restructuring

There was a major restructuring of USP recently. It was planned and processed in late year 2019, then tabled and adopted in principle in the Council Meeting held in November 2019. In due course, it became effective from the beginning of USP calendar year 2020. The restructure was major, however, it did not go too far to amend the USP Charter.

The following figure shows organizational structure of top management after the restructure. There were two Deputy Vice-chancellors and two Vice-presidents earlier, but there are three Deputy vice-chancellors in the new structure.

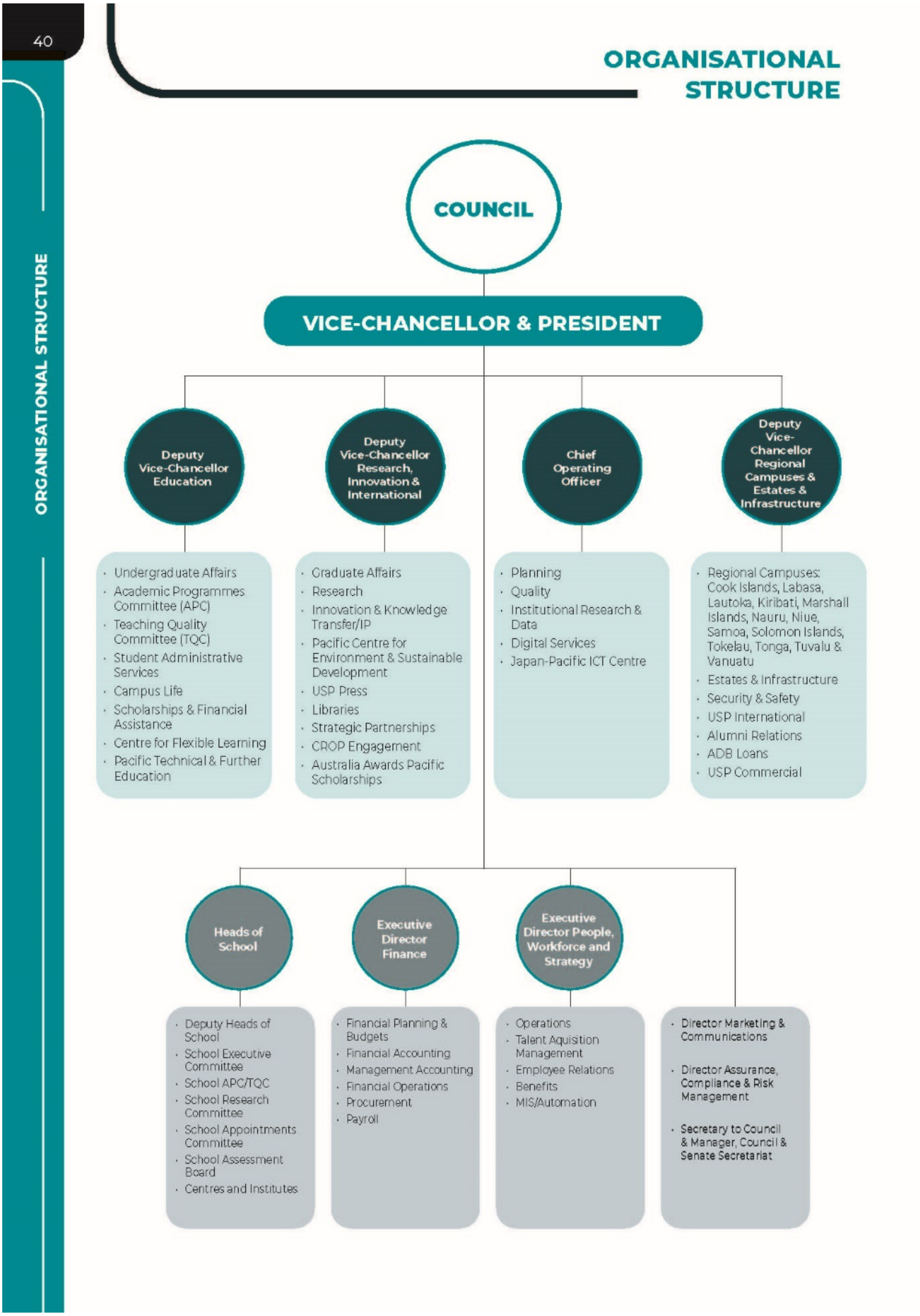


Figure 2-1 Organizational structure of top management after the restructure in USP

2-3 USP Education Services

2-3-1 Education Organization

There were three faculties with 17 schools before 2020, which were reorganized into 6 schools with 17 Disciplines by the restructure mentioned earlier. The following are the schools after restructure.

School of Accounting, Finance and Economics (SAFE)

School of Business and Management (SBM)

School of Information Technology, Engineering, Mathematics, and Physics (STEMP)

School of Agriculture, Geography, Environment, Oceans, and Natural Sciences (SAGEONS)

School of Law and Social Sciences (SoLaSS)

School of Pacific Arts, Communication, and Education (SPACE)

Enrollment by school to be extracted from Annual Report 2020 when obtained

2-3-2 Education Programmes Offered

USP offers education various programmes as listed below, not only those offered by general universities.

i) Preliminary Programme
Equivalent to Year 12 or Form 6 higher secondary education

ii) Foundation Programme
Equivalent to Year 13 or Form 7 higher secondary education, called UPY (University Preparatory Year) in some cases

iii) Undergraduate Programme
Bachelor Programmes for three years for most of them offered by the 6 schools

iv) Postgraduate Programme
Master and PhD Programmes offered by the 6 schools

v) CVET (Continuing Vocational Education and Training) Programmes
More practical and occupation oriented certificates and diplomas in tourism, business, etc.

vi) Workforce development training
Short training courses for upgrading job skills for (potentially) active workforces in laobour market

2-3-3 Campuses and Centres

Education porgrammes are offered in various USP campuses and centres. Each of 12 member countries has one Regional Campus except for Fiji where two regional campuses, namely, Lautoka and Labasa in addition to main Campus at Laucara. Regional Campuses are headed Campus Directors.

Some countries have centres smaller than campuses for those residing far from central area of their country. Centres are managed by Centre Manager who reports Director of Regional Campuses. Small centres may be equipped with rooms for online lecture (REACT room), some desktop PCs for students and a library served by minimum number of staff.

Enrollment by registration campuses to be extracted from Annual Report 2020 when obtained

2-3-4 Entry Requirement

As in other tertiary education institute, USP programmes have clear entry requirement. However, it may be a little complicated since USP is supposed to enroll students from 12 counties by its nature from the beginning of its establishment.

As to certificates for completion of secondary education, there was regional assessment for Year 12 or Form 6 equivalent in the past, but not any more while that for Year 13 or Form 7 is in place today. Therefore, each member country is supposed to organize Year 12 completion certificate. Some actually do so for Year 13 as well. The following information is provided in the Handbook and Calendar 2021 presenting recognition of those secondary education certificates by USP. Please note that this is for those who have entered USP in year 2021, mostly January and February 2021 and Handbook and Calendar 2022 is not yet published.

Table 2-1 Secondary Education Completion Certificates recognized by USP

COUNTRY	YEAR 12/FORM 6 OR PRELIMINARY LEVEL	YEAR 13/FORM 7 OR FOUNDATION LEVEL
Cook Islands	NZ NCEA* Level 2	NZ NCEA* Level 3
Kiribati	KSSC	South Pacific Form 7
Fiji	Fiji Year 12 Certificate	Fiji Year 13 Certificate
Marshall Islands	No equivalent	RMI Foundation
Nauru	QSCE	QSCE
Niue	NZ NCEA Level 2	No equivalent
Samoa	Samoa Senior Secondary Certificate	NUS Foundation Certificate
Solomon Islands	SISSC	South Pacific Form 7
Tokelau	No equivalent	Form 7
Tonga	TFSC	TNFSC
Tuvalu	TSSC	No equivalent
Vanuatu	VSSC	South Pacific Form Seven Certificate

* NZ National Certificate of Educational Achievement Key: Level Equivalence Level 1: Year 11/Form 5

Level 2: Year 12/Form 6

Level 3: Year 13/Form 7

3. Outline of Education Sector in USP Member Countries

This JICA survey focuses on USP which is one of prominent tertiary education institutes in the region. When tertiary education is discussed, we should look into prior levels such as secondary education and primary education since tertiary education is generally offered for those who complete the basic education. Therefore, basic education sectors of USP member countries are reviewed in this section.

3-1 Basic Education Overview

In the above purpose, Education Quality and Assessment Programme (EQAP) is one of reliable information sources. It is one of nine divisions of Secretariat of Pacific Community (SPC) specialized in education, formerly known as South Pacific Board for Education Assessment. According to its HP, it focuses on four key outcomes to fulfill SPC's development objective of improving quality education in the Pacific. Three are key goals that relate to education quality outcomes and the fourth is to strengthen its knowledge and capacity in order to realise the three key education quality goals.

1. More national Ministries of Education and other key institutions increase the use of information for policy development and implementation, planning and management
2. More PICT schools increase and improve the assessment of students performance against curricula
3. More PICT national agencies, employers and learners increase the use of recognized quality assured qualifications
4. EQAP is increasingly recognized as a leader and source of knowledge and expertise in education in the Pacific

As use of information is emphasized the above Goal 1, EQAP itself makes efforts of compilations of information originally collected by authorities of member countries. EQAP member countries do include 12 USP member countries and some other countries and territories in the Pacific.

The following figure shows primary education enrollment. Most of USP member countries exceed 90% except for Marshall Islands and Tuvalu.

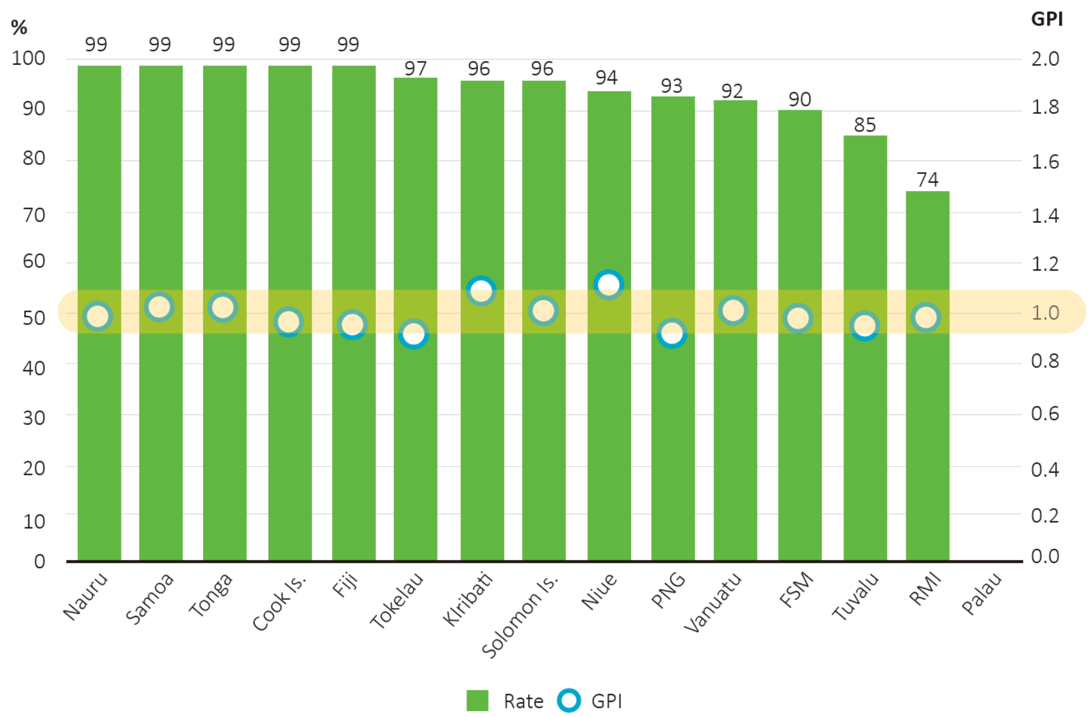


Figure 3-1 Total net enrolment rate in primary education

The following figure shows secondary education enrollment rate. Three USP member countries, namely Nauru, Niue and Samoa exceed 90% while five countries remain between around 50% to 70%, and four countries are missing indicators. *Other sources may be studied for missing data.*

The report states that there is a further investigation needed though, disparity in access to secondary education is one of hindering factors for rural areas and poor households.

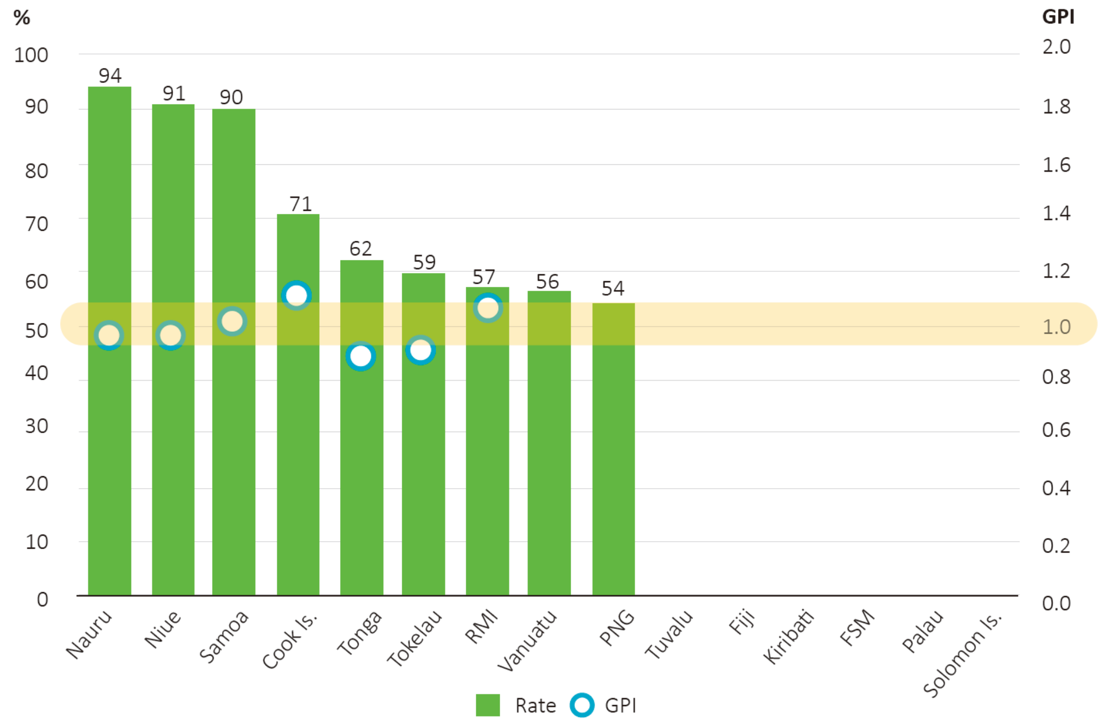


Figure 3-2 Total net enrolment rate in upper secondary education

The following two figures show literacy and numeracy proficiency in Grade 6 in primary education. The data was collected through Pacific Islands Literacy and Numeracy Assessment 2018 coordinated by EQAP. Indicators of USP member countries in literacy vary between just below 50% (Tonga and Tuvalu) up to 80% (Cook Islands) while so do those for numeracy between over 60% (Nauru, Tokelau and Niue) to over 90% (Solomon Islands, Fiji and Tonga). Please note that translation of languages were involved in some of assessment instruments in some countries so that comparison among countries may require thorough data process and analysis.

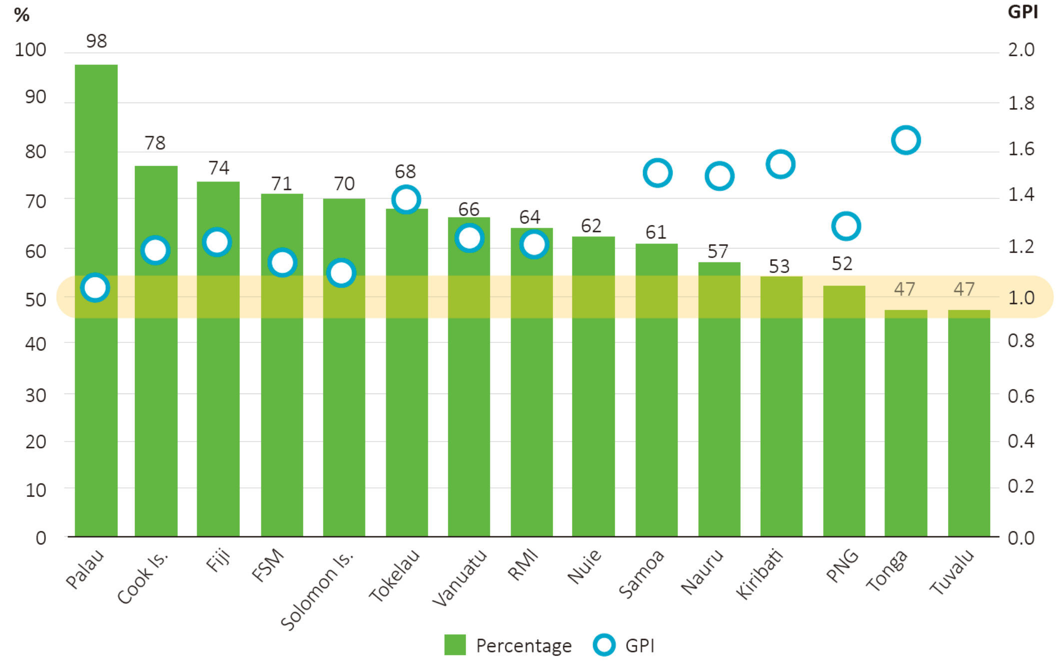


Figure 3-3　Literacy Proficiency in primary education (PILNA)

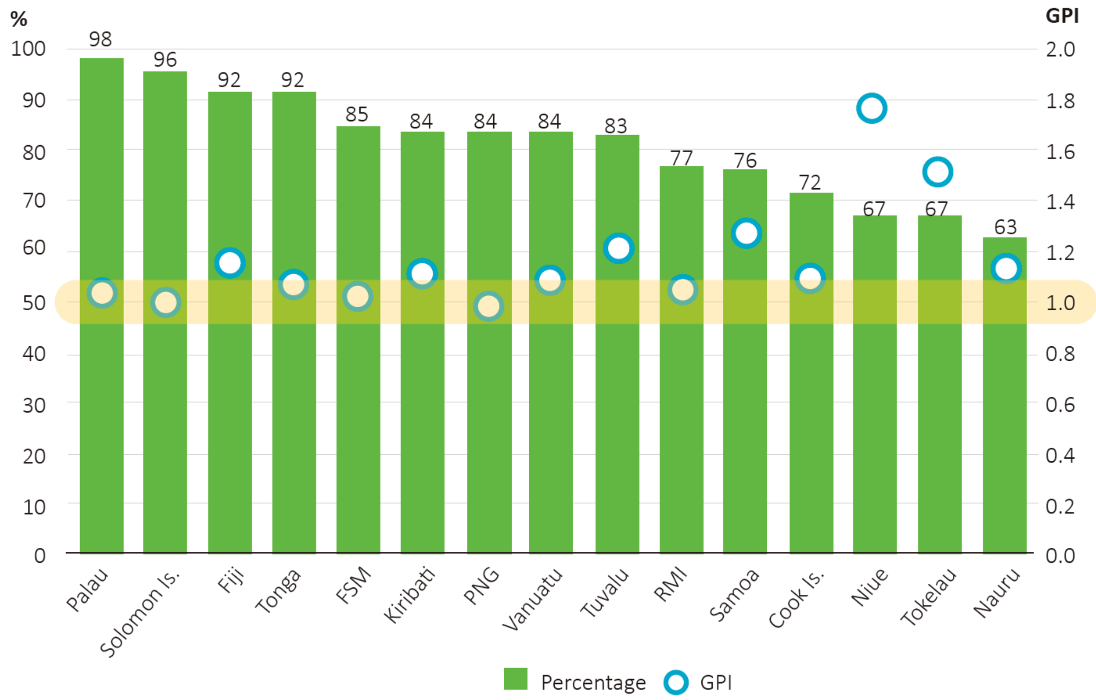


Figure 3-4　Numeracy Proficiency in primary education (PILNA)

The following figure shows educational attainment of population aged 25 or over for lower secondary education. Although five countries out of 12 USP member countries are without data which limit us to generalize 12 USP member countries, seven USP member countries are almost reaching 80% or higher. It may be an evidence for readiness and demand for upper secondary education and then tertiary education.

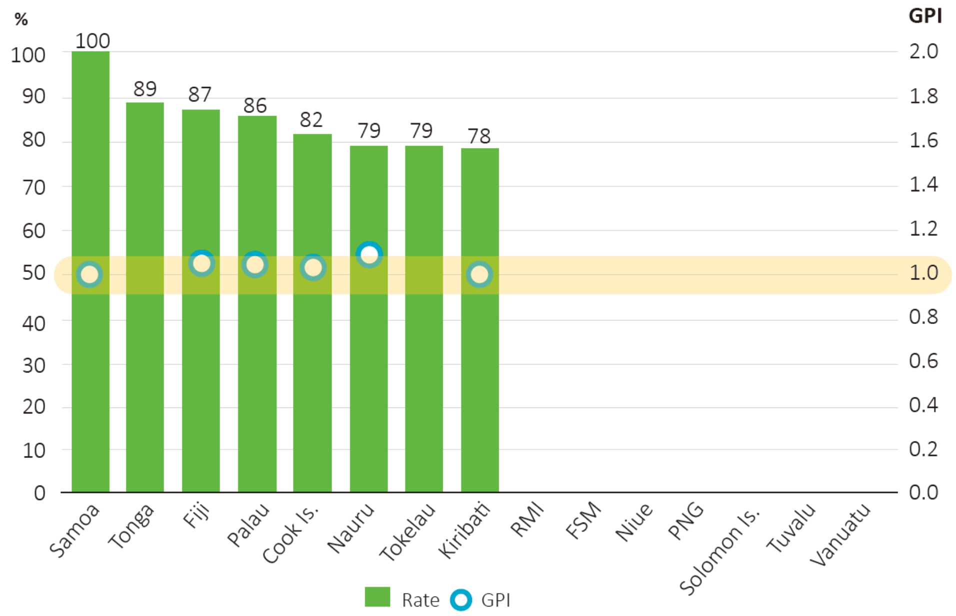


Figure 3-5 Education Attainment of population aged 25+ for lower secondary education

The following figure shows educational attainment of population aged 25 or over for postsecondary education. Five countries out of 12 USP member countries are again without data. And indicators for seven USP member countries vary from 5%(Kiribati) to 35% (Tokelau). These should include those who studied at USP. Taking the relatively high attainment for secondary education seen in previous figure into consideration, it is possible that potential demand for post secondary education and training is much larger than existing programmes offered in the region, although cost implications is obviously affecting participation in post secondary education and training.

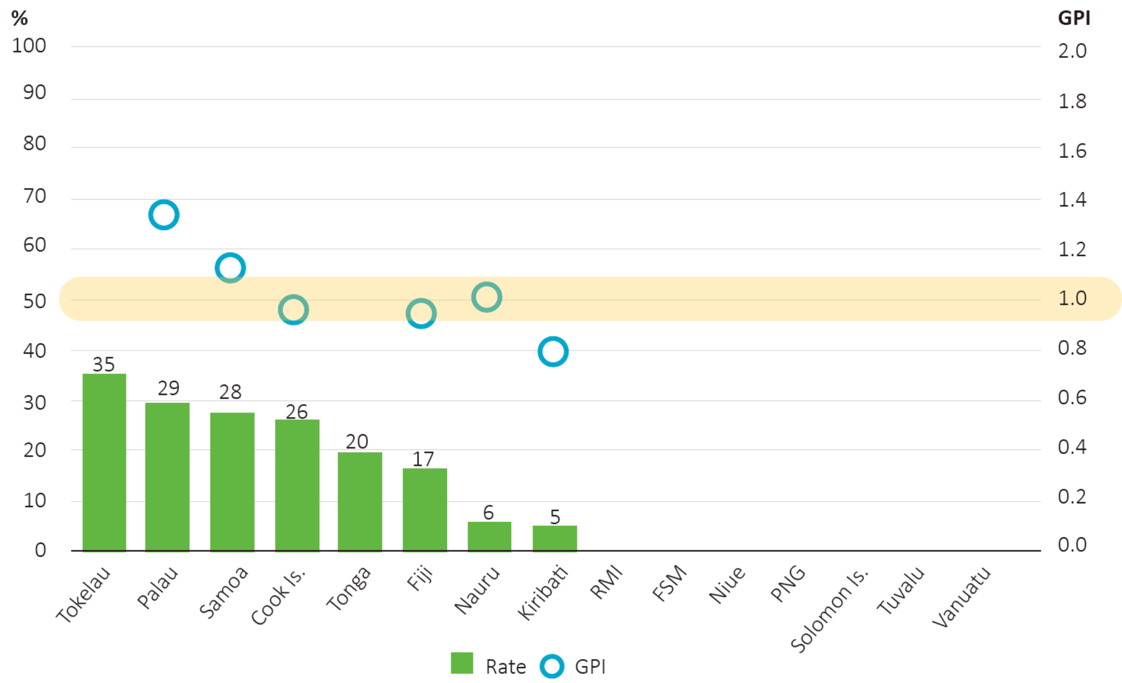


Figure 3-6 Education Attainment of population aged 25+ for post secondary education

3-2 Education Assessment

To be described

3-3 Avenues for Secondary Education Leavers

When secondary school students successfully complete secondary education, some, if not most, of them will be interested to pursue further education and training. USP is one of possible realistic avenues available, but not sole option. There are other avenues including the following education and training institutions (or programme).

3-3-1 Fiji National University (FNU)

To be described

3-3-2 University of Fiji (uni Fiji)

To be described

3-3-3 National University of Samoa (NUS)

To be described

3-3-4 National University of Solomon Islands

To be described

3-3-5 Australia Pacific Training College (APTC)

To be described

4. History of Japan's Support for USP

As shown in the table below, the Japanese government has been providing support to the USP in various ways, especially in the ICT field. In terms of support for distance learning system, the Japanese government has provided support for the development of communications satellite facilities (USPNet), the deployment of Ku-band, and a program to dispatch experts in this field to Japanese universities, and these support has become a major foundation for the USP's distance learning system today.

Table 4-1 Support History by Japan for USP

Type of Support	Year	Project	Summary
Scholarships	*To be Confirmed*	Ryoichi Sasakawa Young Leaders Fellowship Fund	*To be Confirmed*
Grant Aid	1998	Project for Upgrading of USP-Net Communication System	Upgrade of USPNet Communication System by installation of dedicated satellite communication network equipment (parabolic antenna, wireless equipment, etc.) for using VSAT small satellite earth stations in 2000 in Fiji to upgrade its conventional analog communication lines to digital.
Technical Cooperation	2002 ~ 2005	Project on strengthening the programs and networks	- Computer Science(CS) Component: OJT for young teachers by long/short-term experts and training in Japan, development of distance learning courses for CS, and strengthening of CS labs - Distance Flexible Learning(DFL) Component: Strengthen the capacity to develop multimedia materials, developing models for e-learning courses, standardize course development procedures, and build a multimedia database to centrally manage multimedia materials. - Information Technology Research and Training(IT R&T) Component: Formulation of procedures for conducting surveys and research, Conducting research on the use of IT for socioeconomic development, and Planning and implementation of short-term model training courses
Grant Aid	2007 (Phase I) 2008 ~ 2009 (Phase II)	Construction of Information and Communication Technology Centre at University of the South Pacific	Phase I: Construction of Information and Communication Technology Centre (JAPAN-PACIFIC ICT CENTER) Phase II: Construction of Multipurpose Lecture Theatre
Technical Cooperation	2010 ~ 2013	ICT for Human Development and Human Security Project	- New CS/IS bachelor programs are offered at SCIMS. - USPNet is efficiently used and distance learning environment is enhanced. (Ku-band Deployment) - New ICT technologies are utilized and promoted in delivery of distance learning - Operational policy and structure of the Japan-Pacific ICT Center are established.
Student Exchange	2012	Japan-Pacific Youth Exchange Project	*To be Confirmed*
Student Exchange	2012 ~ 2013	KIZUNA Project	USP students had invited to Japan and participated exchange programs, visited to disaster-affected areas and done volunteer activities, etc.

Type of Support	Year	Project	Summary
Student Exchange	2013	JENESYS2.0	The project provides fully funded 9 days study tours to Japan (in Mie prefecture and Tokyo).
Student Exchange	2015 ~	The JENESYS Programme	The project provides fully funded 7-9 days study tours to Japan for University students between the ages of 18 and 34 enrolled in degree or higher level programmes.
GGP*	2018	Upgrading of Sustainable Agriculture in Gau Island Project	Procurement of Tractor with the farm implements, portable sawmill and working shed to School of Marine Studies (USP) in Gau Island

*Grant Assistance for Grass-Roots Human Security Projects
*JENESYS: Japan-East Asia Network of Exchange for Students and Youths

5. Current Situation of Distance Learning System of USP

5-1 Outline of Distance Learning System of USP

In general, the components of a distance learning system can be categorized as follows.

- <u>Software (Software and Application)</u>
- <u>Hardware (Communication Equipment, Server System, etc.)</u>
- <u>Network (Internet connection by Satellite, Optical Fiber, etc.)</u>
- Learning Method (Courses Structure, Learning Mode, etc.)
- Contents (Video, Audio, Documents, etc.)
- User (Student, Lecturer, Staff)
- Administration (Administrator, User Support, etc.)

These three weeks the Team had collected information from various perspectives on the topics above. However, in this field report, it had been focused on software, network and hardware, which are directly relevant to the consideration of Japan's support. The results of the field survey for the Hardware and Network are shown in Section 5-2, and result for the Software is shown in Section 5-3.

5-2 Network Infrastructure and Communication Equipment

For conducting distance learning covering campuses/centers in 12 member countries, a network connecting each country is an essential and critical basic infrastructure.
Currently, the USP is operating a combination of satellite networks (USPNet) using C-Band and Ku-Band, and networks via the Internet as these network infrastructures.
In this survey, in order to understand the current status of the network infrastructure, we conducted a survey of the following: 1) information on each campus/center where the network is being deployed, 2) logical connections of the network, 3) physical connections of the network, and equipment. The details of the survey are shown in the table below.

Table5-1 Survey Contents for Network Infrastructure and Communication Equipment

No.	Target	Survey Contents
1	Campus structure/distance learning environment	structure of distance learning centers, distance learning environment, communication tools mainly used and requirements for the network
2	Network configuration / data center / security measures	the results of the survey on the logical connection configuration of the USP network
3	Physical connection between locations	the actual connection between locations and the results of the survey of existing facilities

5-2-1 Campus Structure/Distance Learning Environment

(1) Campus/Center

USP provides distance education through 13 remote campuses, 12 remote centers, and two outreach commons in 12 member countries, centered on the Laucala main campus in Suva, Fiji. All the sites are connected by the network shown below, and during normal condition before the Corona disaster, most of the lectures were held and delivered at the Laucala campus, except for the former Faculty of Law in Vanuatu and the former Faculty of Agriculture in Samoa.

(2) Communication Tools for Distance Learning

In considering the communication infrastructure for distance education, it is important to understand the status of real-time communication tools such as ZOOM, since they occupy a large percentage of the communication network.

When distance education started using narrow-band satellite links, it was conducted only with audio. After the installation of the C-Band satellite communication system in 2000 with support from the Japanese government, two-way video communication became possible.

The REACT system is a remote learning system that enables two-way communication on satellite lines with limited capacity. As shown in the figure below, the REACT system utilizes multicast technology, which enables a single packet to transmit signals to multiple recipients in response to a user's outgoing message, to realize two-way communication over narrow bandwidth communication lines. However, since the REACT system uses multicast, it can only be used within the WAN via USP satellite lines, and needs to be converted to unicast via a gateway in the routing system for distribution to remote campuses/centers via the Internet.

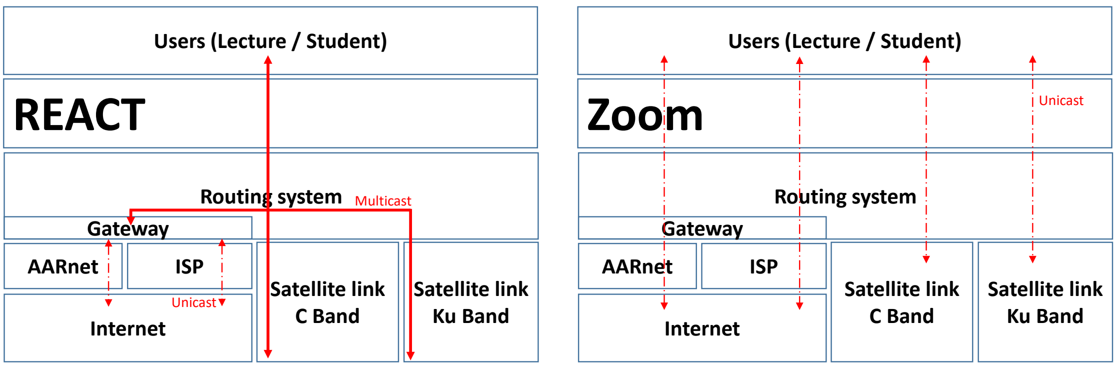


Figure 5-1 Comparison of communication tools

On the other hand, conference systems such as ZOOM, which have been widely used in recent years, use unicast technology that sends out packets to each communicator, and although the capacity required for communication lines is larger, it can be used freely on networks including the Internet environment.

Before the Corona disaster, lectures were held remotely between faculty members on the REACT system side of the Laucala campus and students gathered on the REACT system side of several remote sites.

However, since the REACT system required lectures to be conducted from the system at the Laucala campus, and access to the campus was restricted after Corona, both faculty and students attended lectures at home, and lectures were completely shifted to ZOOM.

(3) Network Infrastructure Required for the Use of Communication Tools

The communication environment is improving all over the world, and many applications have been developed based on it. On the other hand, the need for custom-made software for narrow-band communication links such as REACT will decrease.

As for REACT, although it is easy to use as a dedicated system for distance learning, it is a custom-made software, so if updates are needed, USP will have to do it on its own. In general, in many fields nowadays, when ready-made general-purpose software is available, there is a shift toward the introduction of general-purpose software that can be updated continuously, rather than creating custom-made software and updating it as needed. This also applies to communication tools for distance education. This also means that the requirements for communication links will need to be as high bandwidth as the Internet.

5-2-2 Network Configuration / Data Center / Security Measures

(1) Network Configuration

The following figure is shown USP Network Diagram. The network configuration of USP consists of a WAN via Internet service providers and a WAN using C-Band and Ku-Band satellite lines called USPNet with the main campus in Laucala as the hub.

The network equipment of the hub station at the Laucala main campus is redundant to ensure the reliability of the network.

QoS (Quality of Service) technology is used to prioritize the services used in order to make effective use of the limited network capacity.

Services such as the ZOOM system, where the impact of latency is significant (real-time communication), are given higher priority.

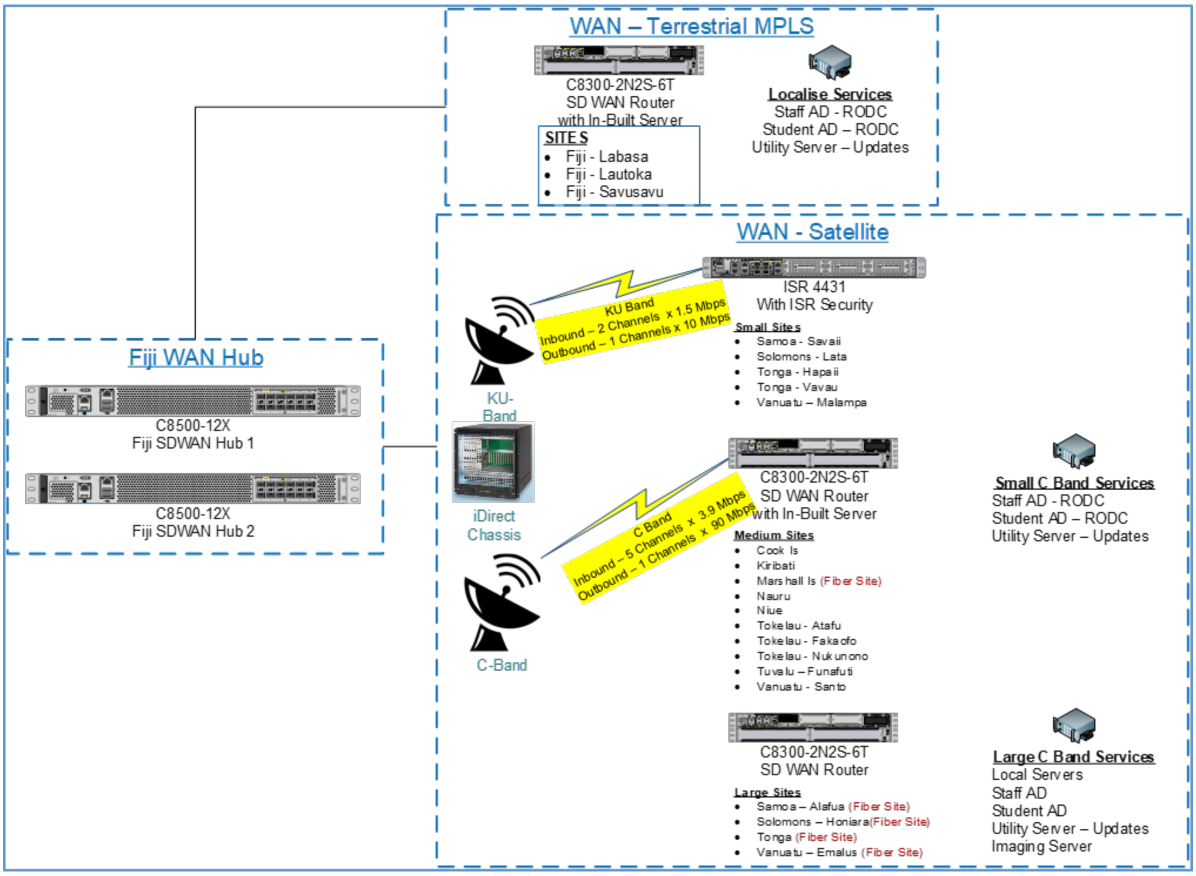


Figure 5-2 USP Network Diagram

(2) Data Center

The data center where the servers used for the services provided by USP are installed is also located in the main campus of Laucala. Although migration to the cloud was considered, the current on-premise system is being used because of the running costs. The data is regularly backed up every day at midnight to the Tonga campus, which has AARNet's broadband Internet connection, and in the event of a failure, the backup data is restored to a replacement device for recovery. Server equipment in the data center is also redundant, as is the network, to ensure the reliability of the computer system as a whole.

(3) Security Measures

In terms of security, whenever a terminal other than the USP asset is connected to the USP network, the connecting terminal downloads a special application and scans the terminal to confirm its safety. All services are tied to a login portal, with VPN login if necessary, to ensure security.

In general, virus infection from off-line media such as USB storage media is highly dangerous, but students are allowed to connect their own USB storage media to USP PCs for use in the Offline Print Package (OPP), which is data that students download and take home for study. The terminals of USP assets are secured with anti-virus software.

5-2-3 Physical Connection between Locations

(1) Network Connection Between All Campus/Center

The network connection diagram of USP is shown in the figure below, and detailed information including the capacity of each link is shown in the Table 5-2.

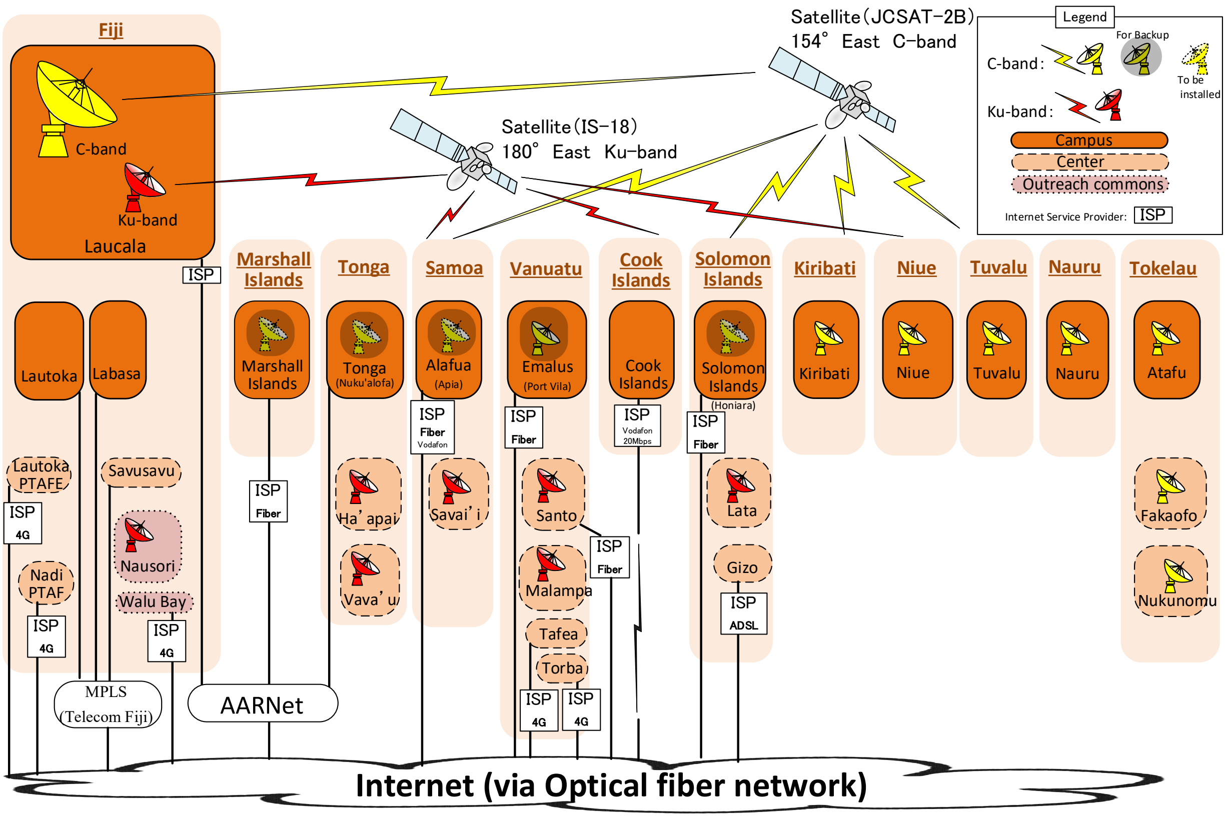


Figure 5-3 Existing USPNet Network

The upper part of the above figure shows the satellite link, i. e., USPNet, with the yellow parabolic antenna indicating the C-Band link and the red parabolic antenna indicating the Ku-Band link.

The lower part of the figure shows the network via an Internet service provider. As mentioned above, the upper USPNet and the lower connection via the Internet each constitute a WAN.

The C-Band mainly connects the remote campuses in each country, and the Ku-Band satellite link connects the remote centers to complement it.

In areas where the C-Band parabola is shaded in gray, such as the Marshall Islands, the Internet is mainly used and satellite links are used as backup.

Vanuatu's Santo is connected to the Laucala main campus via Ku-Band satellite, but access to the Internet is through an Internet service provider.

Table5-2 Detail Information of USPNet Network

Country	City	Campus	Center	OutreachCommons	Type	Satellite system information						Band width (Mbps)		Total number of terminals	Number of REACT Rooms	Remarks
						Band	Station ID	Power	Antenna Diameter	Year of installing	Supporting countries	UP	Down			
Fiji	Suva	Laucala			HUB	C	FJI-SUV-004	200W	7.6 m	(2022)	NZ	90	18			2000 JPN installed
					HUB	Ku			4.5m	2010	JPN	10	3			
					Optical Fiber Cable(AARNet)							100	100			
				Walu Bay	ISP (4G)							(4G)				
	Nausori			Nausori	Remote	Ku		4W	1.8m	2010	JPN	10	3			
	Labasa	Labasa			Optical Fiber Cable(MPLS Telecom Fiji)							20	20	80	2	
			Labasa PTAF		ISP (4G)							(4G)		0	0	
	Savusavu		Savusavu		Optical Fiber Cable(MPLS Telecom Fiji)							10	10	27	2	
	Lautoka	Lautoka			Optical Fiber Cable(MPLS Telecom Fiji)							40	40			
	Nadi		Nadi PTAF		ISP (4G)							(4G)				
Samoa	Apia	Alafua			Remote	C	SMO-API-004	10W	6.3 m	(2022)	NZ	Backup				
					Optical Fiber Cable(Bluesky Fiber)							22	8			
	Savai'i		Savai'i		Remote	Ku		3W	1.8m	2010	JPN	10	3			
Vanuatu	Port Vila	Emalus			Remote	C	VUT-PTV-002	10W	4.5 m	2021	NZ	Backup				
					Optical Fiber Cable(Gov Fiber)							80	20			
	Santo		Santo		Remote	C	VUT-PTV-009	5W	3.8 m	2006		replaced				not in used.
					Remote	Ku		3W	1.8m	2010	JPN	10	3			
					Optical Fiber Cable											Only for Internet access
	Tafea		Tafea		ISP (4G)							(4G)				
	Malampa		Malampa		Remote	Ku		3W	1.8m	2010	JPN	10	3			
	Torba		Torba		ISP (4G)							(4G)				
Cook Is.	Rarotonga	Cook Is.			ISP(Bluesky Fiber)							80	20	48	1	
Kiribati	Tarawa	Kiribati			Remote	C	KIR-TAR-002	10W	4.5 m	2020	NZ	90	18	41	2	
Niue	Alofi	Niue			Remote	C	NIU-ALO-002	10W	4.5 m	2020	NZ	90	18			
Tonga	Nuku'alofa	Tonga			Remote	C	TON-NUK-002	10W	4.5 m	(2022)	NZ	Backup				2000 JPN installed
					Optical Fiber Cable(AARNet)							100	100			
	Na'apal		Na'apal		Remote	Ku		3W	1.8m	2010	JPN	10	3			
	Vava'u		Vava'u		Remote	Ku		3W	1.8m	2010	JPN	10	3			
Marshall Is.	Maluro	Marshall Is.			Remote	C	MHL-MJO-003	10W	4.5 m	(2022)	NZ	Backup				2000 JPN installed
					Optical Fiber Cable(NTA Fiber /AARNet)							80	20			
Solomon Is.	Honiara	Solomon Is.			Remote	C	SLM-HON-003	10W	4.5 m	(2022)	NZ	Backup				2000 JPN installed
					Optical Fiber Cable(ISP Fiber)							100	30			
	Gizo		Gizo		ISP (ADSL)							ADSL				
	Lata		Lata		Remote	Ku		3W	1.8m	2010	JPN	10	3			
Tuvalu	Funafuti	Tuvalu			Remote	C	TUV-FUN-002	10W	4.5 m	2019	NZ	90	18			2000 JPN installed
Nauru	Yaren	Nauru			Remote	C	NRU-YAR-002	10W	4.5 m	2018	NZ	90	18	32	1	
					ISP(Digisel)											Only for Internet access
Tokelau	Atafu	Tokelau			Remote	C	TKL-ATA-001	10W	4.5 m	2021	NZ	90	18	12		
	Fakaofo		Fakaofo		Remote	C	TKL-Fakaofo	10W	4.5 m	2015	OwnBGT	90	18	16		
	Nukunonu		Nukunonu		Remote	C	TKL-Nukunonu	10W	4.5 m	2015	OwnBGT	90	18	5		

(2) Internet

In terms of Internet access, the Fiji Laucala campus, Marshall Islands campus, and Tonga campus are connected to the Internet via AARNet, an Australian academic research network. The Marshallese campus is connected to the AARNet through Guam via an ISP. In Fiji, Lautoka, Labasa campus and Savusavu center are connected to the Internet via Telecom Fiji's fiber optic MPLS network.

The Samoa campus, the Emalus campus in Vanuatu, the Cook Islands campus, and the Solomon Islands campus are also connected to the Internet through the Internet Service Provider's high bandwidth network. Other centers are connected to the Internet via 4G and other lines.

(3) Satellite Link

Except for the campuses and centers that are connected by submarine optical fiber, the USPNet satellite link is still an important communication infrastructure. The C-Band connecting the campuses of each country and the Ku-Band connecting the centers are both configured with the Fiji Laucala campus as the hub station.

As shown in the logical connection diagram in Figure 5-3 above, C-Band and Ku-Band are connected to the USP network through the network management system of the Fiji Laucala campus.

C-Band has been upgraded since 2018 with equipment updates by the New Zealand MFAT project. Some installations have been delayed due to the Corona disaster, including the hub station at the Laucala main campus, but all are planned to be upgraded.

As for Ku-Band, the major equipment for satellite communication has not been updated since it was introduced in 2010 as part of Japan's technical cooperation project. (The equipment for data transmission and control, called baseband system, has been upgraded along with the C-Band equipment by MFAT.)

Outdoor equipment for satellite communications has not been updated since Ku-Band was introduced in 2010 as part of Japan’s technical cooperation project. (The equipment installed indoors has been updated together with the C-Band equipment update by MFAT around 2018.)

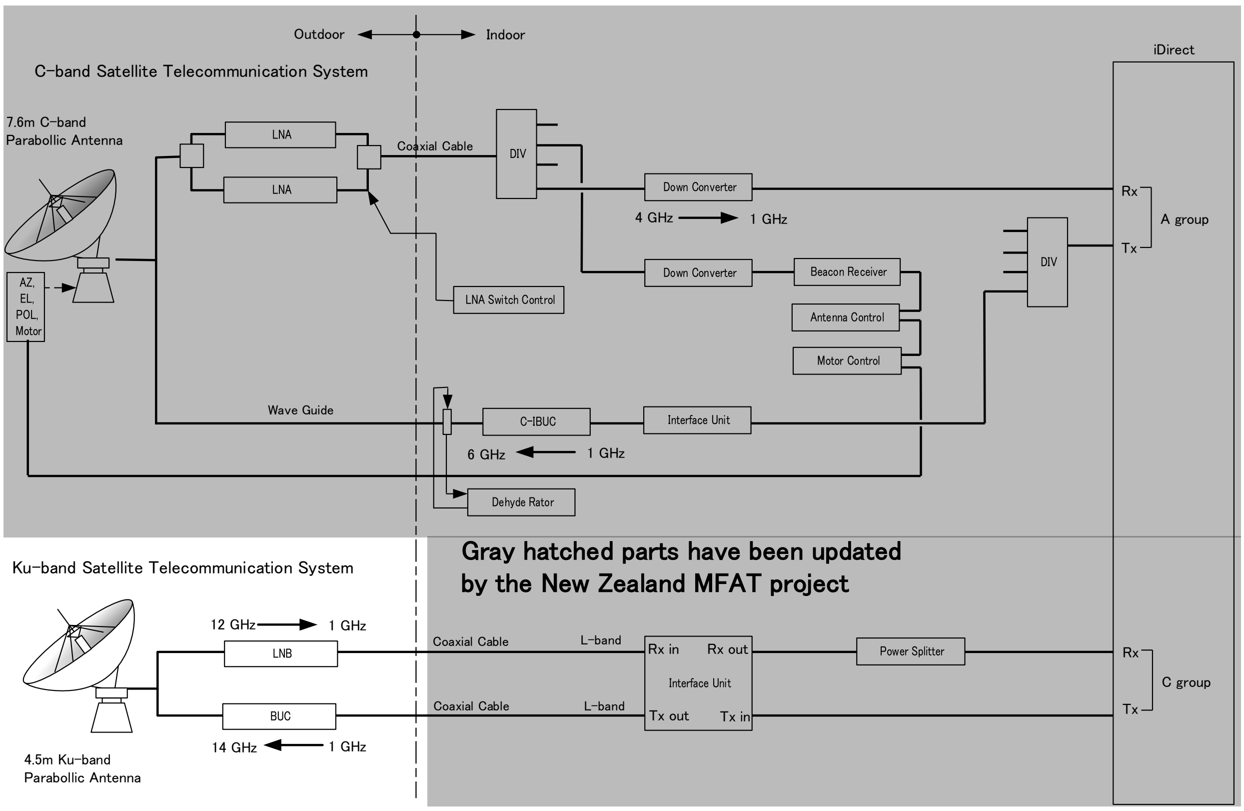


Figure 5-4 USPNet Hub Station Diagram

(4) Bandwidth

The transmission capacity of the current C-Band and Ku-Band satellite communications is shown in the following figure.

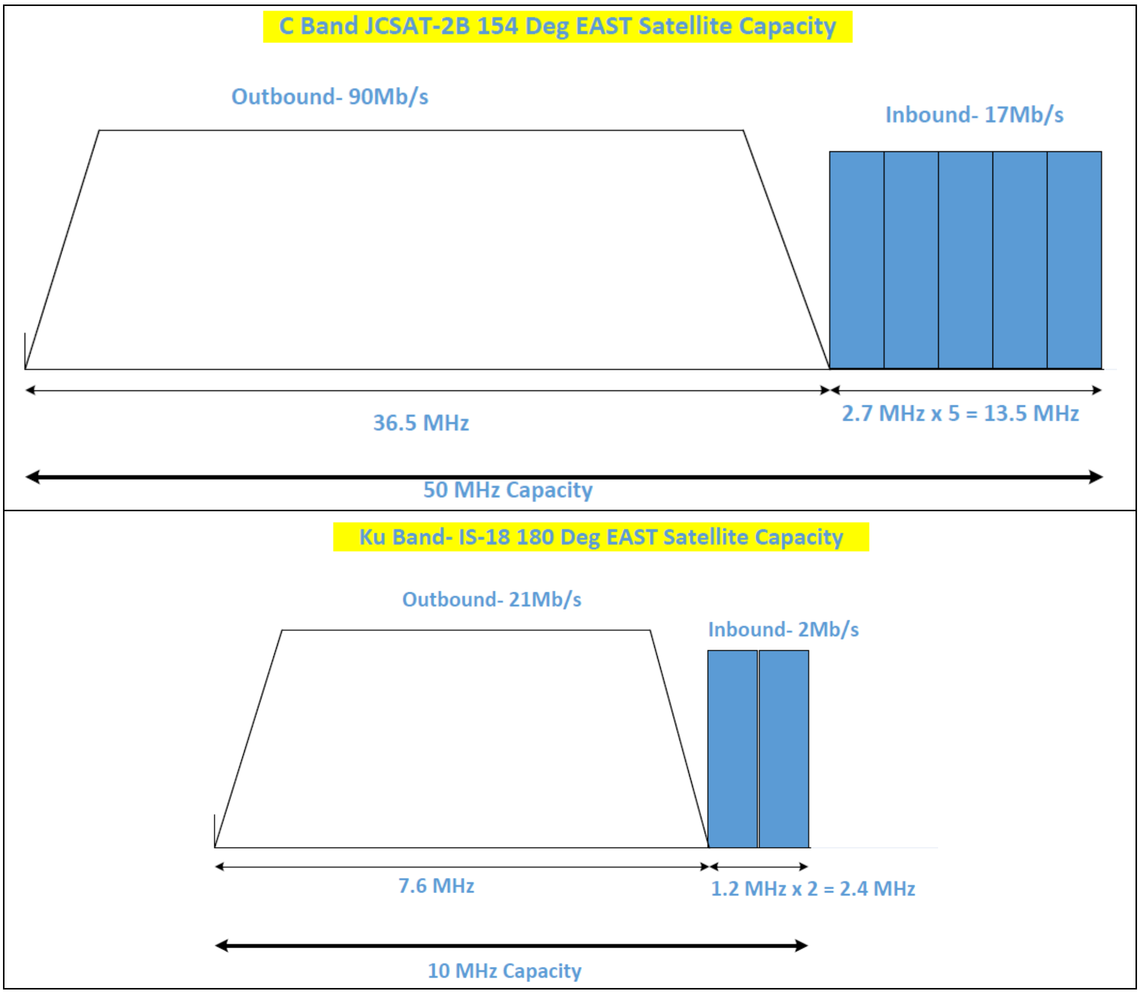


Figure 5-5　Capacity of Satellite Link Transmission

As for C-Band, the frequency band used for satellite communication was expanded from 15MHz to 50MHz in conjunction with the MFAT project by New Zealand, and the data transmission capacity is 90Mbps outbound and 17Mbps inbound from the hub station, so there is currently no shortage of bandwidth for online classes in distance education.

The Ku-Band has a frequency bandwidth of 10 MHz, with a data transmission capacity of 21 Mbps outbound and 2 Mbps inbound from the hub station. In Ku-Band, the frequency band was doubled from 5MHz in September 2020, and the link budget, a constant for satellite communication, was reviewed to increase the transmission capacity, but it can be confirmed that the transmission capacity of Ku-Band is insufficient compared to the Internet and C-Band satellite links.

(5)　Providing Mobile Connectivity to Students in Fiji

Due to the Corona disaster, faculty and student access to the Fiji Laucala campus has been restricted, causing the need to access the USP servers from off campus.

USP provided mobile data providers Vodafone and Digicel with free off-campus access to the USP network for faculty and students, with USP covering the data charges for access to the USP servers via their networks. This service is available only in Fiji. As mentioned above, the USP data center is located at the Laucala campus in Fiji, so access from outside Fiji is through the IXP (Internet eXchange Point), which is an interconnection point for exchanging communications between countries, making it difficult to provide the same service. So, it is not implemented. Therefore, most of the students outside of Fiji connect to the USP network from their campuses or centers, except for a few students who can afford an Internet connection.

(6) Summary of the Current State of the Network Infrastructure

An assessment of the current state of the infrastructure for distance education in 12 member countries is shown in the table below.

In terms of the communication network connecting the sites, the data capacity of the Ku-Band satellite link has room for improvement.

Table 5-3 Summary of the Current State of the Network Infrastructure

Items			Conditions
Communication Network	Internet	Optical fiber	Enough capacity for distance learning
		Others	Good Enough capacity for distance learning
	Satellite Link	C-Band	Enough capacity for distance learning
		Ku-Band	Need to be expand data capacity
Computer system and Network Routing system			The main equipment installed in the data center at the Laucala campus has a redundant configuration, and the system has sufficient power backup. At the remote campus, most of the equipment is operated in a single configuration with no power backup.
Security			All services are tied to a login portal, with VPN login if necessary, to ensure security.

5-3 Software and Application

Moodle, which USP uses as the LMS for its distance learning system, is an open source e-learning platform that has a relatively large number of users among similar systems.

In this survey, in order to understand the current status of the moodle and software/application on distance learning system in USP, the Team collected the following information: 1) The outline of the current distance learning system, 2) Software and application usage, 3) The current structure of Moodle, 4) Server Configuration with Moodle Running, and 5) Use usage. The details of the survey are shown in the table below.

Table 5-4 Survey Contents for Software and Application on Distance Learning System

No.	Target	Survey Contents
1	The outline of the current distance learning system	Connection/relationship between Moodle and other software/application
2	Software and application usage	Current usage situation on each software/application of Distance Learning System
3	The current structure of Moodle	Confirmation of the standard plug-in function of the Moodle in USP
4	Server Configuration with Moodle Running	Confirmation of the server configuration, specification, location
5	User Usage	Confirmation of the number of Moodle user, number of access to Moodle

5-3-1 Overview of the Current Distance Learning System at USP

USP has introduced and operated the lesson support system “USP’s Leaning Systems Platform” as a part of the distance learning system and the system consists of Moodle and other software. The following diagram shows the relationship between Moodle and the related software used in the distance learning system. In the figure, internal services and tools provided by USP, the external services and tools provided by the cloud and Web services.

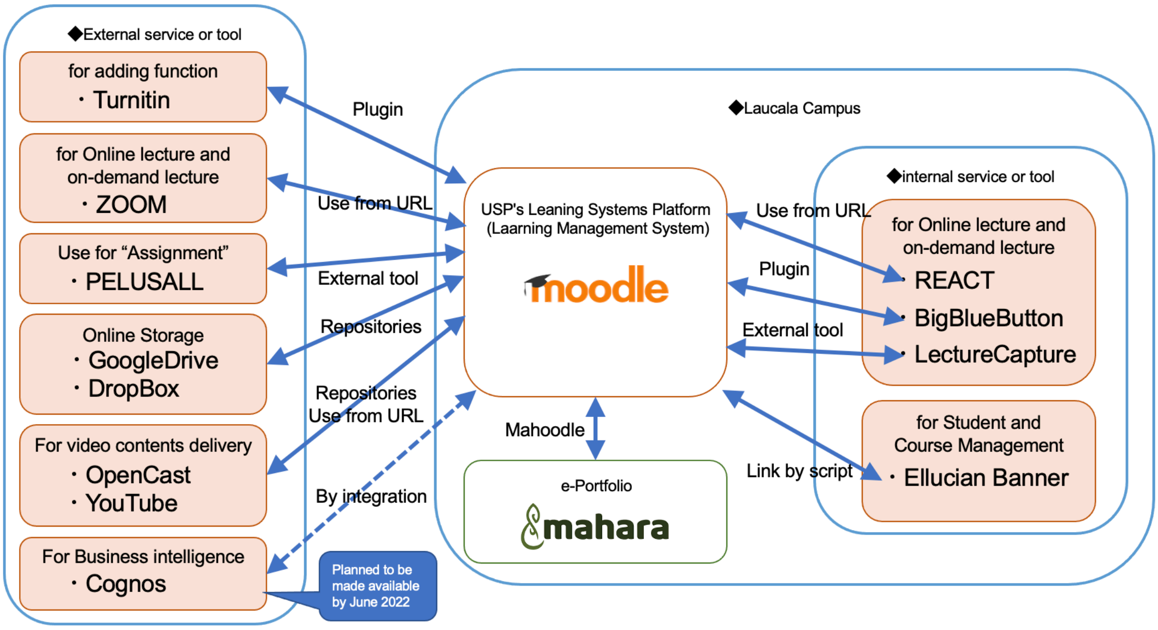


Figure 5-6 Outline of the Current Distance Learning System

Then the description of linkage between Moodle and related software is shown in the table below.

Table 5-5 Linkage Between Moodle and Other Services and Tools

Term	Description
Plugin	Work together using a module for Moodle called a plugin. Many plugins have been released to add various functions to Moodle. Some are available free of charge from the official website and some are offered as products.
External tool	One of the functions of Moodle, it works with external services and tools according to the standard called LTI.
Repositories	One of the functions of Moodle, Repositories provide access to specific types of file sources.
Use from URL	Display the URL for linking in Moodle
By integration	Develop a API for linking
Link by script	Execute data linkage with a script
Mahoodle	Mahoodle is a way to integrate Moodle and Mahara, supporting single sign-on and transfer of content.

5-3-2 Software and Application Usage

The table below describes the platforms, external services, software, applications used in current distance learning systems and how they are used in the USP.

Table 5-6 Software/Application Usage in Current Distance Learning System

Category	Software/Application	Description of Software/Application
Learning Management System	Moodle	Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments.
e-Portfolio	Mahara	Mahara can edit and submit documents such as diaries, course plans, and research papers. The status of each document (submitted, unstarted, etc.) can be displayed and confirmed. Introduced in the early course (UU100 Communications & Information Literacy) that all students take, training on how to use and WS are also provided, but they are not used much at this time.
Online lecture and on-demand lecture	REACT	Remote Education and Conferencing Tool. Online lectures with video and audio can be conducted via USPNet. The lectures are delivered and taken in a room with dedicated equipment. Because it is necessary to gather in a special room to take the class, it is not suitable for the current situation under COVID-19.
	BigBlueButton	Delivery of online lectures and recording of its video. Currently, its use is restricted for the following reason: Insufficient hardware resources
	Lecture Capture	A facility that can record a lecture to video, synthesize it with projection materials, convert it into audio and video files, and stream it. Video files are stored on the PC storage included in the equipment and can be delivered as on-demand lectures. Dedicated hardware and operator are required. Currently installed in 10 rooms at Laucala campus.
	ZOOM	Delivery of online lectures and recording of its video. Accounts and schedules are managed by ITS
Student and Course Management	Ellucian Banner	Ellucian Banner manages annual course information and enrollment information. The following information is automatically and periodically sent to Moodle for registration in cooperation with Moodle. ・SOLS to Moodle dump of enrollments – once a day ・Moodle Collector Tables to Course Shells – every hour ・Course registration / update – First three weeks of a Semester
Adding function	Turnitin	The content of reports and assignments submitted by students can be queried against the submissions of other students and information on the Internet to quickly visualize similarities with existing information.
Online Storage	GoogleDrive	Online storage used as a place to store video content
	DropBox	Online storage which is used as a place to submit assignments
Video contents delivery	OpenCast	Automate the capture, processing, management, and delivery of video
	YouTube	Video distribution platform
Use for "Assignment"	PELUSALL	Social eBook reader. Not only eBooks, but also documents, web pages, videos, and audio can be used as content. Students can add annotations and comments to the content and share them with other students and lecturers. Student can purchase e-books and use it as well. PELUSALL is used to submit student assignments in USP.
Business intelligence	IBM Cognos	BI (Business Intelligence) software that uses AI to automatically determine what type of data has been uploaded and how it should be aggregated and classified. It can also automatically select analysis methods.

5-3-3 Current Structure of Moodle

Moodle is a learning management system that has many functions necessary for conducting online education at educational institutions such as universities and high schools, and is suitable for building and operating an online educational environment.

In this section, Activity / Roles and non-standard plugins used in USP Moodle are described.

The table below shows the features of Moodle.

Table 5-7 Features of Moodle

Term	Description	
Activity	An activity is a general name for a group of features in a Moodle course. An activity is something that a student will do that interacts with other students and or the teacher.	
Roles	A role is a collection of permissions defined for the whole system that you can assign to specific users in specific contexts. The combination of roles and context define a specific user's ability to do something on any page.	
Non-standard plugins	Plug-in that is not implemented in Moodle in the standard state, but is additionally implemented in order to add functions and link with external service tools.	
Material	MS Office app	Word, Excel, PowerPoint
	PDF	Adobe Acrobat
	Video files	mp4, mov 3gp and others
	Audio files	mp3, wav, podcast and others
	H5P	HTML5 contents
	Others	iSpring, Authoring tools

The detail information of current structure of Moodle is as shown in Attachment-1.

This attachment describes the Activities, Roles, and Non-standard plugins currently used by USP Moodle. By looking at this, you can know the components of the course, user privileges, and functions added in addition to the standard functions.

5-3-4 Server Configuration with Moodle Running

Many web applications like Moodle are used in USP distance learning systems. When operating a Web application, back-end specifications such as servers and databases are important depending on the scale and content. The figure below shows the current USP Moodle backend configuration.

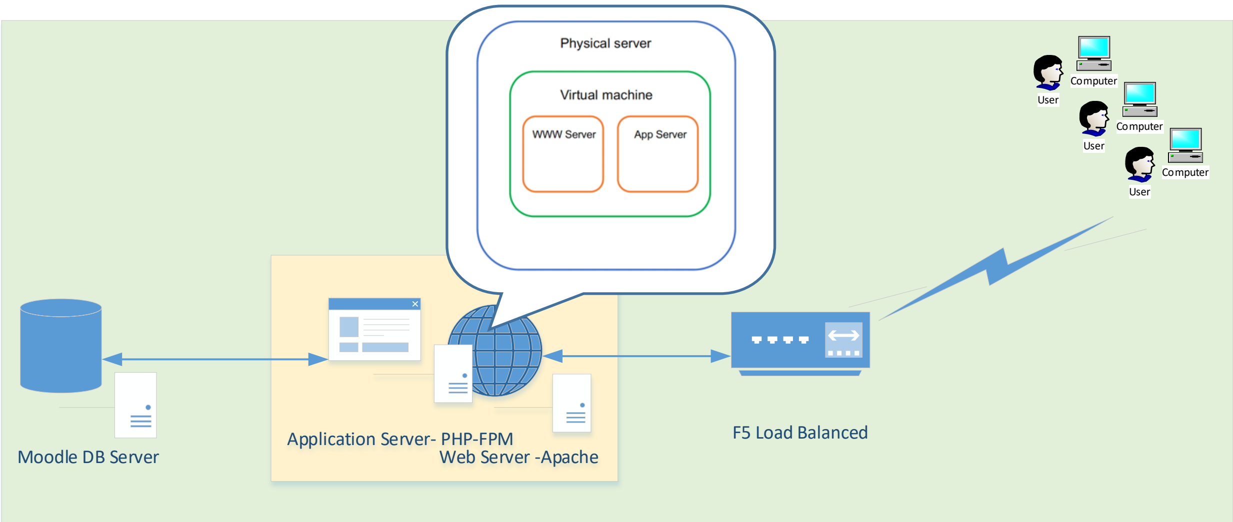


Figure 5-7 Current USP Moodle Backend Configuration

Web server is a VM and the Application Server which is in the form of PHP-FPM (php scripts that come with Apache Server software), so both Web Server and Application Server come as parts of the Apache Web Server software. This means that Web Server x 1 and Application Server x 1 are on the same VM server.
In this case the F5 load balancer is more used for security reasons, so only the IP of the F5 is visible from the outside world. N.B – Our F5 is also used for other applications apart from Moodle.
Detail specification of servers related Moodle is shown in the table below.

Table 5-8 Server Configuration with Moodle Running

Item	Q'ty	Specification	Remarks
Web Server	1	OS: CentOS 8.3, Cores: 16, RAM: 128GB, Storage/Disk: 3.2 TB	VM running on Nutanix HCI
Moodle Database Server	1	OS: CentOS 8.3, Cores: 16, RAM: 128GB, Storage/Disk: 1.2 TB	VM running on Nutanix HCI
F5 Load Balancer	1	F5 Load Balancer Model: BIG-IP i5800	2 Hardware Appliances in High Availability, Security

Table 5-9 Server Configuration and Version of Moodle / Middleware and Others

Item	Specification	Version
OS	CentOS Linux	8.3
Web Server	Apache HTTP Server	2.4
Database	Maria DB	10.3.17
Application Server	Same as Web Server	2.4
LMS	Moodle	3.9
Others	PHP	7.3.25

5-3-5 User Usage

This section explains how Moodle is used by lecturers and students who operate Moodle every day as users of USP Moodle. This is to consider whether it is possible to operate more efficiently and effectively by understanding how Moodle is used, and whether it is possible to improve the platform so that it is easier for teachers and students to use.

(1) Number of Active User

The number of registered users of Moodle as of November 30, 2021 (Tue) is as follows

- Total users – 43,444*

*Number of students 31,310/Number of Lecturers 249 (Senior Lecturer, Lecturer, Assistant Lecturer, Tutors/Tas)
Source: Annual report 2019

When considering the specifications of the server on which Moodle is running, the specifications are calculated based on the users who use it, that is, how many of the registered users access at the same time.
In the case of educational institutions such as universities, it is often assumed that 10% of users access at the same time, but in the case of USP, considering the simultaneous access of about 4,300 people as a prerequisite, Table 5-8 Server Configuration with Moodle Running The specs shown in can be considered to be able to meet the prerequisites.

(2) Online Survey for Student and Lecture

1) Survey Purpose

This online survey was conducted for the following purposes

- To understand users' usage of distance learning system.
- To survey the Operation literacy of distance learning system of users.
- To obtain user’s impressions and opinions about the distance learning system.

2) Survey Item

The items surveyed were as follows

- User attributes
- Connection environment and status with the distance learning system
- Proficiency level of software/application operation
- Opinion and expectation about online learning
- Usability of the distance learning system
- Opinions about the distance learning system
- Mobile phone carriers used in each region

3) Survey Condition

Period: November 25 - December 3, 2021

Target: Users who operate Moodle as lecturers and students

Method: Online survey using Google Form

Notification: Email to Target

4) Survey Result

- Number of Answers

Lecturers: 10, Students: 36

- Respondent’s Attributes

The attributes of those who responded to this online survey are as follows.

Table 5-10 Attributes of Lecturer

School	Title					
	Dr.	Senior Lecturer	Lecturer	Assistant Lecturer	Coordi -nator	Fellow
SBM:Discipline of Management and Public Administration		1				
SBM:Discipline of Tourism and Hospitality Management		1			1	
SBM:Graduate School of Business				1		
SoLaSS:Discipline of Government, Development and International Affairs	1	1				1
SoLaSS:Discipline of LawDiscipline of Social Sciences			1			
STEMP:Discipline of Mathematical Science		1				
STEMP:Discipline of Mechanical Engineering		1				
Total	1	5	1	1	1	1

Current Residential Location: All respondents in Fiji, Campus / center: All respondents in Laucala campus

Table 5-11 Attributes of Student

Current Residential Location	Year / Grade							
	1st year	2nd year	3rd year	Preliminary (yr12)	Foundation (yr13)	Master Program	PhD Program	Others
Fiji	4	4	5			3	1	4
Nauru	1					1		
Solomon Islands		1						1
Tonga	1	1			1			1
Tuvalu			1					
Vanuatu	2	2			1			1
Total	8	8	6	0	2	4	1	7

Table5-12 Campus/Center where the respondent (Student) is primarily based

Campus	Number of Student
Emalus Campus Vanuatu	5
Laucala Campus	21
Nauru Campus	2
Samoa Campus	1
Solomon Islands Campus	2
Tonga Campus	4
Tuvalu Campus	1

For the results and summary of the online survey, please refer to Attachment-2 and Attachment-3.

6. Challenge and Issue of Distance Learning System of USP

6-1 Network Infrastructure and Communication Equipment

(1) Expansion of Ku-Band satellite link capacity

Keeping a good connection environment between remote campuses/centers located in 12 member countries is indispensable for the USP to proceed with distance education. The campuses/centers connected via the Internet as shown in the figure below have sufficient line capacity. Since the line capacity is based on the contract with the ISP, the contract needs to be renewed for expansion.

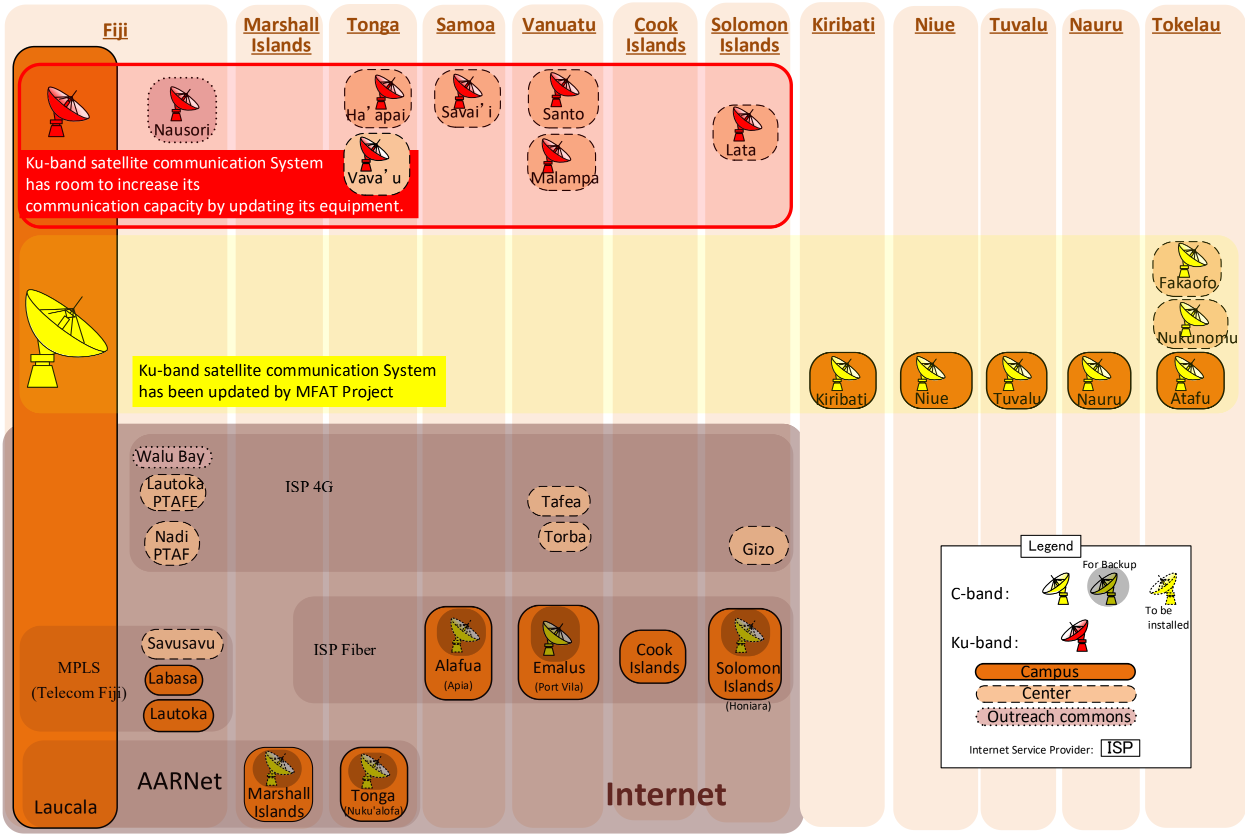


Figure 6-1 USP Network Infrastructure Category

As for the satellite links, two systems, C-Band and Ku-Band, are in operation, and C-Band has already been updated by the MFAT project in NZ. As shown in Figure 5-5 above, the bandwidth is 90 Mbps downstream from the hub station, so the infrastructure is sufficient for distance education applications.

On the other hand, the six remote centers and one outreach commons in five countries connected by Ku-Band have doubled the frequency bands used for satellite communications in 2020 to increase their capacity. However, as shown in Figure 5-5, the downstream capacity from the Fiji hub station is 21 Mbps and the upstream capacity is 2 Mbps, which is insufficient compared to the Internet and C-Band satellite circuits. The development of an infrastructure that enables uniform education at all remote campuses/centers is an urgent issue for the USP, which is implementing distance education in 12 member countries, to overcome.

As a network infrastructure for distance education, the trend is to shift to Internet connections provided by Internet service providers using submarine fiber-optic cables connected to the sites. However, for sites that do not have submarine fiber-optic cables, satellite links will continue to play an important role in the network infrastructure.

In some cases, such as the Emalus campus in Vanuatu, fiber-optic cables have already been installed, and the Internet service provider's Internet line is used as the main line, with the C-Band satellite line as a backup line for redundancy and increased reliability.

Submarine optical fiber may be laid in some remote centers that are currently using mainly Ku-Band. However, in some cases, such as in Vanuatu, the cable is laid only to Efate Island where the capital Port Vila is located, making it difficult for remote centers located on other islands to benefit from the optical fiber network.

In terms of eliminating the digital divide, the increase in the network capacity of such remote centers will have an important meaning. Even after the fiber-optic network is in place, it can be used as a backup as in the case of C-Band.

(2) BCP Measures

As shown in the network configuration diagram in Figure 5-1, the current configuration is a data center and network hub at the Laucala campus in Fiji.

For UPS, which provides distance education via network to remote campuses/centers dispersed in 12 member countries, the fact that the data center and network hub functions are centralized in one location is a point that needs to be improved from the perspective of BCP in the event of a disaster or other unforeseen circumstances, and the construction of a secondary hub is required.

(3) Training of Engineering Staffs

The network that supports distance learning at USP is based on the latest IT infrastructure. As technology improves, the quality of the infrastructure is also increasing, and the quality of distance learning is expected to benefit from this improvement. The speed of progress in these technologies is rapid, and it is necessary to constantly catch up with the latest technology, so enhancing the training of engineers is an urgent issue.

(4) Restoration of USP Communication Buildings

The USP Communication Building which houses the Student Administrative Services, Pacific Technical and Further Education and the Centre for Flexible Learning was burned down by fire in November 2018.

That building had contained React Room, CFL Meeting Room, Media Studio, etc..

Currently, the departments that were housed in the building have been temporarily moved to other buildings and are in need of restoration.

6-2 Software and Application

From the results of the online survey, interview with ITS and Workshop with CFL, the Team has found the challenge and issues that are shown in the table below.

Table 6-1 Challenge and Issue on Distance Learning System

No.	Challenge and Issue	Consideration of the Challenge and Issue
1	Connectivity Issues	Just over 30% of students are dissatisfied with their connection to distance learning system. About 16% of the students answered that they have problems in viewing on-demand video lectures, and about 31% of the students answered that they have problems in connection and stability in connection to ZOOM. 30% of lecturers and 36.1% of students answered “Slow” in terms of inconvenience of distance learning system. The availability of each service and tool of the distance learning system, especially Moodle, depends on the quality of the network, such as connectivity and stability, which may lead to loss of learning opportunities in some cases. From the above, Regarding the connectivity of users, especially students, it is necessary to take measures such as adding WiFi connection points and improving network speed if it is on campus, and lending a WiFi router if it is off campus.
2	User Support	Regarding the operation of the application and software, all the lecturers responded that they understand it, but 13.9% of the students responded that they do not understand much.

No.	Challenge and Issue	Consideration of the Challenge and Issue
		As for the frequency of use of the user guide, 52.8% of the students answered almost everyday or a few times a week, which suggests that the user guide is used on a daily basis and that the need for it is high. On the other hand, 20% of the lecturers and 2.8% of the students answered that the user guide is not very useful. When asked what type of user guide they thought was useful, there were various responses such as Video Manual, Online Training by Zoom, Face to face training, and Contact the help desk by phone.
3	Overload on Moodle System	Did have this issue of overload when migrated to Moodle 3.9 early 2021, however it was more to do with Apache and PHP-FPM config parameters not being tuned properly. Apart from the parameter tuning we did increase the number of cores. In case ITS replaces the server device, upgrade the version of Moodle, or update the middleware in the future, the settings of Moodle and middleware may return to the initial values, so ITS needs to check.
4	Providing appropriate user support	As shown in the results of the online survey, students use the online user guide more frequently, and there are requests for a variety of support methods such as video content and ZOOM support. It is necessary to provide user-centered support by restructuring the user support system and reconsidering the means of provision.
5	Content design	Since the current teaching material content is not compatible with mobile devices and information on the latest content production, media and authoring may not be known, content production methods, media and authoring tools including teaching material content for mobile devices the Team thinks that it is good to provide the latest information on and support the construction of an environment where production and development can be practiced.
6	Improving the content production environment	While the physical production environment with hardware such as studios, cameras, and lighting is important, the Team thinks it would be good to propose improvements that can be implemented by the system, such as a shared environment for past content files and assets and a group authoring environment.

7. Plan to Update Distance Learning System (Concept of the USP Connect)

7-1 Planning Mechanism of USP

USP regular planning consists of two plan documents, namely Strategic Plan and Annual Plan. Strategic Plans cover for a few years while Annual Plans cover literarily a year. Annual Plans may be interpreted as breakdown of Strategic Plan for each operational year. All these plans should be presented and approved by the USP Council.

7-1-1 Strategic Plan

USP website avails the following Strategic Plans.

Strategic Plan 2006- 2010

Strategic Plan 2010- 2012

Strategic Plan 2013- 2018

Strategic Plan 2019- 2021

Strategic Plan 2022- 2024

Strategic Plan 2022- 2024 just came out in November 2021 after approval by Council Meeting held in mid November. Forward from the VCP of the Plan starts with a header '*Planning Landscape Underpinned by Challenging Economic Context'* as;

'Our last Strategic Plan (SP) 2019-2021, has been characterised by two predominant factors. First, has been a fall in our core funding and second, we have found ourselves gripped in a global COVID pandemic.'

It is understandable that the last Strategic Plan has not been well achieved due to the economic constraints under the circumstances with the pandemic, then the new Strategic Plan will take over the previous plans with minor changes in five priority areas as follows;

1. Education
2. Research, Innovation and Partnerships
3. Regional Campuses and Global Engagement
4. Regional Cooperation through the CROP Network
5. Governance and Intelligent Use of Resource

As seen above, education has been a top priority area for USP. And its Objective 7 *'Improve student experience in the post-COVID-19 environment'* states *'Expand online education including the greater adoption of the Massive Open Online Courses (MOOCs) and live, interactive online courses.'* More than in other tertiary education institution, USP realizes and emphasizes importance of development in the area of quality online learning. Then the next statement follows; *'Increase innovations in educational technologies, including the enhancement of USP's Learning Management System, Moodle, by incorporating Artificial Intelligence-based Education Tools which collect and analyse data on a student's performance.'* It indicates USP's commitment to endeavour to adopt the latest learning technology where there are needs more than any other institutions with students scattered over the 12 island nations only connected online.

As any university does, USP also puts priority in research as well as described in Priority Area 2. There are five themes highlighted and Theme 3 is '*Education, Culture, Health & Wellbeing'* where USP's central role to play is stipulated in the area of '*the development of innovative actions and interventions for the enhancement of educational opportunities and outcomes.'*

7-1-2 *Annual Plan 2022 (to be received)*

Annual Plan 2022 is prepared in line with the approved 3 years Strategic Plan 2022 – 2024. ……………………….

7-1-3 Annual Plan 2021, Estates and Infrastructure

During interview sessions with Estate and Infrastructure Section, the section has prepared independent Annual Plan which is in line with USP Annual Plan but more detailed information is available. Since the section is in charge of infrastructure development, their plan has all the projects including those in the pipeline are listed. It is very helpful to understand all the development projects plans drawn by USP as a whole entity, but not a wish list from all different segmentations. All the proposed projects are categorized under five priority areas under Strategic Plan 2021. Among those, the following are the list of projects under the Priority Area 3 *'Regional Campuses'. Needs to confirm which of these were completed or not.*

- Deferred Maintenance Implementation for the following buildings and infrastructure at USPs Alafua Campus (19 buildings), USPs Kiribati Campus (4 buildings), USP SI Campus (4 buildings)
- Finalize the Regional Campuses Organization Structure Framework and Financing Plan
- Complete the construction of the new REACT Facility Solomon Islands Lawson Tama Campus
- Complete the Roof Replacement Works for USPs RMI Campus
- TEFMA Audit and Benchmark Reporting for Alafua, Emalus, and Kiribati.
- Finalize the land agreement for the proposed Labasa and Lautoka Campuses.
- Finalize the 10-year maintenance plan for Alafua and Emalus Campuses.
- Science Lab – Emalus – Start of the construction
- Accommodation for international students
- All the Regional Campus Development is aligned to the individual campus development plan.

7-2 Network Infrastructure and Communication Equipment

(1) Expansion of Ku-Band satellite link capacity

The Ku-Band satellite frequency bandwidth was doubled in 2020 to increase data transmission capacity, but the hardware installed in 2010 is still being used, and no further upgrades are planned at this time.

(2) BCP measures / Secondary hub concept

The need for a secondary hub has been recognized by USP stakeholders and the need was emphasized by DVC, but no concrete plans have been made for the timing of its implementation.

(3) Training of Engineering Staffs

The importance of training technicians is recognized, and training is provided as appropriate, but it is not sufficient, and further enhanced training is desired.

(4) Restoration of communication buildings

Donors are being sought for the restoration of the burned Communication Building, but no concrete restoration plan is underway.

7-3 Software and Application

7-3-1 Future Moodle version upgrade schedule

ITS plans to upgrade Moodle to version 3.11 in December 2022. This will require approval from the Learning and Teaching Committee and CITC (Communication Information Technology Committee) giving the approval and ITS working with CFL/ and Schools who is the main stakeholder for Moodle.

7-3-2 Confirmation of configuration software / applications in the USP Connect concept

At the workshop with CFL staff held on Thursday, December 2, 2021, we confirmed the usage status and future plans of the software and applications described in the USPConnect Concept document (See Attachment-4).

The table below shows the results.

Table 7-1 Confirmation of USP Connect Concept

Category	Purpose of use	Software/Application	Status of use	JICA Team Comments
1. Learning management	Learning Management System	(1) MOODLE	✔	#1
	ePortfollio	(2) Mahara	✔	#1
	Analytics	(3) Matomo		#13
		(4) Cognos		#2
		(5) Early Warning System	✔	#3
	Synchronous Tools	(6) REACT	✔	#1, #12 Not used temporarily
		(7) BigBlueButton	✔	#1, #12 Limited use
		(8) Poodll		#4
	Academic Integrity	(9) Turnitin	✔	#1
	Cloud Services	(10) Google Apps	✔	Use Google Drive Only Used as online storage
		(11) Own Cloud	✔	Uses original system "Mana"
	Student Management System	(12) Ellucian (Banner)	✔	#1
2. Contents management	Media Platform	(13) OPEN CAST	✔	#1
		(14) Alfresco		#5
	OER (Open Educational Resouce)	(15) Edu-sharing		#6
		(16) Joomla		#7 Used as teaching material only
		(17) Pressbooks		#8
3. Information sharing	SMS Gateway	(1) KANNEL		#9
	Social Media	(2) Facebook		#10 Not officially used
		(3) Twitter		#10 Not officially used
		(4) Youtube	✔	#1 For Video contents delivery
	Library	(5) Greenstone	Not used	#11
		(6) Spydus	Not used	#11

#1 See Section 5-3-2 Software and Application Usage / Table 5-6 Software/Application Usage in Current Distance Learning System

#2 Other than the tools currently in use, the only company currently planned to be introduced is the BI tool "Cognos" for analysis. Currently, Cognos is not used on Moodle, but ITS is considering using Cognos for the purpose of analyzing Moodle's activity usage by school, level, and campus. ITS says that hardware provisioned and Cognos planned to be made available by June 2022.

#3 Learning analytics are software algorithms that are used to predict or detect unknown aspects of the learning process, based on historical data and current behavior. There are four main categories of learning analytics:

descriptive (what happened?) / predictive (what will happen next?) / diagnostic (why did it happen?) / prescriptive (do this to improve)
Use analytics to identify and notify students who haven't recently accessed or haven't yet accessed the course.

#4 Poodll is equipped with functions that cannot be realized by standard Moodle, such as use other than assignments, automatic scoring, and saving to an external server.

#5 Content management system (portal site framework).

#6 Repository for collaborating, managing, and using objects such as Moodle courses.

#7 A system that centrally manages homepage images, texts, designs, and layout information from a web browser.

#8 A content management system designed for book production. Based on WordPress, it is possible to export content in various formats for ebooks, webbooks and prints.

#9 WAP and SMS gateways. Used for displaying trillions of short messages (SMS), WAP push services, and mobile internet connections.

#10 Moodle and these SNSs are not generally linked, but they may be used as a means of communication between students and between students and teachers.

#11 This system similar to the library management system "Symphony" currently used by USP

#12 During the lockdown in April 2021 due to the effects of the COVID-19, USP started shifting the delivery method of online lectures from REACT to ZOOM at the time when USP staff and students could not enter the campus, and REACT is not in use at this time (Dec 2021). In the future, a shift from ZOOM to WebEX is being considered. Also, depending on the future situation, online lectures by REACT may be resumed, so some services and tools such as ZOOM and BigBlueButton may be changed.

#13 Open source web analytics software aimed at tracking user activity on a website.It can be linked with Moodle by Plugin.

The Team could confirm the current status of the distance learning system and challenges/issues in the workshop with CFL held on December 2, 2021. (See Attachment-5: Draft Report of Joint Workshop)
After returning to Japan, the Team will prepare a proposal for the future development plan (including vision, objectives, specific action plan, etc.) of the distance learning system based on the results of the workshop.
Then the Team plans to hold a workshop with CFL in the middle of January 2022 and finalize it.
The future development plan to be obtained from these workshops will be described in the Final Report and can be used as a future plan of USP distance learning system.

7-3-3 Current USP Moodle rating

With a view to enhancing and improving the distance learning system in the future, the current status of USP Moodle was evaluated according to the following criteria in order to compare it with the current situation and measure and evaluate its effects.
The results of the Comprehensive evaluation of USP Moodle by the Team is in good. The detail evaluation results of the USP Moodle are shown in the table below.

Table 7-2 Current USP Moodle rating

Category	Item	Description	Rating	Reason
System	Upward compatibility	Does it support version upgrade?	○	Moodle supports version upgrade, but USP Moodle is customized, so operation verification is required after version upgrade.
	Customize	Is it easy to customize?	◎	Since Moodle is open source, anyone can customize it under certain conditions.
	Cooperation with other systems	Can it be linked with other systems?	○	Can work together but requires development
	Mobile compatible	Is it compatible with mobile devices?	◎	· Adopts responsive design · Moodle app can be used
Security	Security at the time of authentication	What is the security content at the time of authentication?	○	LDAP servers are used for authentication on Moodle
	Security support	What about security measures?	○	General measures are taken by SSL / TLS certificate for encryption.
Performance	Connectivity	Is it easy to connect or is it stable?	○	There is no problem connecting to Moodle, but it depends on the connection environment.
	Response time	How long does it take to react after operating?	△	Depends on the connection environment. Reference: WiFi connection (2M): △ Mobile (DATA / LTE) (50M): ○
	Download	Download each material	△	Depends on the connection environment. Reference: WiFi connection (2M): △ Mobile (DATA / LTE) (50M): ○
	Internal video content playback	Can the video in Moodle be played?	△	Sometimes paused due to reading during playback
	External video content playback	Can Google Drive and YouTube videos be played?	△	· Google Drive videos could pause due to loading during playback. · YouTube is no problem.
	Online lecture	Participation in online lectures	○	Lecture Capture and ZOOM recording sessions can be viewed as on-demand lectures via OpenCast. Depends on the connection environment. Reference: WiFi connection (2M): △ Mobile (DATA / LTE) (50M): ○
Usability	Operability	Is the operation easy to understand?	○	It is not an intuitive operation like GUI, but the structure is organized.
	User interface	Is the user interface easy to understand?	○	Easy to understand by changing appearance
	Site navigation	Is it easy to find where you need the information?	○	Easy to understand by using blocks
	Course composition	Is the structure of the course and the arrangement of activities easy to understand?	△	Depending on the course, one screen was long and sometimes difficult to understand.
	Help content	Is there a lot of help content such as user guides?	△	· The content is necessary and sufficient · It is difficult to know the position of the content you want to see because you cannot search by keyword.
Contents	Quality	How is the quality of the content?	○	Maintaining necessary and sufficient quality
	Multimedia support	Using rich content such as H5P or SCORM?	△	Most of the content currently in use consists of standard videos and documents
	Mobile compatible	Is it compatible with mobile devices?	○	· Adopts responsive design · Video can be played normally

Legend: ◎:Very good ○:Good △: Not enough ×: Need improvement

8. Future Support by JICA for Distance Learning System of USP

8-1 Network Infrastructure and Communication Equipment

(1) Expansion of Ku-Band satellite link capacity

In satellite communication, data is modulated for transmission and transmitted by radio waves for satellite communication, and in general, it is possible to increase the transmission capacity with the same frequency bandwidth by boosting the modulation level. In other words, there is a possibility to increase the transmission capacity without increasing the cost of satellite communication.

In the current Ku-Band used in USP, the signal is transmitted by 8PSK (phase shift modulation), which expresses the signal by discontinuously changing the phase of the carrier wave, but 16PSK and even 32PSK, which can technically secure twice the transmission capacity, have been put to practical use.

However, since there is a trade-off between the modulation level and transmission robustness, the modulation level cannot be simply increased in order to increase the transmission capacity.

It is necessary for the satellite communication service provider to make a decision on the feasibility of a technical study of the circuit design called a link budget. If it is technically feasible, a study of Ku-Band satellite communication equipment with the performance required to achieve the link budget will be conducted, and an estimate of the cost of updating the equipment will be calculated.

Technical studies will be carried out to determine whether the transmission capacity can be improved by increasing the output power of Ku-Band satellite communication equipment to improve the robustness of the transmission channel and increase the modulation level.

(2) BCP measures / Secondary hub concept

Currently, both the data center and the network hub are centralized at the Laucala campus in Fiji.

Data backups are already taken, and in the event of a failure, it is planned that the backup data will be restored to a substitute server for recovery, but since it will take time to recover, it is desirable to establish a secondary hub with the same functions as the current hub.

As shown in Table 5-3, the Internet connection in Tonga has the same environment as the one in the Laucala campus in Fiji, and the installation of a secondary hub here can be considered as a BCP measure.

(3) Training of Engineering Staffs

Technical assistance for the development of engineers to maintain the network, such as technical cooperation projects, is desired.

8-2 Software and Application with Capacity Building

As a result of this survey, the following are possible future support in the field of Software and Application.

(1) Enhancing / Improving the Online Learning Environment with Moodle

USP has four learning modes to flexibly respond to student situations such as residence, network environment, and device ownership. Some modes, such as Blended mode and print mode, have a Moodle usage rate of 30% or less. In order to continue to spend the "new normal" era with Covid-19, it is necessary to prepare to increase the ratio of online learning.

or that purpose, it is necessary to take the following measures to strengthen and improve the online learning environment in Moodle.

- Enhancing and stabilizing the network environment of regional campuses and centres
- ~~Deployment of the latest devices to regional campuses and centres~~
- Enhancement / improvement of Moodle functions by adding plugins and linking with external services

(2) Improvement of User Support Environment

・Support content and configuration optimization / structuring

・Optimization of delivery means

Introduction of video manual

Introduction and utilization of chatbots

(3) Introduction of the Latest Learning Design

・Education on the latest learning design

Dispatching experts and training human resources

・Support for introducing the latest technology

Science of learning / Learning experience / learning journey

(4) Improvement of Content Production Environment

Building a collaborative work environment

Building asset sharing and search methods

Providing and operating training for authoring tools

Provide training on multimedia asset production methods for instructors

8-3 Other

Restoration of USP Communication Buildings

Under consideration

9. Tentative Recommendations

This JICA Survey (the Survey) is limited in timeframe given as five months from October 2021 to February 2022, which falls in Xmas (Summer) Holiday in the Pacific as well, and also in resources input. During field survey from November to December 2021, the JICA Survey Team felt that there may need to make some recommendations in the Final Report of the Survey to be prepared in February 2022. Although the recommendations may not be eventually necessary to be made after further data compilation from December to February, this Field Report briefly states those as tentative recommendations so that the USP management could be better prepared when those would appear in the Final Report. Details of scope and other specifications for the recommendations shall be elaborated in the Final Report.

(1) Expected Impact Analysis of New Centre Development

As raised by USP management during the debriefing of the field survey on Wednesday, 8th December 2021, possibilities of creating new centres under Regional Campuses are to be considered. It should be true that with the more centres the more students could study on islands in the proximity of their residences. However, cost effectiveness must be thoroughly assessed as well since there may exist other higher priority development components for enhancement of learning of students.

In this regard, thorough data collection and analysis on expected impacts such as numbers of students who would choose to study at a new centre when it is developed on some of islands may be recommended at the end of the Survey.

(2) Connectivity Assessment by Network Monitoring

Issue of connectivity is raised by various stakeholders during the field survey, however, actual connectivity at the end recipient students in Regional Campuses is not measured at USP HQs now. If it is actually measured during busy study duration in USP semesters, it may be useful in order to identify priorities as well as measures to be taken to improve the connectivity.

Such measurement by possible network monitoring may be recommended at the end of this survey.

(3) Review of Effectiveness by Learning Mode

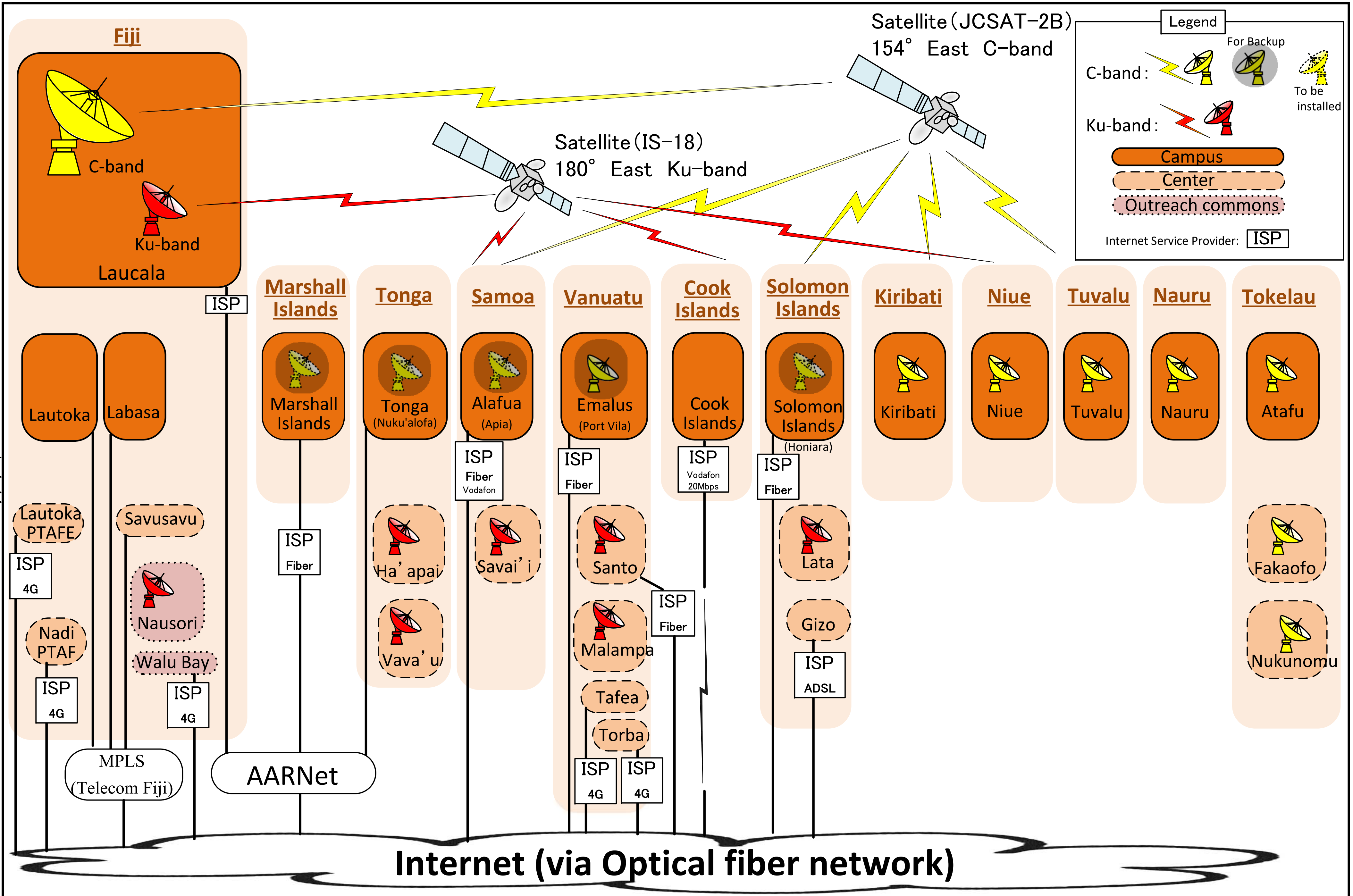
USP currently provides four different learning modes, namely, face to face, blended, online and print. Face to face mode does not usually require online (or offline) learning instruments, although COVID19 has forced those to adopt Zoom lectures. As to print mode, needs from some students in areas of USP member counties where environment for online learning is not well provided are emphasized. However, strategic plan 2022 – 2024 encourages further endeavour to deploy teaching and learning technology and that would promote shifting some of print mode courses to online mode.

In order to capture all these different learning modes comprehensively, review of effectiveness by learning mode may be recommended at the end of the Survey.

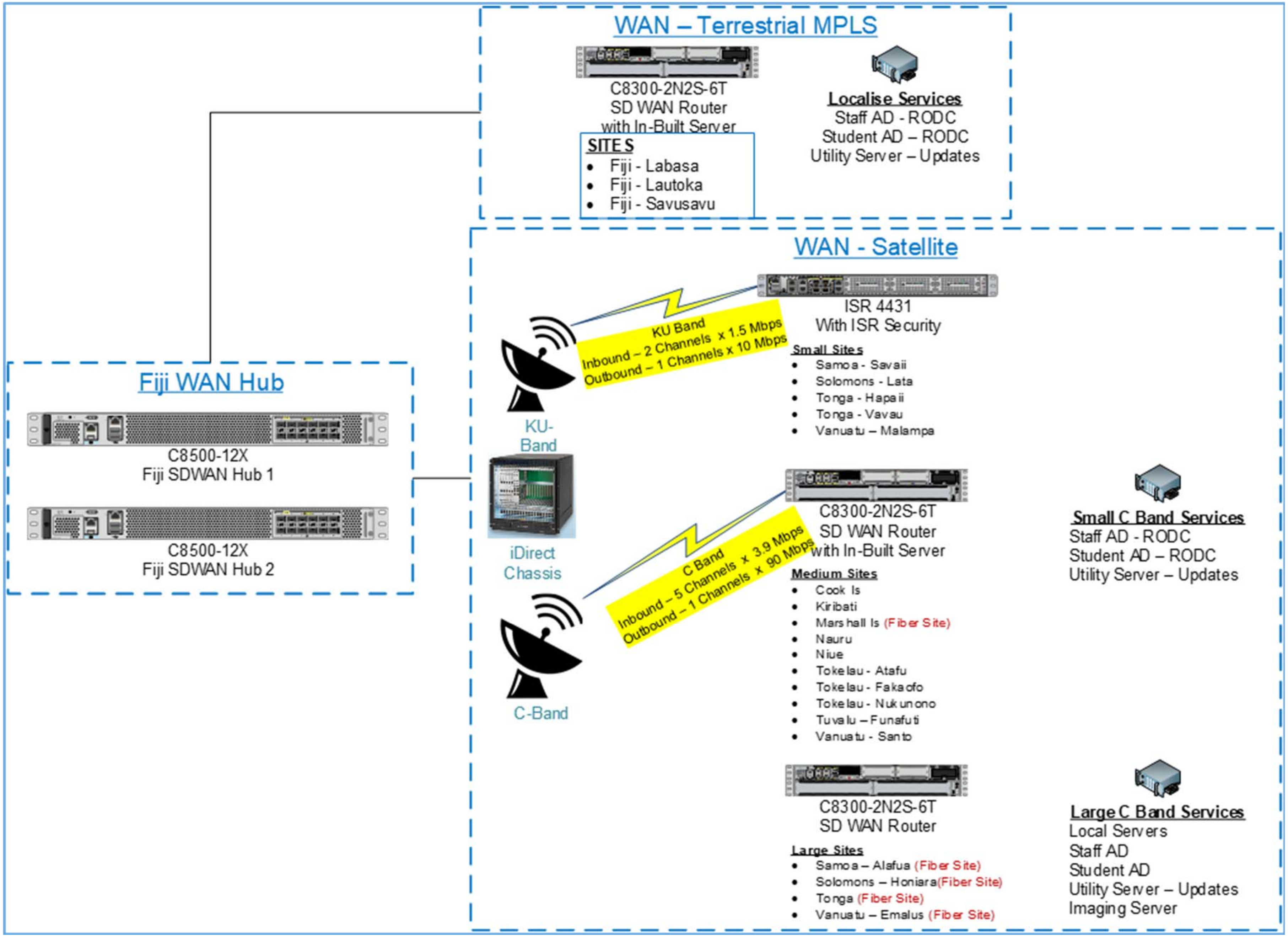
10. Drawings

Dwg. No.	Title
D-01	Existing USPNet Network
D-02	USP Network Diagram
D-03	USPNet Hub station Diagram

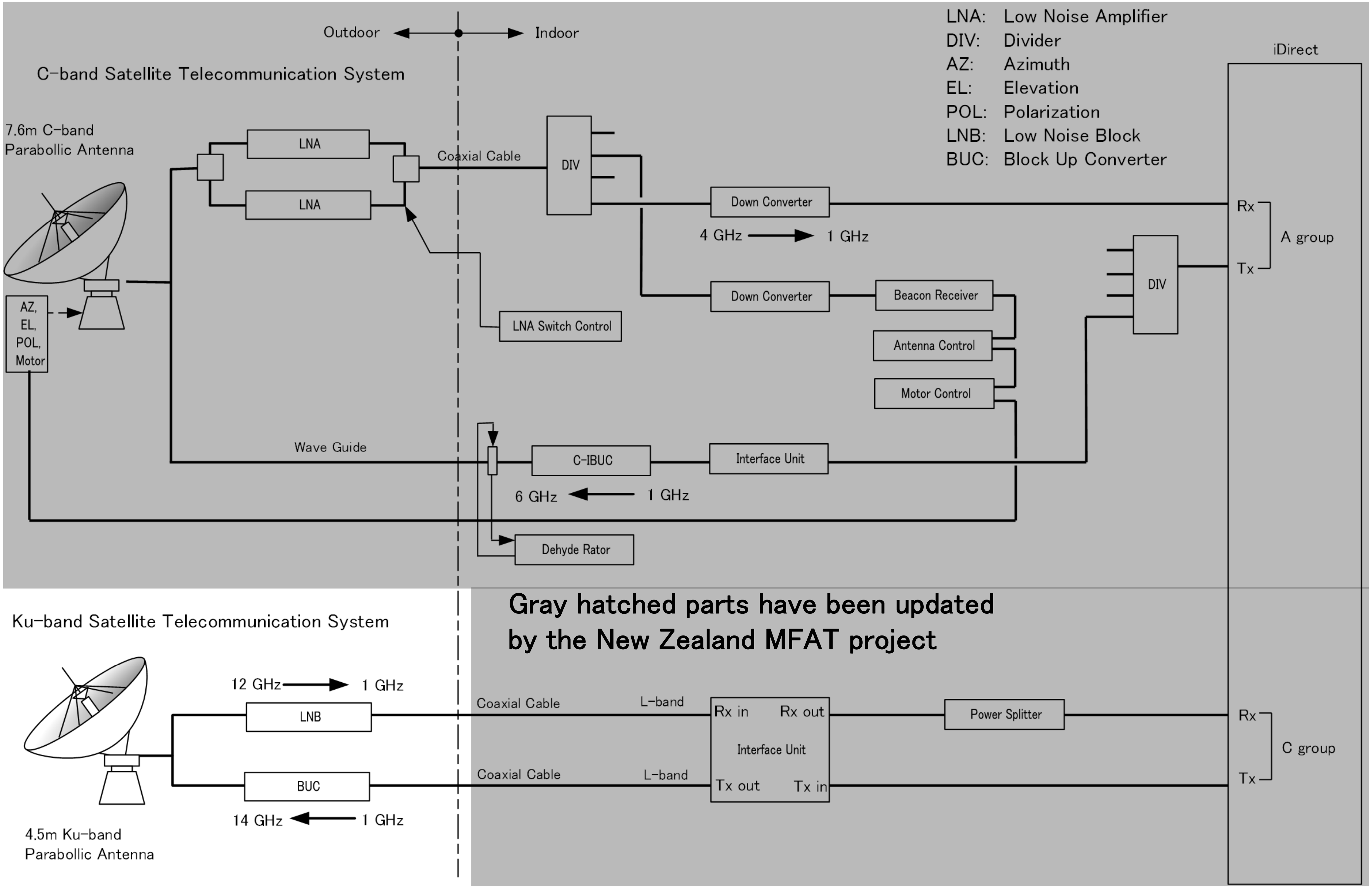
End



PROJECT NAME	COUNTERPART ORGANIZATION	TITLE	SCALE	DATE	DESIGNED	CHECKED	APPROVED	DWG No.
Data Collection Survey for the Distance Learning System and Communication Network of The University of the South Pacific In the Pacific Region	The University of the South Pacific In the Pacific Region	Existing USPNet Network	---	7th Dec. 2021	K.Harikae			D-01
				yec YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN				



PROJECT NAME	COUNTERPART ORGANIZATION	TITLE	SCALE	DATE	DESIGNED	CHECKED	APPROVED	DWG No.
Data Collection Survey for the Distance Learning System and Communication Network of The University of the South Pacific In the Pacific Region	The University of the South Pacific In the Pacific Region	USP Network Diagram	---	7th Dec. 2021				D-02
				yec YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN				



PROJECT NAME	COUNTERPART ORGANIZATION	TITLE	SCALE	DATE	DESIGNED	CHECKED	APPROVED	DWG No.
Data Collection Survey for the Distance Learning System and Communication Network of The University of the South Pacific In the Pacific Region	The University of the South Pacific In the Pacific Region	USPNet Hub station Diagram	---	7th Dec. 2021				D-03
				yec YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN				

Appendix 5 Function of USP Moodle

Appendix-5　Function of USP Moodle

The current configuration of activities, roles, and non-standard plugins used in USP Moodle is shown in the table below.

Category	Name	Details
Activity	Assignment	An activity in which students submit their work. Academic staff can grade the submissions and register the grades. Assignments can be submitted as document files, image files, audio files, video files, etc., or they can be submitted by writing in Moodle directly.
	Chat	An activity that allows course participants to engage in real-time, synchronous discussions within a Moodle course.
	Choice	An activity in which a simple question can be asked or a poll taken. It can be set up so that a single question can be posed and a single or multiple answers can be given. It is also used by USP as a means for students to sign up for classes and tutorials that are conducted face-to-face or online.
	External tool	External tool provides a means for course participants to manipulate LTI-compliant learning resources and activities on other websites and to send grades back to Moodle when available.
	Feedback	The activity of creating and conducting a survey to collect feedback (a questionnaire). It allows for the creation of original or ungraded questions that can be used for course or faculty evaluations.
	Forum	An activity that allows course participants to post comments as part of a "thread". Image files, audio files, video files, etc. can also be posted. Faculty can grade and rate forum posts and give students permission to rate each other's posts.
	Glossary	A plugin to create, publish, and edit glossaries. Glossaries can be created and edited by course participants.
	Lesson	Academic staff can create "branching" exercises that consist of multiple stages and transition to specific pages in accordance with the answers.
	Quiz	A variety of question types are available to meet various educational goals, from simple multiple-choice questions to descriptive, essay, fill-in-the-blank, and calculation questions. The questions you create can be saved in the question bank for reuse in other quizzes or randomized.
	Resources	Resources are activities that academic staff can use to support learning, such as files, URL links, and simple text content such

Category	Name	Details
		as books and pages. They are used to let students browse different websites or download materials.
Role	Site administrator	The site administrator has the authority to operate and view everything.
	Course designer	A UPS custom role based on the course creator role. A user assigned the role of course designer can create courses.
	Lecturer	A UPS custom role based on the lecturer role. Lecturer have the authority to add or change activities, grade assignments, and perform other operations as long as they are within the course they are teaching.
	Teaching assistant	A UPS custom role based on the student role.
	Teaching assistant (limited access)	A UPS custom role based on the student role.
	Mentor	A UPS custom role based on the student role.
	Student	A student can participate in activities and view resources within the course in which they are enrolled, but they cannot modify or edit the course, activities, or resources, nor can they view their grades or course history.
	Guest	Guests without a Moodle account can log in and participate in courses that allow access as a guest.
Non-standard plugins	Attendance	A plugin to manage student attendance records for courses. You can register attendance records automatically, semi-automatically, or manually.
	BigBlueButtonBN	A plugin that integrates Moodle with BigBlueButton and allows you to use BigBlueButton from Moodle.
	Turnitin plagiarism plugin	A plugin that allows you to use Turnitin from Moodle.
	Questionnaire	A plugin that allows you to create surveys with different types of questions, collect data from users, and aggregate the results.
	Poster	A resource module that allows faculty to create pages from blocks of HTML, comments, calendars, RSS feeds, etc., and drag and drop them into the desired location.
	Reflection	A plugin that allows you to create a global blog (where everyone in the module posts to the same blog), a group blog, or an individual user blog, in addition to the standard Moodle blog.
	Moodle proctoring	A plugin that automatically captures photos of users via webcam when a student quiz is conducted, to identify who is taking the test or to ensure that the student did not attempt any inappropriate activity during the test.

Appendix 6 Online Survey Result on Distance Learning System (Student of USP)

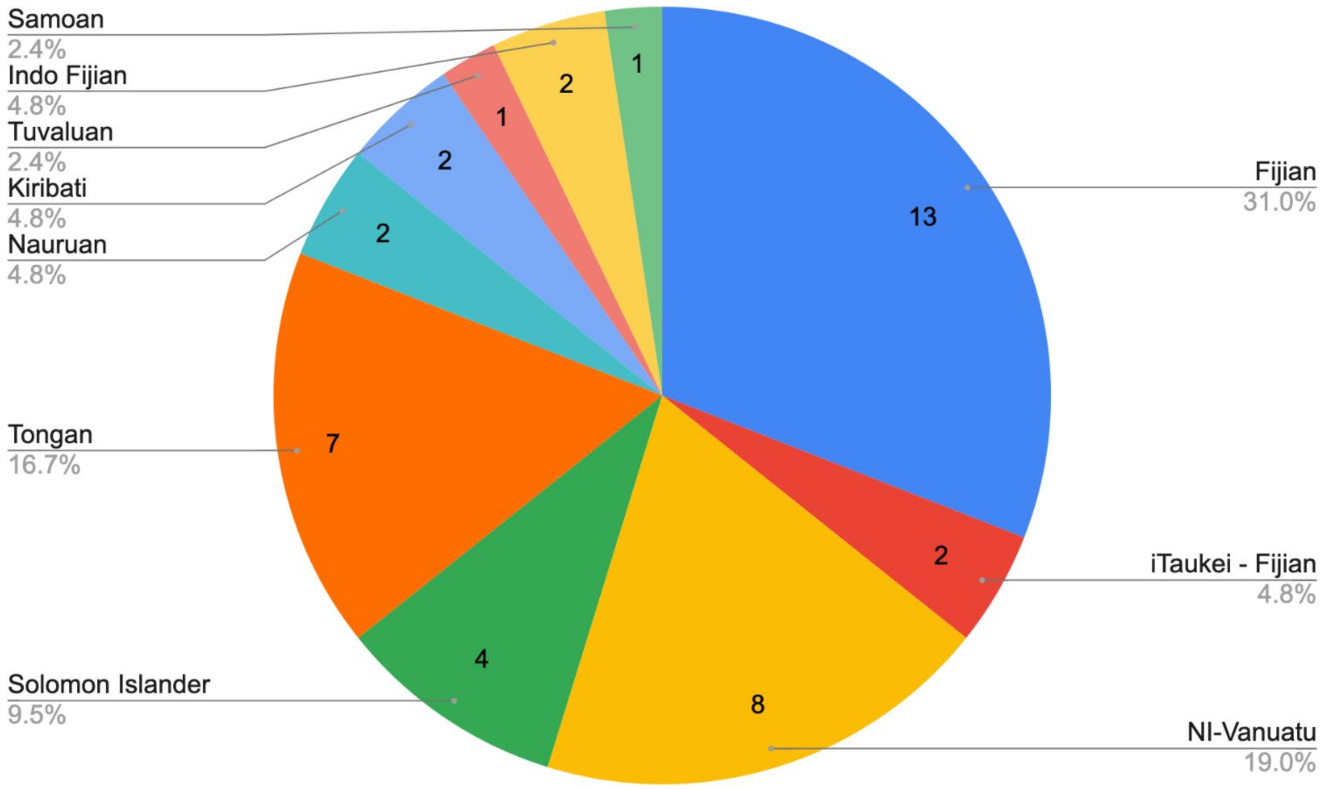
Appendix-6 Online survey results on distance learning systems (Students of USP)

1. Attribute information of questionnaire respondent

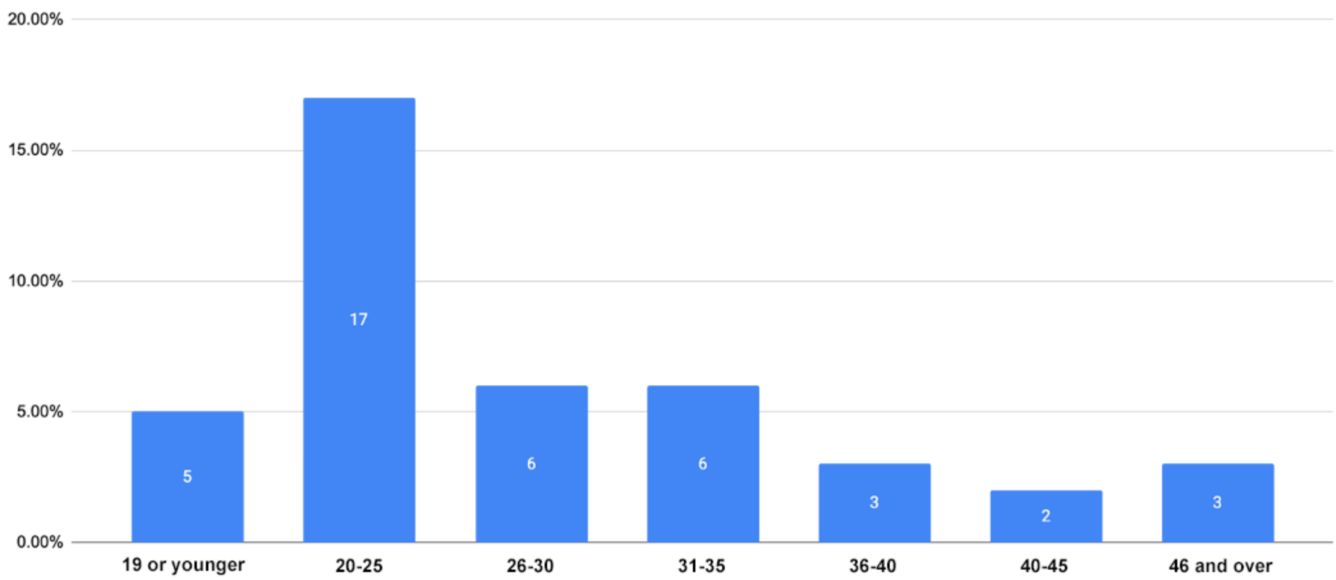
From the viewpoint of privacy protection, 1.1.1 surname, 1.1.2 given name, and 1.2 student ID are not listed.

1.4 The age was derived from the birthday and used as the age of the respondents.

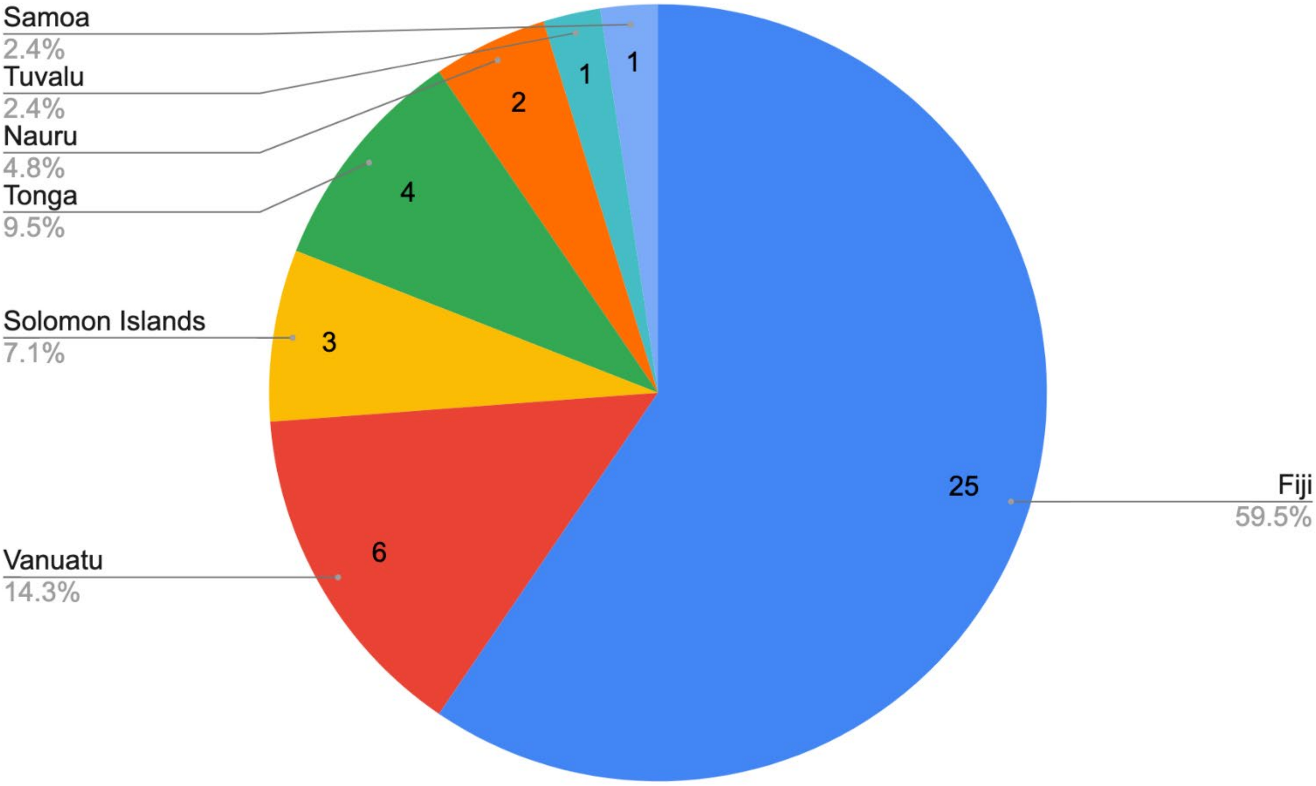
1.3 Nationality



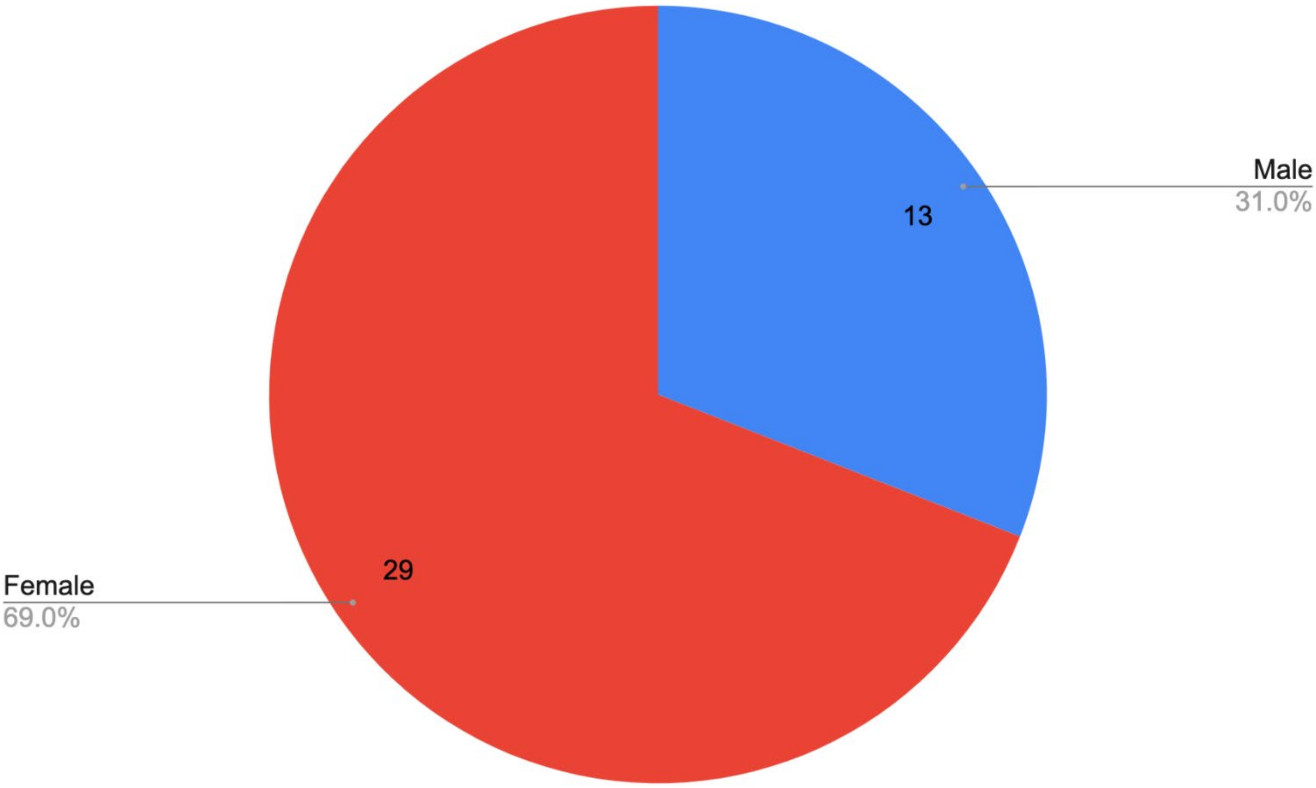
1.4 Age of respondent



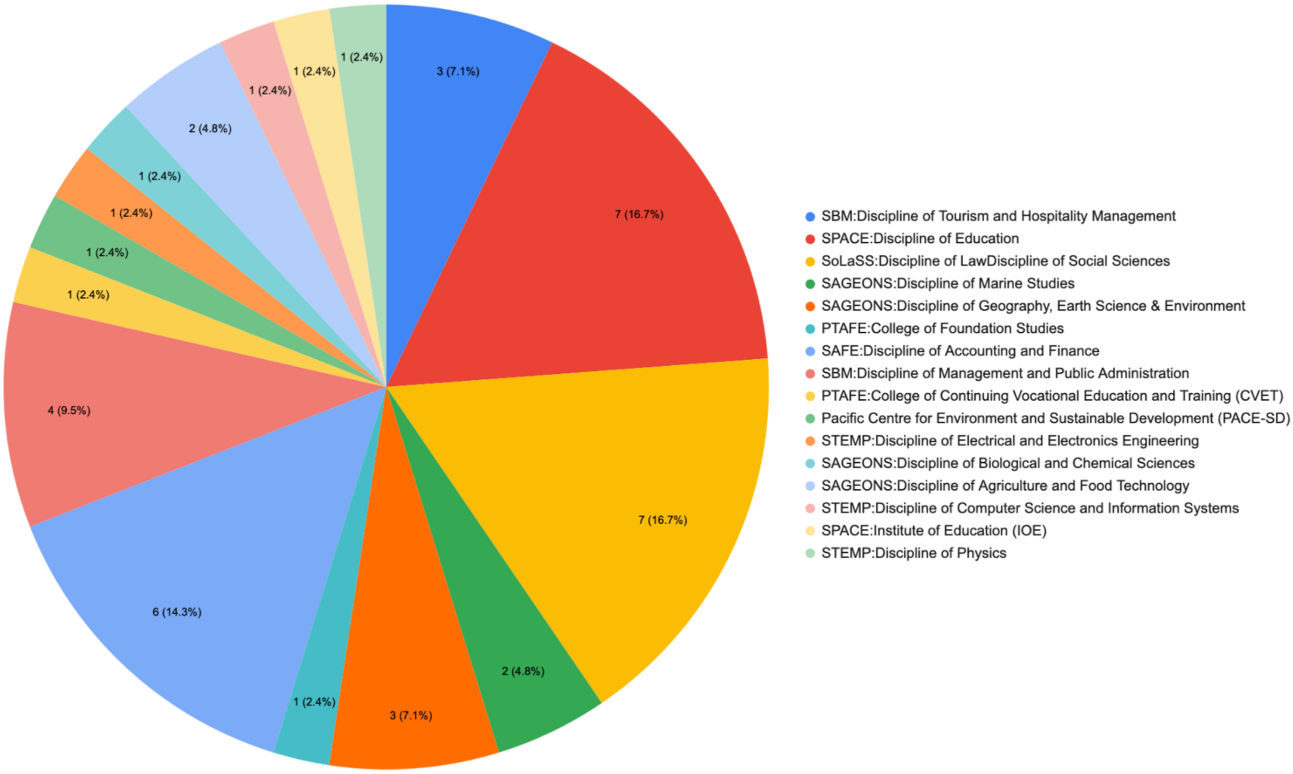
1.5 Current Residential Location



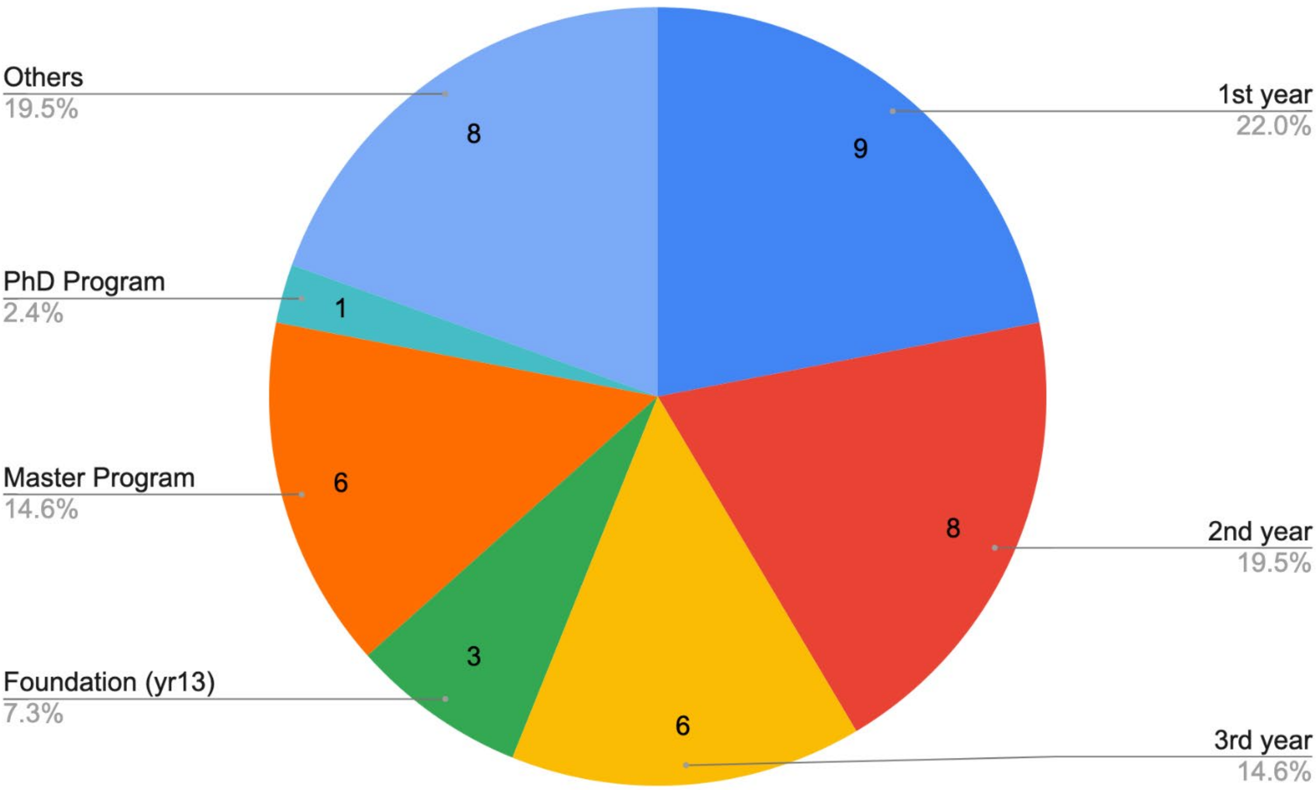
1.6 Gender



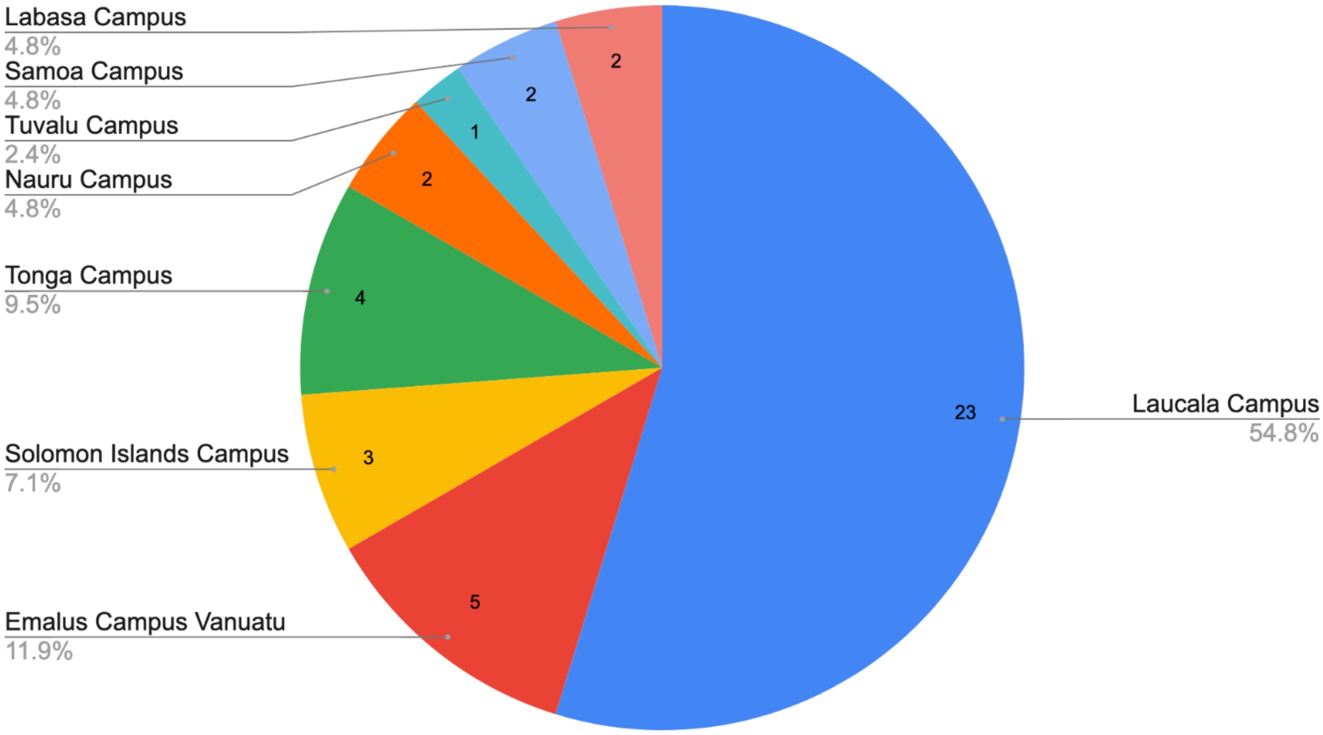
1.7 Program / Courses currently taking at USP



1.8 Year / Grade in the above program

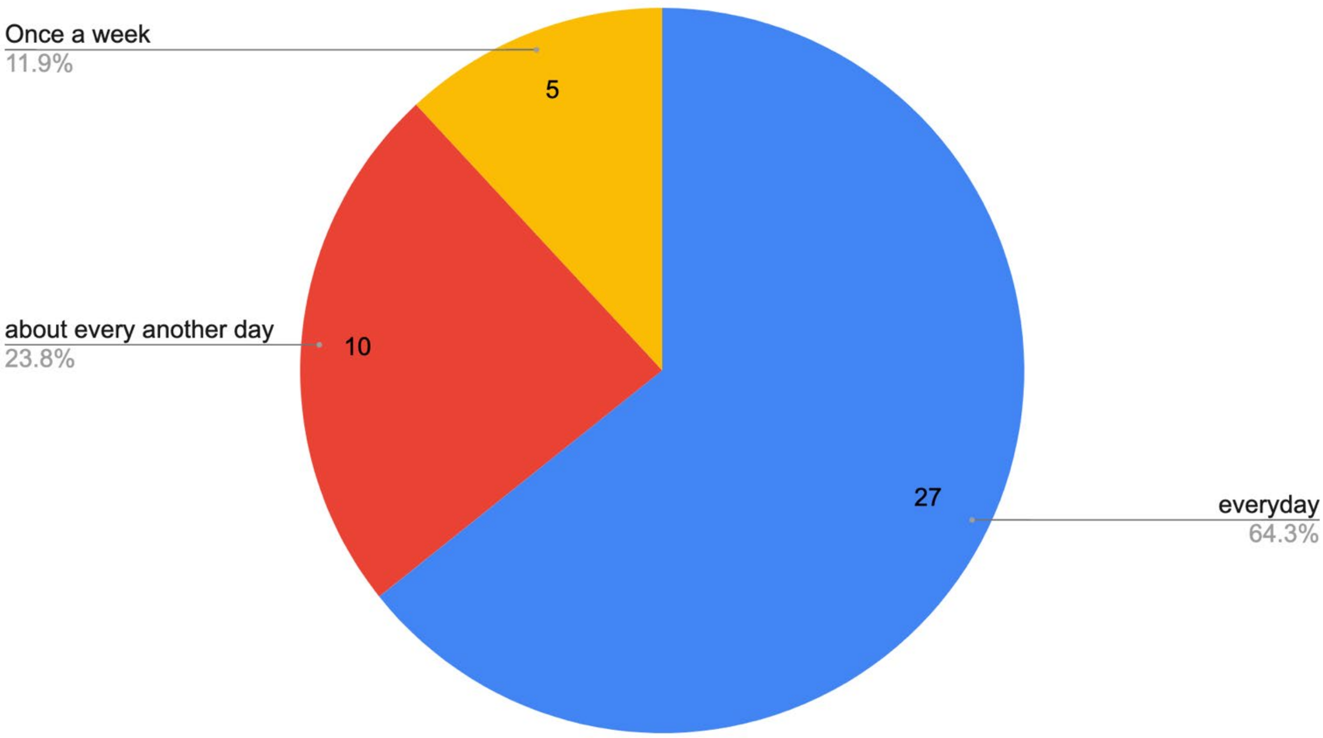


1.9 Campus / center you mainly visit to study

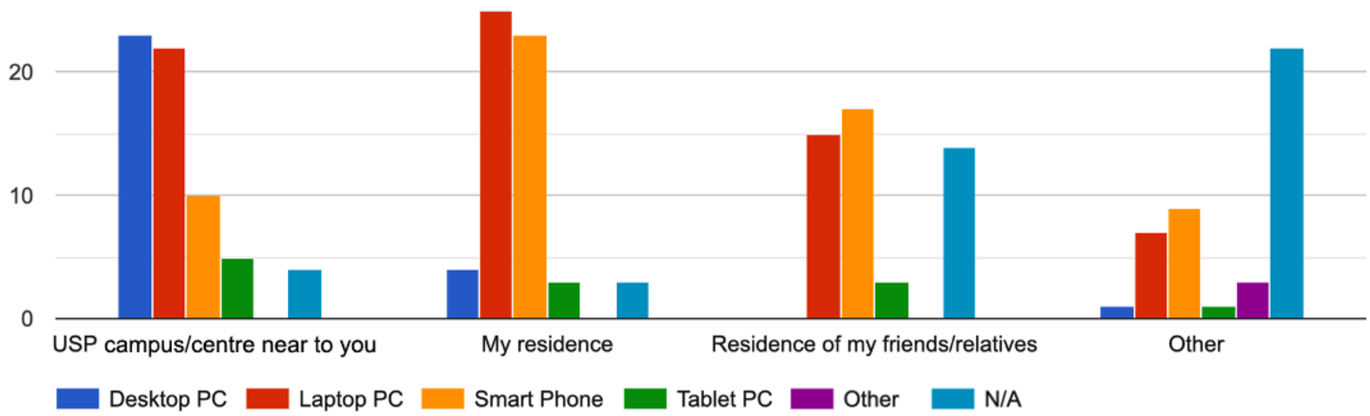


2. Participate in distance learning system

2.1 How often do you usually access online learning platform?



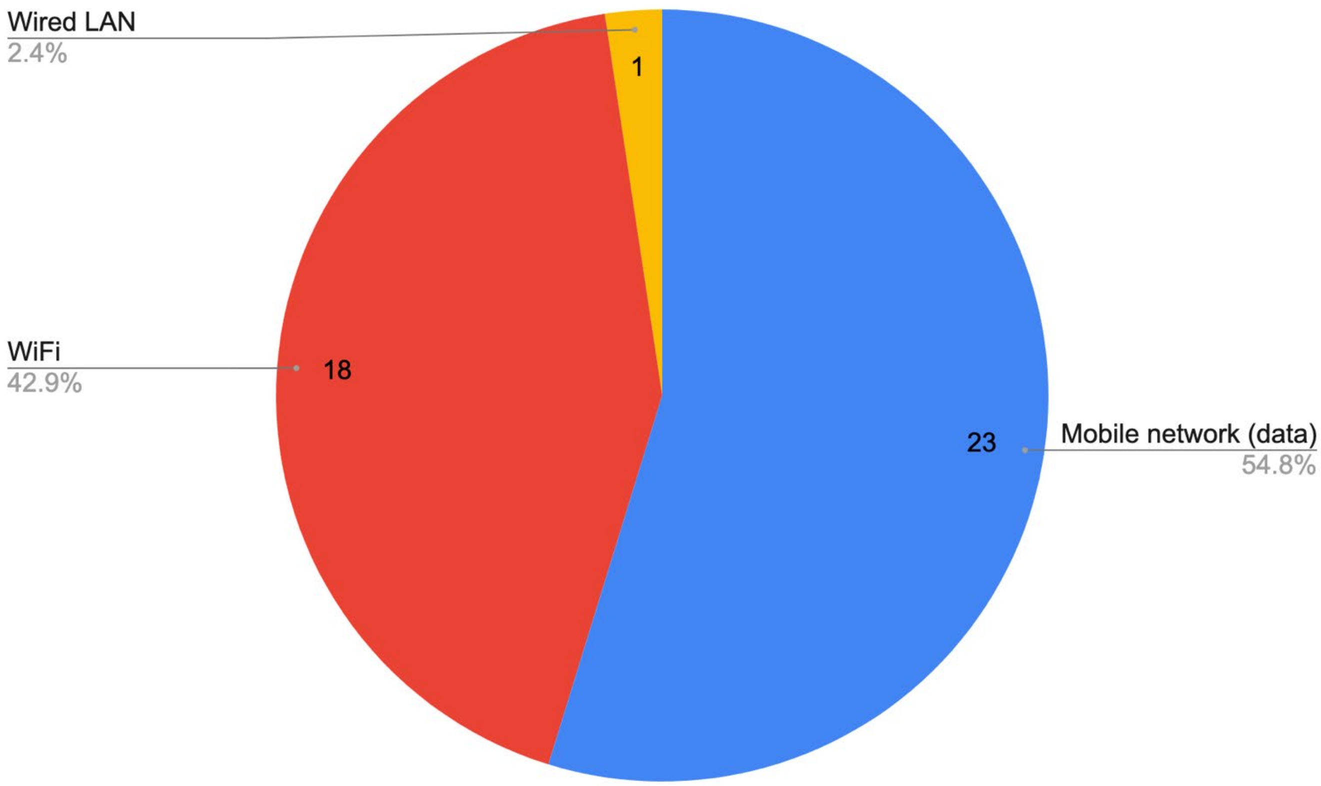
2.2 Where do you usually access online learning material?



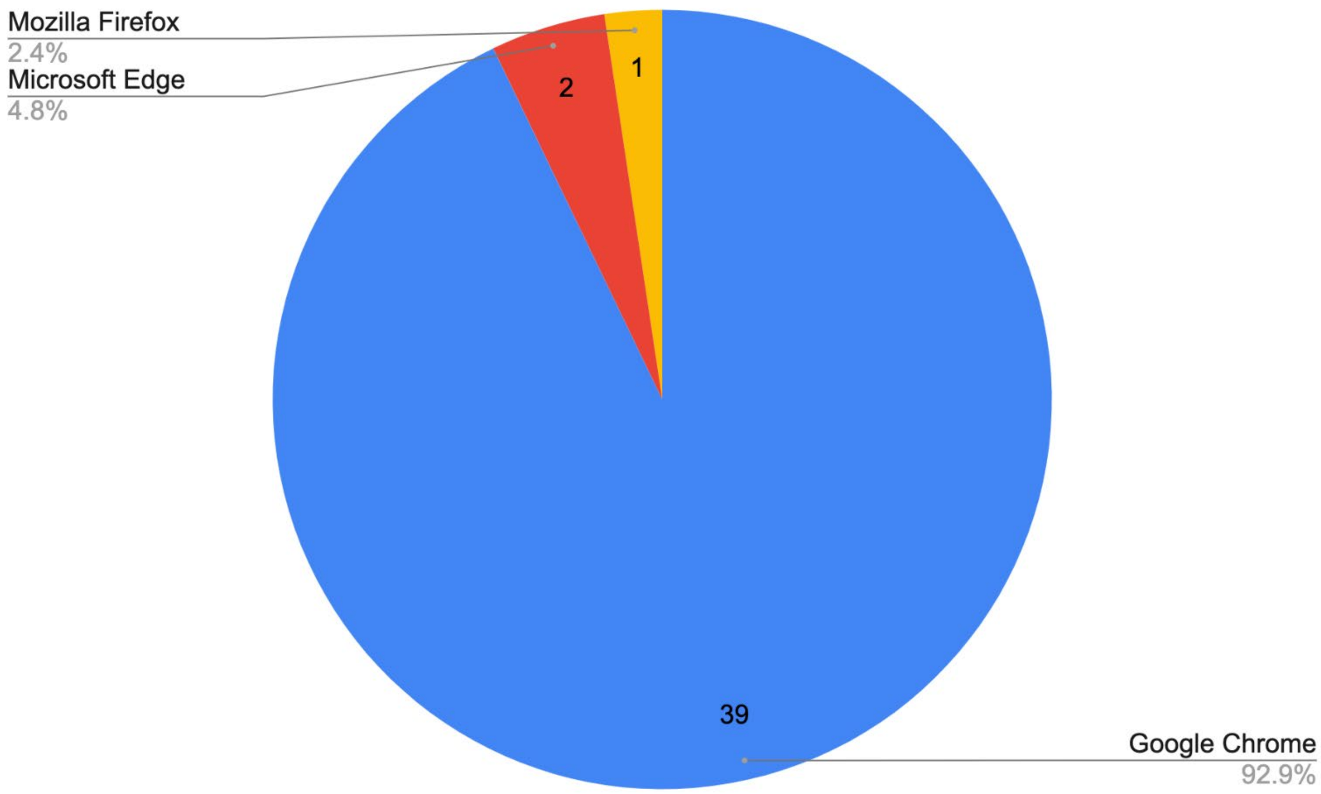
2.2.1 If you choice others in previous question, please specify.

Use laptop in my office workspace at USP
Library Books
Use PC in the Campus
using other people laptop
I paired my phone to other phones, to get the internet connection.
laptop

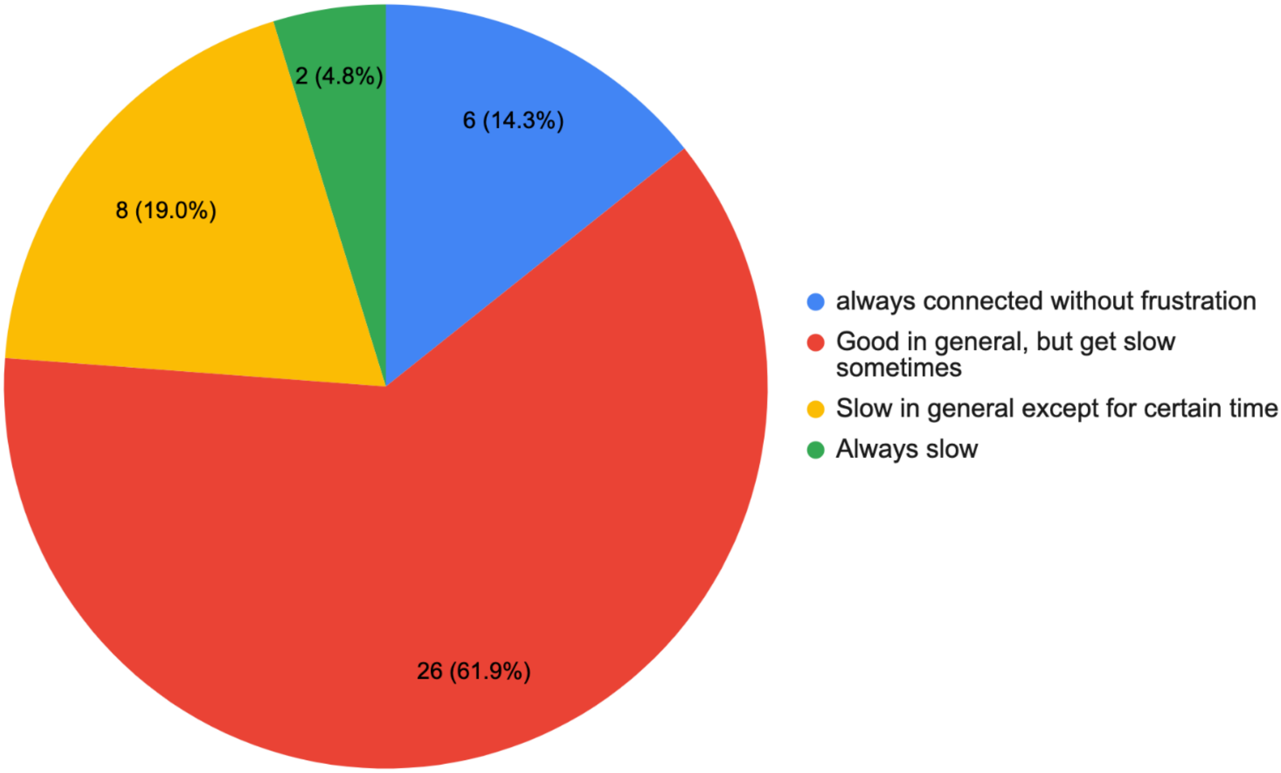
2.3 How do you get online connection at the place you answered in previous question?



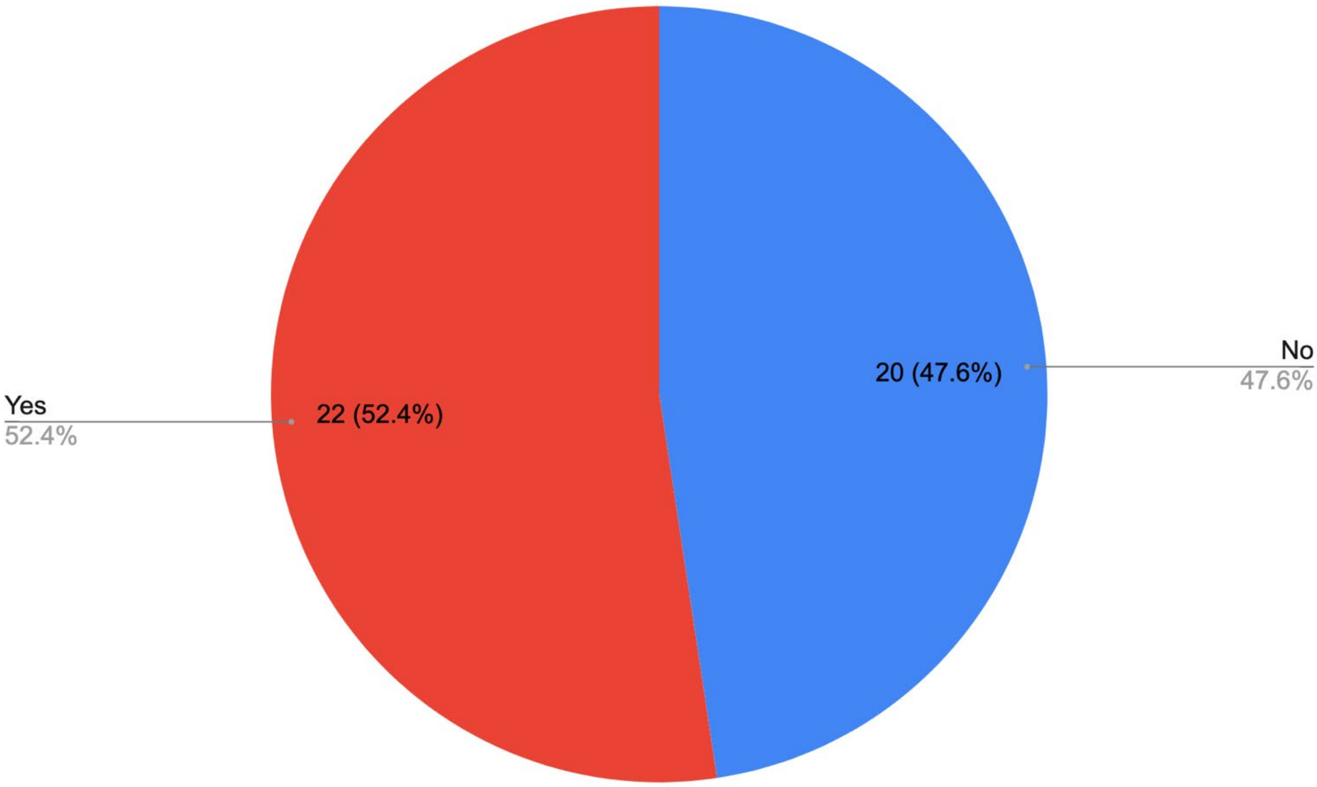
2.4 What is the main web browser you use to log in to the distance learning platform?



2.5 How is the online connection status at the place you answered in previous question?



2.6 Are you using mobile applications (Smart Phone, Tablet, etc.) related to distance learning platform?

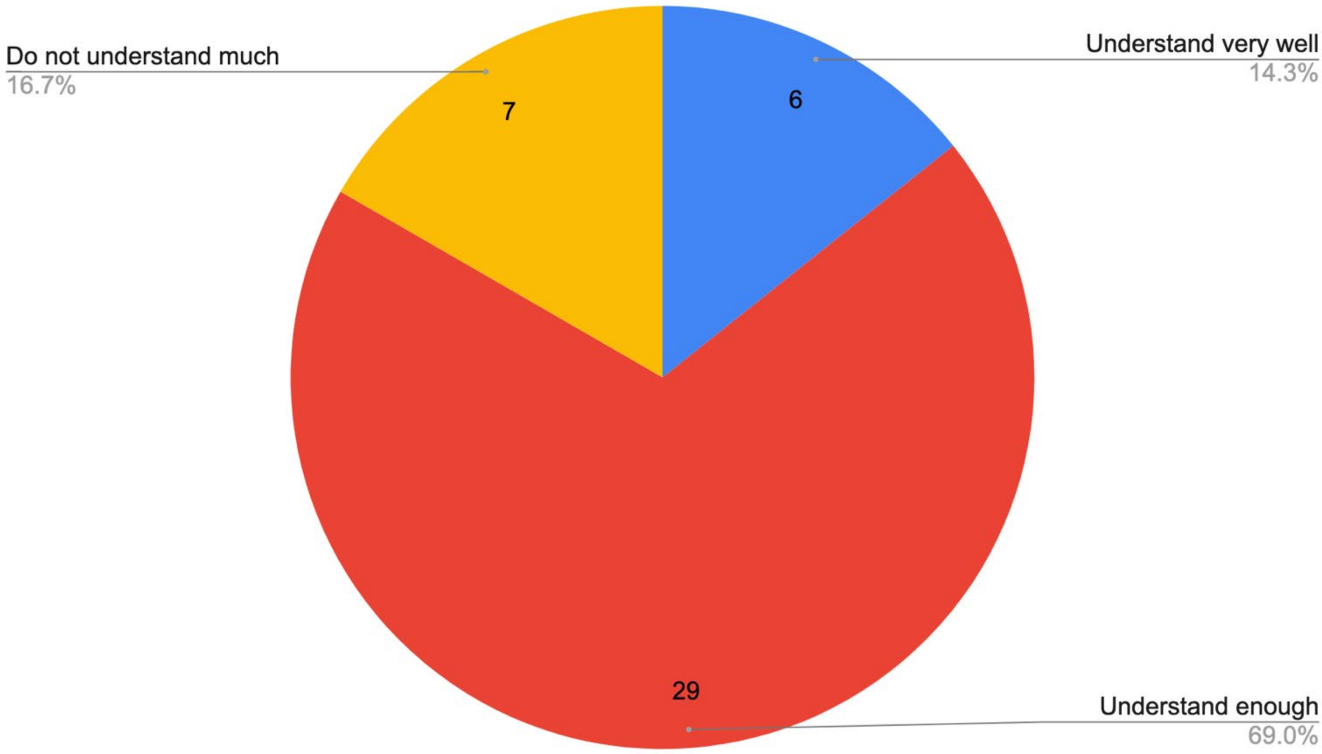


2.6.1 If you answered "Yes" in previous question, could you please fill in the names of applications?

Moodle
iPad 13 inch
Smart phone
Zoom app
USP MOODLE, italki, facebook, instagram, linked
google chrome
Safari
Desktop Computer
Tablet
SmartPhones
Zoom, USP Library
zoom
Smart Phone
Smart phone
zoom, viber
1. Smart phone with USP Application installed to for easy access to emails and groups chats especially when dealing with group activities 2. Laptop: I had to book marked my USP website due to the fact that network is often slow so I don't have to waste time typing in USP Website link on chrome tabs. This makes life easier. 3. If I may include, I use student modem that I purchased from the Vodafone shop here in Vanuatu that has students special offers and is very convenient and affordable for me as a student.
Google scholar、 Mozilar firefox
Smart Phone
Smart Phone - Samsung Android
iPhone with Safari (in case that USP' s Wifi doesn' t work)
smart phone A11
android phone

3. Operation of Distance learning system / Technology

3.1 Could you kindly provide your understanding of the operation of software, tools and services related to Distance Learning System?

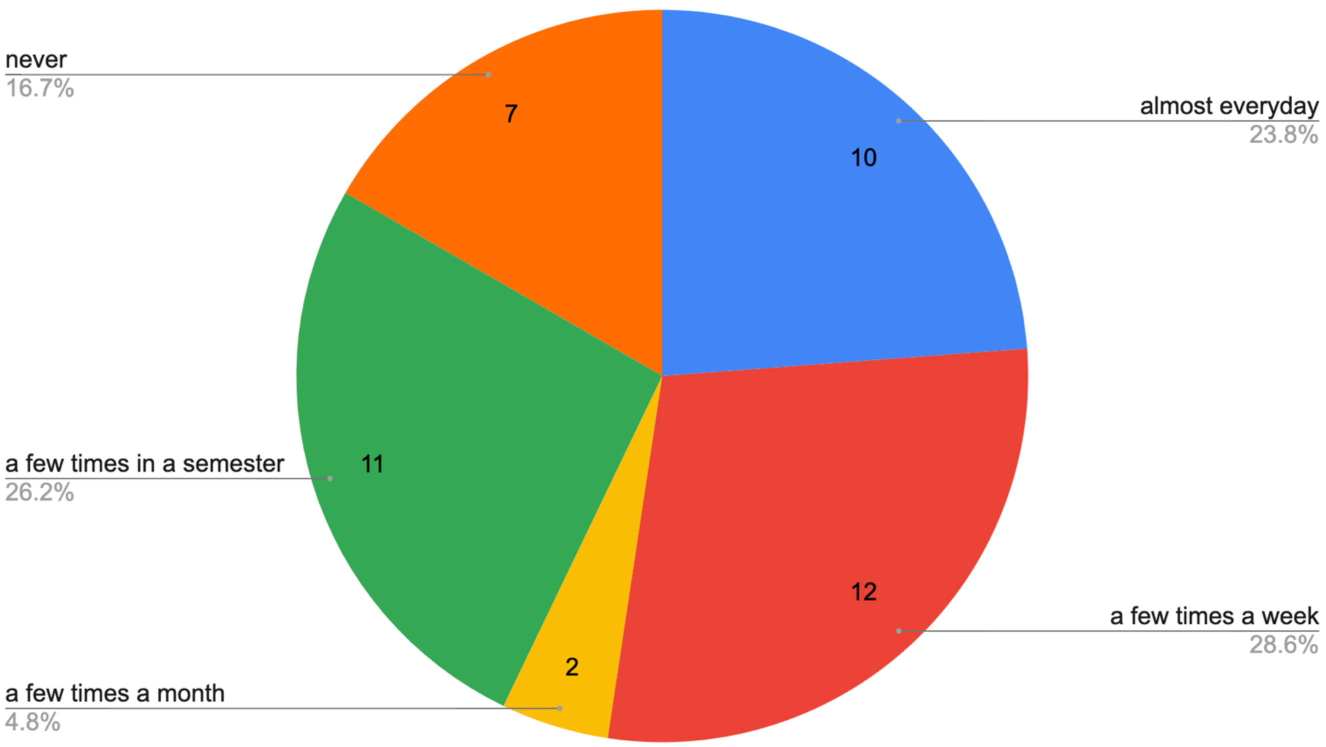


3.1.1 Why do you think so?

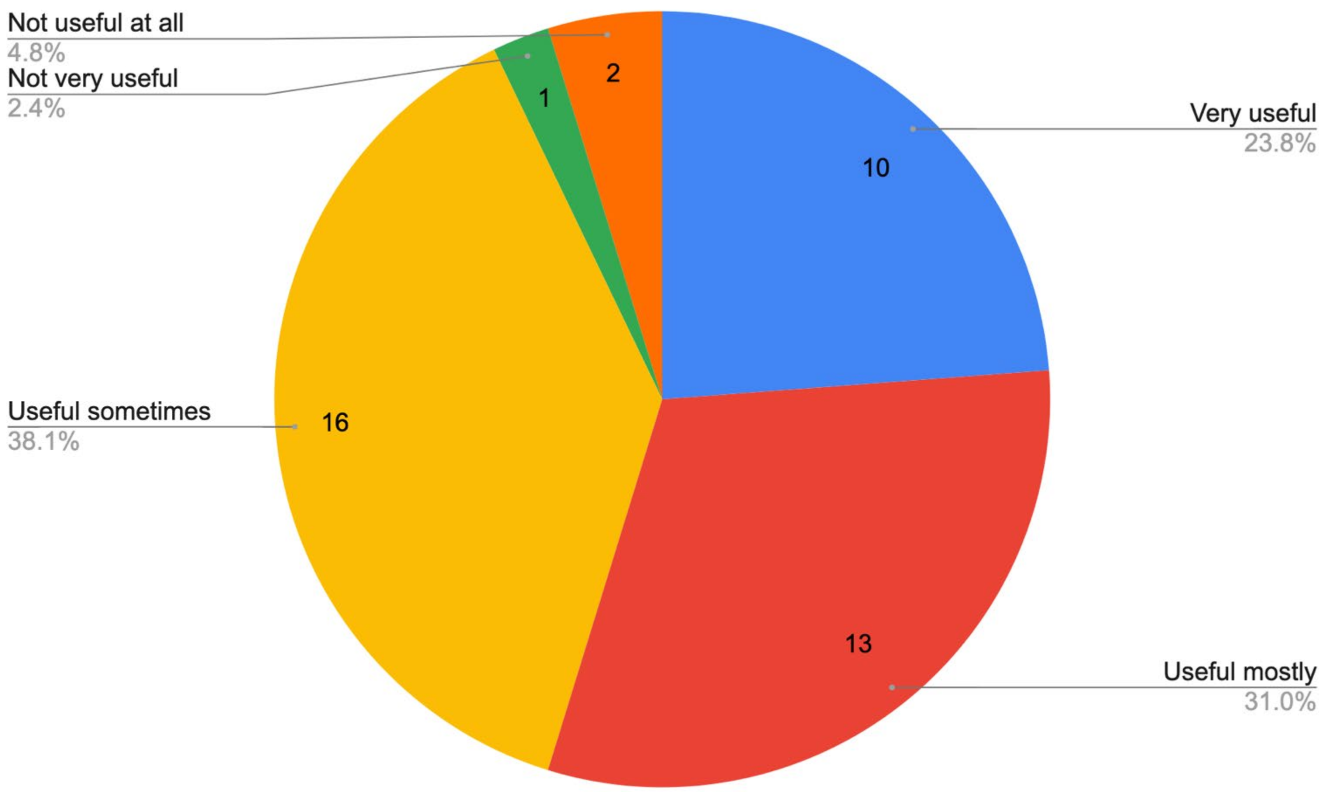
Usage of tools and software has enable students to access required academic data over the phone or available devices with the availability of internet connection. It has made the communication of information more sufficient
Most applications are user-friendly so we do not get into technicality of it
Some of the software could be self explanatory, whereas other softwares need skills to be developed to be used efficiently.
Because I can cope with the online learning despite using software tool and others.
I do understand enough the operation of the Zoom software we used for learning because we normally used this app tool to learn remotely during Covid pandemic.
Because I have been using the tools since undergrad, I am well versed with its operations, functions etc.
I think because there are many learning courses I took that have different ways of learning offer.

Distance Learning System is not good when it comes to understanding of the operation of software. It will not keep us up to date of most things that are need to be done daily, so when we doing Distance Learning System, we find it difficulty.
Because I have just started my first year of studies
The language is English and kindly understandable
Because I am using it everyday with no least difficult
I don't usually do distance learning
Because I was able to use them, sometime I face difficulties but I got it.
Because I have learnt view of those software tools in my computer classes.
Through first hand experience. At first it was slightly hard. But once you use it over and over pretty much get use to it.
because of lack of technology skills in using software
The relationship or the common aspect that can be considered is that in order for distance learning to be successful, operational software, tools and services are highly required.
Have not been exposed to it a lot but I do have a basic understanding to get by
Distance Learning System for instance use of Zoom is something new to me ever since 2020 when I started studying again, but in the era of Pandemic, that I came to realize that it is very very convenient especially for us in the Pacific. Given that we have a very vast ocean and its expensive to travel far and wide to pursue studies, we can save money for travelling to support our family during this pandemic but at the same time study well with the help of Zoom or virtual classes. I came to perceive Moodle as a very very useful tool during this pandemic as well as the student mail, because these are the only means of students communicating with their lecturers, coordinators and even their course colleagues. These pandemic helps us to find virtual options that we never thought of using before or those we never knew before to start using them.
I am only an user, I don' t have to know the background to it. e.g Driving is not Mechanic.
Because there is minimum teacher and student f2f meeting. It's more of a self learning process. It does shin the light that university is not need as individuals we are able to carry out tasks without help.
It is user friendly.
Sometimes there is too many information from the google chrome about what you're searching for.
Everyday use
Everything is automatic
as I do not have much information about the software's
I already did some courses through the distance learning mode
sometimes it gets hard to study online because of network connections
I haven't been using software related to the Distance Learning System.

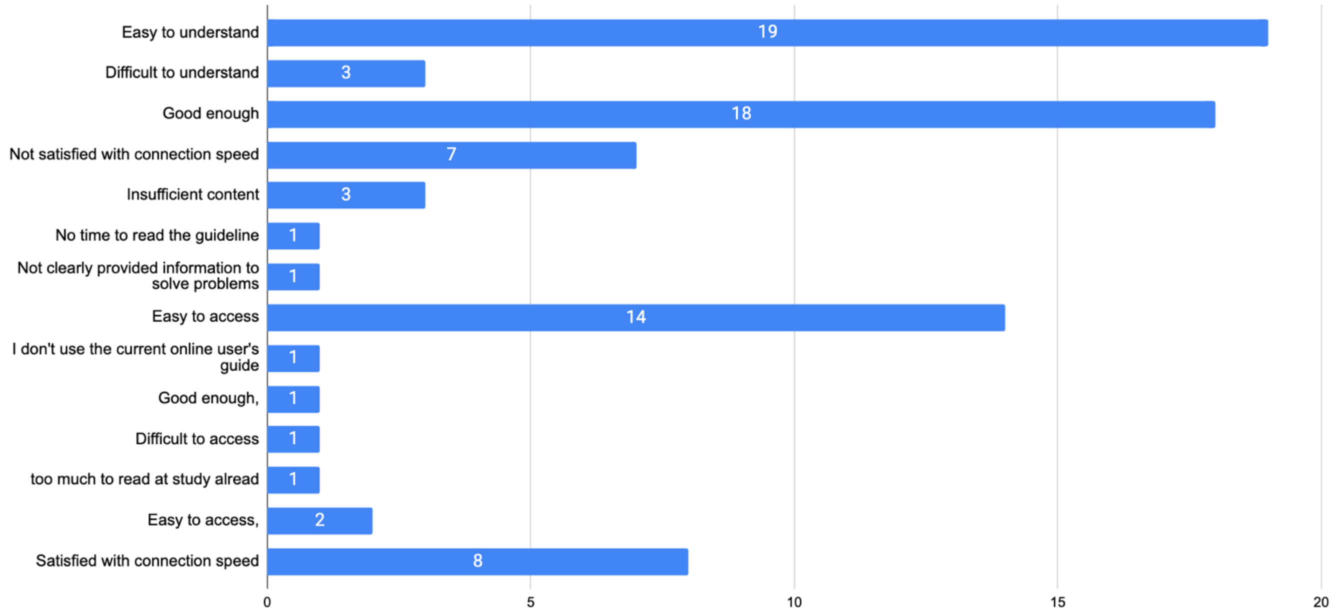
3.2 How often do you use online user's guide of Distance Learning System?



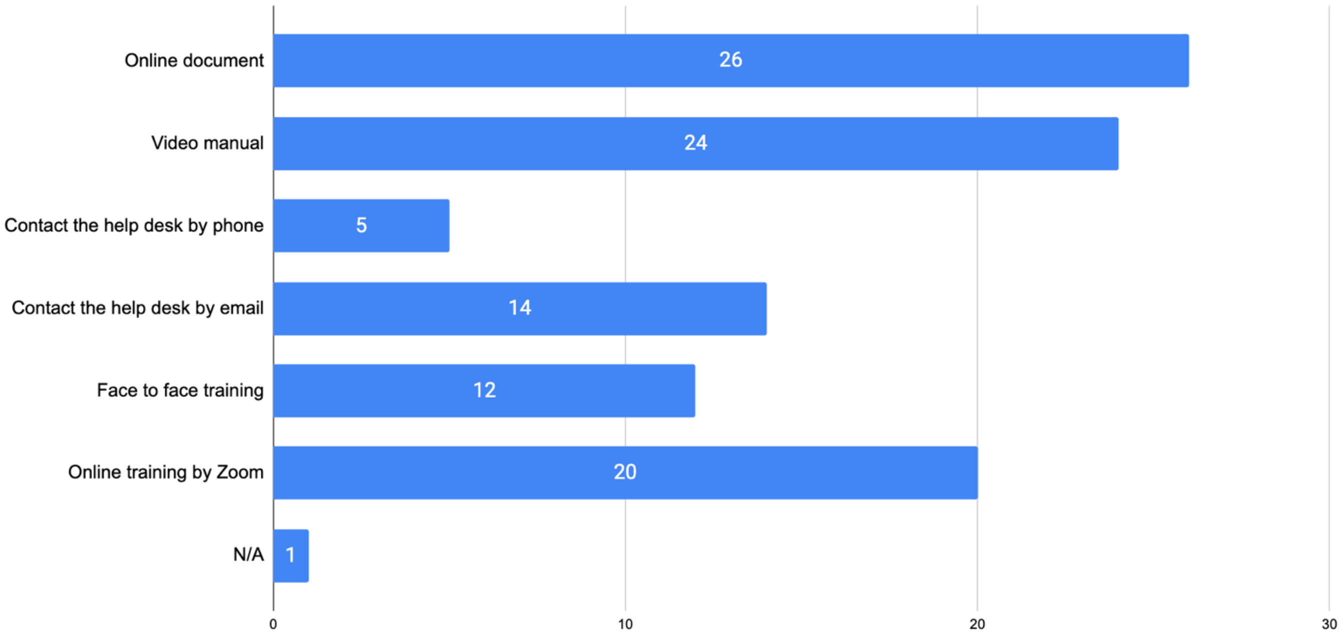
3.3Is the current online user's guide useful for you?



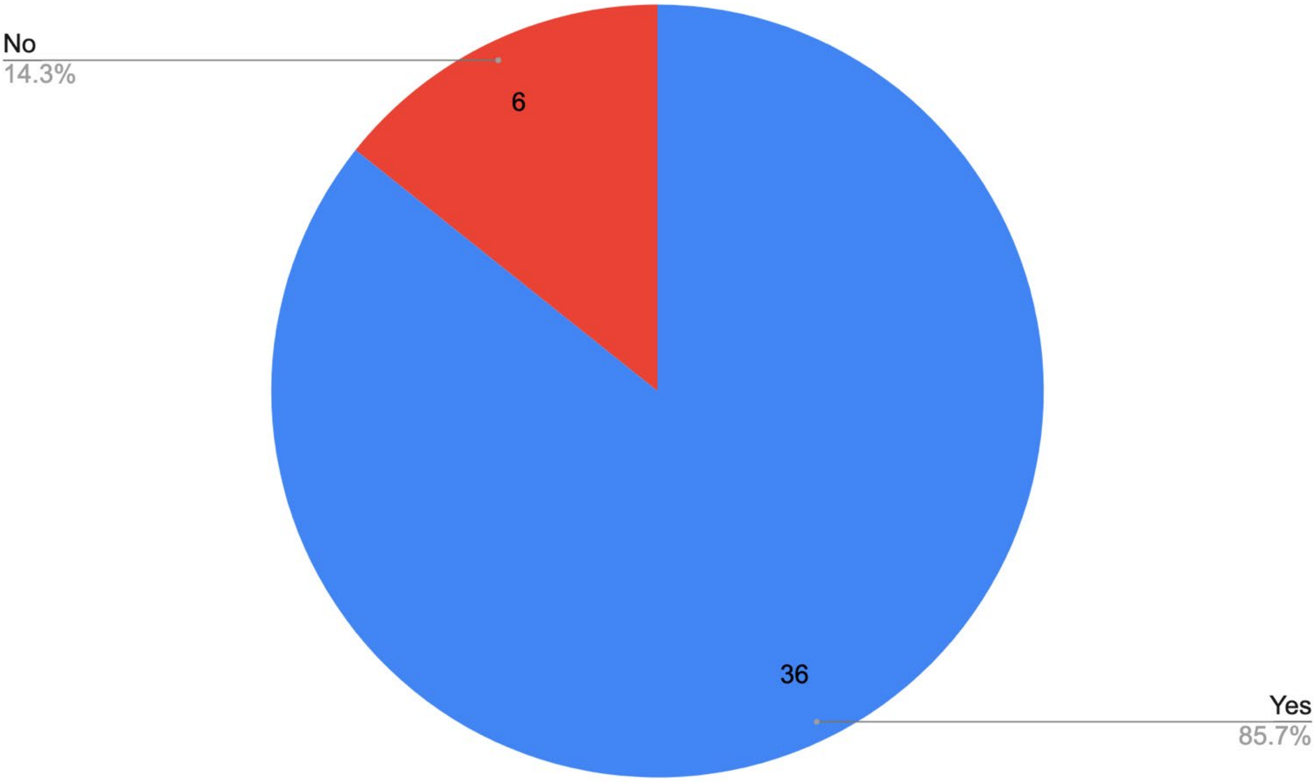
3.3.1 Could you please provide the reason for the previous response?



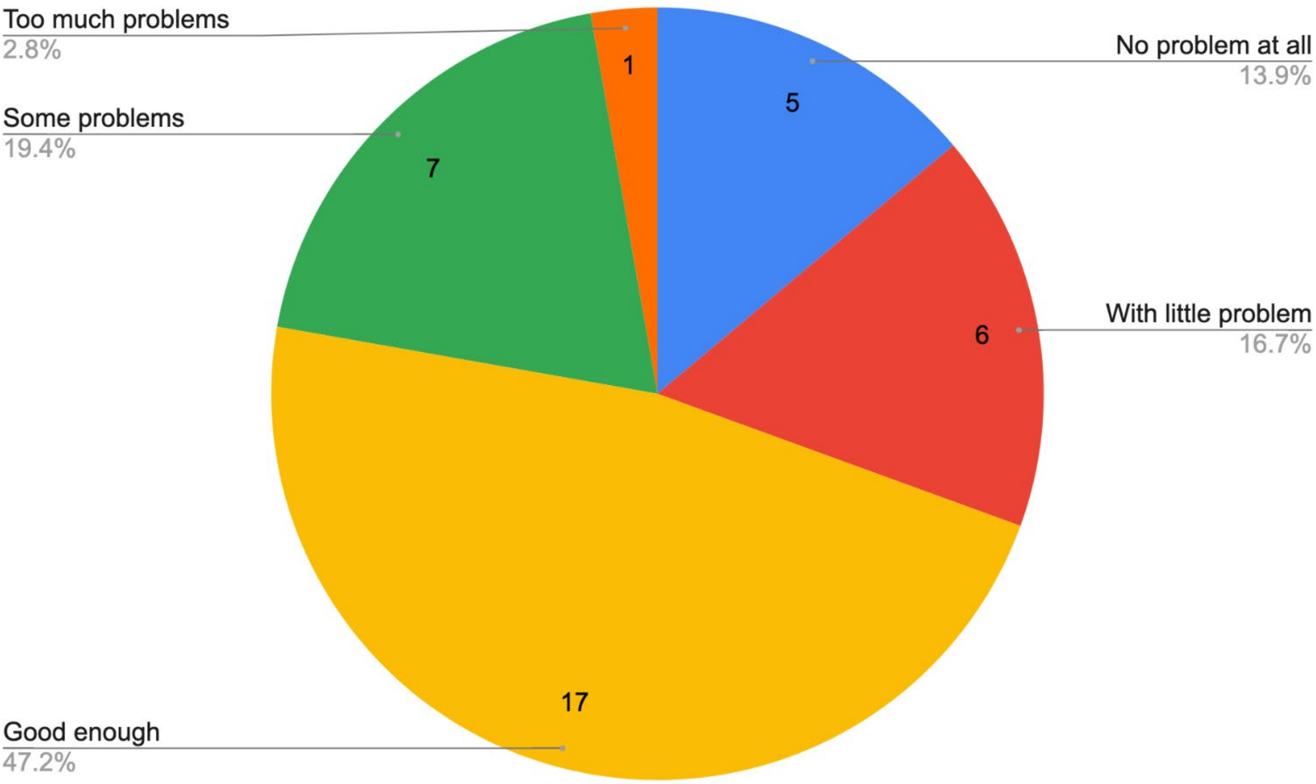
3.4 What kind of user's guide do you find useful for you?



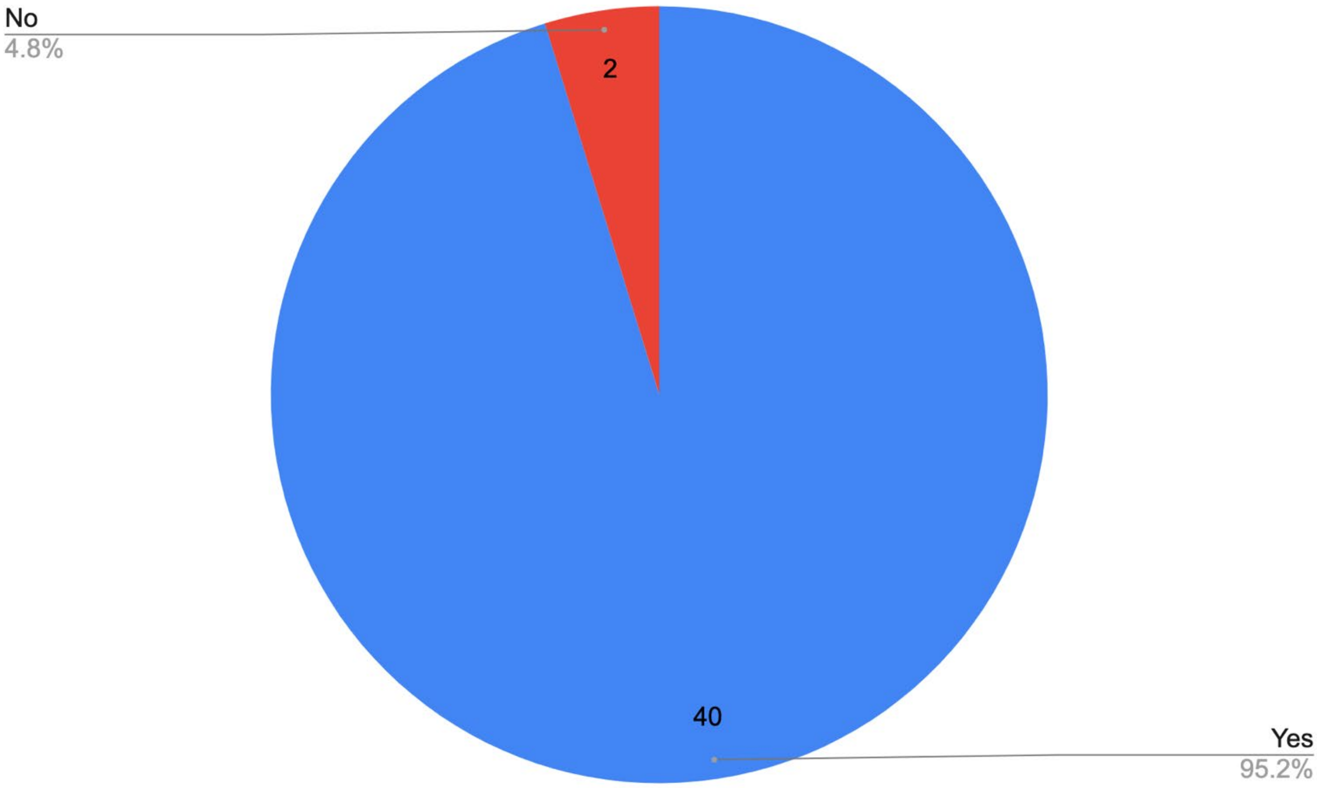
3.5 Are there Lecture Recording (on-demand) service in courses you are taking?



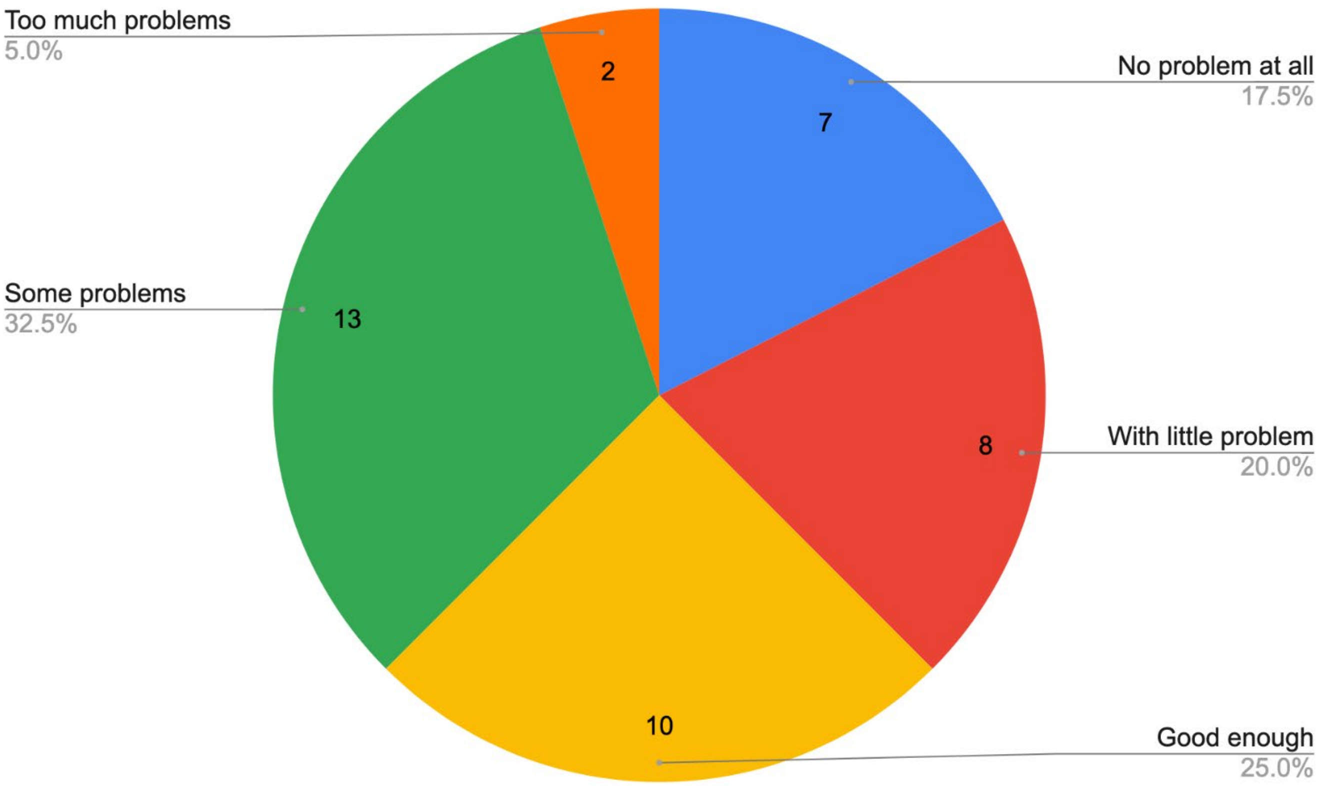
3.5.1 If you answered "Yes", please provide your viewing status.



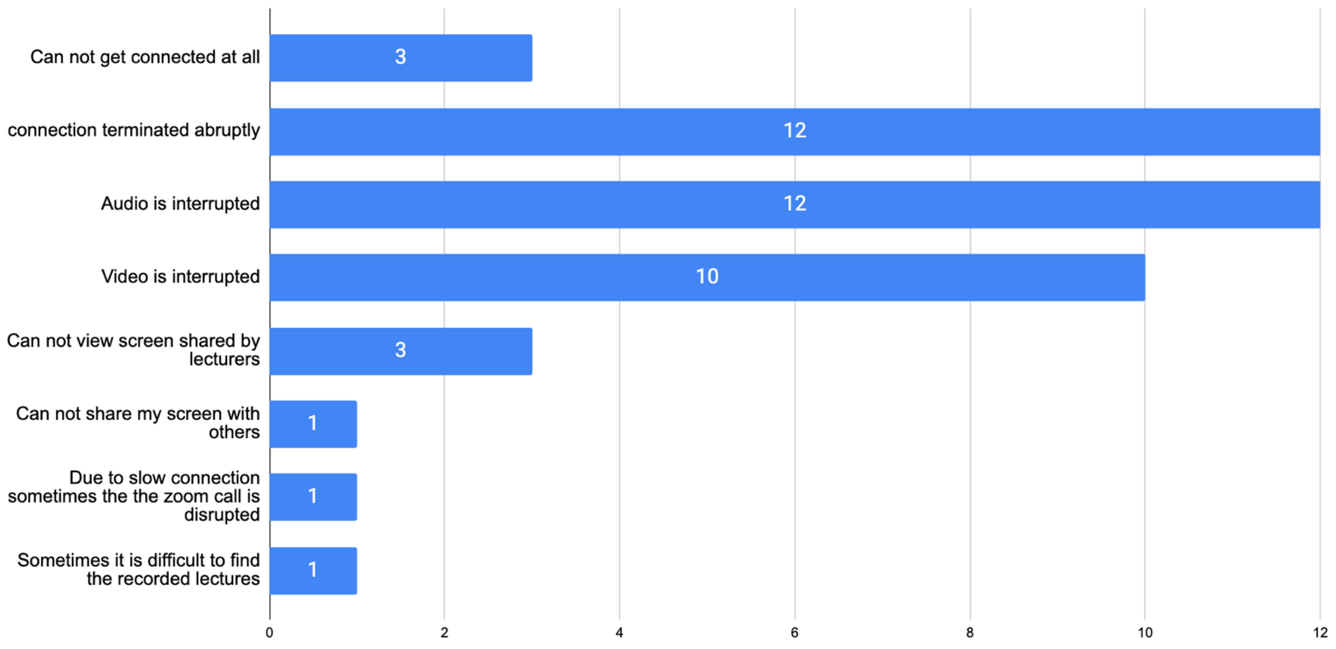
3.6 Are there Online Zoom Sessions service in courses you are taking?



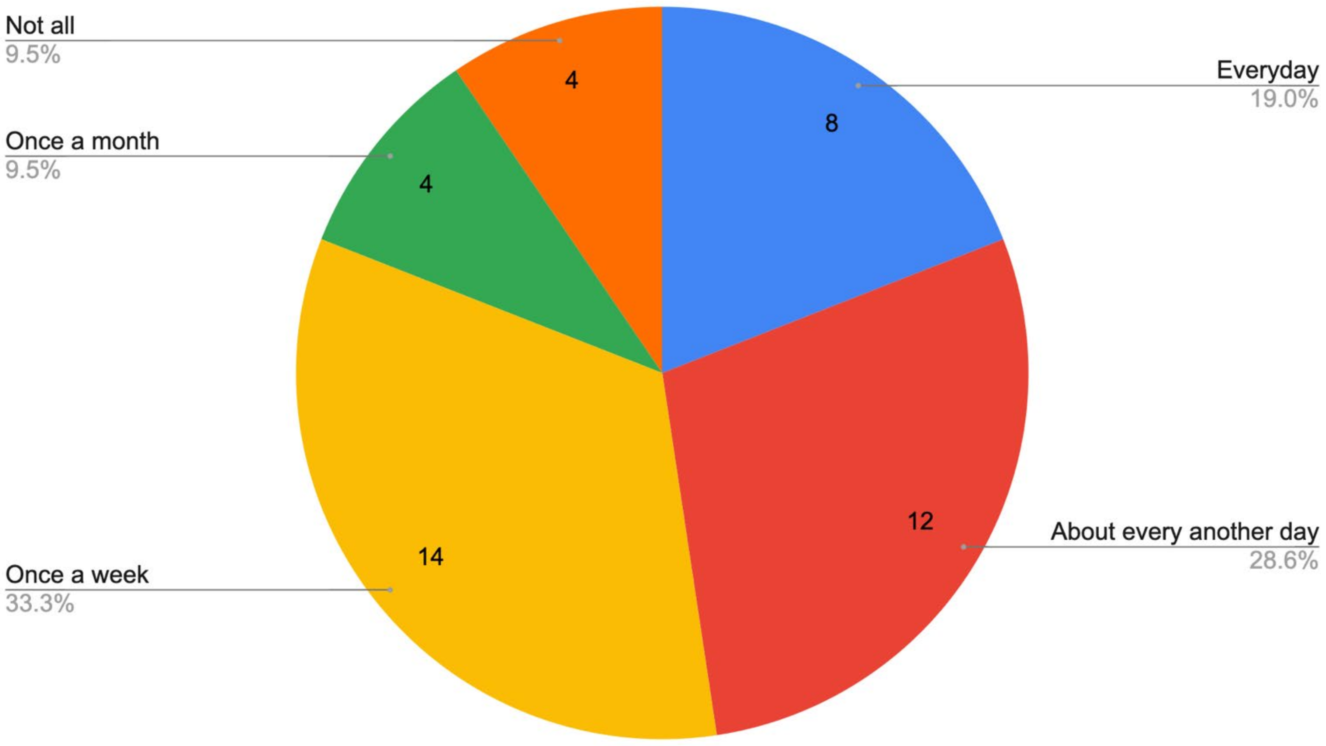
3.6.1 If you answered "Yes" in previous question, please provide your viewing status.



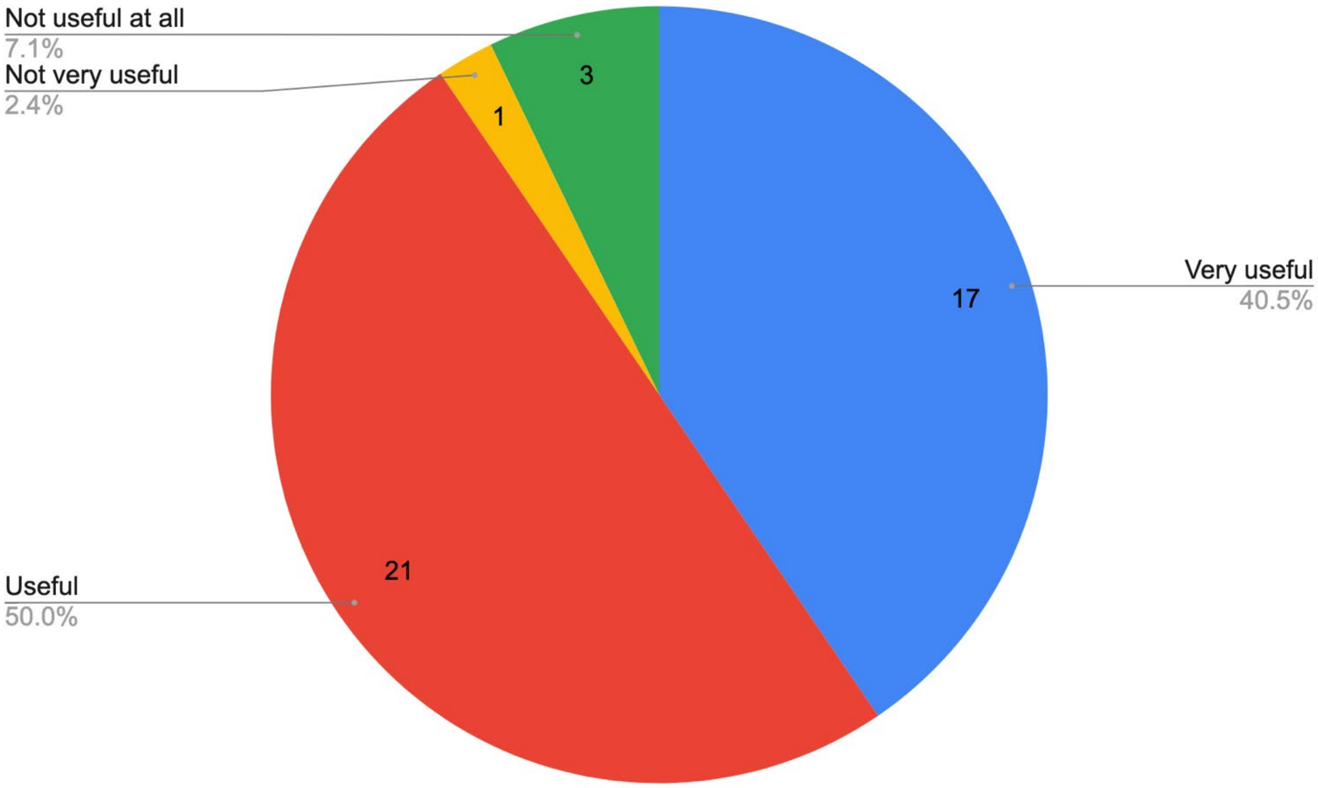
3.6.2 If you answered "Some problems" or "Too much problems", please provide the reason.



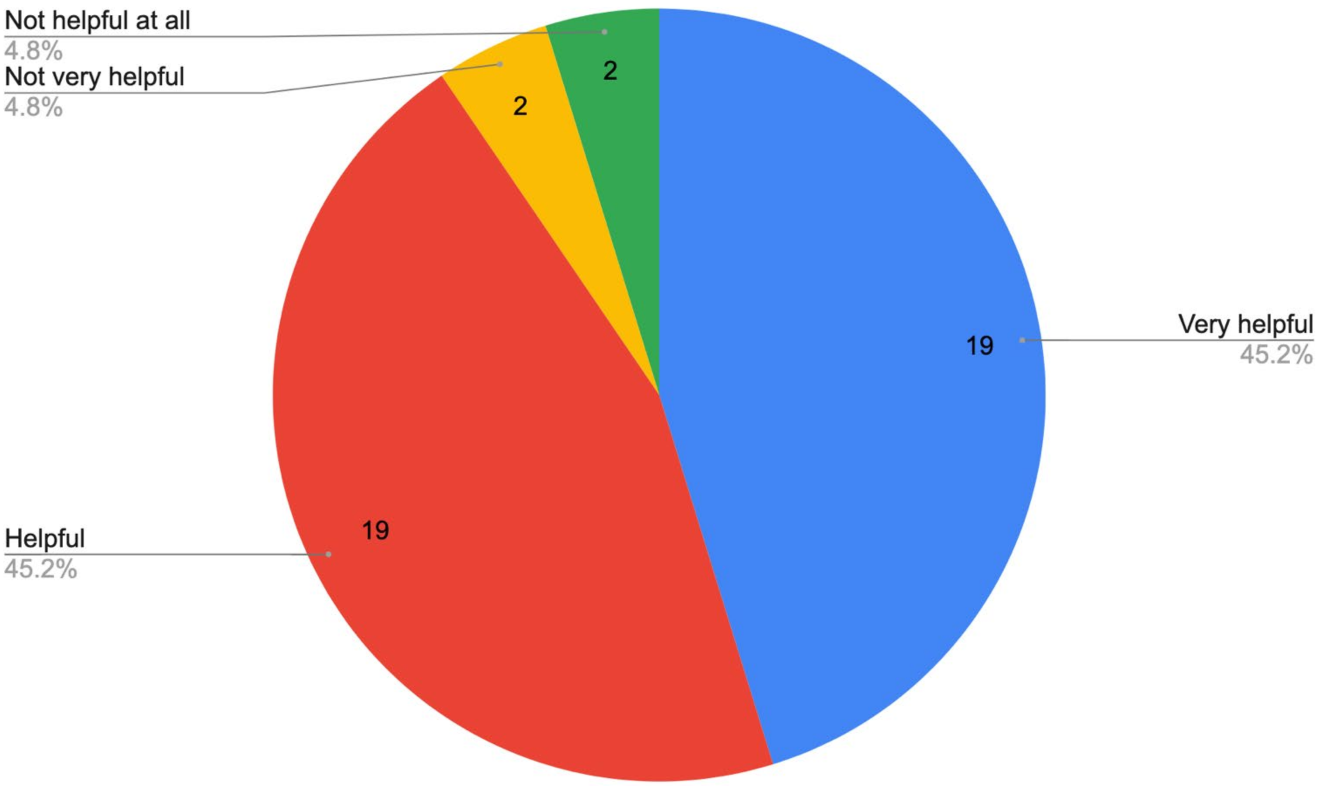
3.7 How often do you use online tutorial service?



3.8 Is the current tutorial services useful for you?



3.9 What do you think about online learning?



3.10 What do you expect from online learning?

Fast communication and access to data
More videos & Fun activities
I expect online learning to more global rather than regional, as it would develop more of an interaction of different cultures and the ability to understand more of a wide range of perspective.
To keep going.
Learning is accessible anywhere.
Expect the tutors to answer questions and discuss activities, mostly a communication platform unlike lectures
Accessible
Everything was clear
provide more lecture recordings
More details about the course and more info and clear explanation
To continue its very helpful especially for those who are working and study at the same time.
To be able to use the available resources in improving my coursework and grades for a better gpa
Flexibility of learning and it is
information
Very good marks.
Pretty impressed with how USP transitioned to online for all its courses. At first I was worried, but tools and resources USP provided online gave me a peace of mind.
user friendly or easy to understand
I expect from online learning to be more lenient on the assessment
online materials
Lecture, lab and tutorial recordings be uploaded on time.
To have more information provided in terms of course outline and learning materials
Online support
I expect it to be dependable: that is whenever I had issues with my courses or assignments or even with my Moodle and inquire or seek help, there should be individuals who are always available to help. like what choice do we online learners have than to wait for more than a day for our responses or answers to our questions. It' s frustrating sometimes when our issues are of urgencies especially as it relates to our assignments. This situation is very applicable to those of us who are part time students and working at the same time.
All learning materials provided and lectures recorded and stored for viewing.
More instructive as some lecturers start having vague expectations.

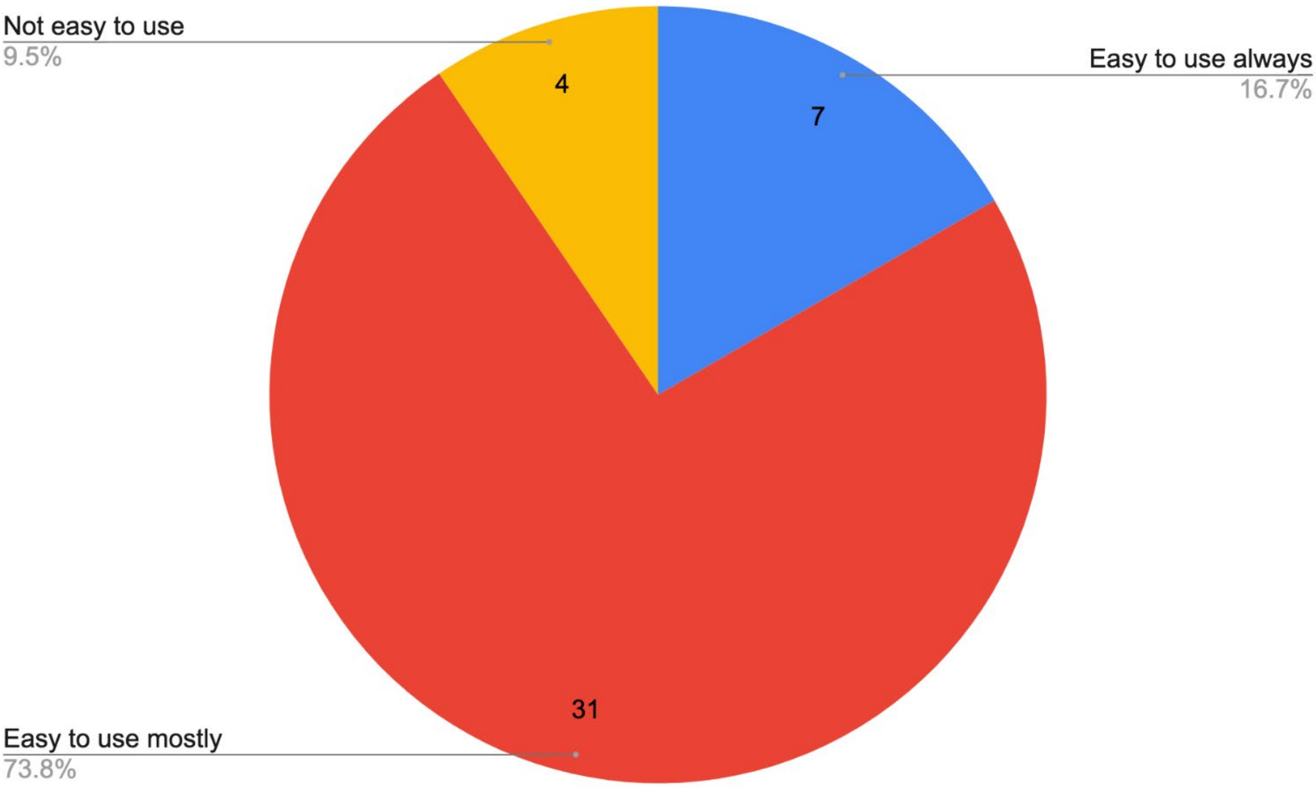
Effective learning tools & Cooperative and understanding course coordinators
Power point to upload by the lecture
Easy access in a safe environment
Clear explanation of content and group contribution
It's alright.
detailed information and experiments
Ability to download lecture recordings for own revision later on without having to always connect to data/wifi when there is a need to watch it.
Frequent feedback must be done
get answers to our questions regarding our assignments and all
Positive learning outcomes.

3.11 Could you kindly provide your opinion about online learning, if any?

With the development of new IA integrated tools and software systems it keeps on getting better
It is not a good learning tool in reality/real learning takes place f2f but in times of world crises as Covid-19, it is a handy platform to get us going.
Online learning is difficult for me because I have a preference for face-to-face. However, in some cases, I develop my own strategies of being up to task.
online learning is good because we students struggle on our own to learn things and not spoon feed by the teacher.
Online is the best as learners located in remote areas can also have access to learning.
Good
Online learning is good
yes it is a very useful tool in my studies
It very helpful and I love online learning. It avoid wasting time staying inside the classroom. But it really help anywhere you go, you can access your course, as long you can access to the internet.
Online learning is very useful especially at a time like this with the pandemic
Nil
Need to update the network.
It provides an opportunity for those that leave in remote places to still have access to learning. It also saves people time and money on travelling daily to school to attend lecturers or classes.
It usually complicated as when in a zoom lecture or class, the signal may become poor where you can miss important information.

Better integration of online tools with learning objectives. Maybe when going though notes after a certain slide could have an interactive quiz or test. This to show what you have understood so far. In future look at how to properly cater for those students who do not have electronic devices or internet connection.
would be great for a continuous upgrade to meet the demand from users
The assignment drop box should not be close on the due date and time but open it and allow late submission deduction of marks
Online learning is interesting and fun but the issue lies more on the students procrastinating and the resources (recordings) not being uploaded on time.
online learning is challenging
I don't like it as I prefer face to face learning but it is necessary at times and a good way to learn
Like I said, people who are responsible for the queries or lecturers, tutors or even coordinators must be individuals that students would regard them as dependable as defined above. Its the only way to have students fully enjoyed their studies despite this pandemic.
Online learning is the way forward. I do not have to run from one class room to another.
More workload compared to Face to face and lecturers are not stating the expected requirement of the assignments.
Effective and helpful due to the current given situation (COVID-19)
Online learning is very useful, and I preferred learning online but practical can be a problem.
The challenge is that a few lecturers don't reach out to students & is very unfriendly and unapproachable
Very good platform for us that study from isolated countries and allows for group interaction and contributions. Technical difficulties, access and cost can be a hinderance for some of the students. Often when trying to connect for Zoom sessions through the Moodle platform there has been connectivity problems and I have had to use my personal iPhone as a backup
At times it isn't helpful because online learning is not much reliable.
I support online learning 100%! Its very flexible and so efficient. I don't have to worry about walking into a class late after work, I can run errands while attending classes online and communication online with lecturers are somewhat open and comfortable. Based on the influence of the Pacific culture, at time some students don't have the confidence to ask direct questions verbally in class, thus having to 'type' the questions in the class chat section on zoom sort of helps or eases the situation and makes learning enjoyable for students.
Very helpful at times like this (CoViD)
online learning is ok but it is the connection which is the biggest problem

3.12 What do you think about the usability of Distance Learning System?

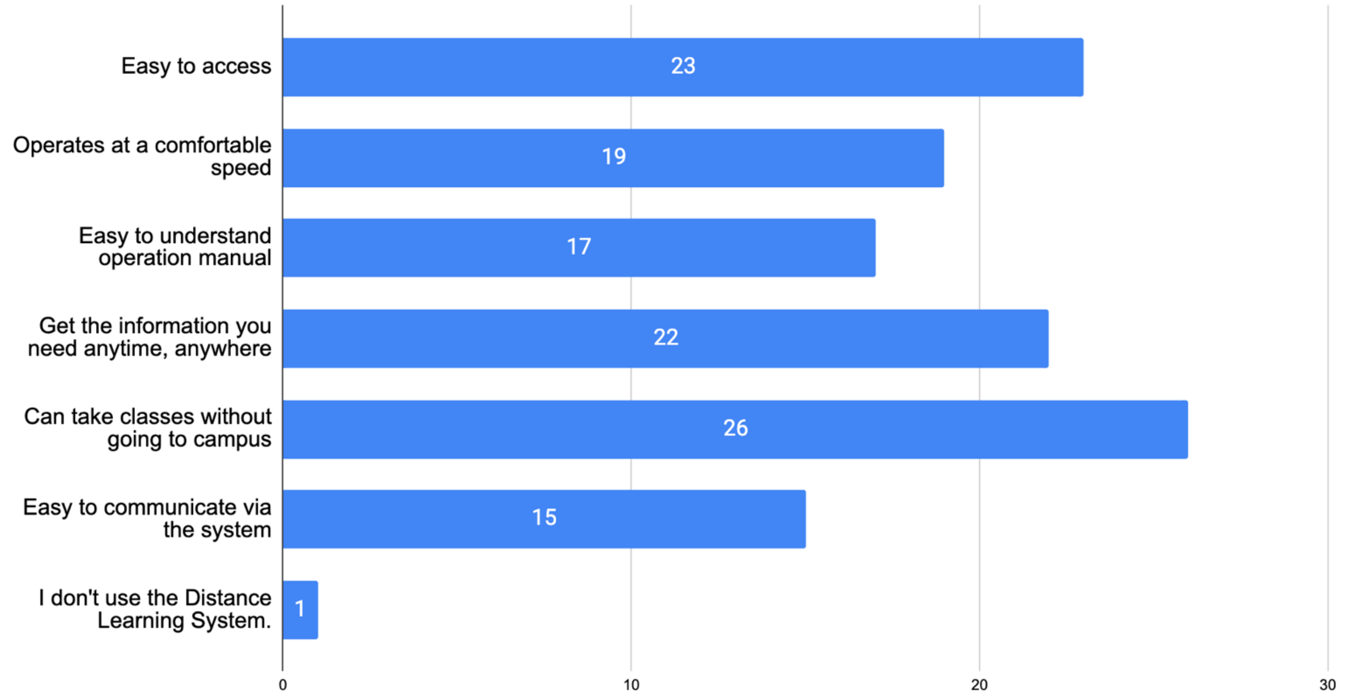


3.12.1 Why do you think so?

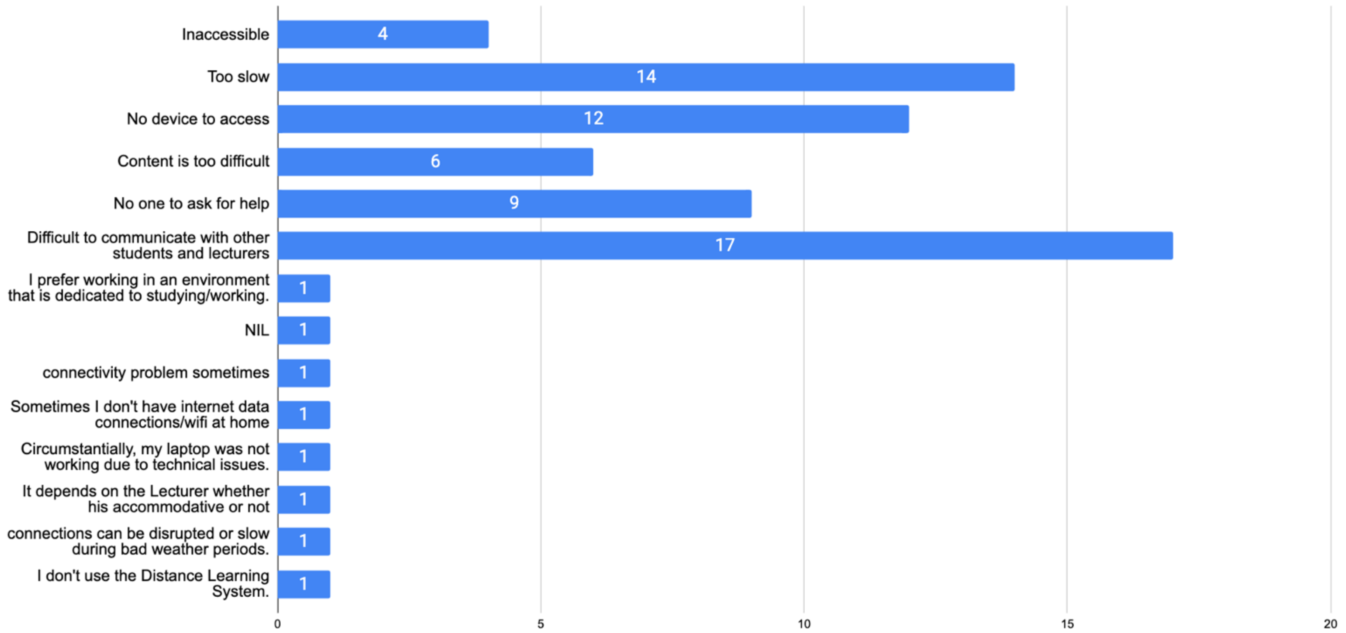
Accessible at any point of time
Mostly it requires login only
Using zoom, which is accessible for a lot of devices that we are currently using.
Because we can connect anytime to attend lecture recordings if we have busy schedule and for some reason we cannot make it to face to face class.
Because when you are staying far from the school or learning institution but you can still have access to learn online.
Instructions are clear however connection is always an issue
Because of time difference. If only assignments are due to our country local time.
The usability of Distance Learning System is good but when it comes to connectivity, sometimes it is more slowly.
can access it easily
Easy to learn and useful for communicate
Because it good and very helpful
Because I hardly have problem using it
it's easy to understand and user friendly

Attractive to user
There are some features that could improve on. Some links on the page do not work.
familiar with it
Because the task given is too much to complete compare to face to face
It would be hard are first for those of us facing issues in understanding technology.
During rainy seasons connection is either slow or unavailable
First of all, I would say that its flexibility and doesn't really matter where you at, learning always occurs. But as I stressed earlier, some platforms students choose as their go for options to reach out for help and it always turns out as not being useful as it was supposed to be, for instance student emails. its easy to use student emails but the response or expectations of interactions that students get from that determines whether or not that is a 'go for' option for students especially when it comes to 'Distance Learning System'. Another thing is the presentation slides. Some lecturers uses recordings as resources for their students when I would suggest that PPT presentations would be really helpful. Some of the recordings cannot be accessed for students who might be having issues financially that they would prefer PPT that would consume less data to download it compare to recordings. Options of resources that we give our students must also consider the fact that we are not financially the same.
Every information is online, if I have data connection.
Because it available any time
Easier for me to use.
Once people understand the process, it is easier.
It is easy to use but the access gets difficulty at times, such as I as a student choose not to tend to my online classes.
if we can not access though laptop then other things are there to help like smart phone
Easy to maneuver, download readings and communicate with lecturers online eg. moodle.
helps us a lot
Depends to the knowledge of the user.

3.13 Could you kindly provide how you find the Distance Learning System in terms of usefulness or convenience?



3.14 Could you kindly provide how you find the Distance Learning System in terms of challenges or inconvenience?



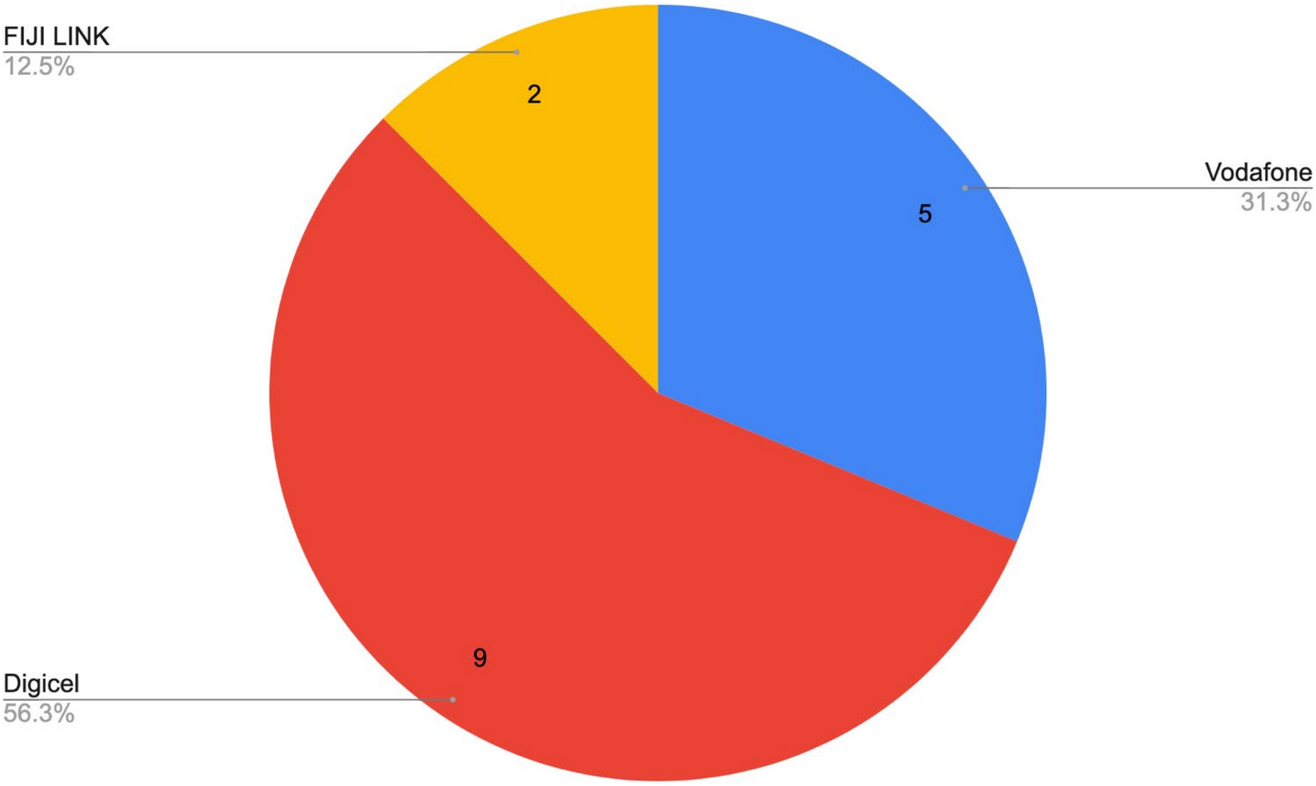
3.15 Could you kindly provide your impressions and other opinions about the Distance Learning System?

Fast, easy and ready to use always
too isolated/can be boring, lacks 'human touch' and communication, lack students participation
It is good in terms of getting to lectures without dressing up, but in terms of an effective learning for me - to be able to communicate and collaborate with the lecturer and the pupil.
overall online learning is good
I can say from my learning experience that distance learning system is very effective as it allows learners to learn anywhere at any time.
Sometimes network to slow
Di
I can manage with own pace and I'm not being distracted by other students when study
We love it
Flexibility
Distance learning system is very useful and I highly recommend it
Pretty good at first, but can improve. Could provide online interactive textbooks. Interactive quiz or test in lecture notes.
Great and help to continue learning despite the restrictions caused by covid19.
Although its interesting it could use some trials in the future in terms of coming up with a new learning method medium (depending on the learner type)
The disadvantages outweigh the advantages
I mean overall, I am happy with Online learning. Its just that there is need for improvement when it comes to responding on a timely manner towards students queries.
DLS is very important for Islands however, at the student level, the ownership of a device to use and data for connectivity is very expensive.
Distance learning system is flexible, easy to access and cost efficient.
It is perfect to learn online but the students like me must do some practical with their coordinators
As we live in isolated communities, and especially with Covid19, learning remotely has become a priority
Hopefully it becomes a norm for Masters students in the future as it is both flexible and a convenient way of learning especially for part-time working students.

2.3.1 Communication environment outside of USPNet

Based on the information available, select the company you are primarily using from the list of mobile network companies in your country.

1. Fiji



2. Kiribati

No answer to this question

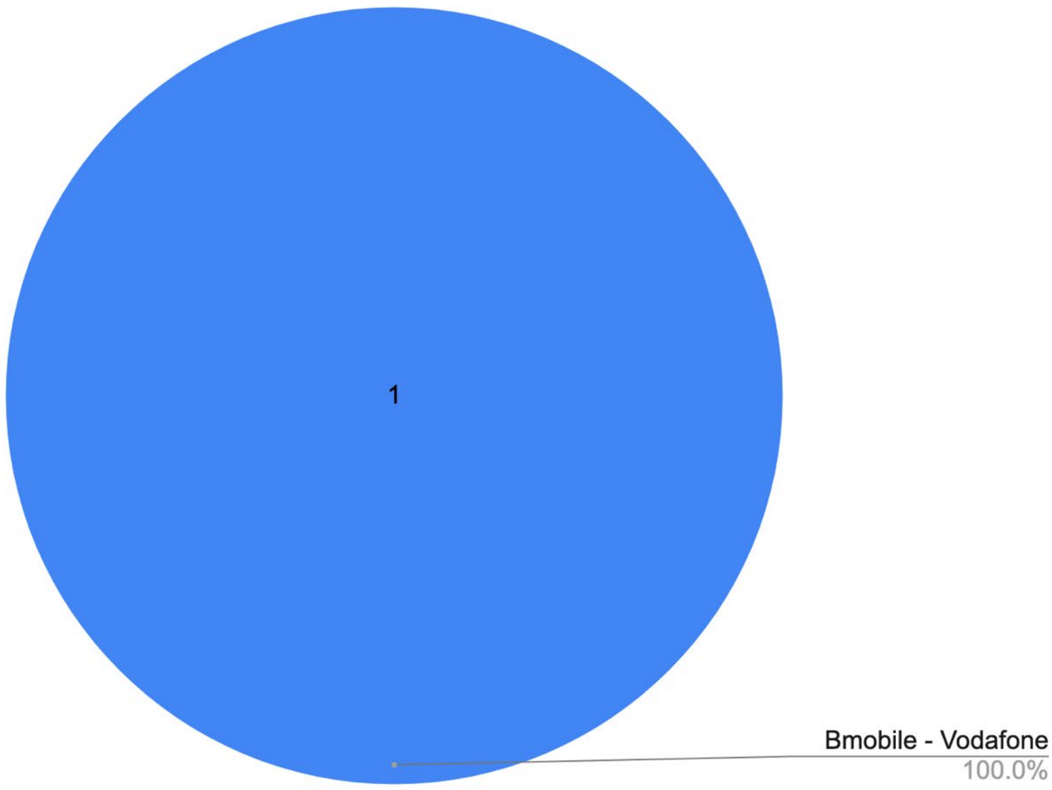
3. Cook Islands

No answer to this question

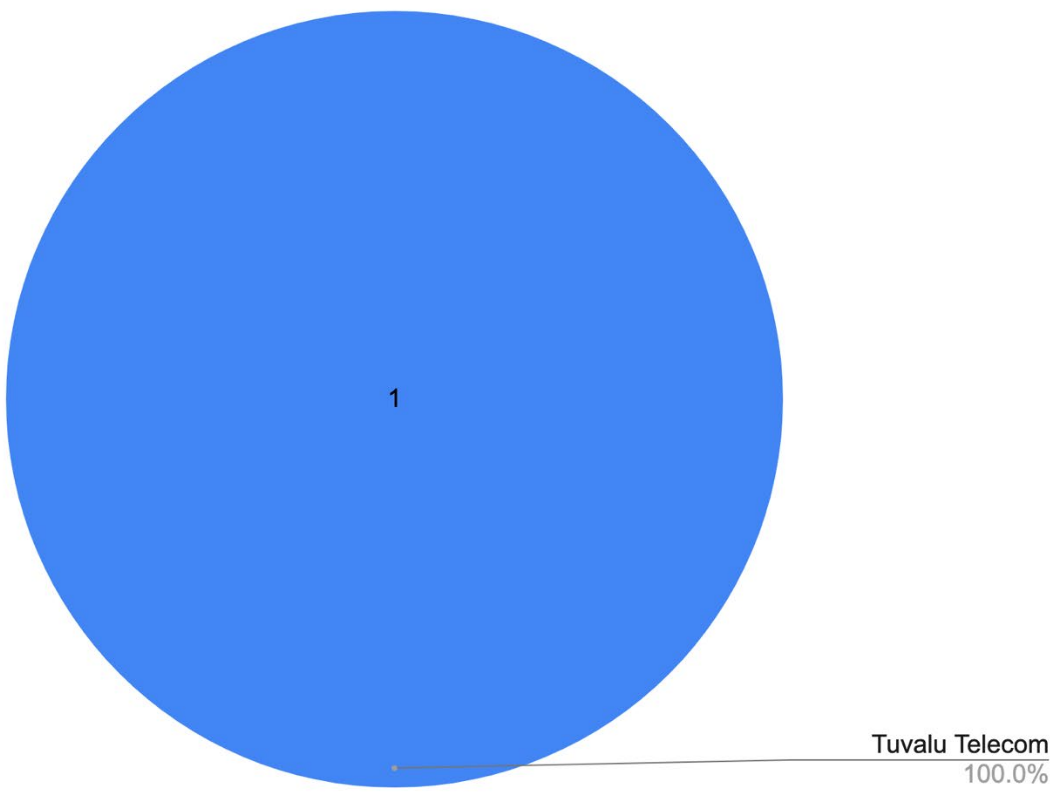
4. Samoa

No answer to this question

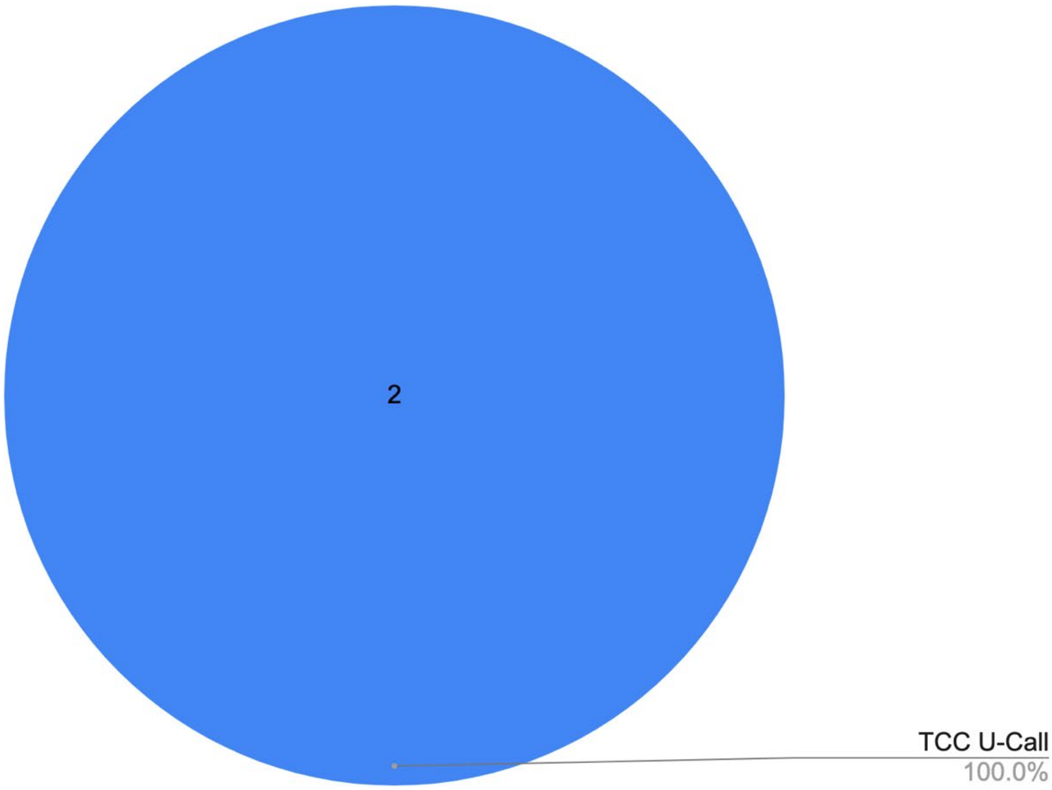
5. Solomon Islands



6. Tuvalu



7. Tonga



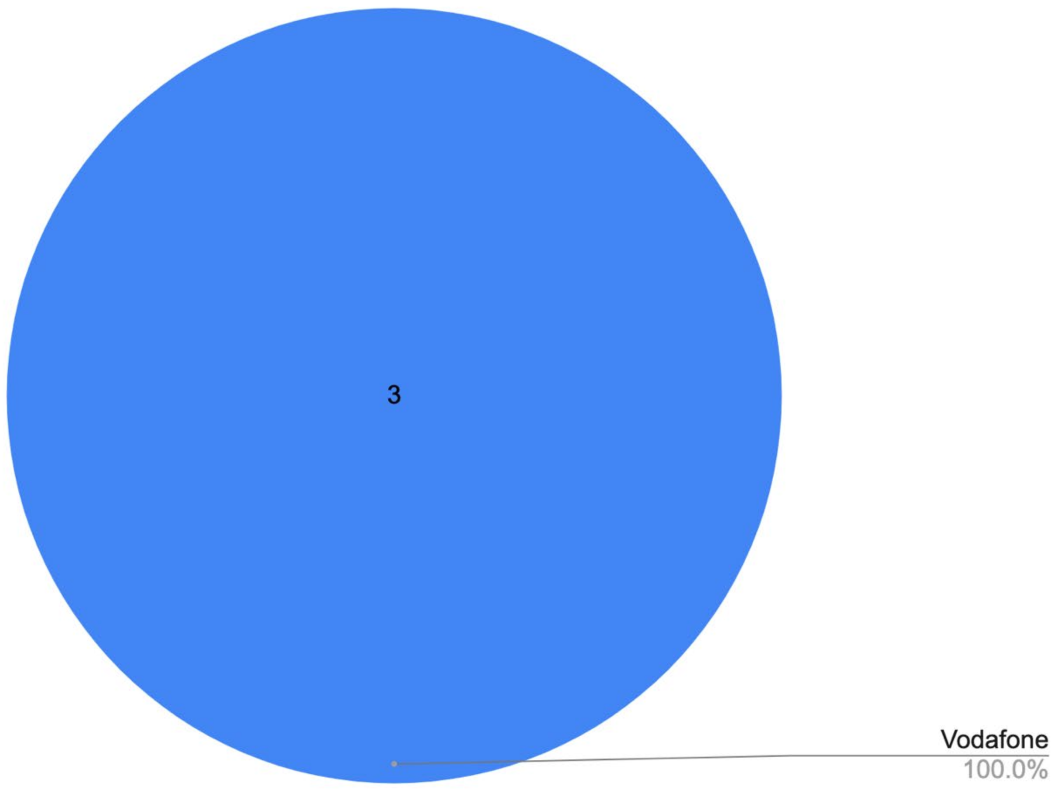
8. Nauru

No answer to this question

9. Niue

No answer to this question

10. Vanuatu



11. Marshall Islands

No answer to this question

12. Tokelau

No answer to this question

Appendix 7 Online Survey Result on Distance Learning System (Academic Staff of USP)

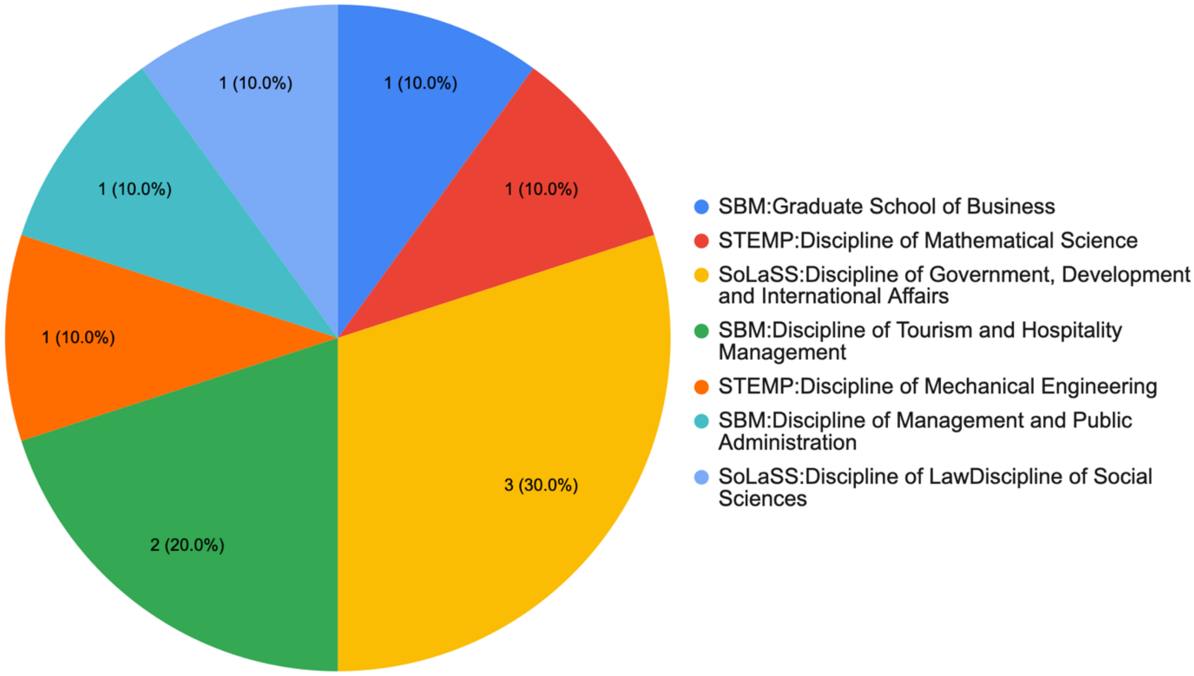
Appendix-7　Online survey results on distance learning systems (Academic Staff of USP)

1. Attribute information of questionnaire respondent

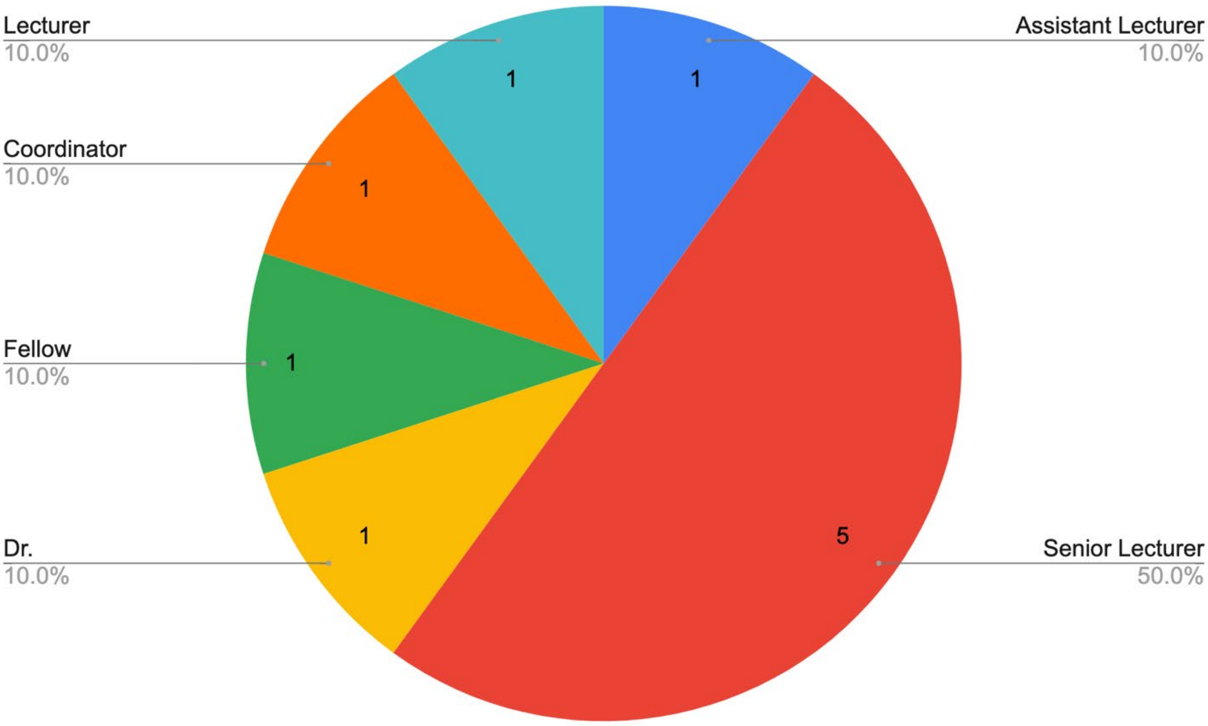
From the viewpoint of privacy protection, 1.1.1 surname, 1.1.2 given name, and 1.6 Stuff ID are not listed.

1.6　The age was derived from the birthday and used as the age of the respondents.

1.2 Your USP School (or equivalent)



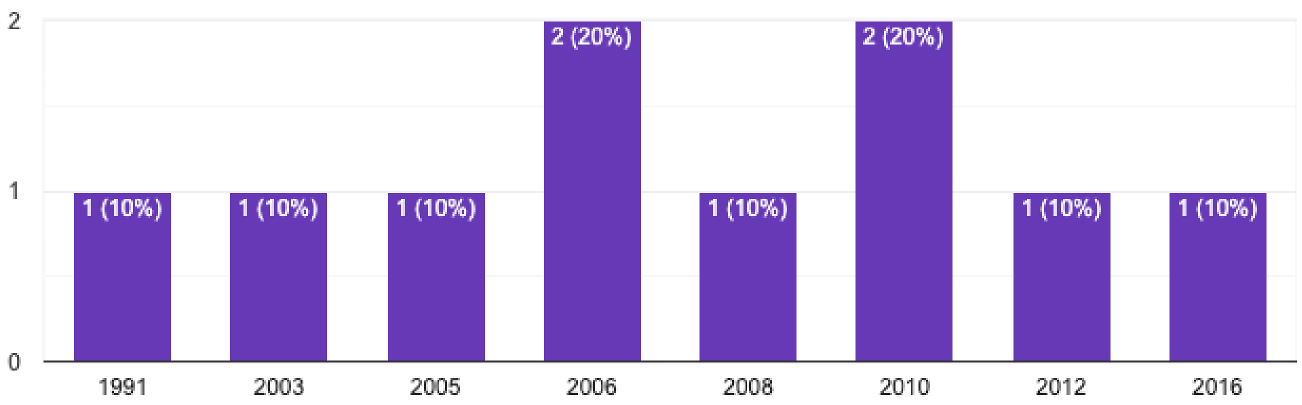
1.3 Your title at USP (Professor, Lecturer, etc.)



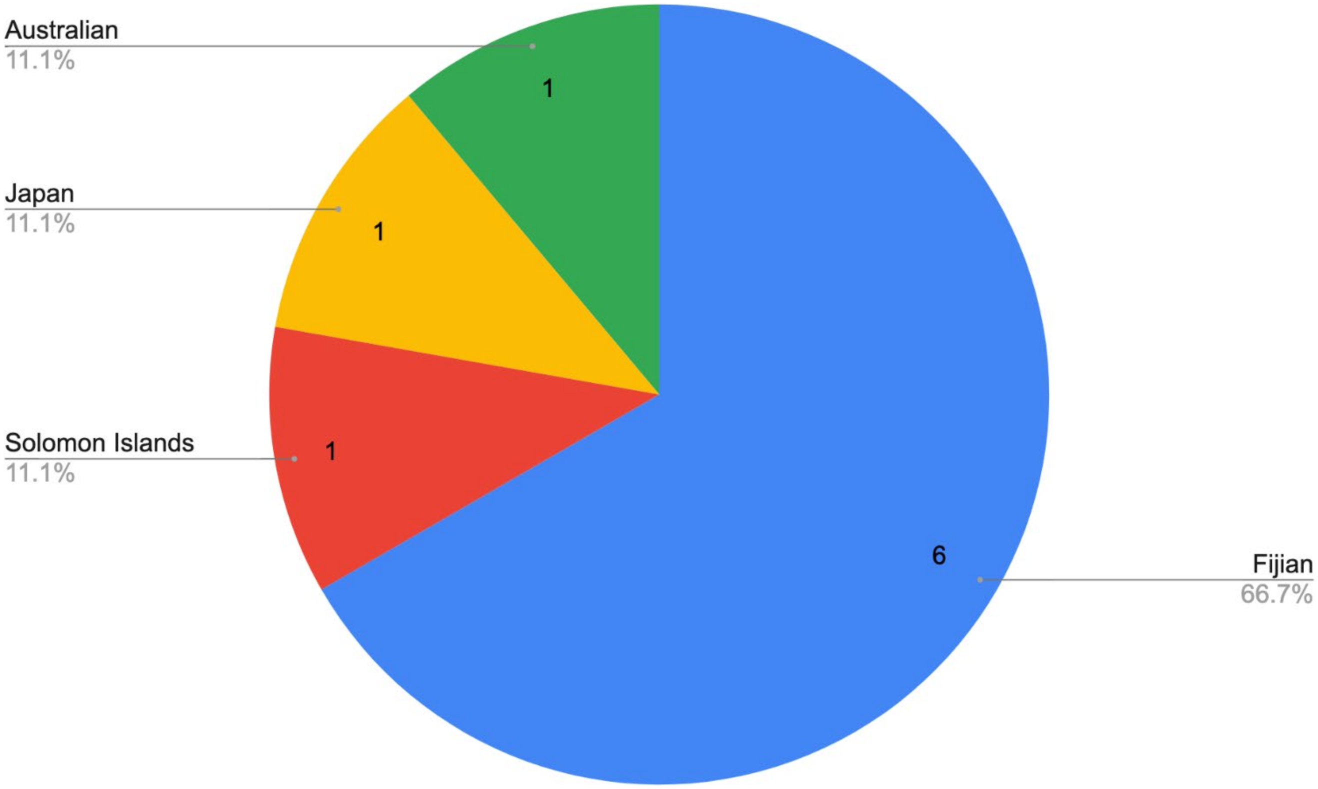
1.4 Your specialty area in education and research at USP

Community based Tourism and Ecotourism
Nonlinear dynamical systems
Human rights, Leadership & Governance
Entrepreneurship, mobility, tourism and hospitality, food, WASH, learning & teaching, culture
Metal forming, material
Politics, Development & International Affairs
Public Sector Reforms
Governance, Public Financial Management
Professional Development
History

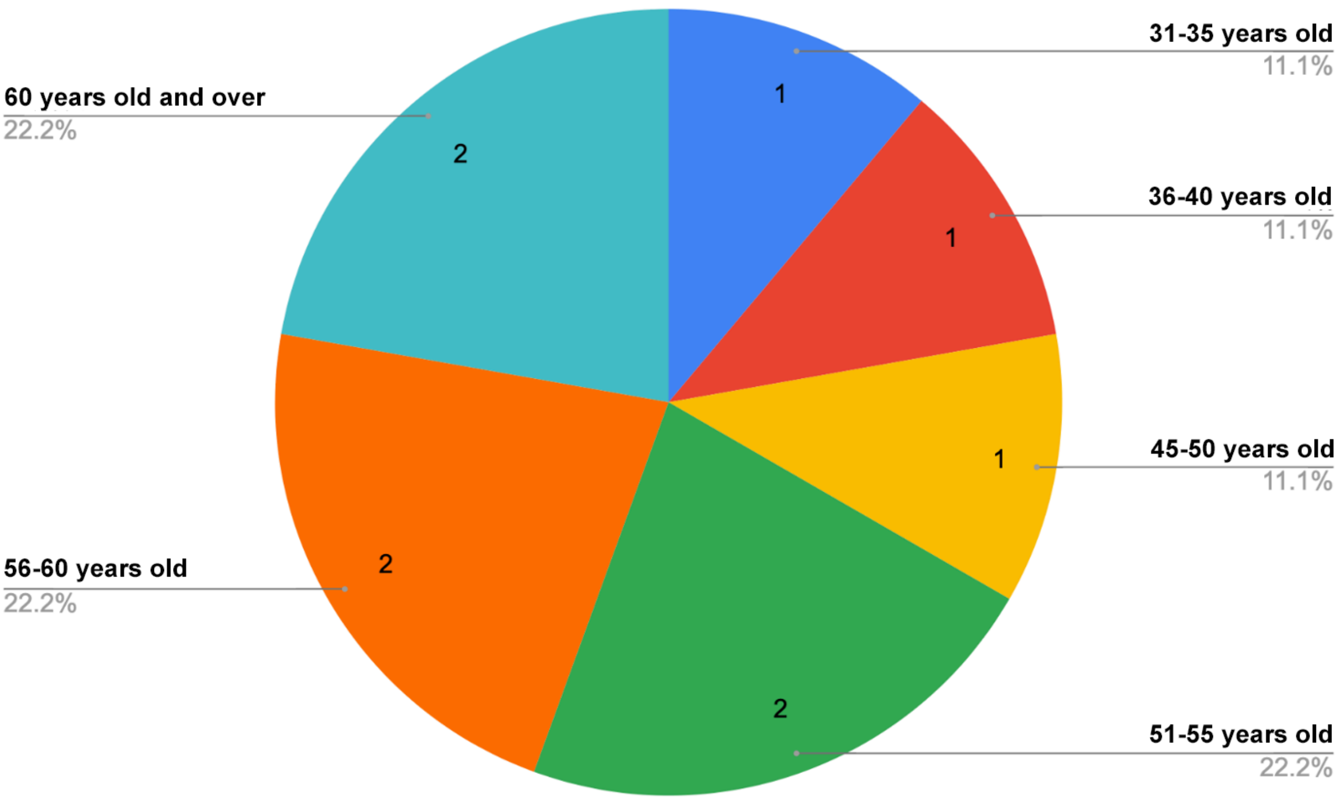
1.5 Year you joined USP



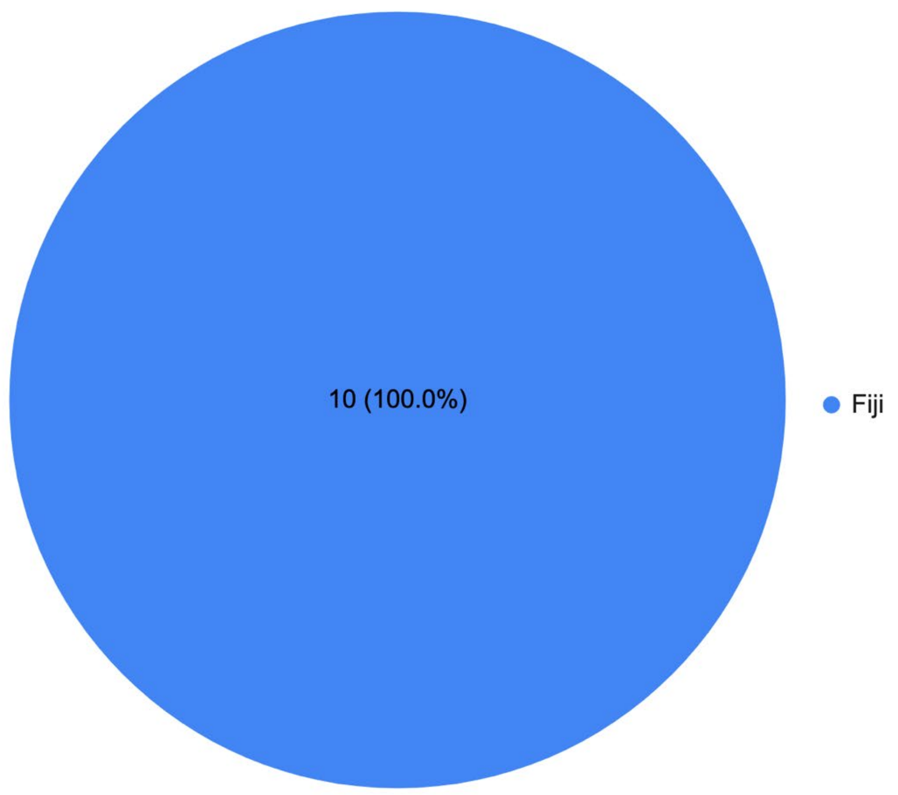
1.7 Nationality



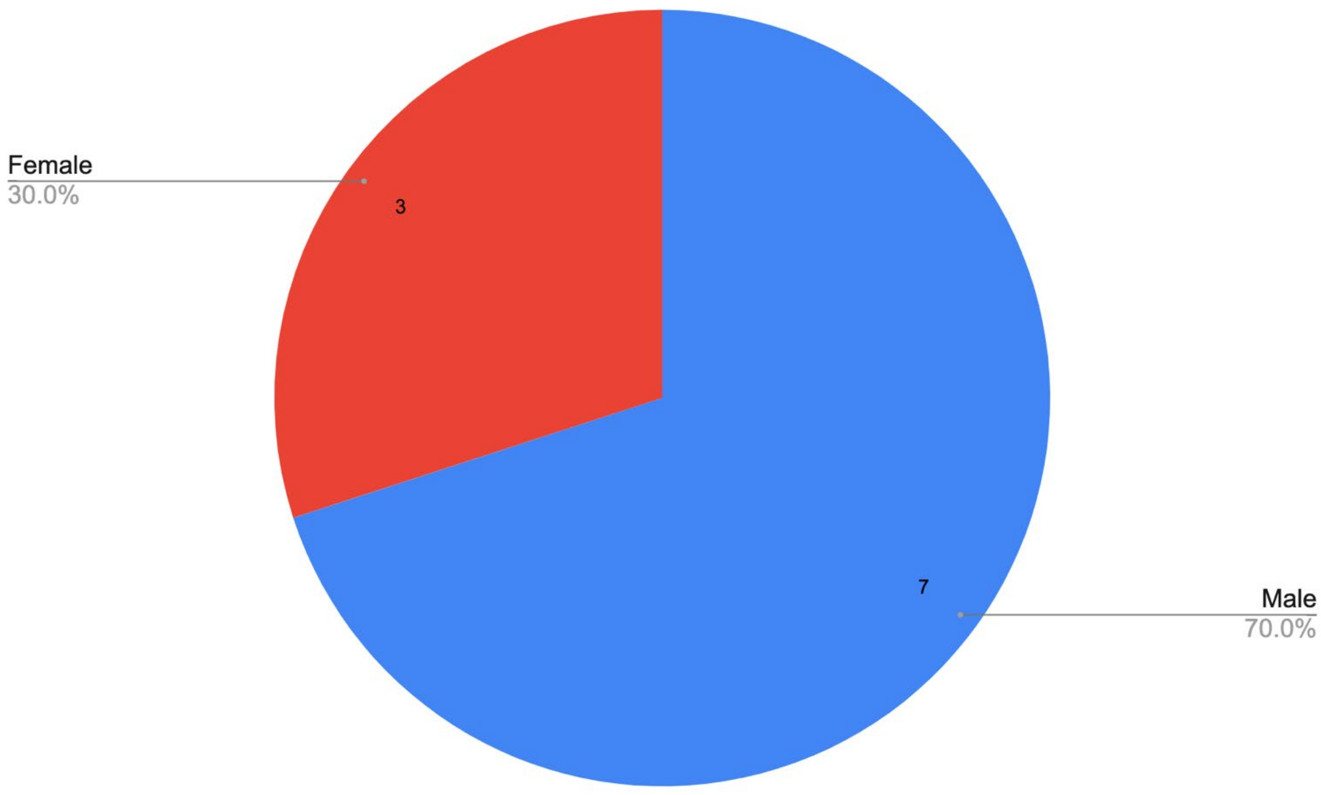
1.8 Age of respondent



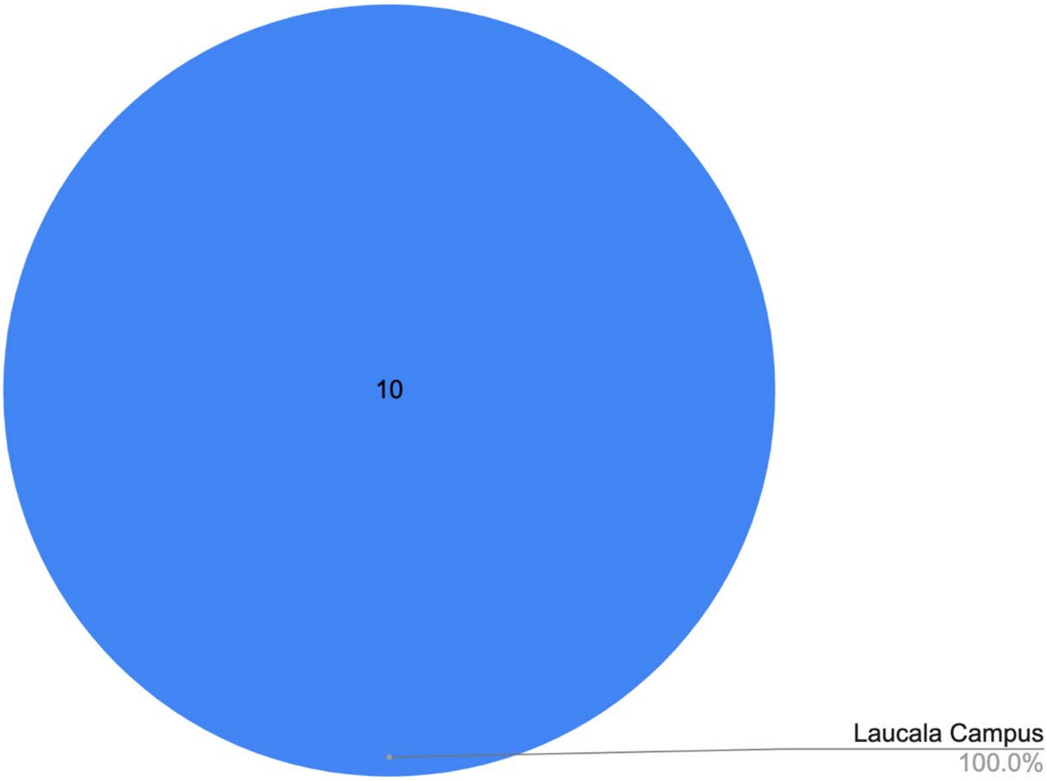
1.9 Current Residential Location



1.10 Gender



1.11 Campus / center your office



2. Content of the education provided by Moodle

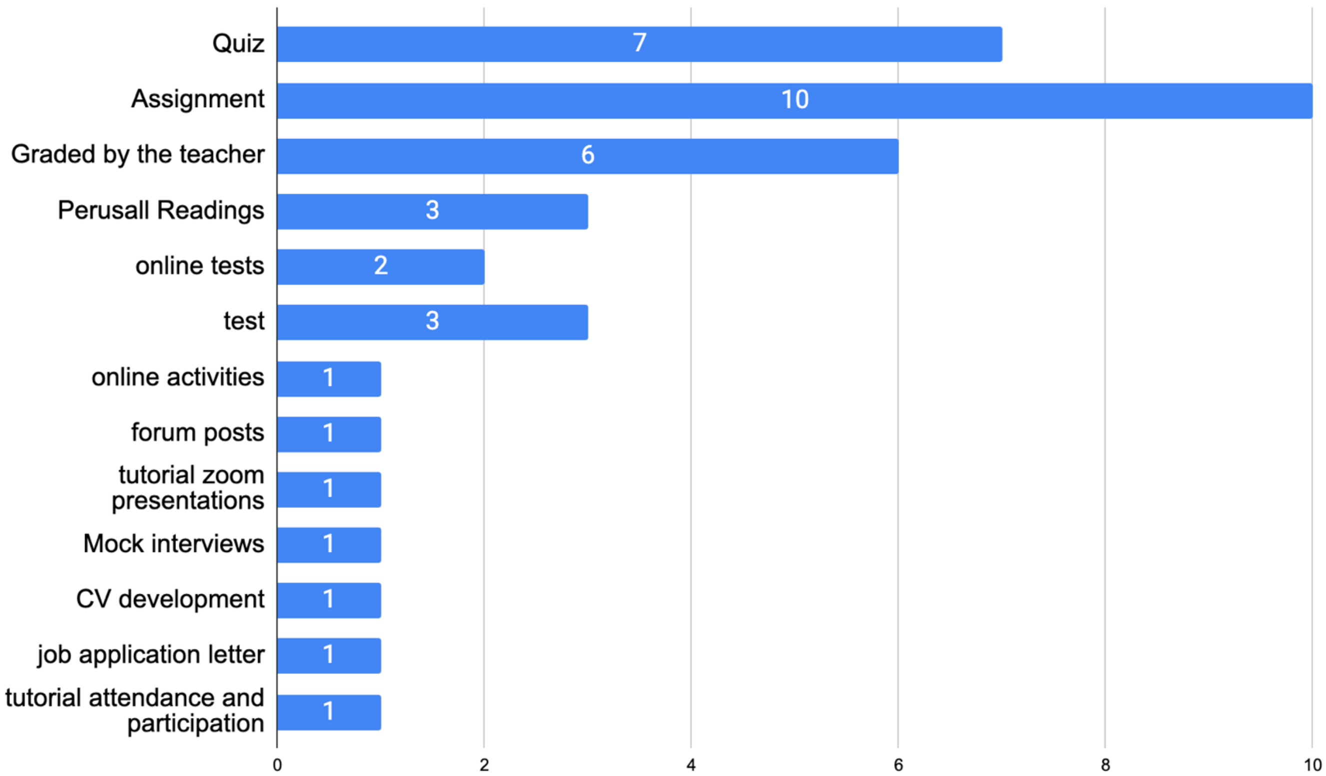
2.1 Please list all the courses you are currently teaching in 2nd semester 2021?

TS107 - Tourism in the South Pacific and TS207 - Marketing for Hospitality and tourism
MA312 and MA161
DG102 & DG301
TS302, TS218, TS303, TS304, TS405
MM399, MM323
PL203, PL300
MG202, MG451
DG404, DG411, PL300 (with another lecturer)
Co-Teach TS216 Integrated Learning for Tourism & Hospitality
HY206 HY302

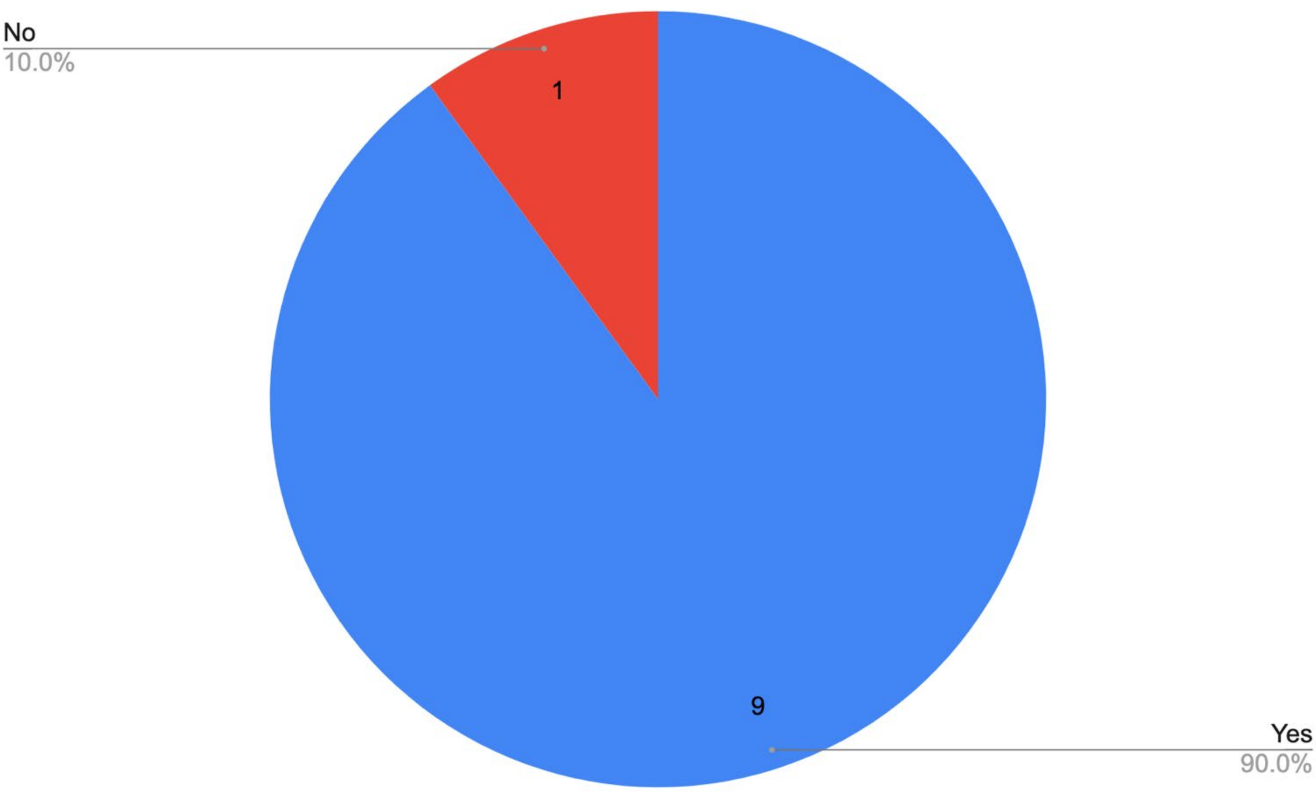
2.2 Could you kindly describe kinds of teaching and learning materials you use?

Moodle as a learning platform, Zoom to conduct lectures and tutorials. Perusall for weekly readings. Youtube and moodle for students to upload assignments and share information. Mobile phones to contact students for counselling purposes. E-copies of study guides and textbooks and made available in moodle.
OER, textbooks, materials already designed for online course
Written course materials, graphics and videos.
Study Guides, Lecture ppts, YouTube videos, textbook, academic journals,
Online readings, lectures slides, perusall, forum discussions,
Coursebook, Lecture Slides, Recorded Lectures and Tutorials, Readings
Moodle, PowerPoint and notes made by myself, Readings
Apart from the course material, Moodle is used to post additional resources, Perusal, OPERA software (online reservations), lectures, tutorials
Videos, audio files, ebooks, pdfs, powerpoint

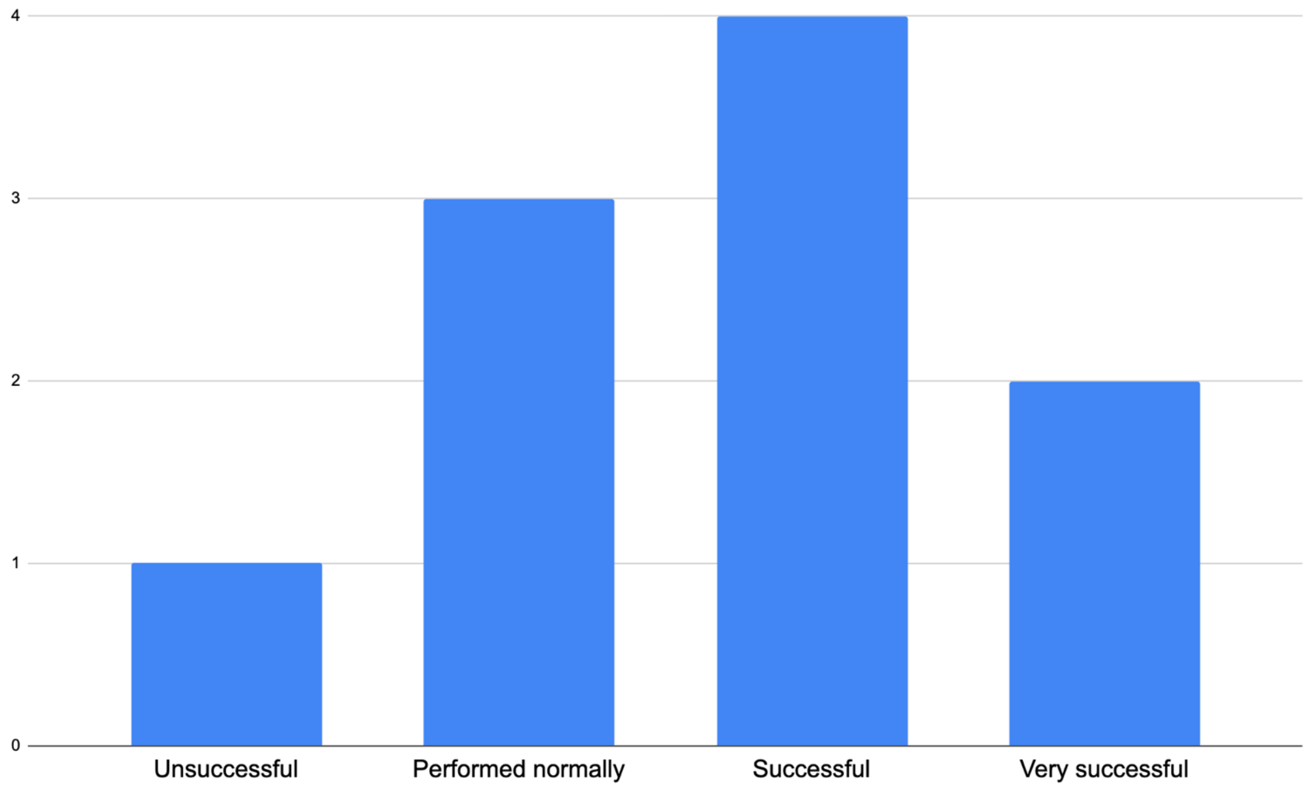
2.3 How do you carry out assessment other than end of semester exam?



2.4 Do you hold online workshops or discussions for your courses?



2.4.1 If so, were they successful?

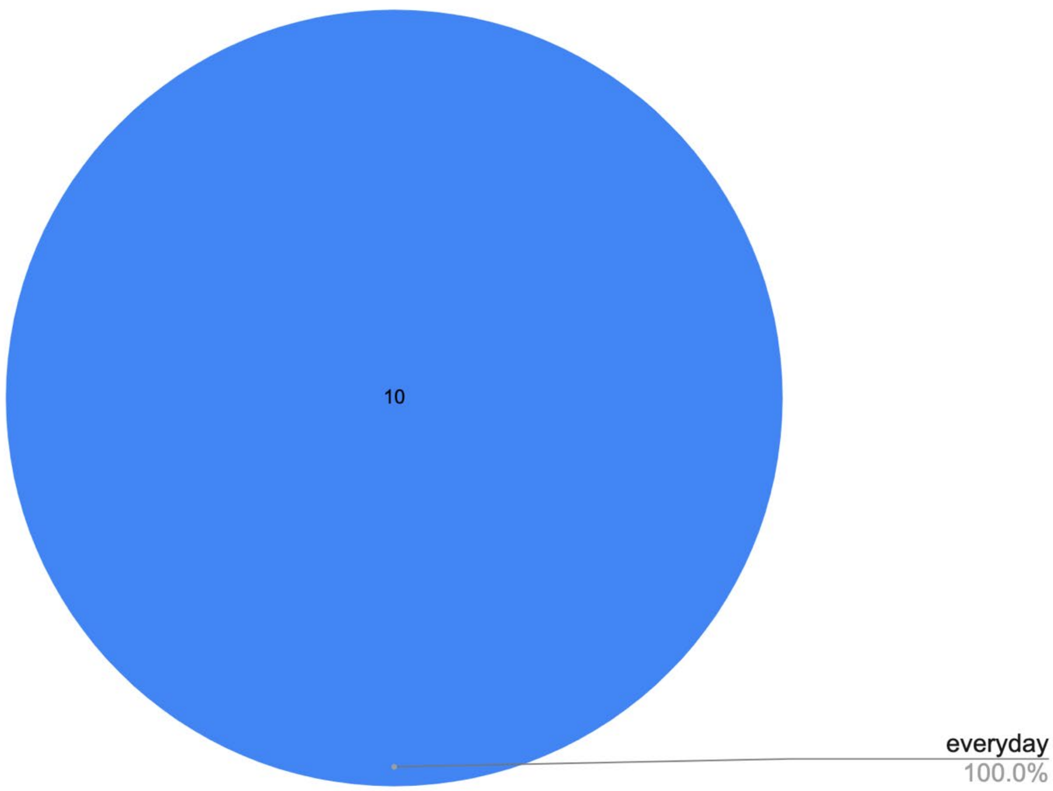


2.4.2 Why do you think so?

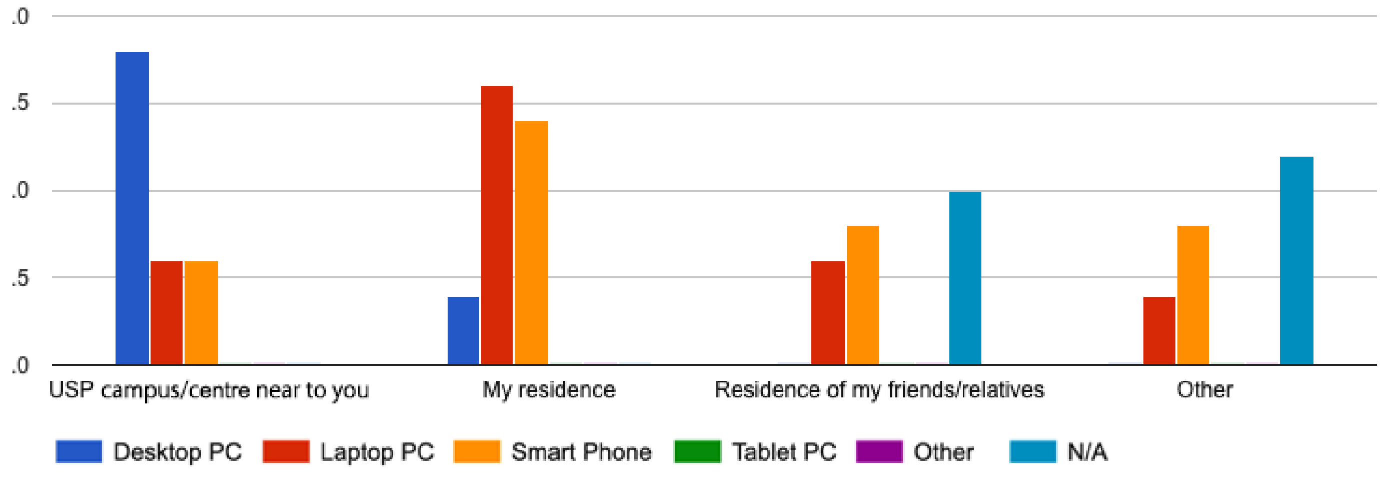
A few students had issues with accessibility to resources like lap top, data
If by workshops, you mean tutorials, my response would be yes, I run weekly tutorials for 2 hours per slot and they are well attended but compared to face to face sessions, participation is much weaker.
Students enjoy engaging online, have learned to do this well over the last year. Work well in Zoom breakout rooms. Classes are well prepared and interactive. Discussions are well facilitated and students are encouraged to discuss their opinions. The isolation of COVID19 has made them seek socialisation and doing this online is the main option they have given the learning environment available to them at the moment.
Unless they are assessed, students will not contribute.
Student response and involvement improved
A majority of students attended the sessions.
Many students attended when we had guest speakers from the industry, entrepreneurs, alumni
Lack of participation from students (on average less than 10%). I cannot make participation compulsory for online courses

3. Access to distance learning systems

3.1 How often do you usually access Distance Learning System?



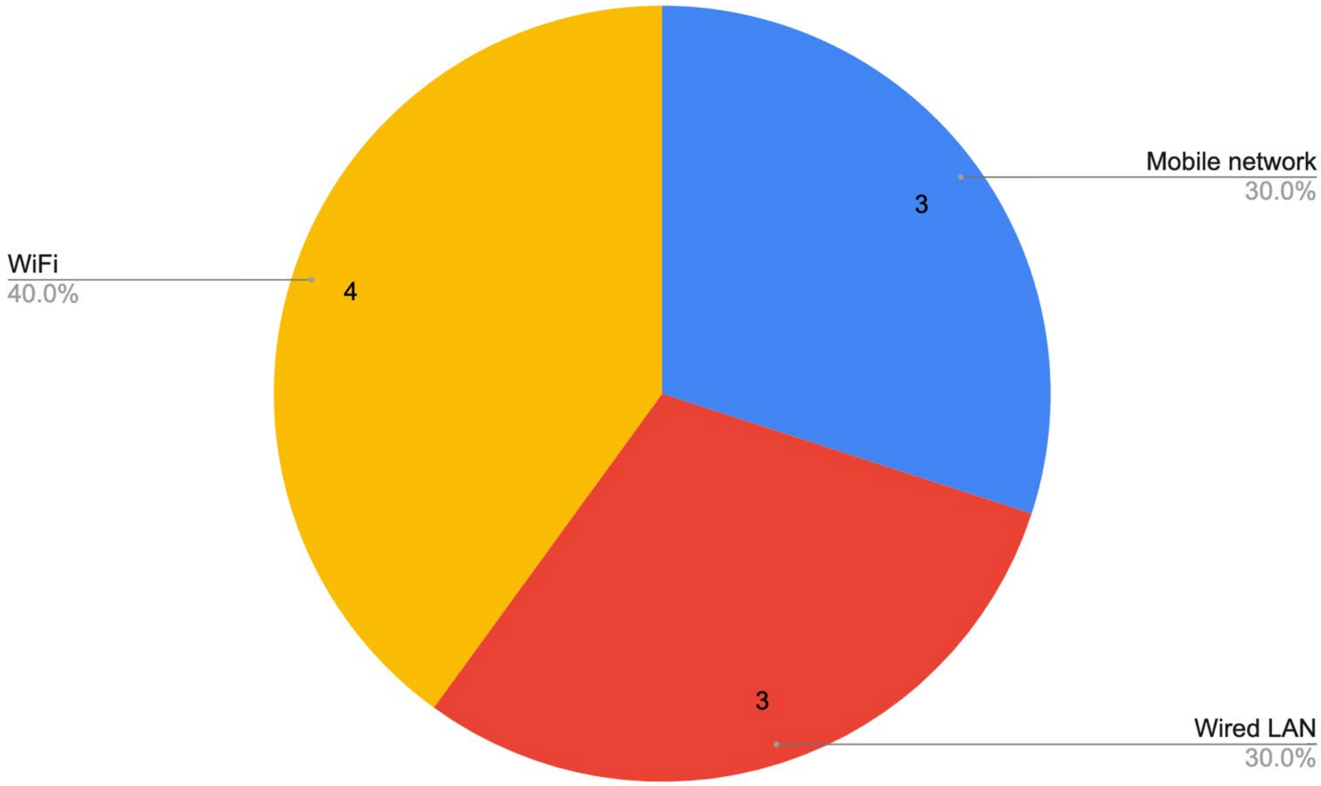
3.2 Where do you usually access Distance Learning System?



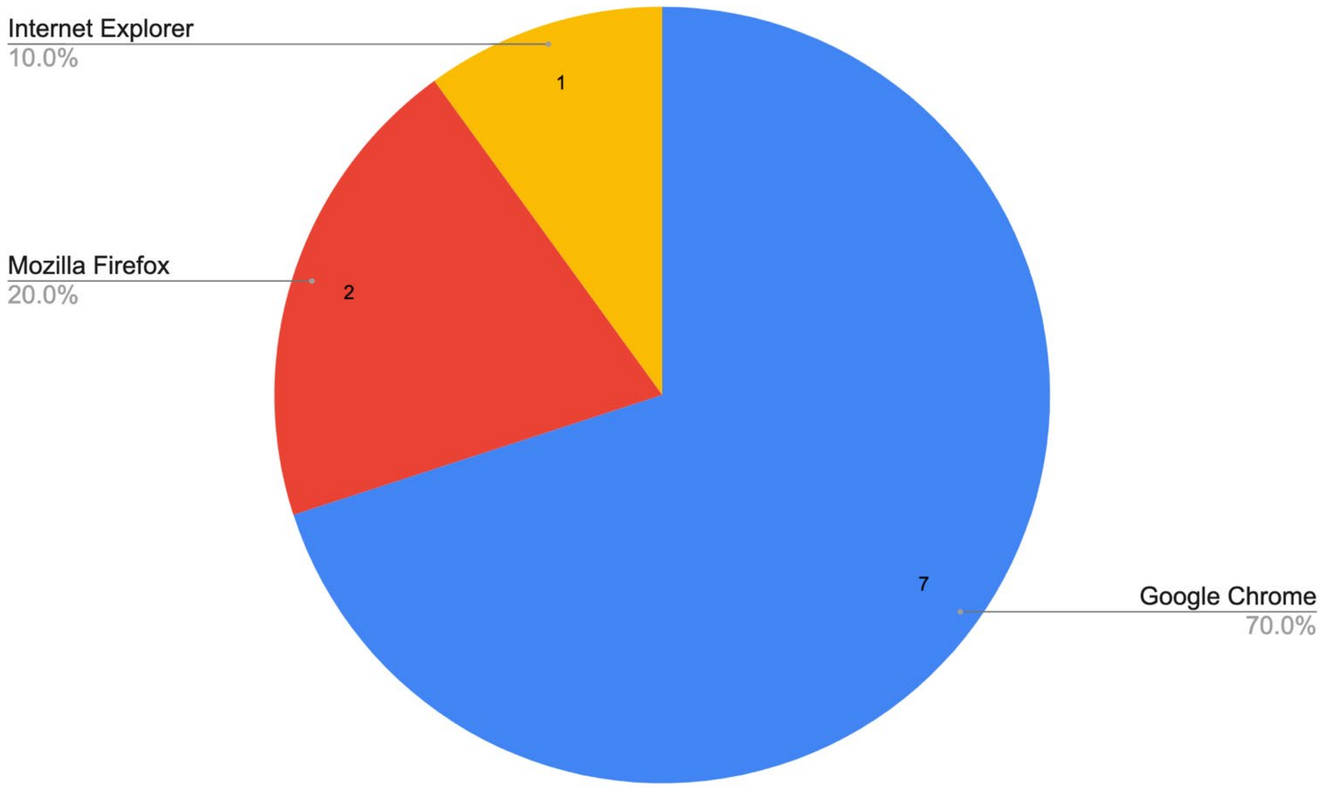
3.2.1 If you choice is "Others" in previous question, Please specify.

Other place apart from home or office
N/A
Traveling - phone access

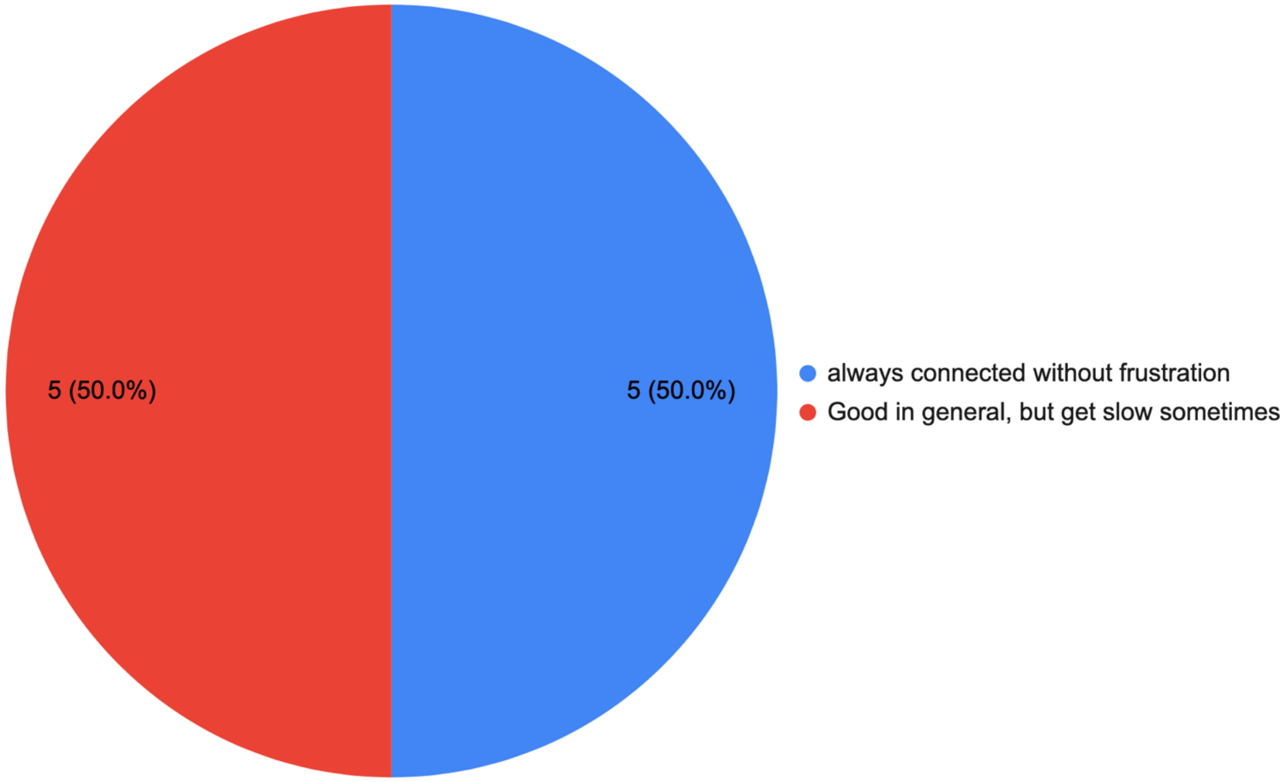
3.3 How do you get online connection at the place you answered in previous question?



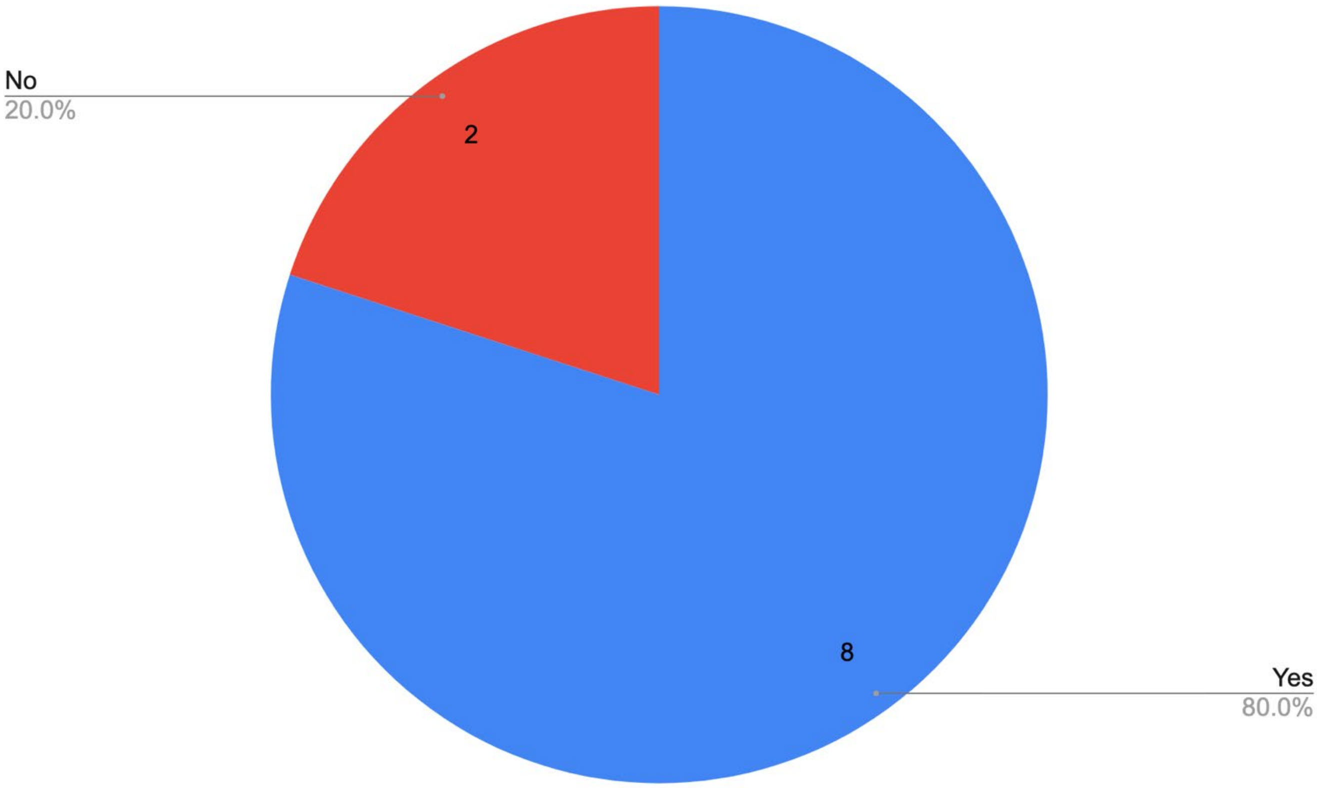
3.4 What is the main web browser you use to log in to the distance learning system?



3.5 How is the online connection status at the place you answered in previous question?



3.6 Are you using mobile applications (Smart Phone, Tablet, etc.) to access Distance Learning Platform?

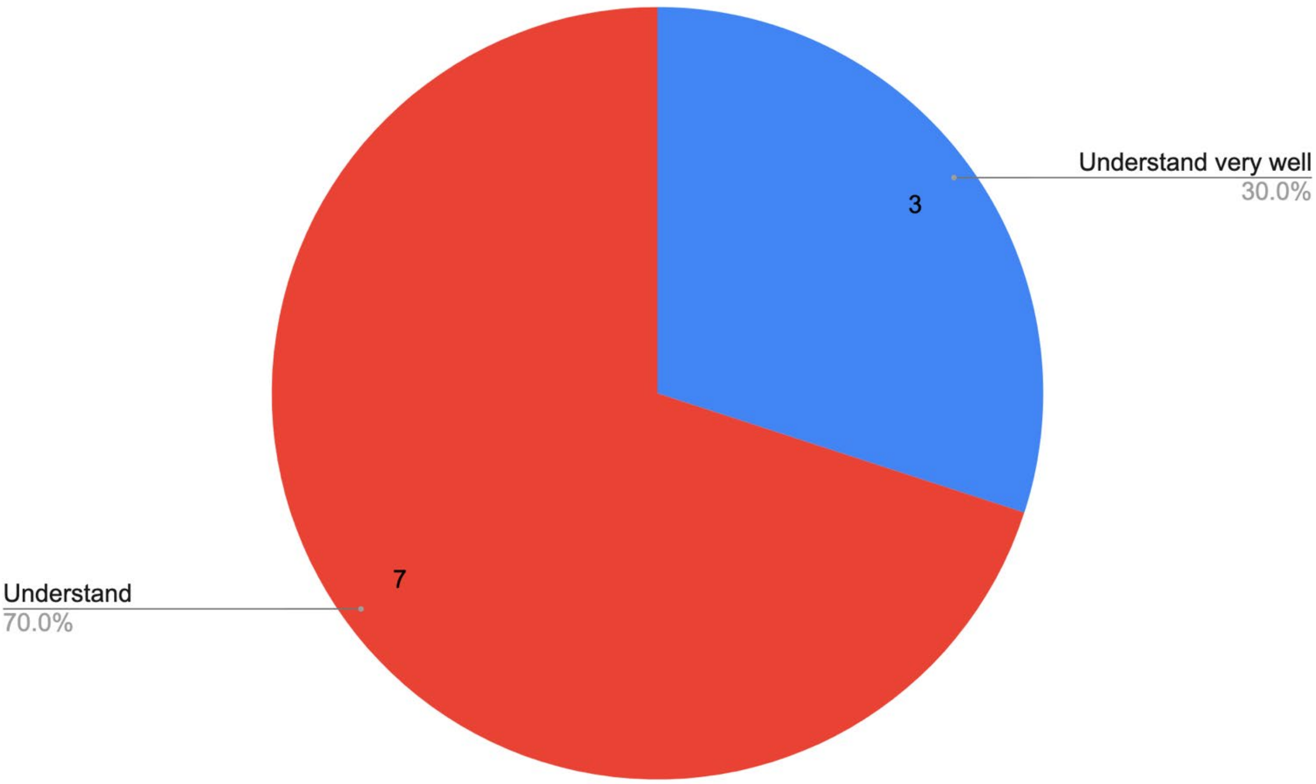


3.6.1 If you answered “Yes”, could you please provide names of applications?

Smart phone
Smart phone
Google Chrome
Samsung J7
smart phone

4. Operation of Distance Learning System / Technology

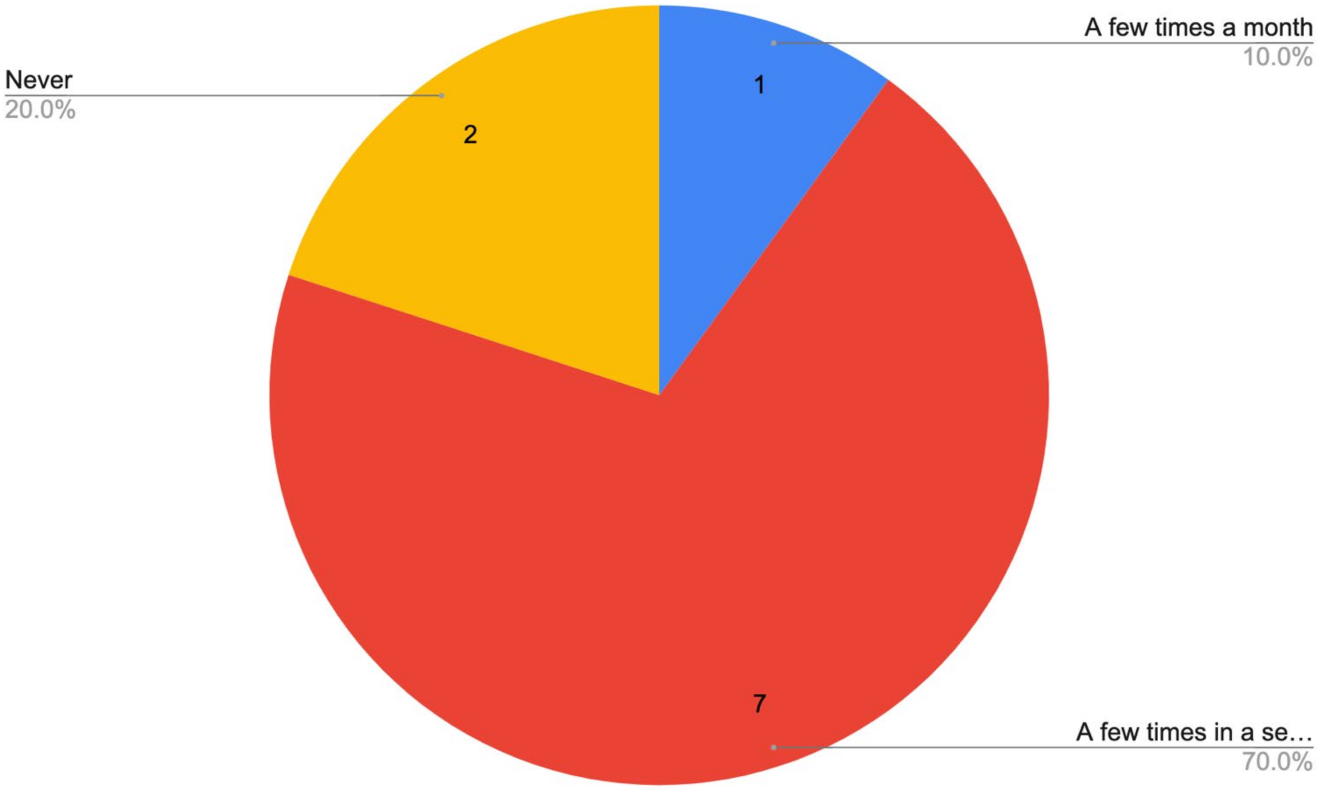
4.1 Could you kindly provide your understanding of the operation of software, tools and services related to Distance Learning System?



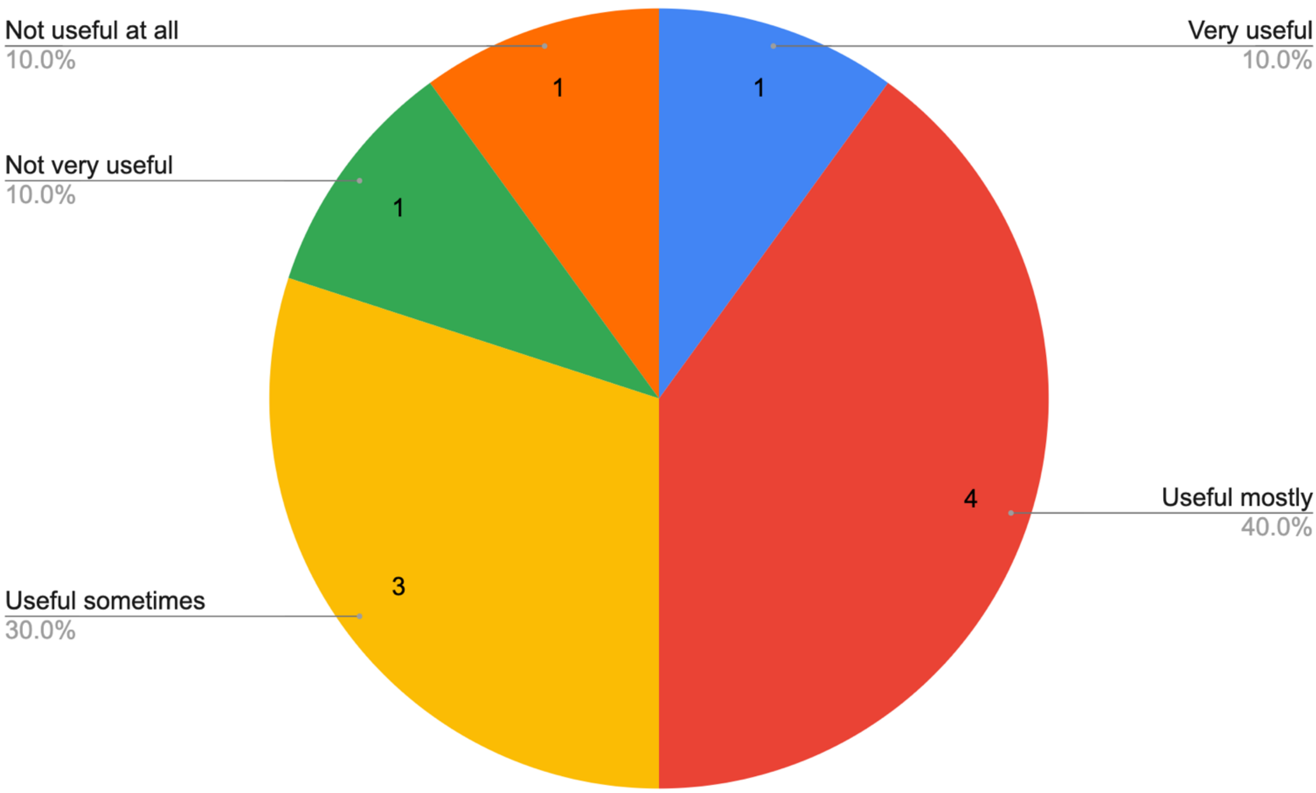
4.1.1 Why do you think so?

Centre for Flexible Learning conduct workshops for teachers who use Distance Learning system in their teaching.
I have been using these devices for as long as they have been around, am interested in IT and have undertaken all the training where necessary.
I use them
I can make it work, but it can be used better.
I can set most distance learning tools myself. Assistance of the assigned CFL person were sought only when something new such as Perusall was introduced.
CFL training, in-house staff training/assistance, self-taught by following instructions
I am part of a younger generation more familiar with computers

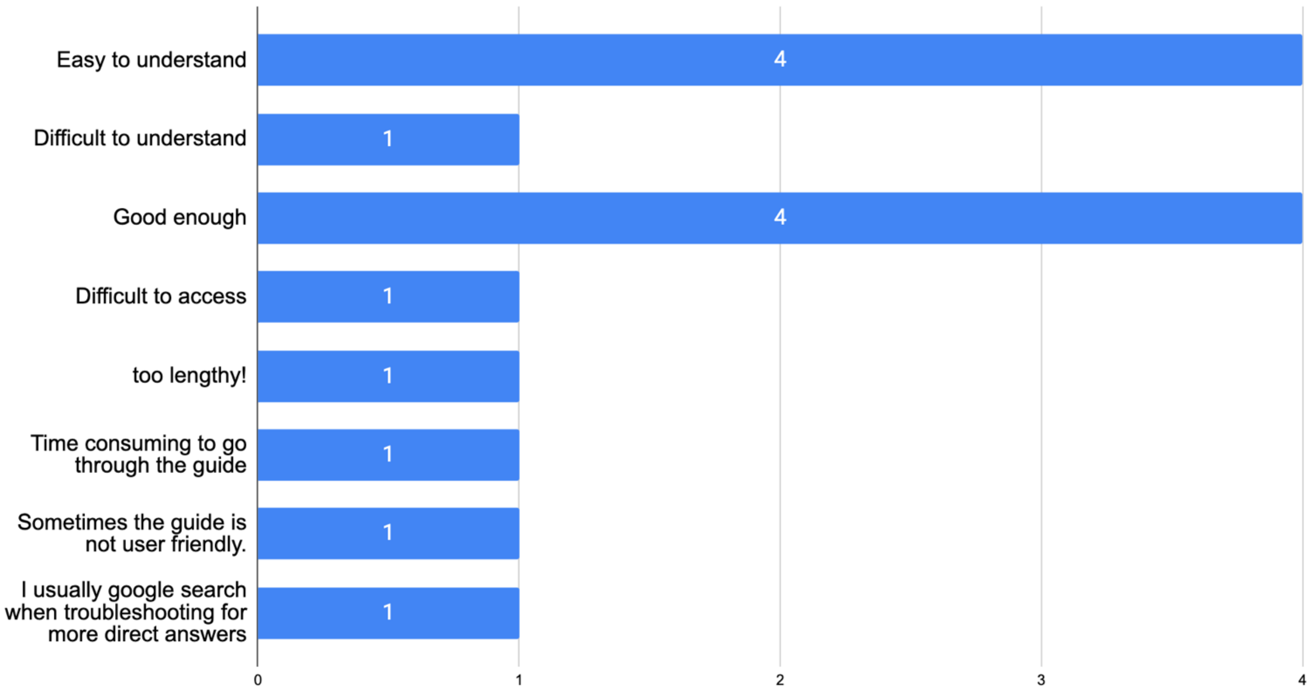
4.2 How often do you use online user's guide of Distance Learning System?



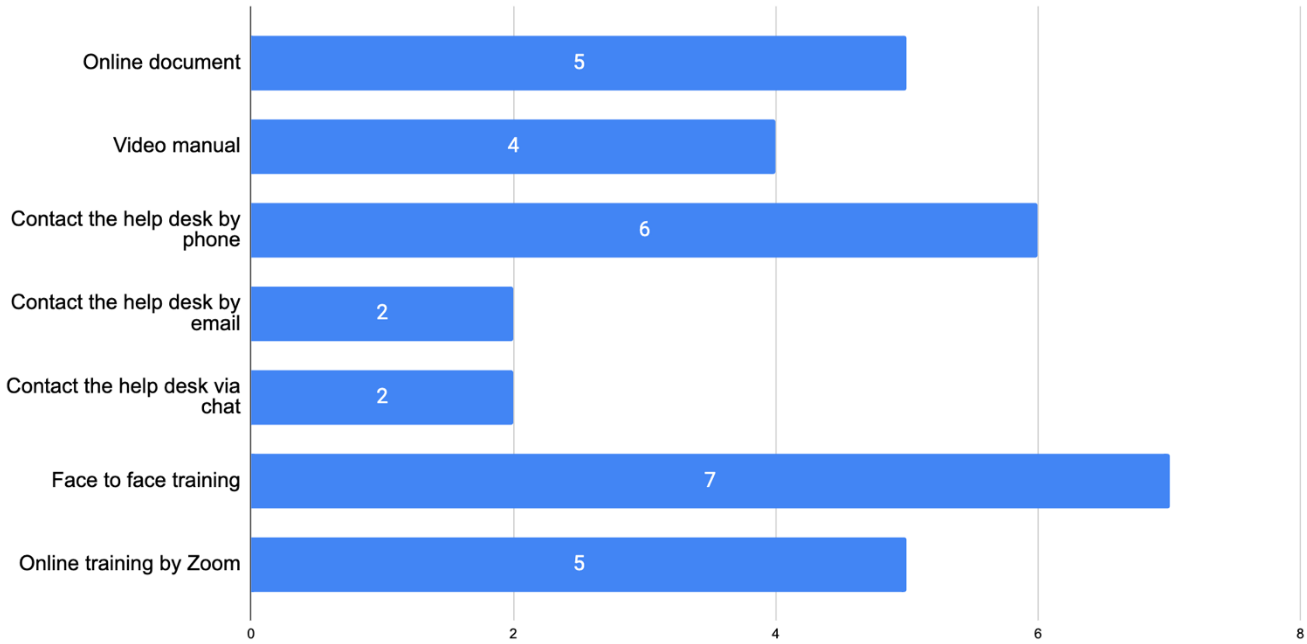
4.3 Is the current online user's guide useful for you?



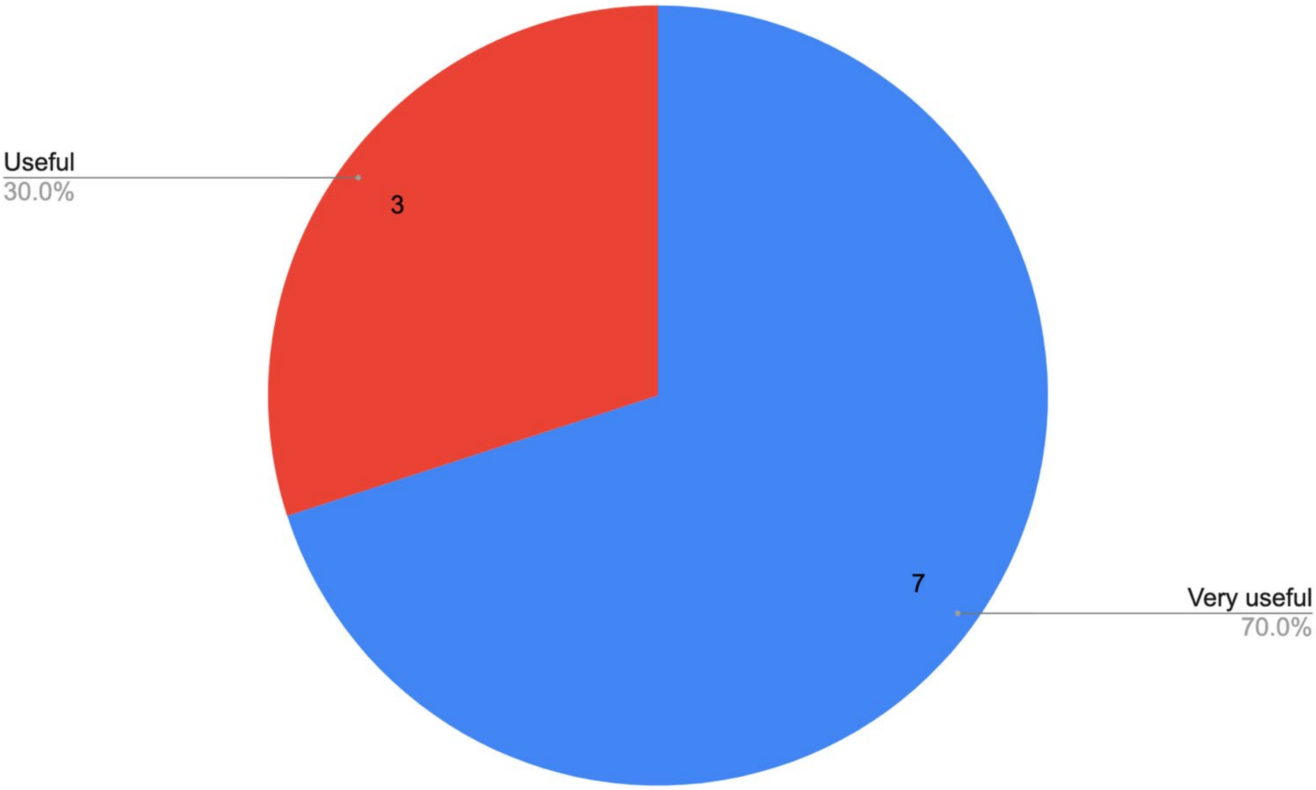
4.3.1 Could you please provide the reason?



4.4 What kind of user's guide do you find useful for you?



4.5 What do you think about online learning?



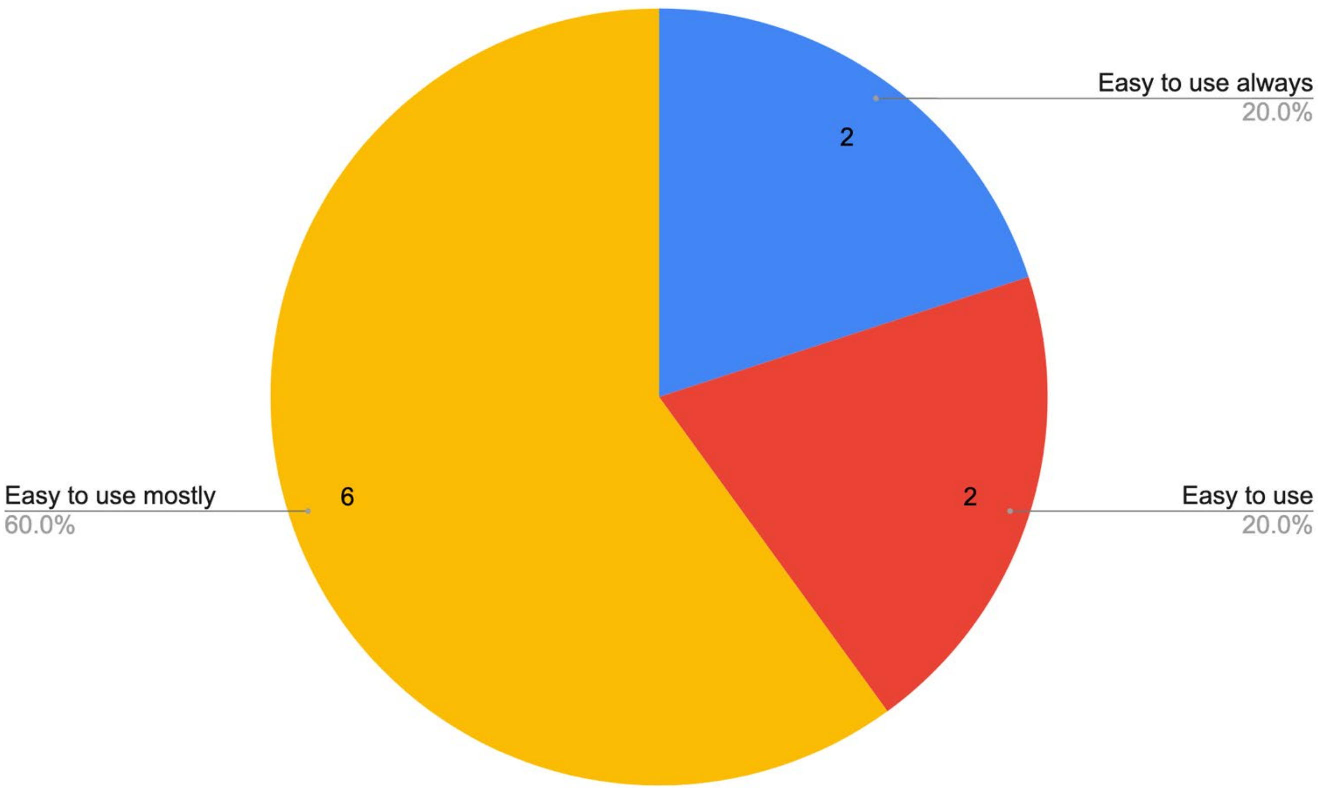
4.6 What do you think enhance online learning further?

When new tools are explored and we are provided with the right support [technical and training]
Good quality internet connection consistently for all students and staff. To ensure all students have to turn on their videos during class. Its very dry classes when you seem to be talking to blank screens! Majority of students do not turn on their videos.
Ensuring students have free/cheap data packages
internet connectivity by students in rural communities
Students need better connectivity.
Improved IT training of lecturers and students.
Better access to learning platforms and material, students' accessibility to internet, all assessments marked by the system, make assessments more project/research based and have students record(video) the process etc.
Improvement in infrastructure in regional campuses

4.7 If you have, could you kindly provide your opinion about online learning?

It is very useful, but not all students have the same access. In some places, students may have connectivity issue while others may have the challenge of having laptops and data to be able to connect.
It can never replace the interaction and flow of participation in the face to face setting!
Online learning during COVID19 is an excellent educational option, although time consuming, and has allowed students from throughout the region to continue their education.
It is here to stay and it is good.
It is very useful and those who are insisting F2F teaching for postgraduate level need to find online methods suitable for postgraduates.
Online learning is great but it should be one of the options for students because all students learn differently. The end result is delivering quality education in any mode and ensuring students are successful, not inhibited nor disadvantaged.

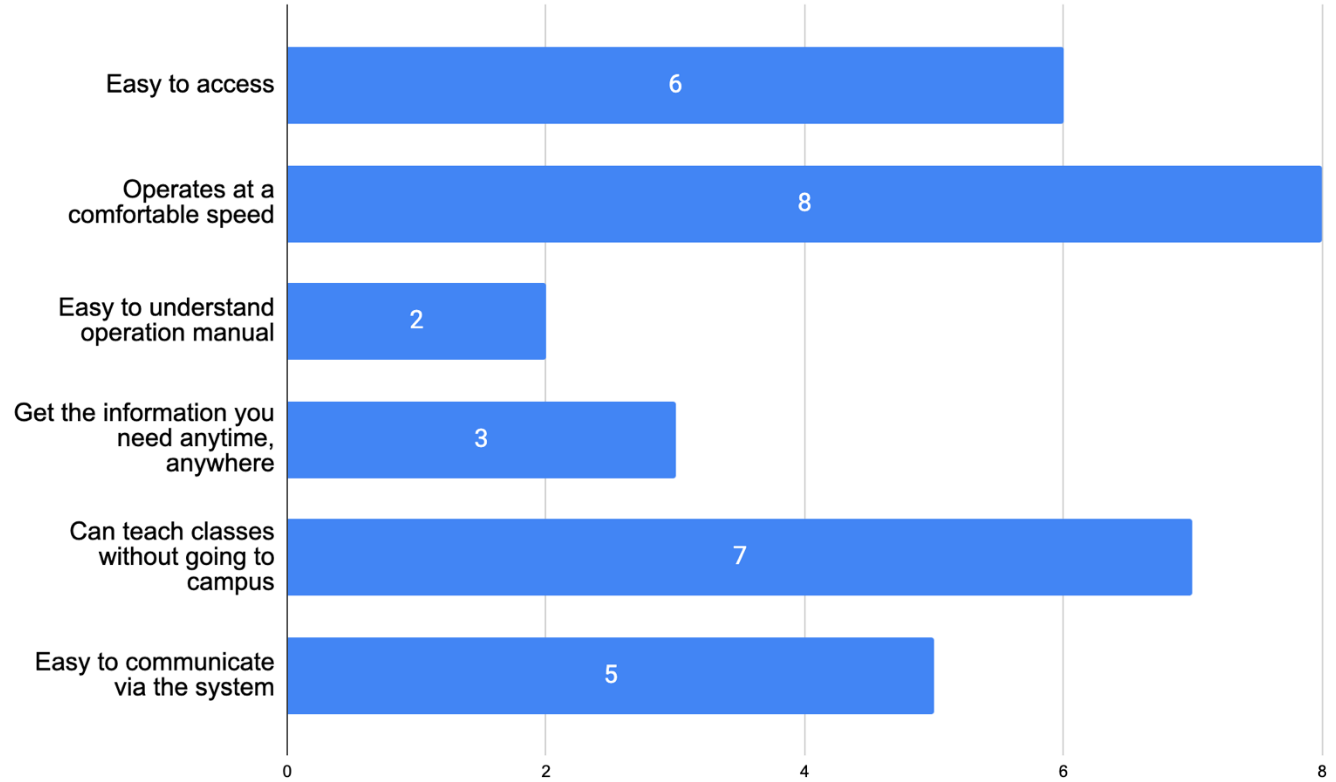
4.8 What do you think about the usability of Distance Learning System?



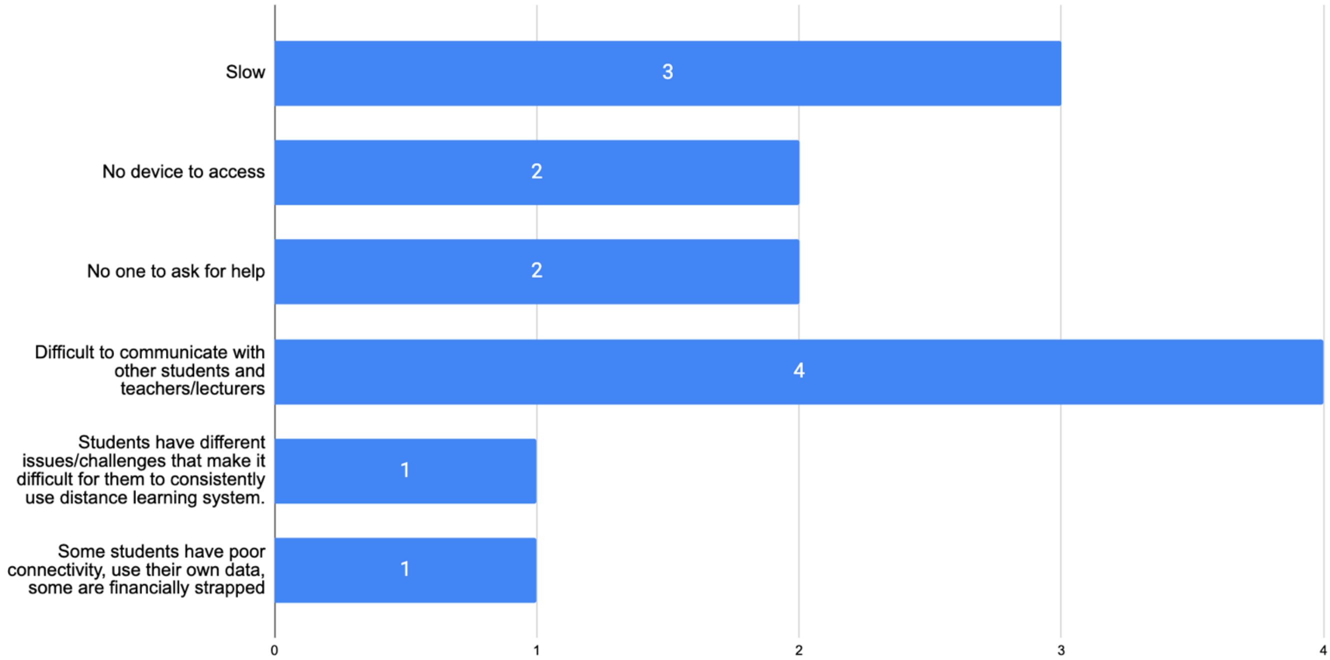
4.8.1 Why do you think so?

It is easy to use if students and teachers are provided with the right resources and support to enable them to use the distance learning system.
Apart from students having difficulties due to the cost of access, the online services for THM courses have been well developed and students are provided on Moodle with everything they need to do well in the course.
You can only use it if you have connectivity and the students have connectivity.
It has helped replace face-face teaching.
Need to learn the system and then need some experience to use the online tools properly.
But the playing filed is not leveled when one has to consider accessibility, connectivity and resources, these affect usability.
Some systems at USP are not compatible with each other (eg SOLS and Moodle)

4.9 Could you kindly provide how you find the Distance Learning System in terms of usefulness or convenience?



4.10 Could you kindly provide how you find the Distance Learning System in terms of challenges or inconvenience?



4.11 Could you kindly provide your impressions and other opinions about the Distance Learning System?

It is a great tool but is not the only solution to learning.
Moodle is a very good system although some students find it costly to access and download resources.
Distance learning can be facilitated by lecturers if they have proper reliable desktops in the office. Right now my office PC is not working so use my personal laptop.
This is the future.
It is a useful too but most of us need to have proper training to use it properly.
Staff often has to use own data, pay for internet installation at home, some students do not have enough data etc

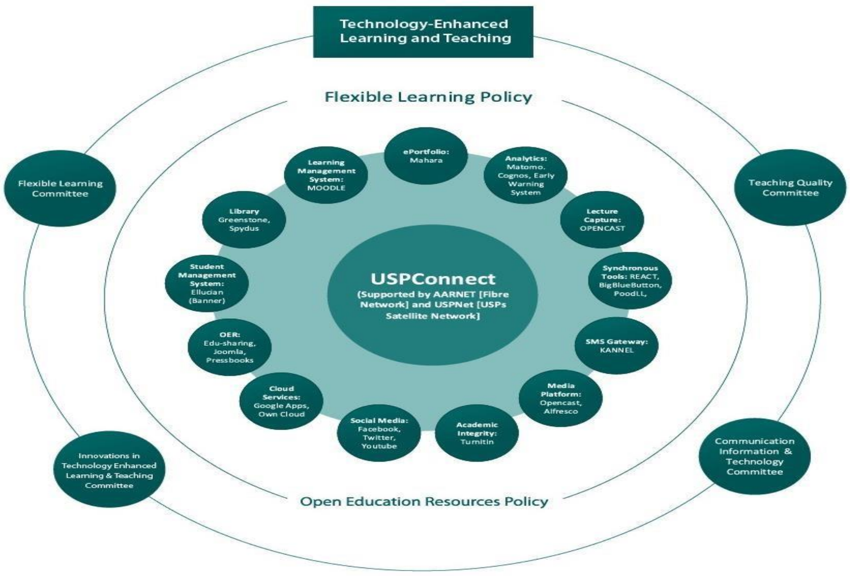
Appendix 8 USPConnect Concept Document

Japan's Bilateral Development Assistance Needs Survey

Technical Cooperation Projects: ICT (digital transformation aiding learning and teaching in view of COVID-19 restrictions)

Project Title: USPCONNECT: Transitioning to Learning and Teaching Online @USP

Brief Description: The COVID'19 pandemic has already begun to change the landscape of learning and teaching globally, and the University of the South Pacific is no exception. Fortunately, for USP, there is a strong tradition of distributed and disaggregated learning and teaching that it can build upon. Nevertheless, a rethink and re-engineering of business processes is imperative, and it will require a recalibration of learning and teaching choreographies, including how these are supported throughout the University. USP is moving decisively to adopt and integrate a wide variety of technologies to support open, flexible and technology-enhanced learning and teaching opportunities at the University. The technological infrastructure of this recalibration of learning and teaching choreographies at USP is captured by the idea of ***USPConnect*** (see Figure 1).



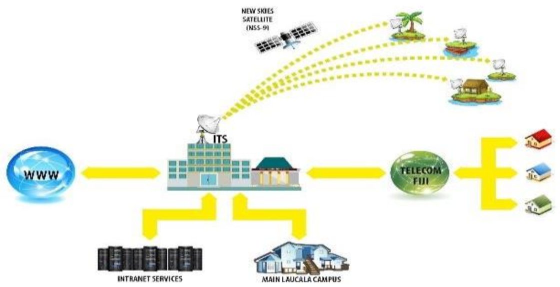
USPConnect (USPs integrated TEL architecture)

USPConnect is USP's on-line learning environment. It comprises a plethora of technologies that are designed to work in sync in order to support an increasingly open, flexible and technology-enhanced learning and teaching environment, and specifically the following key dimensions of flexibility:

1. *Learner-content engagement:* This is about learners' engagement and interaction with the subject matter in ways that suit individuals, their styles and approaches to studying and its time, place and pace.
2. *Learner-teacher engagement:* This is about choices learners have in relation to the mode and method of their engagement and interaction with their teachers and tutors.
3. *Learner-learner engagement:* This is about choices learners have in relation to the mode and method of their engagement and interaction with their peers in small and large groups, and in offline and online educational settings.
4. *Learner engagement with assessment activities:* This is about choices learners have in relation to the fulfilment of their assessment requirements.
5. *Learner engagement with feedback:* This is about choices learners have in relation to access to feedback on their learning and assessment activities.

6. *Learner engagement with the learning environment:* This is about adaptable access, interaction and engagement with the learning environment (such as with mobile devices, Wi-Fi access and innovative use of study space).
7. *Learner engagement with the institution:* This is about choices learners have in relation to their engagement with the services of the educational institution.

USPConnect comprises a growing suite of tools that can be amassed to support various learning and teaching initiatives. These tools rely on a robust technology infrastructure (See Figure 2: USPNet--USP's Satellite telecommunications network architecture). The backbone of this initiative is USPNet, a satellite network that incorporates a hybrid C/Ku Band system. It supports two major networks. One is *USPNet, a WAN* incorporating hybrid satellite and submarine fiberoptic technology that delivers Internet-based administrative and educational services to staff and students in the region, and the other is AARNet *(Australian Academic Research Network)* which offers USP access to a global education and research network, and a much wider range of resources.



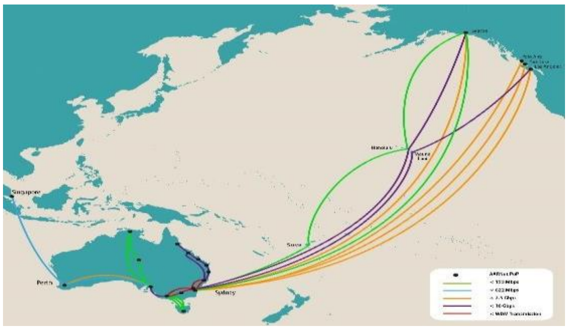


Figure 2: The USP ICT infrastructure
Figure 3: AARNet connects USP campuses.

Key Outcomes:

1. Assess the capacity of USPConnect to meet the challenges and the growing demand for open, flexible and technology-enhanced learning and teaching.
2. Upgrade the capacity of USPConnect to meet the challenges and the growing demand for open, flexible and technology-enhanced learning and teaching (This will include upgrade of existing tools as well as the adoption of new tools).
3. Upgrade the capacity of the infrastructure (especially in relation to ubiquitous connectivity and bandwidth) to support USPConnect to meet the challenges and the growing demand for open, flexible and technology-enhanced learning and teaching.
4. Build capacity in the adoption of USPConnect to meet the challenges and the growing demand for open, flexible and technology-enhanced learning and teaching.

Relevance to USP Strategic Plan:

Priority Area 1: Education
Objective 1: To inspire our students across all campuses through implementing a world-class curriculum using the most appropriate pedagogical techniques for Pacific learners
OBJECTIVE 2: To continuously improve the quality of teaching throughout the University through engaged and passionate staff.

Initiatives: 1.1.2 Ensure all programmes contain flexible learning opportunities, and the effective use of libraries and open education resources (OER); 1.1.4 Evaluate the assessment for all learning outcomes at course and programme levels, to ensure learning outcomes are measured appropriately; 1.2.1 Expand continuing professional education to enhance teaching that supports excellence and innovation in all aspects of the delivery of education for our students;

Priority Area 5: Governance and Intelligent use of Resources
Objective 2: Provide an ICT platform for Digital Transformation to support world-class education, research and innovation and administration. 5.2.2 Provide digital opportunities to inspire students and staff to embrace innovation

Key Beneficiaries: Learners and teachers

Timeframe: 2021-2022

Total Cost Estimates: tbd (Based on the Initiatives identified)

Appendix 9　Reports on CFL & JICA Study Team Joint Workshop

(Draft)

Report on Joint Workshop for Near Future Development of Flexible Learning (FL) Offered by USP (Centre for Flexible Learning, USP & JICA Study Team) with focus on Online Learning

1. Background

   JICA has dispatched a Study Team to collect information on USP's distance learning system and communication network. There was an initial concept titled *USP Connect* shared by USP with JICA. In order to draw near future development of distance learning to be offered by USP based on the review of the *USP Connect*, mini workshop with CFL was organized.

   Programme for 1st Workshop

   1. Rapid Assessment of Current Situation of Distance learning System

   1.1 Original Concept as in USP Connect vs Current Operation identified by JICA Study

   1.2 Categories of Applications (etc.) by Functionality in terms of Distance Learning System

   2. Challenges and Issues (group)

   Group discussion by Functionality

   3. Solutions to the Raised Challenges and Issues

   Group discussion by Functionality

   4. Summary of Part I

2. Confirmation of Current Distance Education System with Focus on applications

   To be compiled into Final Report of the JICA Study

3. Discussion based on Current Situation

   Discussion is held for the purpose of identification of challenges and issues related. Active participation by all participants from CFL highlighted various challenges and issues. Moreover, the discussion indicated possible implications for further development of distance learning offered by USP, or CFL. The JICA Study Team compiled those out of the discussion into the SWOT analysis format below.

SWOT Analysis

	Promoting	Hindering
Internal	*Strengths* ✓ Having campuses in 12 countries with communication network for FL ✓ Having School of Education to engage in education research ✓ Having School of S&T to collaborate in FL system development ✓ SAS, CFL and ITS has accumulated user support experiences in given environment ✓ JICA implemented technical cooperation with ID development components (around 2010)	*Weaknesses* ✓ Communication network system is limited in both satellites and fiber cables for various factors ✓ Currently no FL (ID) research conducted by School of Education ✓ No institutional framework for involvement of School S&T in FL ✓ Learners support is not well organized in one stop service (confusing so easy to get lost and give up) ✓ Type of FL learning material is limited ✓ OER is not really in place nor well integrated between CFL and Library ✓ Mobile learning is not initiated ✓ CFL is not updated with the latest FL technology
External	*Opportunities* ✓ COVID 19 created demand for strengthening distance learning (highlighted in Strategic plan) ✓ Mobile phones are becoming affordable for students ✓ Optic Fibre cables are to be laid gradually across islands slowly though ✓ Satellite communication technology has advanced to cater better for those Islands having no optic fibre connection	*Threats* ✓ COVID 19 messed up learning not only F2F but others due to lecturers' working from home ✓ Facility for multi-media learning material development lost in fire accident (communication building) ✓ Possible digital divide caused by availability of optic fiber connections

4. Further SWOT Analysis

Compilation in the form of SWOT analysis was further analyzed by combination of Internal and External elements.

	Promoting	Hindering
Internal	*Strengths*	*Weaknesses*
External	*Opportunities*	*Threats*

	Strength	Weakness
Opportunities	**Opportunities x Strength** ✓ Activate research in FL in collaboration with schools with relevant expertise using already established communication network Regional Campuses/Centres ✓ Streamline student support services provided through own devices (smart phone)	**Opportunities x Weakness** ✓ Deliver FL using advanced technology in selected campuses connected with optic fibre for piloting advanced education and research purpose. ✓ Enhance FL through mobile devices (smart phone) by introducing material development technology learning
Threats	**Threats x Strength** ✓ Ease digital divide with ku band communication system which USP is equipped with physical and human resources.	**Threats x Weakness** ✓ Prepare for emergency such as pandemic prevalence and also natural disasters periodically attack pacific islands.

5. Way forward

Further discussion between CFL and JICA Study Team may be proposed to elaborate the future development in a form of an online workshop.

Programme for Joint Workshop for Near Future Development of Flexible Learning (FL) Offered by USP (Centre for Flexible Learning, USP & JICA Study Team) with focus on Online Learning

<u>Introduction: Thursday, 2nd December 2021, 14:00-17:00 (Venue: USP Library Conference Room)</u>

0. Opening (*No Protocols!, Get start working!*)
   Introduction of participants

1. Scope of Workshop
   Scope of Workshop is confined in Enhancement of Learning of USP Students with priorities with:
   i. Main Scope: Blended Mode & Online Mode Courses
   ii. Optional Scope: Print Mode Courses where relevant
   iii. Possible Scope in emergency(?): Face to Face Mode Courses

2. Objectives

2.1 To Share Understanding of Current Situation with Problems and Issues (Part I)

2.2 To Come Up with Provisional Proposal for Near Future Development of Flexible Learning (Part II)

<u>Workshop Part I: Thursday, 2nd December 2021, 14:00-17:00 (Venue: USP Library Conference Room)</u>

3. Rapid Assessment of Current Situation of Distance learning System (1 hr)

3.1 Original Concept as in **USP Connect** vs Current Operation identified by JICA Study

3.2 Categories of Applications (etc.) by Functionality in terms of Distance Learning System

4. Challenges and Issues (group, 0.5 hr)
   Group discussion by Functionality

5. Solutions to the Raised Challenges and Issues (group, 0.5 hr)
   Group discussion by Functionality

6. Summary of Part I (1 hr)

<u>Workshop Part II (tentative): xxxday, xx xxx 20xx, xx:xx-xx:xx (venue: *xxx*)</u>

7. Provisional Goals to be Achieved
8. Necessary and Sufficient Outputs to Achieve the Goals
9. Inputs and Activities with Timeframe for Outputs

(Draft)

Report on *CFL & JICA Study Team 2nd Joint Workshop*
for
Proposal for Strengthening Flexible Learning (FL) through Research at USP

1. Background

JICA has dispatched a Study Team to collect information on USP's distance learning system and communication network in November 2021. In order to draw near future development of distance learning to be offered by USP based on the review of the *USP Connect*, mini workshop with CFL was organized on Thursday, 2nd December 2021. Information gathered as results of the workshop were further analyzed by JICA Study Team which was presented in Report of the 1st Workshop herewith attached. In order to share the analysis, to present proposal for a project drafted by the JICA Study Team based on the analysis and then to exchange views on those analysis and proposal, 2nd workshop was organized on Wednesday, 26th January 2022 connecting Tokyo and Suva online.

<u>Programme for 2nd Workshop</u>

1. *Review of 1st Joint Workshop held on Thursday, 2nd of December 2021*
   Presentation of Report on 1st Joint Workshop by JICA Study Team
   - *Activities conducted following the programme of the WS*
   - *SWOT Analysis*
   - *Further SWOT Analysis*
2. *Provisional Proposal by JICA Study Team*
   - *Presentation by JICA Study Team*
3. *Consultative Session for Improvement of Joint Proposal*
   - *Corrections, additional information, possible foreseen obstacles, etc. from CFL*
   - *Responses and further inquiries from JICA Study Team*
4. *Way Forward*
   - *for JICA Study Team*
   - *for CFL*

2. Results and Outcomes

Following the presentation of report for 1st Workshop including SWOT analysis by the JICA Study Team (see attached Report for 1st Workshop with SWOT Analysis and further SWOT Analysis), Proposal for a new project is presented by the JICA Study Team (see attached presentation prepared with MS Powerpoint).

In the consultative session, a few observations were shared from CFL as summarized below.

<u>*Research in FL by CFL*</u>

JICA Study Team shared understanding of current CFL that is not mandated to be engaged in research. Academic staff given research in their portfolio would have sabbatical leaves but it did not seem to be applied. CFL shared there were sabbatical leaves given in 2000, but no more to date. It would tell the less priority for FL research by USP currently.

Themes for Research

Research on Instructional Systems may be conducted globally, but USP should consider more about actual context in the reality in the region. FL research will have to include target audiences which in our USP case includes the indigenous/small/remote peoples. Probably that is something for us at CFL to always emphasize and included in the IDs KPI.

Japan may have advantage in such viewpoints since it imported western system and adjusted those to local context but did not just enforce western system over already existing system considering that Japan as a nation has taken hundreds of years to have become what they were then when westerners arrived.

School of Education

External Review of CFL conducted in August 2020 made a recommendation about PGCTT (Postgraduate Certificate in Tertiary Teaching) that includes a course on online learning among other things (ED403: Innovations in Learning Technologies & Professional Practice). The recommendation states that the PGCTT be reviewed and re-designed to increase the teaching role of CFL and other relevant staff (i.e. Library) in the teaching of the course, subject to appropriate qualification levels being present in ii, Recommendation 11. During CFL retreat held in December 2021, the External Review was reviewed. The recommendation above was agreed by CFL staff in principle and to be reported to DVC (Education).

In view of the recommendation by the External Review, there were some observations shared about involvement of SoE in the proposed project such that the recommendation could suggest that education programme development in FL may better fit in CFL. However, CFL is not an academic section currently to award certificates/qualifications. It would need review and revision of status of CFL. A possible concern may be current academic profiles of CFL staff considering that USP requires postgraduate degrees for teaching staff in principle. JICA Study Team took notes of observations and expressed that it seemed it was internal matter in USP so that JICA would respect decision by USP management in this matter in principle when it comes to design details of the proposed project.

International Accreditation and Recognition

If FL Programmes are to be offered in future, international accreditation and recognition by well-recognized universities, association, accreditation bodies, etc. should be considered from the planning stage considering USP is recognized neither internationally nor regionally as FL education institutions. If Kumamoto University (KU) is going to be involved, it may be an option to offer programme recognized KU or even develop co-hosting FL Programme together. Another thought is that because Australian or NZ standards are common and valid in some cases in many of USP member countries, accreditation or recognition in line with those may be preference by people in the Pacific.

Possible foreseen obstacles

CFL appreciates and agrees with the proposal in principle, however, there could be possible foreseen obstacles. Since the proposal simply proposed to add a new mandate to CFL as focal point for research activities in FL, review of adequate staffing as well as portfolio including renumeration and benefits should be conducted.

I.e., CFL are given numerous of duties already, especially with COVID-19 forcing to convert more courses into online, it would be difficult to find time for research. And for current portfolios of CFL staff don’t stipulate research activities as regular duty, it needs to be reviewed and revised including their renumerations and benefits. For your reference, CFL and its staff are capable of conducting research and have been actually writing papers in project activities such as USP 50 years anniversary only a few years ago.

Another obstacle is facility. As known by stakeholders, CFL lost their facilities in the fire of Communication Building in 2018. It is obvious that USP needs to recover, actually not only recover but expand the lost facilities to realize the proposal. The JICA Study Team has proposed to JICA HQs of that facility development project as well recently, but feedback from JICA HQs is not yet received.

3. Way forward

Because CFL agrees with the proposal prepared by the JICA Study Team in principle with conditions that a few of foreseen obstacles need to be addressed as stated above, both parties take it as Joint Proposal from now on owned by two parties. Both parties have agreed that each should take needful actions in both sides, i.e., CFL shall report to DVC (Education) about the Workshop and the Proposal, and the JICA Study Team incorporate of the outcomes of the Workshop in the Final Report to JICA which shall be circulated with USP management within a few months.

4. Participants

The following were participants in the workshop. Please note that all participants agreed in the way forward stated above.

CFL (Centre for Flexible Learning), USP (University of South Pacific) (Suva, Fiji)

Dr. Rajni Chand, Director

Dr. Irene Yee Chief, Instructional Designer

Mr. Pita Tuisawau, Instructional Designer

Mr. Evan Naqiolevu, Learning Experience Designer

Mr. Mojito Jione, Learning Experience Designer

Mr. Mohammed Hussein, Learning Experience Designer

Mr. Nitendra Gounder, Education Technologist

Ms. Sarome Seeto, PA to Director

JICA Study Team (Tokyo, Japan)

Mr. Yosuke Ikeda

Mr. Kazuhiko Harikae

Mr. Sugashi Nagai

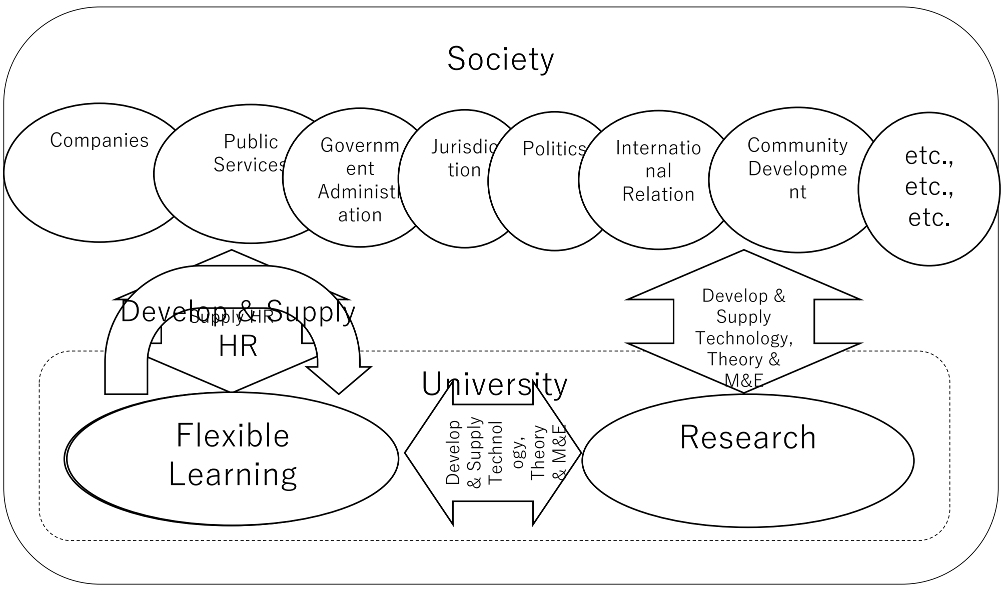
Mr. Takehiko Tanabe

Proposal

Project for Research Capacity Development of Flexible Learning at USP (Tentative)

JICA Study Team for Distance Education by University of South Pacific (January 2022)

1. Current & Future FL by USP



2. Mid&Long-term Perspective of FL by USP

Mid&Long-term Perspectives of Development of FL by USP: ***Establish Regional & International Recognition in FL Community as FL Education & Research Institution***

- Positive Spiral Circulation between Unique Education Practices & Research by USP in FL -

Mid&Long-term Goal of FL by USP is to become **a Leading Institution in FL Education & Research** by Fully Utilising **Unlimited Potential in High Demand and Varied Delivery Options of FL** as Unique Feature that Any Other Institutions in the World Can Not Have, due to Given Circumstance of USP Member Island Nations spreading over Pacific Ocean.

Eduction

Offer FL Programmes/Courses Responding to Education Demands from Island Nations with Remoteness & Smallness as their unique features

(should consider about those who can not study at Laucala nor reside in Fiji due to their social engagement, e.g. many study while working in public sector)

Research themes drawn from accumulated experiences of FL in given circumstances that vary from positive to negative and from new to old viewpoints

Apply and Extend Results of resarches conducted to offer better quality of FL

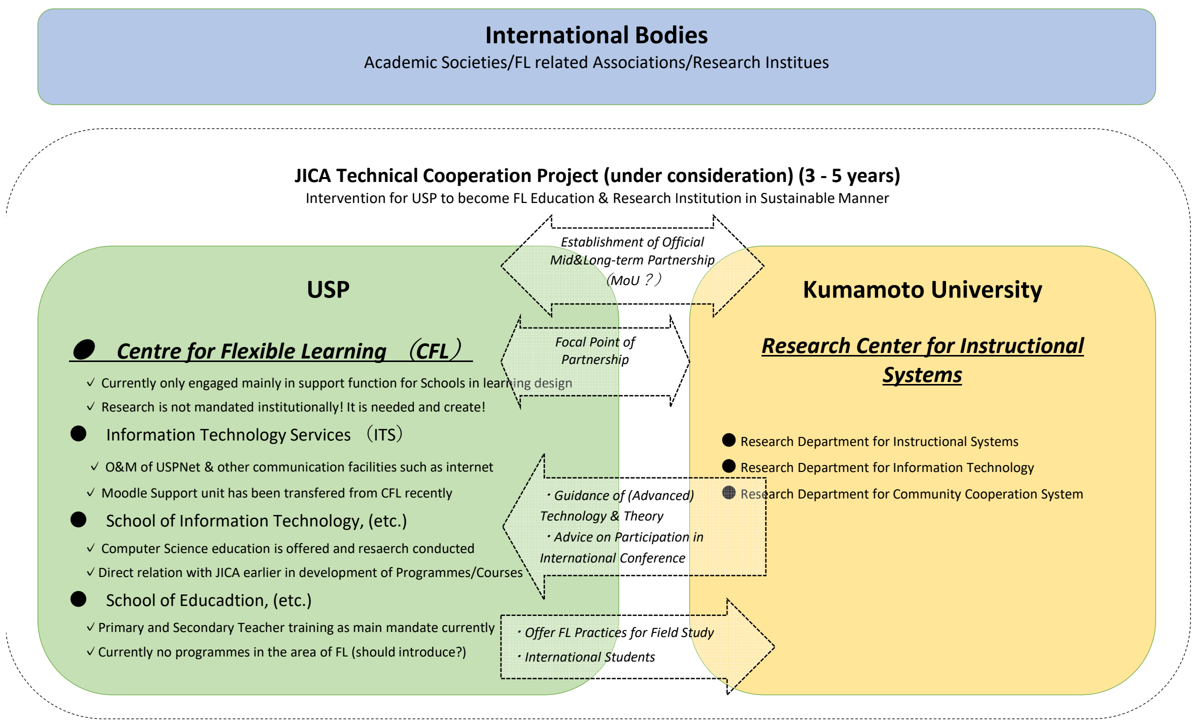
Research

Endeavour to engage in practical research on FL enabled by given circumstances with Remoteness & Smallness as their unique features

(should be aware that the circumstances are promoting factor but are also challenging because access to the latest FL theory/technology is not easy)

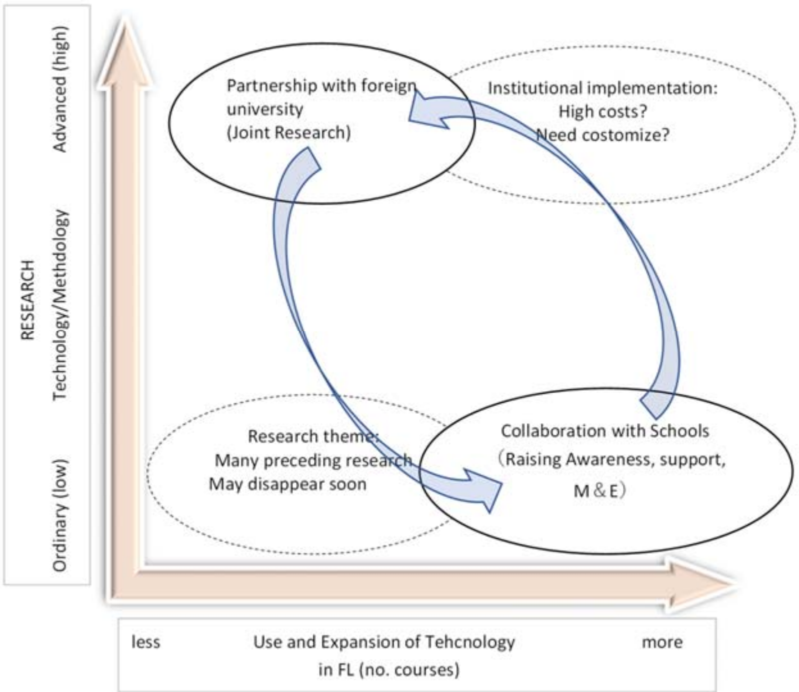
3. Stakeholders Mapping

Interrelation between Two Universities desired to be established by JICA Project Implementation



4. Strategy for Positive Spiral Circulation

Research for Education, Education for Research



5. Possibility of Succeeding Project

Project for **Research Capacity** Development in FL by USP

Project for HR Development in FL by USP

End

(Tentative) Programme for CFL & JICA Study Team 2nd Joint Workshop
for
Proposal for Strengthening Flexible Learning (FL) through Research at USP

Introduction: Wednesday, 26th January 2022, 13:00-16:00 (Venue: online basis)

0. Opening (*No Protocols!, Get start working!*)
   Introduction of participants

1. Objectives
   To Come Up Jointly with Proposal for Strengthening Flexible Learning through Research at USP

2nd Joint Workshop: Wednesday, 26th December 2021, 13:00-16:00

2. Session 1: Review of 1st Joint Workshop held on Thursday, 2nd of December 2021 (0.5 hr)
   Presentation of Report on 1st Joint Workshop by JICA Study Team
   - *Activities conducted following the programme of the WS*
   - *SWOT Analysis*
   - *Further SWOT Analysis*

3. Session 2: Provisional Proposal by JICA Study Team (0.5 hr)
   - *Presentation by JICA Study Team*

4. Session 3: Consultative Session for Improvement of Joint Proposal (1 hr)
   - *Corrections, additional information, possible foreseen obstacles, etc. from CFL*
   - *Responses and further inquiries from JICA Study Team*

5. Session 4: Way Forward (0.5 hr)
   - *for JICA Study Team*
   - *for CFL*

End of Programme for 2nd Workshop

Appendix 10 Field Report
(Potentiality of Applying Digital Technologies in Fiji)

Note: This report was made principally for the purpose of recording the field survey result as of December 2021, and was not submitted to the Government of Fiji.

DATA COLLECTION SURVEY
FOR
POTENTIALITY OF APPLYING DIGITAL TECHNOLGIES
IN FIJI

FIELD REPORT

December, 2021

JICA PROJECT TEAM
(Joint Venture of Yachiyo Engineering Co., Ltd.
and Koei Research & Consulting Inc.)

<u>**Table of Contents**</u>

1. Introduction

This Field Report is to establish mutual understandings among JICA Project Team (hereinafter referred to as “the Team”) for the application of digital technologies in Fiji, which is aligned with the Data Collection Survey for the Distance Learning System and Communication Network of the University of the South Pacific in the Pacific Region (hereinafter referred to as “the Survey”) and The University of the South Pacific (hereinafter referred as “USP”) and relevant organizations on the technical and engineering aspects for the distance learning system of USP. This has been also prepared by the Team based on the results of the field survey and discussions with the relevant organizations, entities, and individuals prominent in this theme.
The Team had been dispatched to Fiji and conducted the field survey in Fiji from November 16, 2021 to November 20, 2021. Through the filed survey, the Team collected the below-listed information:

(1) The current global landscape and positioning of Fiji in Digitalization
(2) Needs and issues relevant to Digitalization that are necessary to realize the possibility of support by JICA for it.

It is also noted that all the information as described in this report will be decided after further studies in Japan with JICA and the Team. JICA will submit the final report, which describes the proposals on future support for the applications of digital technologies for the public and private sectors in Fiji to the Government of Fiji in March 2022.

2. Overview

2-1 Digitalization in the world

The word “digitization” refers to is foundational shift connecting the physical and the virtual by applying evolving technologies including various applications of artificial intelligence, ICT (Information Communication technologies) or IoT (Internet of Things), which enables visualization, learning, monitoring, automation, and many other things. The digital transformation refers to a drastic transformation enabled by digitalization, which is applicable to both a private sector as well as a public sector. In the past decade, this wave of digital transformation is literally shifting ongoing practice to a new one in the both sectors in an overwhelming pace and manner, and changing the power balance of countries, companies and individuals. At the same time, the digitalization is bringing a further gap between those capable of digitalization and those incapable, which eventually leads to the gap of national competitiveness. From a public standpoint, the digitalization is an opportunity to review and transform the past legacy in government, industries, and national security, while this is a risk to be left behind by the other countries if failing to catch up with this new world norm. this is the landscape where we are Therefore, it would be worth considering the potentiality of digitalization for every country.

2-2 Digitalization in the Public Sector

As for Japan, the Digital Agency was established in 2021, contributes to reforming the culture of administration in a user-driven manner through digitalization. Society 5.0 was proposed in the 5th Science and Technology Basic Plan as a future society that Japan aspires to.

2-3 Digitalization in the Private Sector

Digitalization in a business context mainly means the process of applying digital technology to reinvent business models and transform a company's products and customer experiences, and that of innovating products that create new value and connecting people with things, insights and experiences. Newly appearing technologies are available, functional, quick, customizable, affordable and continue popping up. It has become essential part of corporate strategy to adopt these digital technologies for surviving in this so-called VUCA era. From the macro-economic standpoint, the level and penetration of digital technologies or digitalization are one of the key indicators linked to national economic competitiveness.

2-4 New Threats

Cyberthreats are growing in scale and complexity, and a rising number of these increasingly sophisticated attacks are globally being poured to both public and private sectors of every country. While Fiji has been developing cybersecurity infrastructure, the cyberattack in 2021 resulted in damages to some of public services, and it took a while to be fully restored. Then, Government of Fiji has been evolving the cybersecurity measures alongside new cybersecurity threats.

2-5 Unexpected Acceleration by Covid-19

Responses to the recent pandemic of Covid-19 has positive effects to speed the adoption of digital technologies by several years or even a decade, and many of them would remain for the long haul. According to the survey by McKinsey & Company, companies have accelerated the digitization of their businesses and internal operations as well. increased funding for digital initiatives than anything else—more than increases in costs, the number of people in technology roles.

3. Positioning of Fiji

3-1 Digitalization on the move

Like any other countries, digitalization is getting momentum in Fiji. That momentum is shown in the Government of Fiji the Fijian Government’s 5 year and 20-year National Development Plan, in which “Connectivity” is described as the prioritized issues to overcome.

3-2 Initiative by Ministry of Communication

Ministry of Communications is the regulating authority of digitalization for entire public functions.

3-3 Digital Government Transformation Programme

The Digital Government Transformation Programme in line with the Fijian Government's 5 year and 20-year National Development Plan which calls for the steady improvement of the quality and accessibility of government services.

3-4 digitalFIJI

digitalFIJI is a programme to implement a number of government applications, enhance the overall ICT infrastructure and build and develop capacity in digital transformation in the government. digitalFIJI is managed through the Digital Government Transformation Office to create better online services available, establish the necessary governance structure for the digital transformation and ensure the long-term and sustainable impact of the digital transformation programme in Fiji.

3-5 careFiji

careFIJI, a mobile application for tracking developed by the Government of Fiji to assist the Ministry of Health and Medical Services, is the representative and latest example of digitalization in Fiji. This application was launched to monitor and track the ongoing Covid-19 pandemic in Fiji. Most of shops, hotels, restaurants, and buildings have stickers with QR codes with which those in Fiji are required to submit their locations by reading through careFIJI. The mobile app is available on Google Play and the App Store, and has literally become part of routines in life.

3-6 M-PAiSA

M-PAiSA, a mobile application by Vodafone Fiji, is another success case representing digitalization in Fiji. M-PAiSA is an easy method of remote payment contact less payment, receiving and sending money remotely from different places around the country. This product became very popular and saw an exponential growth in the year 2021 with the closure of borders and restrictions of movement in Fiji. M-PAiSA was also used to distribute grants from the Government of Fiji to Fiji people in a smooth and quick manner during the time of pandemic.

4. Survey

4-1 Concept

In IMD World Digital Competitiveness Ranking, the digital competitiveness by nation is evaluated based on the three factors; Knowledge (Talent, Training & education, Scientific concentration), Technology (Regulatory framework, Capital, Technological framework) and Future readiness (Adaptive attitudes, Business agility, IT integration). It appears reasonable the potential support for digitalization in Fiji can be considered from these three factors.

4-2 Methodology

The Survey was done by either questionnaire or interviewing, or both.

4-3 Target in the Public sector

To capture the needs from the regulating or relevant organizations on digitalization, the questionnaires were distributed to the below-listed organizations through JICA Fiji Office. The answers were collected from those with an asterisk mark (*).

- Ministry of Communications *
- Ministry of Economy
- Ministry of Commerce, Trade, and Tourism
- Ministry of Education, Heritage and Arts
- Ministry of Fishery
- Ministry of Waterways and Environment *
- Ministry of Local Government
- Ministry of Employment, Productivity and Industrial Relations
- Ministry of Agriculture
- Digital Government Transformation Office *
- Department of Energy *
- Investment Fiji *

In parallel with the questionnaire, these interviews were conducted to the below-listed organizations.

- Ministry of Economy
- Ministry of Education, Heritage and Arts
- Ministry of Waterways and Environment
- Digital Government Transformation Office
- Department of Energy
- Investment Fiji

4-4 Other Targets

To capture the further needs, interviews were done to the following entities or individuals.

- Business person [Multiple]
- Entrepreneurs [Multiple]
- Academia / Researchers [Multiple]

5. Recognized Needs

5-1 Needs raised from the Public Sector

5-1-1 Capacity building on general digitalization [Multiple organizations]

While many of the respondents did not have plans or actions specifically on digitalization at of the Survey, each of these respondents expressed general but clear and strong interests in applying digital technologies into their own area of authority and/or internal operation. It appeared that these respondents knew abstract usefulness of digital technologies though, they did not have ideas with some degree of specificity or did not crunch the potentiality of digital technologies into practice. Accordingly, another common reaction was that they pointed out the lack or shortage of those with knowledge or expertise in digitalization. To install digitalization, the existence of those with such knowledge or expertise are the key factor indispensable. Therefore, capacity building including training sessions or events on digitalization for prospects who can lead installation and utilization at each organization is the area of interests.

5-1-2 Capacity building on cybersecurity [Multiple organizations]

There are explicit and implicit needs from every respondent on capacity building opportunities on cybersecurity. So far, the cybersecurity or digital securities of governmental agencies are oversighted by the Ministry of Communications though, the recent massive cyberattack became a turning point which makes them recognize the importance of individual awareness and readiness on cybersecurity. For solid cyber-resilient national system, not only those in the regulating ministries or position in-charge, but also each and every one of officials at government functions have to embrace certain degree of cybersecurity.

5-1-3 Capacity building for teachers [Ministry of Education, Heritage and Arts]

Specifically in education, there was explicit need of capacity building for teachers, especially for existing teachers. According to the Ministry of Education, Heritage and Arts, they are currently working on building new school curriculum which partially includes IT, with the support of the Government of Korea and international organizations. Separately, they are also working on the universities to nurture teacher trainees with IT capabilities who can bring IT as knowledge and utilize IT tools in teaching. The remaining piece untouched is existing teachers who will be in teaching for several decades, and they are mentioned as bottlenecks to bring digitalization into education of Fiji.

5-1-4 Energy management and optimization [Department of Energy]

The recent rise of oil price and its fluctuation are drawing public attention to efficiency and optimization of energy. According to Department of Energy, the energy management is one of the key areas on which they are currently working on. The recent versions of energy management system (HEMS, BEMS) are of their interests.

5-1-5 Attraction of those with digital technologies [Investment Fiji]

Fuji has been working to attract foreign direct investments, especially those industries which can pump up exports from Fuji and create local employments. Though there appeared to be specific plans which focuses on attracting digital technologies from the overseas, they showed clear and strong interests in having inflow of companies with digital technologies and investments into local startups on digital technologies.

5-2 Needs raised from the Private Sector

5-2-1 Provision of devices

Distribution of electronic devices such as smart tables is the need commonly raised by many respondents from the private sector. While the statistics shows high penetration of mobile devices over 100%, it was insisted that those in rural areas or financially challenged households have access to these devices.

5-2-2 Prevention of outflowing talents

The unstoppable outflow of young talents to adjacent advanced economies like Australia or New Zealand in the pursuit of better working conditions has been occurring from the past decades, which may be an indirect cause of shortage of young professionals and eventually a cause of limited competitiveness as a nation. As far as observed, there appeared to be a trend of IT talents moving out of Fiji once graduated from universities.

5-2-3 Incubation

Pursuit of incubation or business creation are not common career objective for fresh graduates or young professionals in Fiji compared with the other choice to go aboard for work. To nurture digitalization.

5-2-4 Business matching

Unsurprisingly, the need of business matching is commonly shown by most respondents including local startups.

5-2-5 Cybersecurity infrastructure

As one of the business infrastructures, the cybersecurity infrastructure is the one which attracted clear and strong interests from the business sector. In this digital area, most of businesses involve certain internet technologies and infrastructures, which also means the cybersecurity infrastructure is becoming more important in the recent decade. The recent cyberattack drew their attention to integrity of cybersecurity infrastructure of the nation, since this directly impacts their business.

6. Proposal of Further Surveys

Based on the above survey result, the following further surveys mainly for technical cooperation appear to be meaningful.

6-1 Capacity Building

6-1-1 Capacity-building for public officials

- Design training programs and provide to public officials in charge of digitalization at their own organization

6-1-2 Expert dispatch

- Dispatch experts to embed mechanism and culture of digitalization on certain organizations by sharing professional expertise and experiences

6-1-3 Capacity-building for Teachers (Education)

- Design training programs and provide to existing teachers about digitalization to embed digitalization in education

6-2 Cybersecurity

6-2-1 Functionality Assessment

- Assess how organizations, rules, and regulations work, interact and influence each other in accomplishing cybersecurity
- Extract effectiveness, readiness, vulnerability, and other factors for improvement

6-2-2 Capability Assessment

- Assess how those in charge of cybersecurity in regulating and relevant organizations are technically capable
- Extract their level of knowledge, practical readiness, and other factors for improvement

6-2-3 Capacity-building on Cybersecurity

- Design training programs and provide to those in charge of cybersecurity or candidates

6-3 Disaster Control in Climate change

6-3-1 Flood mitigation

- Protecting foreshore villages from climate change by designing and building flood control structures and climate resilient structures
- Provide more trainings on water engineering and water resource management
- Provide digital tools and equipment including software for technical purposes
- Install sensors for capturing climate data and integrating information to foresee and prevent
- Assure wide range of communication using digital tools

6-4 Incubation & Entrepreneurship support

6-4-1 Expert dispatch

- Dispatch experts to embed mechanism and culture for incubation or entrepreneurship on certain organizations by sharing professional expertise and experiences

6-4-2 Event organization

- Organize real/online events on digitalization for those variously from government, academia, and business sectors

6-5 Others

6-5-1 Smart city

6-5-2 Digital tourism

6-5-3 Detection & collection of marine debris

End