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STUDY PROTOCOL

# Indigenous knowledges, practices and resilience in Pacific university students before and during COVID-19 pandemic: protocol for an interdisciplinary and mixed methods

[version 1; peer review: 2 approved with reservations]

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## Abstract

These last decades, Pacific islands undergo major climatic transformations and a rapid socio-economic transition that impacted indigenous knowledges and practices in populations across

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generations. It is also important to identify actions and key points that can be used by the population to be resilient and to be adapted to the world of tomorrow. The COVID-19 pandemic has both reinforced vulnerabilities already present in the Pacific Islands but also revealed a resilience of the population through indigenous knowledges and practices to face this unprecedented situation that has affected the world's population. So, Indigenous Knowledges, Practices and Resilience in the Pacific Islands (SPAR-Pacific) project is an interdisciplinary research initiative that focuses on the indigenous knowledges and practices of Pacific Island populations in a context of high resilience (climate change, socio-economic transition and COVID-19 pandemic). The objectives of this project are to: 1- ensure the existence and activation of indigenous knowledges and practices among young university students from New Caledonia, Vanuatu, Fiji, Solomon Islands and Papua New Guinea; 2- assess the perceptions associated with these knowledges and practices, particularly in relation to intangible aspects among young people; 3- understand dynamics of development, expression, and transmission of indigenous knowledges after the COVID-19 pandemic in connection with the socio- economic and natural environment among these young people.

## Plain language summary

Pacific Island communities are experiencing significant challenges, including climate change, rapid socio-economic changes, and the COVID-19 pandemic. These disruptions have affected indigenous knowledge and practices, which are traditionally passed down through generations. However, the pandemic also revealed the resilience of Pacific Island populations, as they drew on this knowledge to adapt to unprecedented challenges.

The SPAR-Pacific project is a research initiative that explores the role of indigenous knowledge and practices in building resilience across Pacific Island communities. It focuses on young university students in New Caledonia, Vanuatu, Fiji, Solomon Islands, and Papua New Guinea to ensure this knowledge continues to thrive.

The project has three main goals:

Preservation and Activation: Ensure indigenous knowledge and practices are maintained and shared among younger generations.

Perceptions and Intangible Aspects: Understand how young people perceive this knowledge, especially its cultural and non-material importance.

Post-Pandemic Dynamics: Study how indigenous knowledge develops, is expressed, and is transmitted in the context of the COVID-19 pandemic and ongoing socio-economic and environmental changes.

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Any reports and responses or comments on the article can be found at the end of the article.

By focusing on youth, the project highlights the importance of preserving indigenous wisdom to address present and future challenges. Indigenous practices are key to fostering resilience, helping communities adapt to changing environments, and preparing for the uncertainties of tomorrow.

SPAR-Pacific demonstrates how traditional knowledge remains a vital resource for Pacific Island populations in navigating a rapidly changing world.

**Keywords**
kinship, family, tradition, sustainability, vulnerability, transmission, perception, Oceania



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This article is included in the Family Farming, Lifestyle and Health in Small Islands, Countries and Territories collection.

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## Introduction

The Pacific region includes 25 Pacific Island Countries and Territories (PICTs) generally grouped into three geographical and cultural zones: (i) Micronesia which includes the Northern Mariana Islands, the Federated States of Micronesia, Guam, Kiribati, Nauru, Palau and the Marshall Islands; (ii) Melanesia, which covers the region encompassing Papua New Guinea, the Solomon Islands, Vanuatu, New Caledonia and Fiji ; (iii) Polynesia, which includes Samoa, American Samoa, Tonga, Wallis and Futuna, Tuvalu, Tokelau, Niue, Cook Islands, French Polynesia, Hawai'i, New Zealand, Pitcairn and Rapanui (Figure 1). Among them, there are different political statuses, ranging from sovereign states to associated states and non-self-governing territories (Niessen *et al*., 2018). In addition, as a result of immigration flows, the inhabitants of the PICTs have formed large diasporic communities in the developed Pacific rim countries (Voigt-Graf, 2023). In 2016, the Pacific region had an estimated population of 41 million inhabitants (17 million excluding Australia) of which around 12.5 million (11.6 million excluding Australia) considered themselves to be wholly or partially Oceanians of non-European and non-Asian descent (ONENA) (Tarantola *et al*., 2019). The Pacific population is young and growth projections predict approximatively 57 million people by 2050 (Desa, 2017) with large discrepancy between countries (*World Population Dashboard -Pacific-SRO | United Nations Population Fund*, s. d.) and/or the consequences of climate change (Oakes *et al*., 2017).

Observing resilience to diverse vulnerabilities such as socio-economic transition and climate change requires a better understanding of how human adaptation is sustainable. While historically, the settlement of colonial societies in the Pacific islands has shaped part of their present model of action, the recent COVID-19 crisis has exposed the flaws in this model, prompting populations and researchers to rethink it. This work on resilience has rekindled a collective interest in indigenous knowledges and practices in Oceanian societies, particularly among young adults, especially as social transformations have distanced young people from their traditions. This is particularly true during their academic studies, when students are living in urban areas. Indigenous knowledge is *"culture- and context-specific; non-formal knowledge; orally transmitted, and generally not documented; dynamic and adaptive; holistic in nature; [and] closely related to survival and subsistence for many people worldwide"* (*Best practices using indigenous knowledge - UNESCO Bibliothèque Numérique*, s. d.). *Indigenous knowledge is described as "the local knowledge that is unique to a given culture or society … the basis for agriculture, health care, food preparation, education, environmental conservation, and a host of other activities"* (*Indigenous Knowledge - an overview | ScienceDirect Topics*, s. d.), which could play a major role in shaping a new form of resilience for the people of Oceania particularly the younger generations, and could pave the way for a rethinking of societal models. With this in mind, SPAR-Pacific[1] is an interdisciplinary research project (presented in Figure 1) aligned with the region's Sustainable Development Goals (focusing on health, natural capital, and societal change) and is part of a larger international project called: "Family Farming Lifestyle and Health in the Pacific, FALAH"[2] (Fotsing & Galy, 2019), funded by European Union H2020-RISE. To answer these questions, the team built an interdisciplinary database using an integrative methodological scheme comprising tools and methods shared across the social sciences, considering the social, spatial and temporal dimensions of knowledges and practices. The description of the conceptual framework is presented in Figure 2. We will also address the following main research questions in subsequent publications from each partner-country where the protocol has been disseminated and between countries for comparative analysis:

*What is the proportion of university students who claim to be custodians (guardians) of indigenous knowledges?

*What indigenous knowledges and practices related to hunting, fishing, gathering, cultivating fields or gardens, raising animals for food, preparing and preserving food, managing diseases and injury, interpreting phenomena, creating clothing, building shelters, making traditional tools and instruments, orienting and traveling, understanding language, speaking a vernacular language, were activated before and during the COVID-19 pandemic among young university students?

*What indigenous knowledges and practices were involved in their lifestyle during the COVID-19 pandemic, particularly in terms of diet (food preparation, preservation and consumption) and physical activity (gardening, gathering, hunting, fishing)?

*What indigenous linguistic knowledges and practices were used in the homes of these university students?

* What is the students' knowledges and perception of their country's legislation in general, and in particular, of how indigenous knowledges is taken into account in their country's legal system?

* How do university students balance their indigenous knowledges with wider information and channels such as social media, television, newspapers, public places, etc.?

* How do university students perceive the place of ethnic identity, its affirmation, belonging and the sense of commitment to an ethnic group?

We analysed these questions by crossing variables such as gender, income, ethnicity, but also the country and/or social dimensions (practices with family, friends), spatial (according to their place of residence: rural, tribal or urban area before and during the pandemic) and temporal (such as whether practices during the two years of the pandemic were reactivated or not) of these indigenous knowledges and practices. Sub-questions will emerge from the first analysis and will be considered for further potential publications.

We have linked the aspects addressed to the fields of education, health and environment of young adults in universities. In this article, we present the quantitative and qualitative tools co-constructed within an interdisciplinary research team, which today enable us to measure the existence, activation and perception of traditional knowledge and practices among university students before and during the COVID-19 pandemic.

[1] SPAR-Pacific is for the label "*Savoirs, Pratiques Autochtones et Resilience dans le Pacifique*". It has been funded by the special call for research projects in Human and Social Sciences from the Pacific Islands Universities Research Network (2020–2023).

[2] See the websites: https://cordis.europa.eu/project/id/873185/fr or https://falah.unc.nc/fr

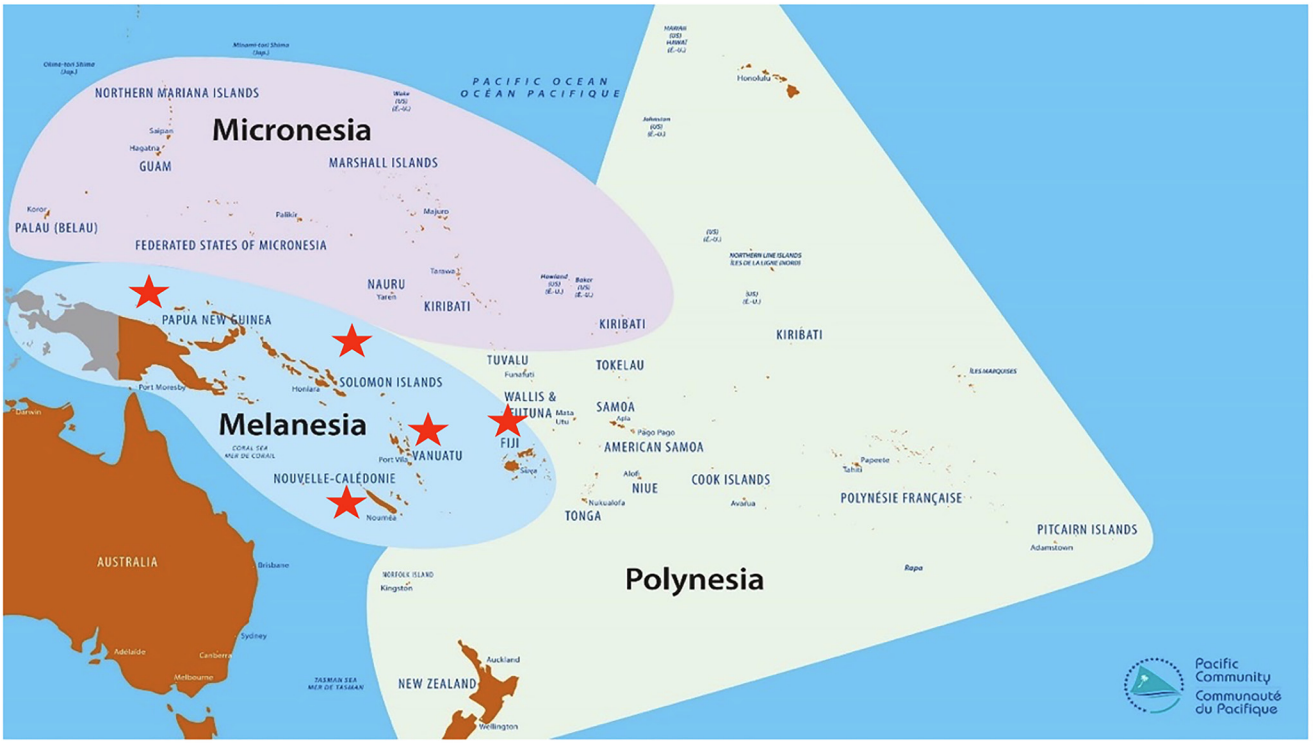


**Figure 1. Melanesian countries where SPAR-Pacific project is deployed.** Figure reproduced with permission from Bertrand-Protat *et al.*, 2023.

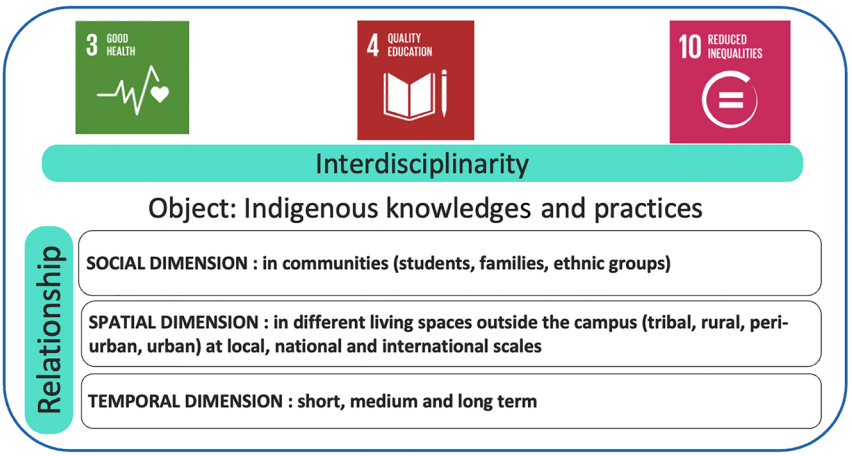


**Figure 2. SPAR-Pacific conceptual framework for indigenous knowledges and practices in students and their social, spatial and temporal interactions in relation with SDGs N°3, 4 and 10.**

## Protocol

This research was carried out at various sites in the Pacific region where universities are present. The sites shown in Figure 1 are as follows: University of New Caledonia, National University of Vanuatu, The University of the South Pacific (Fiji), The Solomon Islands National University, and The University of Goroka (Papua New Guinea).

The SPAR-Pacific project uses a variety of methods including both a quantitative approach (questionnaire in appendix 1)

and a qualitative approach (interview in appendix 2) to provide a multi-layered analysis of the research questions. This project has been developed according to the ObsQual checklist (Low *et al.*, 2024) that ensure international requirements provide by EQUATOR network. The interdisciplinary team built this theoretical framework for its unifying capacities, across disciplinary boundaries and traditions. Indeed, contributions come from a variety of scientific disciplines such as linguistics, sociology, anthropology, geography, communication and information sciences, nutrition and exercise sciences, health sciences, agriculture, law and education.

To address potential selection bias, the survey was made accessible in each faculty/department and interviewers presented it in a seemingly random fashion to students. The team carefully controlled the balance regarding the level of students involved, from first-year university to doctorate level. For the qualitative component, equal proportions of men and women were selected to avoid gender bias.

Prior to the survey, a collective and accepted definition of what constitutes indigenous knowledges and practices was established to ensure consistency in understanding across participants and researchers: "*Indigenous knowledges and practices constitute: a body of knowledge shared by a human group, which is transmitted and transformed in relation to the ecology of that group. This knowledge covers languages, literatures, arts, crafts, rituals, games, gastronomies, medicines, natural resources management (fauna, flora, soils, water), architectures, artefacts, orientation in space, etc. They are both a way of seeing the world and a way of living it.*" This preliminary consideration aligned with the literature (*Best practices using indigenous knowledge - UNESCO Bibliothèque Numérique*, s. d.) (*Indigenous Knowledge - an overview | ScienceDirect Topics*, s. d.)

The questionnaire consists of 71 questions, covering 7 pillars (Figure 3) including:

1) indigenous knowledges and practices concerning hunting, fishing, gathering, cultivating the field or garden, raising animals for food, preparing food, preserving food, managing illness and injury, interpreting phenomena, creating clothing, making traditional tools, building shelters, making instruments, orienting and moving, understanding a language, speaking an indigenous or local language;

2) indigenous knowledges, practices and their perception before and during the COVID-19 pandemic. This part included the social (practices with family, friends), spatial (place of living:

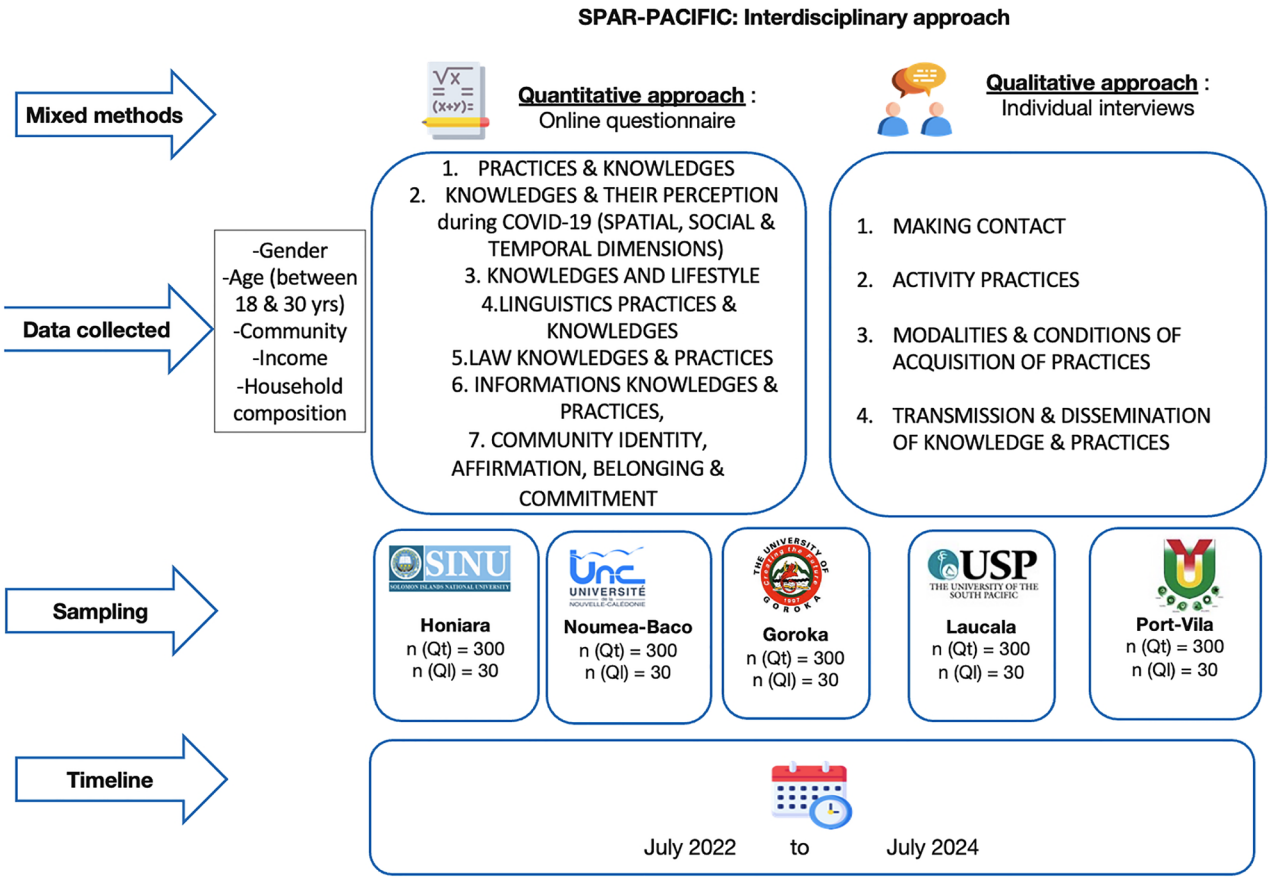


**Figure 3. SPAR Pacific protocol including mixed methods, data collected, estimated sampling and timeline for the 5 universities (New Caledonia, Vanuatu, Fiji, Papua New Guinea and Solomon Islands).**

rural, tribal or urban area before and during the pandemic) and temporal (reactivation of practices during the 2 years of pandemic or not) dimensions of these indigenous knowledges and practices;

3) indigenous knowledges and practices involved in lifestyle during the COVID-19 pandemic especially for food (food preparation, conservation and consumption) and physical activity (gardening, gathering, hunting, fishing);

4) indigenous practices and knowledges concerning linguistics in the household;

5) indigenous knowledges and perception on law in general and on indigenous knowledges in laws of the country;

6) indigenous knowledges in information channels (social medias, TV, paper news, public places, etc.) and their perceptions and practices;

7) Ethnic identity, affirmation, belonging and commitment to its ethnic group (Phinney, 1996).

Next, individual information is requested such as: gender, age, ethnicity, income and household composition.

For the quantitative phase, teams of two interviewers carried out the questionnaire on campus, firstly by meeting students face-to-face, but also via social networks in the case of online course students. The questionnaires are in digital form (Google form and Redcap) and can be completed on tablets, computers or smartphones by students. On average, it took them about twenty minutes to complete this digital form. Originally in French for New Caledonia students and French-speaking ni-Vanuatu students. An English version became available for students in Fiji, Solomon Islands, and Papua New Guinea as well as English-speaking ni-Vanuatu. The team tested each country's version before deployment and minor adaptations were made by local researchers, ensuring the questions were sufficiently contextualized and culturally relevant. Participants were all students of one of the selected universities and between the ages of 18 and 30.

In each university, over 300 students were expected to take part in the quantitative study and 30 in the qualitative part of the project. These figures represent between 3 to 10 % of the student population at each university, and are therefore large enough to be representative. The voluntary participants encountered no particular difficulties in completing the questionnaire.

For the qualitative approach, participants were pre-selected after taking part in the survey. In the final question, participants were given the following choice: "*This involves a 45-minute discussion with a researcher. Would you be willing to be contacted for this additional part? If so, please enter your telephone number or e-mail address here*." Among the volunteers, this question resulted in 30 participants for each country. Students for the interviews were selected on the basis of the following criteria: they are custodians of indigenous knowledges and practices, and they practice "traditional" activities regularly or very often. Equal proportions of men and women were observed. Local practices such as hunting, fishing, gathering and cultivating the field or garden were chosen because the results of the questionnaire showed that these were the most frequent practices among the student population. Individual face-to-face interviews were recorded using a phone recorder and lasted between 45 and 90 minutes. Questions focused on the conditions and reasons for these practices, the techniques employed, and the ways in which these activities are transmitted and shared. This enabled us to select 30 different students from universities in each country (total potential participants: 150). Calls and the first visit were made by a member of the research team native from the respective country. It was decided to conduct the interviews in a semi-directive format, covering all points of the research.

## Experimentation period

The protocol was developed during the global COVID-19 pandemic when the various border closures and re-openings in Pacific countries and territories were subject to government regulations. The specific dates for re-opening borders were different: New Caledonia (13/12/2021), Fiji (01/07/2022), Papua New Guinea (01/07/2022), Vanuatu (01/08/2022) and the Solomon Islands (12/09/2022). The SPAR-Pacific trial period necessarily included the 24 months following the national reopening of the borders of each country and territory.

## Data analysis and statistical design

As far as data analysis is concerned, we will assess the relevance of the proposed factor models on the full sample of participants in the quantitative part of the project. The database was aggregated across countries into a single file. The next step will consist in cleaning the dataset. The data collected will be available in Excel format via Google Form, and will be broken down as follows: Fiji: 423 (26%); New Caledonia: 541 (497 urban Campus and 44 rural Campus - 33%); Solomon Islands: 328 (20%); Vanuatu: 323 (199 French NUV and 124 English NUV - 20%). Each dataset contains more than 70 variables whose names correspond to the question wording. As the questions and answers are in English and French, we had to translate the French datasets and homogenize answers and variable names between the different datasets in order to merge them. As the answers to the multiple-choice questions were all contained in the same variable, and separated by a comma, we also had to transform each of these answers into binary variables in order to be able to process them. From a statistical point of view, all these data and recorded steps were carried out on R using the diverse package. This resulted in a dataset of 1,615 rows for 132 columns. Comparisons of results between students and between countries will be made using Pearson's chi-square test and Fisher's exact test. Additional analyses will be carried out, according to specific research questions. Regarding qualitative data analysis, they will be aggregated in a unique file, then cleaned and paper and electronic interviews will be stored digitally.

Data will only be accessible to researchers involved in the SPAR-Pacific and FALAH project. The data will be stored on a secure server but they will not be accessible to the public due to legal and ethical restrictions. During the publication

process, anonymous data used to write the articles will be deposited in a reliable repository (Zenodo: EU Open Research Repository). This repository includes the function of providing a Digital Object Identifier (DOI). After the ten-year-embargo-period, all anonymized data will be freely accessible in a trusted repository and archive. Private data will be "locally findable" for researchers according to their needs within this community: https://zenodo.org/communities/falah/records?q=&l=list&p=1&s=10&sort=newest. During the publication process, we will use services that provide a permanent identifier, preferably a DOI.

## Study status

At the time of the first submission of this protocol article, the baseline evaluation had been completed and follow-up data collection for the quantitative approach was nearing completion. Due to technical constraints, the survey was carried out using Google forms. With regard to the qualitative approach of the project, interviews have been completed in New Caledonia and Vanuatu and are underway in other countries.

## Ethics statement

This SPAR-Pacific study was a part of the European project *Family Farming, Lifestyle and Health in the Pacific* (FALAH) (n° 873185) (https://hal.science/hal-03150691/). As such, ethical approval for the FALAH project, including areas of research in New Caledonia, Vanuatu, Fiji and the Solomon Islands was obtained from the "Consultative Ethics Comity for New Caledonia" (CCE 2018-06 001 and CCE 2023-10 012). The SPAR project and the protocol were approved by the "Consultative Ethics Comity for New Caledonia" (CCE 2018-06 01). The proposed research met the legal requirements and the Declaration of Helsinki, and the protocol. (*WMA - The World Medical Association-WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Participants*, s. d.) This study was conducted in accordance with the requirements of the Declaration of Helsinki. In a context of global emphasis on indigenous knowledges and practices, we underline the major risk for these to be instrumentalized. Our ethical reflection was thus guided by a desire not to be intrusive in terms of approach. Our research focuses above all on the mechanisms by which indigenous knowledges and practices are made and unmade, rather than on their substance.

## Consent or assent

Study participants were required to provide written informed consent prior to participation in the first page of the online survey and before interview. A consent statement was presented at the start of the initial online survey, allowing participants to choose between "I consent to participate in this study" and "I do not consent to participate in this study." Those who chose the latter option were automatically redirected to a closing page. The declaration of consent ensured that the participants were properly informed about the purpose of the study, procedures, potential risks and benefits, data confidentiality and their rights as study participants, including the right to withdraw from the study at any time without any consequences.

## Data access

Access to data is restricted to the core research team. External requests for access to anonymized data will be considered after completion of the study and subsequent primary publications. Requests must comply with data protection regulations and the aims and methods of the proposed research must be scientifically and ethically sound.

## Plans for disseminating results

The results of this project will be disseminated as part of the Family Farming Lifestyle and Health in the Pacific project which is an EU RISE H2020 scientific program. Team colleagues involved in this multidisciplinary project will have the opportunity to disseminate their results at workshops, conferences and with the support of a dedicated Open Research Europe collection[3].

## Conclusions/Discussion

In the Pacific region, indigenous knowledges and practices are mostly transmitted within families. The students who are the repositories of knowledges are overwhelmingly non-European and non-Asian Oceanians. This unique approach offers interactions between the social, spatial and temporal dimensions of the following 7 pillars: indigenous practices and knowledges, their perceptions before and during the COVID-19 pandemic; lifestyle; linguistic; law; information and ethnic identity, affirmation, belonging and engagement. This interdisciplinary approach aims to gather accurate information on the Pacific region, where countries are undergoing rapid socio-economic transitions. Moreover, when students leave the family circle for university campuses, indigenous practices are supposed to be less active. Consequently, the geographical aspects (spatial dimension), socio-economic contexts (social dimension) and duration (temporal dimension) of time spent on campus may have an impact on indigenous practices. The COVID-19 pandemic has dramatically increased vulnerabilities and potentially highlighted the need for young people to access their indigenous knowledges and practices. Important variables such as age, gender, ethnicity, household composition, and income will also have had an impact, enabling us to refine our understanding of the role of each research pillar. Finally, this project proposes unprecedented collective, interdisciplinary and international social sciences research focusing on indigenous knowledges and practices dedicated to Oceania. SPAR-Pacific project is also open to:

1) the possibility of creating and supporting a network at both regional and international levels, with the Pacific Island University Regional Network (*Home*, s. d.) and the FALAH project (*Accueil | FALAH*, s. d.) including members of research team

2) the ability to bring a comparative dimension to indigenous knowledges and practices and the way they are perceived and maintained in different island territories of the South-West Pacific.

[3] See : https://open-research-europe.ec.europa.eu/collections/family-farming-lifestyle-health/about

3) the ambition to build interdisciplinarity in social sciences at the interfaces of education, environment and health, with a particular focus on the Pacific Islands.

4) mixed methods, tools and measures which could be then adapted and applied to contexts other than universities, such as families, communities, schools, *kastoms*, etc., thus enabling better understanding, awareness and inclusion of "indigenous knowledges and practices" by the scientific community, societies and stakeholders for a better future.

## Ethics and consent

This SPAR-Pacific study was a part of the European project *Family Farming, Lifestyle and Health in the Pacific* (FALAH) (n° 873185) (https://hal.science/hal-03150691/). As such, ethical approval for the FALAH project, including areas of research in New Caledonia, Vanuatu, Fiji and the Solomon Islands was obtained from the "Consultative Ethics Comity for New Caledonia" (CCE 2018-06 001 and CCE 2023-10 012). The SPAR project and the protocol were approved by the "Consultative Ethics Comity for New Caledonia" (CCE 2018-06 01). The proposed research met the legal requirements and the Declaration of Helsinki, and the protocol. (*WMA - The World Medical Association-WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Participants*, s. d.). This study was conducted in accordance with the requirements of the Declaration of Helsinki. In a context of global emphasis on indigenous knowledge and practices, we underline the major risk for these to be instrumentalized. Our ethical reflection was thus guided by a desire not to be intrusive in terms of approach. Our research focuses above all on the mechanisms by which indigenous knowledges and practices are made and unmade, rather than on their substance.

## Data availability

### Underlying data

No data are associated with this article

Zenodo : « Savoirs, pratiques autochtones et résilience dans les îles du Pacifique (SPAR) questionnaire" , https://doi.org/10.5281/zenodo.14842013 (Galy *et al.,* 2025)

This document content french and English version of the questionnaire (71 questions)

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

### Acknowledgements

We would like to thank the students, colleagues and departments of each university who facilitated this research during the course of the academic year.

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# Open Peer Review

## Current Peer Review Status: ? ?

**Version 1**

Reviewer Report 11 February 2026

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**Karabo Justice Chuene**
University of Limpopo, Polokwane, South Africa

I would like to sincerely commend the authors for their valuable work exploring Indigenous knowledge, practices, and resilience among university students in the Pacific Islands, addressing a timely and important topic with an interdisciplinary approach. The use of a mixed- methods approach, along with its multi-country scope, demonstrates careful planning and has the potential to generate meaningful insights. However, I would like to raise few minor issues that I believe if addressed, they will strengthen this study protocol.

**1. Abstract**
The abstract provides a clear description of the study's overall goal and emphasises the importance of Indigenous knowledges, practices, and resilience among Pacific University students. It emphasises the study's interdisciplinary aspect and discusses the mixed-methods approach. While the abstract effectively conveys the significance of the topic, the aims and major research questions might be more explicitly articulated to avoid ambiguity. Some terminology, such as activation, custodianship, and perception, are introduced but not explained, thus reducing understanding for readers unfamiliar with these ideas. Furthermore, giving a brief overview of the procedures and predicted outcomes would improve the abstract and provide a fuller picture of the work.
**2. Introduction**
The introduction provides a full contextual information on Pacific Island populations, demographic patterns, and the importance of Indigenous knowledge in tackling socioeconomic and environmental issues. The motivation for focusing on university students is clearly stated, emphasising their unique role as both stewards and prospective transmitters of Indigenous customs. While the introduction offers a compelling justification, the objectives may be simplified and prioritised to avoid overlap and improve conceptual clarity. Furthermore, crucial concepts should be established and operationalised, including the distinctions between being a custodian of Indigenous knowledge and activating it. The introduction also touches on geographical diversity, but it would be useful to specifically state how these differences will be accounted for in the study design and analysis to guarantee clarity and relevance.

**3. Protocol and Methodology**
The study design is appropriate for the research issues, with quantitative and qualitative approaches used to provide both breadth and depth. Ethical concerns are adequately addressed, with informed consent procedures and approvals fully documented. The involvement of five universities from several Pacific Island countries exemplifies excellent teamwork and regional relevance. In terms of quantitative approach, the sample procedure is explained, but more information about randomisation and representativeness is required. To ensure repeatability, the procedure of converting multiple-choice responses into analysable variables should be more thoroughly documented, and cross-country comparisons would benefit from elaboration on how language and cultural variations are addressed. In the qualitative technique, the interview strategy and participant selection are acceptable, focusing on students who are stewards of Indigenous knowledge. However, the plan for data coding and analysis requires more detail, including the analytical framework, thematic analysis process, and how contextual variations across countries will be captured. Finally, while the questionnaire is available through Zenodo, the actual datasets are not yet publicly accessible. Providing additional information on how the data will be documented, including codebooks and variable dictionaries, will enhance usability when the datasets are eventually made available.

**4. Overall evaluation**
In conclusion, the SPAR-Pacific study represents a valuable interdisciplinary initiative with strong ethical considerations and regional significance. Addressing the clarity of objectives and key concepts, strengthening methodological details to ensure replicability, and clarifying data accessibility and documentation plans will significantly enhance the scientific rigor and constructiveness of the protocol. Once these aspects are addressed, the study protocol will provide a robust and meaningful contribution to the understanding of Indigenous knowledge and practices among university students in the Pacific region.

**References**
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**Is the rationale for, and objectives of, the study clearly described?**
Partly

**Is the study design appropriate for the research question?**
Partly

**Are sufficient details of the methods provided to allow replication by others?**
Partly

**Are the datasets clearly presented in a useable and accessible format?**
Partly

***Competing Interests:*** No competing interests were disclosed.

***Reviewer Expertise:*** Indigenous knowledge in Science Education; Nature of Science; Classroom Pedagogies

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**

Reviewer Report 29 August 2025

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**Robby Zidny**
Chemistry Education, Universitas Sultan Ageng Tirtayasa, Banten, Indonesia

First of all, I would like to appreciate the author's contribution for the study about Indigenous knowledge and practice among university students in higher education. However, there are some aspects that need to be improved to make this study protocol more constructive. The following are some aspects that must be improved in each sections:

1. Abstract

The abstract could be more informative by include some aspects of research methods, research instruments, participants, and general results of the study

1. Introduction
2. In the introduction, the author extensively links the importance of indigenous knowledge to the goals of sustainable development. However, the discussion on how this knowledge is significant enough for university students to know is very lack. What are its future impacts and potential benefits for the students?

3. Protocol and Methodology

- In the protocol section, were the Indigenous elders/ stakeholders involved in this research? If so, where should they be mentioned in the research protocol? This should be done as a respect for them.
- In the research method used, I haven't seen any data triangulation. Is this research based purely on interview data? Data triangulation should have been conducted using both literature reviews and primary sources from Indigenous Elders/ stakeholders familiar with Indigenous knowledge.
- Is the data reliability guaranteed in processing qualitative interview data? How did the researcher ensure data reliability? Was an interrater reliability analysis performed on the interview results? If so, it should be explained in the methods section.
- During the interviews, I didn't find detailed data on the local philosophical and cultural aspects of the Indigenous knowledge held by local residents and students. These philosophical and cultural aspects are important for teaching the moral and ethical values behind indigenous knowledge.

- Indigenous knowledge is generally passed down orally from generation to generation, perhaps the protocol should also ask how this knowledge can be transmitted between generations.

**Is the rationale for, and objectives of, the study clearly described?**
Yes

**Is the study design appropriate for the research question?**
Yes

**Are sufficient details of the methods provided to allow replication by others?**
Partly

**Are the datasets clearly presented in a useable and accessible format?**
Partly

***Competing Interests:*** No competing interests were disclosed.

***Reviewer Expertise:*** Indigenous Knowledge in Science Education

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**