University students' perceptions of climate change: the case study of the University of the South Pacific-Fiji Islands

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Abstract

Purpose – Higher education plays a vital role in educating citizens about climate change and promoting pro-environment behavior. Based on this statement, this study aims to analyze and evaluate students' perception of climate change at the University of the South Pacific in Fiji. The study aims to understand the main ideas and concepts of climate change by analyzing information habits and individual opinions on the causes of climate change as perceived by the students of two student organizations aimed at environmental protection.

Design/methodology/approach – A qualitative approach was used to gather data on students' perceptions and information habits toward climate change. The data were collected through a questionnaire to characterize students from the socio-demography and their perceptions, information habits and knowledge relating to climate change. This paper uses the case study method to examine students' climate change perceptions at two different student organizations at the same university. The research study involved a focus group technique. Two focus groups at the University of the South Pacific were administered. The focus groups' selection in this study took into account the aims and objectives of the students' organization toward climate change awareness, adaptation, mitigation and environment protection.

Findings – The focus groups participants believe that climate change is a serious problem in the South Pacific region. Results suggest significant differences in climate change perception at the two students' organizations chosen for this study. Students at the Econesian society nicknamed climate change as a nuclear weapon for the South Pacific responsible for changes in the habitat, coral bleaching, lifestyle changes, mother of all other environmental problems and the introduction of invasive species into Fiji. Students at Wantok Moana-related climate change to drastic weather changes, lack of fish feed and additional toxins in the sea. The results also showed that students at the Econesian society have a better understanding of climate change than the students of Wantok Moana.

Practical implications – This paper provides an insight into how students of Small Islands Developing States view climate change and the factors affecting their opinions. It also shows how climate change perception varies within the same university. This implies the need to integrate climate change into the higher education curriculum and more research on this topic.

Originality/value – This paper is the first to compare and contrast university students' climate change perception in Fiji. The results make an essential contribution to the extant climate change literature by identifying and categorizing climate change perception and the factors that shape students' perception of climate change from the university students' perspective in Fiji.

Keywords Climate change, Perception, Mitigation, Nuclear weapon, Marine ecosystem

Paper type Research paper

1. Introduction
Climate change is disastrous to the world. The landscape and flora and fauna in it, are all primarily determined by climate acting over long time intervals (Pittock, 2009). Climate change is a multidimensional global hazard that poses many happenstances for people worldwide (Swim *et al.*, 2011). The public sees this as the risks that require precarious consideration vary greatly (Kim and Wolinsky-Nahmias, 2014). Climate change has been defined by Weber (2010) as a systematic change in average conditions over time. This change is tough to detect and see without numerical measurements, making it difficult for cynics to believe that climate change is happening (Weber, 2010). Although climate change can occur in several parts of the world, various effects can damage several biomes (Brody *et al.*, 2008; Leiserowitz, 2005). Climate change is not a new occurrence; as early as 1827, Fourier noted an increase in the level of atmospheric carbon dioxide and the effects of greenhouse gases (GHGs) (Leiserowitz, 2007).

Climate change is projected to have considerable impacts on small island states, menacing some islands' very presence as they are exposed to sea level rise, increased flooding, coastal erosion and changes in habitats (IPCC, 2014). Occupants of small island developing states (SIDS) are predominantly vulnerable to loss of livelihoods, forced migration and food insecurity due to climate change (Turvey, 2007). SIDS are overly exposed to the impact of climate change (Stephenson *et al.*, 2014; IPCC, 2007). Such exposure is related to their "small size, insularity and inaccessibility, environmental factors, inadequate disaster alleviation capability and demographic and economic organization," limiting their ability to adapt (Pelling and Uitto,2001). Climate change is expected to worsen climatic events' impacts through increased incidence and magnitude of events such as droughts, storm surges and, perhaps, hurricanes on account of an increase in sea surface temperatures (O'Hare *et al.*, 2013). Climate change portends our global community. The Intergovernmental Panel on climate change claims that anthropogenic carbon discharges have led to and will continue to lead to a hotter, wetter and more treacherous earth (IPCC, 2014). Understanding humans' abilities to combat and adapt to global climate change is a persistent social issue. Politically contentious, scientifically subdued and environmentally shocking, the spectacle of climate change – as well as public understandings of it – is a critical topic of research for social scientists (Dunlap and Brulle, 2015).

Higher education has a critical role to play in educating college students about global climate change. Yet, few have pursued to study college students' knowledge and attitudes about this issue thoroughly. Thus, although the immense majority of those enrolled in our colleges belong to the "climate change generation." These are the ones who grew up with more information and less scientific uncertainty about climate change – very little is known, for example, about how well-educated they are about the essential science of climate change or how concerned they are about it (Armel *et al.*, 2011; Cordero *et al.*, 2008; Feldman *et al.*, 2010). Educational organizations for university-level higher education need to play a more critical role in preparing the next generation to face Climate change challenges and prospects (Morgado *et al.*, 2017; Basanta, 2016; Santos *et al.*, 2016; Wachholz *et al.*, 2012; Leal Filho, 2010)

and to the effective communication of climate change public and environmental plan and the need to engage in its training. Higher education institutions (HEIs) must be able to support the long-term enactment of global and local climate change policies (by research, education and knowledge transfer missions) (Leal Filho, 2010). HEIs also have a critical and crucial role in climate change adaptation providing professional multidisciplinary and intersectoral skills to face this Global Change and Societal Challenge (Morgado *et al.*, 2017; Santos *et al.*, 2016; Leal Filho, 2010), participate in the local community (education, research and pilot projects to build their resilience) (Leal Filho *et al.*, 2016; Viegas *et al.*, 2016) and enable indigenous communities to access clean technology to mitigate the effect of climate change (Leal Filho *et al.*, 2016; Setti *et al.*, 2016; Yoko and Audrey, 2015).

Given the significance of climate change, college students' erroneous beliefs about this environmental problem are a concern. The students sitting in our college classrooms today will have to make multifaceted policy decisions about climate change mitigation and do so from a conversant perspective. As such, educators need a more precise grasp of their knowledge, concerns and attitudes about climate change. Understanding their views could lead to more effective teaching practices and foster more significant climate change literacy levels, a precursor for active stewardship to protect the environment (Wachholz *et al.*, 2012).

Individuals play an important role in reacting to climate change. Whether they are leaders in government, business or a neighborhood association or members of the public at large, individuals are eventually the thespians who pledge, instigate, guide and endorse the necessary cuts in GHG emissions to slow down global warming. Recognizing these roles does not indicate a disregard for the more massive (enabling or constraining) circumstances in which individuals act, nor do we mean to place an inapt obligation on individuals. There is forever a tension between structure and agency, which can only be accredited but not fixed one way or the other. However, to the extent we recognize individuals' critical role in responding to climate change, what matters is their level of cognitive and emotive commitment and how that commitment leads to or is affected by behavioral changes and civic and political deeds.

Perceptions of climate change risks are often reliant upon an individual's views, values and experiences. Personal experience and observations of direct impacts of climate change have been found to impact climate risk perceptions, resulting in various and multidimensional understandings of climate change that vary within countries and even communities (Tapsuwan and Rongrongmuang, 2015; Van der Linden, 2015). Perceptions of climate change impacts are affected by previous experience, environmental consciousness, propinquity to the risk and overall cultural and moral values (Bain *et al.*, 2012; Carlton and Jacobson, 2013; Altschuler and Brownlee, 2016). A study on gauging the level of awareness on climate change and sustainable development among students of Partido State University, Camarines Sur, Philippines, revealed that the University students understand climate change issues regardless of year level. They are mindful that climate change is already happening; it manifests in diverse ways; people are already suffering its impacts; it is an instant and urgent concern; it is a threat to sustainable development. The first-year students had the lowest computed weighted mean for all indicators, while fourth-year students showed the highest computed mean. Interestingly, students in the third-year level had a lower computed weighted mean than the second-year level (Barreda, 2018).

Another study on assessing university student perceptions and command of climate change in Portugal, Mexico and Mozambique revealed that most respondents of all nationalities believed that climate change was happening. Nevertheless, Mexican respondents were significantly less confident of its existence compared with the Portuguese and Mozambicans. Mozambicans were significantly much more engrossed in climate

change than Mexicans or Portuguese students (Morgado *et al.*, 2017). Universally, most respondents (94%) believed that climate change was happening. Their age group significantly influenced the perception that climate change was happening, i.e. all respondents above 30 years old believed that climate change was happening, while only 89% of respondents between 21 and 30 believed it was happening (Alves *et al.*, 2018).

The purpose of this study was to investigate university students' perceptions of climate change. The study aimed to provide information to the stakeholders on the effective design of instruments that allow better adaptation and mitigation by the society based on the younger generations' perceptions of and ideas about climate change. This is the first study conducted within the Fijian context. The results in this context should have meaningful implications for national, regional and international future climate change policies and university curriculum adaptation to students' perceptions. This study involves a qualitative design analysis using a focus group to determine the views of the students' in Fiji on climate change. The study considers the elements mentioned above and the importance of understanding students' views on climate change in a country with a high vulnerability to climate change because of its geographic features. This paper addresses three research questions:

RQ1. What is the students' understanding of climate change?

RQ2. What role does the media play in shaping students' perceptions?

RQ3. What are the factors that affect students' perception of climate change?

2. Perception of climate change

Research on risk perceptions of climate change in developing countries is crucial as these nations need a versatile ability to react to climate changes. Risk perception has been expressed as "the vital question, which has yet to be adequately addressed in climate change research is: do communities in the developing world perceive climate change as being a significant threat when compared to other developmental and environmental problems?" (Shisanya and Khayesi, 2007). The absence of sufficient and dependable network observation and information can be viewed as an essential requirement in building up an exact comprehension of climate changes in developing countries.

An article by Weber (2010) designates that governments and citizens of many countries show diminutive concern about climate change and its consequences. The author has argued that people's perception of risks is essential for them to take action. In a similar study of native perceptions of global warming in Tibet, Byg and Salick (2009) clinched that climate change is a physical science spectacle and has social, cultural and economic aspects. The study found that people in the six Tibetan villages studied were not aware of global climate change and mostly presumed the changes they observed as local. A case study of a resettlement program in Mozambique showed a similar scenario (Patt and Schroter, 2008). The study found that farmers and policymakers disagreed about climate risk's seriousness and the need for adaptation. The results emphasized the need for active discussion across shareholders as a necessary condition for articulating policies that can then be successful.

A Report on Climate change and Pacific Island Countries titled the Asia Pacific Human Development Report Background Papers Series 2012/07 outlined the International community's responses, regional agencies, governments and community leaders toward the effects of recent climate change. According to this report, much inaction in the Pacific Islands to implement effective climate-change adaptation strategies arises from believing that the climate is not changing *per se*, merely manifesting its usual variability. This view of

observed changes in a particular climate and climate-linked variables is most familiar at the community level (including individual stakeholders) and widespread at sub-national (district) levels (UNDP, 2012).

Belief in the reality of climate change is waxing and waning, dependent on parallel events such as cold winters and other weather extremes or non-climatic events such as terrorist extortions, economic downturns or significant public hullabaloos like that following the illicit recovery and publication of personal emails from the University of East Anglia or discoveries of mistakes in the 2007 report of the International Panel on Climate Change (IPCC). Still, generally more than half the population in surveyed developed countries "believe" in science. At the same time, perceptions of the prevailing level of consensus among scientists vary significantly from year to year. They have not essentially changed, as surveys started asking questions about it more than 20 years ago (Wolf and Moser, 2011).

> While the evidence is not uniform, gender, age and ethnicity appear to affect the levels of understanding, perception of reality and urgency of climate change, the sense of obligation to act, concern for the future and-importantly-the roles of different demographic clusters hold concerning climate-relevant behaviors. For example, McCright found in a longitudinal review of Gallup Poll data between 2001 and 2008 for the USA that contrary to prospects from scientific literacy research-American women have more excellent scientific knowledge of climate change than men. Yet, they undervalue their climate change knowledge compared to men. Women express somewhat more significant worry about climate change than do men. This gender divide is unaccounted for by dissimilarities in fundamental values and beliefs or in the social roles that men and women differentially execute in society. There is initial evidence from large-scale studies proposing that recent direct experience with weather-related disasters increases concern about climate change, yet preparedness to take adaptive or mitigative behavior following such familiarities is inconsistent. Possibly because of the many physical, psychological, social and political impacts on risk perception. In contrast to other problems, alarm about climate change varies over time within and among countries and projected policy solutions. Often, climate change falls short and sometimes by a substantial margin, when compared to other, more directly experienced environmental problems (such as water or air pollution). The information the public receives and hears about climate change and evaluating the risks from climate change leads to a generally low level of concern. Public perceptions of climate risk and backing for adaptation policies vary between countries (Wolf and Moser, 2011). In-depth studies on individuals' climate change understandings, perceptions and engagement from various locations revealed that climate change is continuously considered a "severe" problem by the public in Britain, Australia and most European regions (Eurobarometer, 2014; Pidgeon, 2012; Reser et al., 2012). For example, in Rome and Norwich, participants fell into four divisions based on their beliefs about climate change, namely, refuting, undecided, apathetic and engaged. Participants demonstrated a strong awareness of climate change and most, albeit with some reluctance and skepticism, accredited a human contribution. Most considered climate change an intractable problem due to scientific ambiguity and futile solutions. Climate change was perceived to be distant. Imagining long-term prospects (using scenarios) proved difficult; two decades is viable. Myopia was recognized and condemned but viewed as unavoidable. Irrespective of attitudes toward climate change, discussants shared the hope that the future would be a "better place" (more fair, equitable and less environment disruption). Personal experiences and opinions toughened aspirations. Participants believed a significant catastrophe was necessary to alter communal trajectories thoroughly. A contradiction between scientific projections and personal views leads to questioning science (Wolf and Moser, 2011).

The study of understanding individual climate change, perception and engagement revealed that awareness of climate change and global warming is shallow in Ethiopia. Most recognize neither the terms nor the concepts. Regardless of their religion, most Ethiopians feel that God alone has the supremacy to change the weather. Very few believe that human activity has a role to play. Traditional community and religious leaders are the least informed about

climate change, while concern is rising among urban opinion leaders. Focus group discussions on climate change in St. Vincent exposed a limited understanding of its meaning, causes and potential impacts. Some participants showed that they had heard the concept mentioned on the radio or television programs. Still, it was clear that they lack understanding as they were inept in response to questions on what is and what causes it and required this understanding from the researcher. Other studies on the perception of climate change in the Caribbean display similar reactions where individuals' or different livelihood groups' observations are associated with inconsistency in the weather (James, 2008; Baptiste, 2013; Macpherson and Akpinar-Elci, 2013; Simpson *et al.*, 2012).

Americans' awareness of "global warming" or "climate change" has generally risen since the 1980s (although they perceive risk as limited and distant temporally and spatially). However, the rise has been uneven. Leiserowitz notes that in 1989, 70% of Americans viewed climate change seriously and by 2003 that percentage rose to 92%. However, in recent years' belief in the anthropocentric link and risk has dipped. In 2010, 57% of American adults felt climate change was happening, compared to 71% in 2008. Only 53% believed in an anthropogenic trigger (complete or partial) in 2010, compared to 62% in 2008 (Safi *et al.*, 2014).

China has seen a relatively high awareness among the public of climate change in the past decade and the majority of the public understands that the issue was human-caused. Climate change constitutes a complex phenomenon drawing upon multidisciplinary knowledge – science, economics, society, politics and ethics – and therefore, the awareness of climate change is also multifaceted. The Chinese public's climate perceptions from 2007 to 2012 were generally of high accuracy and the awareness level after 2009 has heightened, as shown by various surveys. More Chinese seriously worry about climate change and one of the related findings is that many have experienced some negative climate impact personally. Climate change is one of the Chinese public's significant concerns (Wang and Zhou, 2020).

3. Methodology
To develop this study and understand the views of the university students on climate change, two students' organizations aimed at environmental protection i.e. Econesian Society and Wantok Moana from the University of the South Pacific were chosen. The focus group method was selected to analyze interrelations within the group regarding the respondents' opinions on specific topics using a set of guiding questions that are often applied in decision-making policy related to climate change (Peterson, 2004). Participants in the focus groups were selected randomly based on the two students' organizations' information and features, taking into account different groups of the population that included a lecturer, a graduate assistant and students ranging from first-year students to students in their final year (third year) of study. The Econesian Society respondents were mostly Bachelor of Arts and Bachelor of Science students majoring in Geography, Landuse Planning and Real Estate, a lecturer in climate change and a graduate assistant in Marine Science. In contrast, the respondents from Wantok Moana consisted of Bachelor of Science students majoring in Marine Science. A total of 32 respondents from Econesian Society were interviewed composed of 20 men and 12 women aged between 20–35 years, whereas 27 respondents from Wantok Moana were interviewed consisting of 15 men and 12 women aged between 18 and 25. The respondents consisted of native Fijians, Fijians of Indian origin and regional students from Vanuatu and Solomon Islands.

An extensive review of the literature on the topic was carried out prior to the initiation of data collection. The secondary sources of information mainly composed of archival research. These sources included books, government documents, conference papers and reports from the University of the South Pacific library from both the general and Pacific collection. The

universities online thesis collection was also a useful resource in the compilation of this article. A wide range of environmental science journal articles was consulted for the review. Most of these were obtained from online databases. Finally, the World Wide Web was used to download essential reports and articles on the topic. The websites of various non-governmental organizations, both regional and international, were visited to obtain background to the issue.

As case studies typically examine all variables' interplay to provide a complete understanding of an event/situation (Colorado State University, 2009), this study used a case study approach. Researchers in the past have presented results using a case study approach on climate change risk perception (Vedwan and Rhoades, 2001; Grothmann and Patt, 2005). For this research, the case study area (The University of the South Pacific) was chosen keeping several factors in mind. These included the duration of the survey, the site's location and accessibility to the area. To make the case study possible, various primary research methods for data collection were used. First, field research involved a preliminary visit to observe the area and identify key informants for the interview. Key informants were then contacted through telephone to explain the study's purpose and set-up a convenient date and time for an interview. Several visits were made within a 2–8-week period to the area to collect the research data. Second, sampling was done to select a smaller portion of the whole population at the University of the South Pacific. It was ensured that a fair distribution is done in terms of the ethnic composition of the sample. On a few occasions, snowball sampling (Mack *et al.*, 2005) was used. Participants interviewed were asked to refer the researcher to other people suitable to participate in the study.

After the study site was chosen, a questionnaire was designed for data collection. Sample questionnaires used in previous studies on the topic were studied carefully before one was designed. It was ensured that the questions collected data to answer all aims and objectives of the study. The questionnaire was formulated to collect background data such as name, age, race, occupation and study duration at the University. It was designed to ascertain informants' knowledge of climate change information. The participants were asked to identify the principal source of climate change information from a range of radio, newspapers, television, community awareness brochures, village meetings, church, general conversation with people and community climate workshops. The prompts were selected based on the knowledge of standard information dissemination media in Fiji. Structured interviews were also conducted with the respondents who had time available for a 30–45 min interview. Open-ended questions were used in this section to collect climate change understanding and recent environmental changes in the area. The interviews used open-ended questions that allowed the respondents to freely answer the questions so that the interviewer could obtain more information about the respondents' views on climate change, its causes and sources of information on climate change (Table 1).

The interviews were conducted in English as this is one of Fiji's official languages and the medium of instruction at Universities. The interviews were recorded with a smartphone. The recordings were then transcribed to facilitate data analysis. The data from the interviews were analyzed to draw conclusions, which is by constructing the themes, relationship between variables and patterns in the data based on the content. Analysis of the content of the interview transcript was carried out to determine the underlying meaning of the interviews. Finally, the coding system was used to sort and retrieve data.

The data obtained through the qualitative survey was analyzed quantitatively using Microsoft Excel. This is an electronic spreadsheet program used for storing, organizing and manipulating data. First, the spreadsheet was planned based on the purpose, the information needed, headings and layout. The Microsoft online help tool was used to

familiarize the author with the functioning of the spreadsheet. Following this, all the data obtained during the household surveys were entered into the worksheet cells. The first stage in the analysis involved examining the frequency distribution and rating of essential parameters using counts and percentages, as charts are visually appealing and make it easy for users to see a comparison, patterns and data trends. It is agreed that both qualitative and quantitative research methods make essential contributions to research. While quantitative analysis describes the quantity and tests relationships between variables, qualitative research provides information regarding individuals, values, beliefs, understanding and interpretations (Danya International, 2003). According to Mack *et al.* (2005), qualitative research methods are essential within applied research as they provide valuable insights into the local perspectives of the population involved. To achieve the goals and objectives of this study, the qualitative method was deemed appropriate and used.

4. Results and discussions
The perception of the two student organizations at the University of the South Pacific regarding climate change can be analyzed as follows.

4.1 Organization 1: Econesian society
Data analysis revealed that 48% of the respondents relate climate change with a change in habitat. On the other hand, 17% attributed climate change to changes in their lifestyle, 12% blamed climate change for coral bleaching. Respondents stated that because of the changes in the temperature resulting from climate change, electrical appliances such as fans and air conditioners have become prevalent. They now use umbrellas and hats for outdoor activities and prefer to stay indoors during midday when the sun's intensity is the greatest. Sometimes the heat is so unbearable that it is hard for them to sleep comfortably, even at night. Another 11% regard climate change as the mother of all other environmental problems, 6% blamed climate change for introducing invasive species such as termites into Fiji, while another 6% referred to climate change as a nuclear weapon for the Pacific. Climate change is a severe environmental problem because the Pacific island nations face the full brunt of this. The impact of climate change will be increasingly drastic in the future. A study on Assessing university student perceptions and comprehension of climate change in Portugal, Mexico and Mozambique revealed that the topic's perceived importance was different among the three nationalities, namely, 66% of Portuguese answered that they "perceived climate change as a very important issue," while 82% of Mozambican and 100% of Mexican students expressed the same opinion. Regarding the level of concern with the topic of climate change, although universally all students shared a

Questions	Rationale
Personal details (name, age, education level, gender, ethnicity and membership details)	Socio-demographic
Information on climate change	Environmental knowledge
Source of information on climate change	Awareness
Description of climate change, global warming and sea level rise	Environmental knowledge
Causes of climate change	Individual perception
Environmental problems in the local community	Self-realization
Factors affecting individual perception	Self-evaluation

Table 1.
Questions asked during structured interviews/ questionnaire

similar degree of great concern with climate change issues (45%–59% were "very much concerned"), Mexican respondents expressed significantly less "somewhat concerned" (31%) than Mozambican and Portuguese (44% and 54%, respectively) and they also expressed substantially greater "little concern" (10%) compared to others (0%–1%). A substantial number of respondents also perceived that climate change impacts were already being felt in human societies in their own country (72%–83%) and much less perceived that climate change would be felt in the next decade (1%–10%) (Morgado *et al.*, 2017). Acceptance, defined as being "sure" or "thinking" climate change is occurring and concern, described as being "very" or "quite" concerned about climate change, was highest in Turkey, at 93% and 91%, respectively. Belief (61%) and concern (50%) were the lowest in the UK (Boyes *et al.*, 2014). There was proof of local differences, with children living in coastal areas more alarmed than those living in the Philippines' rural areas, for example (Prudente *et al.*, 2015).

One of the first questions in accessing the students' perception to the changes in climate was: have they ever heard or come across information on climate change and the source of information. The following graph was generated based on the descriptive analysis performed on the interview data.

According to the results (Figure 1), most informants in sample site one have heard or come across information on climate change (92%). The most common principal source of students' information was the mass media, with 32% having heard about climate change from social media, 20% from newspapers, 18% through television and 15% from the radio. A low 5% have heard about it from religious leaders and another 2% had heard about it through general conversations with friends, making a total of 7%.

A list of close-ended options accessed the perception of climate change causes for the respondents to see and identify their possible causes. The data obtained was analyzed to produce Figure 2, which represents the perceived causes of climate change by the Econesian society students. Based on the outcomes, GHGs emissions (45%) was perceived as the primary cause of climate change. In total, 28% of the respondents believed the burning of fossil fuels in industries to be the cause, while 20% attributed it to deforestation. A final 7% of the sample blamed air pollution as the cause of climate change. In Italy and the UK,
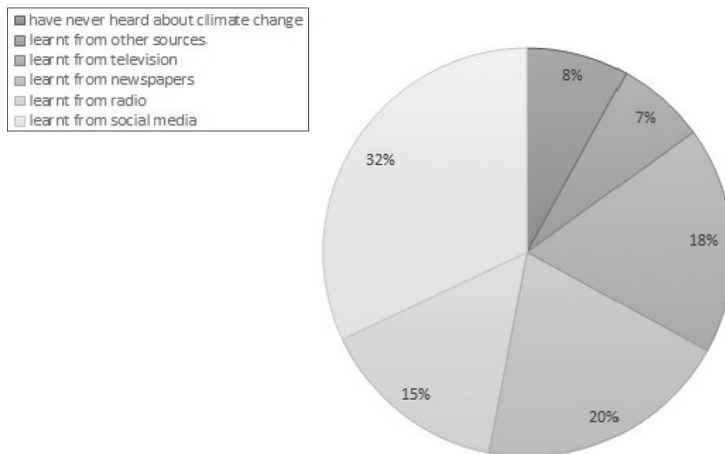

Figure 1.
Percentage (%) of respondents at the Econesian society who have heard or come across information on climate change (number of responses (*n*) = 32)

climate change is an intractable problem due to scientific insecurity and ineffective solutions (Wolf and Moser, 2011).

To measure the respondents' understanding of climate change, they were asked to define or express their views about "climate change," "global warming" and "sea-level rise." The results were then compared with the expert definition of the terms summarized in Table 2. The results for the first term show that most respondents (95%) understood about climate change. Having evaluated the responses, it was seen that a minority of these informants were confused and incorrectly matched climate change. In total, 46% out of the 95% who knew about climate change matched it with changing weather patterns, 24% with ozone layer depletion, 15% with flooding and 10% with growing world population and migration. The other 5% of the respondents had no idea of what climate change was. According to Morgado *et al.* (2017), the perception of climate change impacts on human societies was greater concerning foreign countries than in one's country. For example, it was significantly higher among the Portuguese respondents (92%) than Mozambican or Mexican respondents (88% and 74%, respectively). Following these results, Mexican students perceived to a significantly greater extent that climate change impacts would be felt in 10 years from now (26%), compared to Mozambican (9%) or Portuguese respondents (3%). Most students (72%–85%), likewise, expressed that "the scientific community presumed that climate change was happening," although a considerable proportion said that "there was much disagreement amidst the scientists relating to the subject" (12%–24%). Almost all students (95%–100%), regardless of nationality, also perceived that human activities were a significant cause of climate change.

After assessing the response obtained for the term "global warming," it can be concluded that while 92% of the respondents showed appreciation of the word, 8% had no idea what the term meant. It was also interesting to note that 48% of the respondents described global warming along similar lines to the expert definition. The term was most commonly matched with pollution, ice-melting, natural disasters, the ozone layer, global crisis and warfare. The results for the word "sea-level rise" show that most of the respondents (92%) knew about the term, 49% even matched the expert definition. The other 8% had no idea what the word meant. Sea-level rise was seen to be most commonly compared with cyclones, floods, icebergs and the situation of Tuvalu, Vanuatu and other small island countries.

4.2 Organization 2: Wantok Moana
Student perceptions related to climate change are drastic weather changes (55%), lack of fish feed (28%) and additional toxins in the sea (17%). Therefore, climate change is regarded
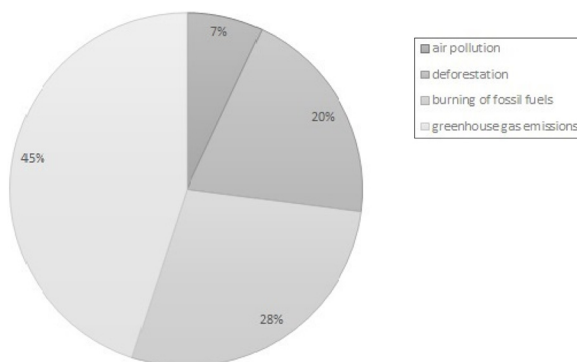

Figure 2.
Cased of climate change, mentioned as perceived by the students of the Econesian society
($n = 32$)

Definition	Expert definition	Average % correctly matching with	Most commonly matched
Climate change	Change in global weather patterns: long-term variation in global weather patterns particularly increases in temperature and storm activity, regarded as a probable consequence of the greenhouse effect (Mastrandrea and Schneider, 2008)	• 95% showed an understanding of the topic • 5% of the respondents had no idea what climate change was	• Changing weather patterns (46%) • Ozone layer depletion (24%) • Flooding (15%) • Growing world population and migration (10%)
Global warming	Global warming is an average increase in the Earth's temperature, which can contribute to changes in global climate patterns (US EPA, 2009)	• 92% of the respondents showed appreciation of the term, 48% of which matched the expert definition • 8% of the respondents had no idea about what the term meant	• Global crisis and warfare (35%) • Ozone depletion (28%) • Ice melting (16%) • Natural disasters (8%) • Pollution (5%)
Sea-level rise	An increase in the mean sea level from the melting of land-based snow and ice, and changes in the water density from an increase in ocean water temperature (IPCC, 2007: 86)	• 92% of the respondents showed appreciation of the term, 49% of which matched the expert definition • 8% of the respondents had no idea about what the word meant	• Flooding due to cyclones (16%) • Water level rising because of the melting of ice (49%) • The situation of Vanuatu, Tuvalu and other small island countries (24%)

Table 2.
Summary of the understanding of climate change-related terms among Econesian society members

as a severe environmental problem because this results in a lack of coral, rising sea levels and marine species extinction. Alves *et al.* (2018) stated that there was a general and similar, perception that biotic communities were previously being impacted by climate change (84%–85%), irrespective of their location. In a study on University Student's Perceptions about climate change: The case of interior design and architecture students of a Brazilian University, most respondents similarly perceived that climate change impacts were already being felt in human societies (79%–81%, in one's country and abroad). Most students (76%) similarly stated that "the scientific community assumed that climate change was happening." However, a considerable proportion expressed that "there was much disparity amidst the scientists relating to the subject" (12%). Nearly, all students (97%–100%), regardless of their age, gender or enrolled course, also perceived that human activities were a significant cause of climate change. When queried on humanity's capacity to

mitigate climate change, the vast majority of the respondents stated that humans could reduce the effects of climate change (98%). However, only a small number (12%) expressed that "humans would effectively manage to mitigate the effect of climate change." To assess the extent to which perceptions of climate change vary among the two sites, a similar analysis was performed on the data obtained from Wantok Moana surveys. Figure 3 depicts the results obtained by analyzing data on climate change knowledge and causes:

> The results show that most of the respondents sampled had heard about climate change. A negligible number of respondents (9%) claimed to have never heard about climate change. Those that have heard about climate change quoted Social media (52%), television (32%) and radio (10%) as the primary source of information. The rest had heard about climate change through other sources, including newspapers, talkback shows and peers. Climate change is also widely accepted in Singapore at the institutional level, including political leadership, civil society, the public and schools. Within the national Singapore curriculum, climate change education is undertaken mainly at the secondary school level within geography. The curriculum approaches climate change as a pressing problem with anthropogenic causes and students are required to learn about climate change science, the impacts of climate change. They assess the responses to climate change at different levels (Seow and Ho, 2017). The majority of Singaporeans personally perceive climate change as moderate to high risk and correspondingly ascribed the adaptation to potential climatic risks as necessary. Among the different demographic groups, respondents with higher education levels considered the importance of adapting to climate change more significant than their counterparts (Yousefpour et al., 2019).

The major cause of climate change, as shown in Figure 3, through close-ended questions, was identified to be the burning of fossil fuels, which 52% of the respondents believed to be the cause. An increase in GHG emissions was thought to be the cause by 30% of the population, while 18% attributed deforestation to the cause. Figure 4 depicts the causes of climate change as perceived by Wantok Moana members.

To access the perception of some climate-related terms such as "climate change," "global warming" and "sea-level rise," respondents at Wantok Moana were questioned to describe their understanding of these terms. The data obtained were then summarized and matched with the expert definition (Table 3). This table has been used to categorize the sample population's responses corresponding to the expected explanation, picking out commonly matched answers. In some cases, respondents who had not heard about climate change opted to describe it from their understanding.

According to the results, 83% of the sample showed an understanding of the term climate change. This was seen to be most commonly matched with changing weather patterns, huge waves and the village level. On the other hand, 17% could not relate climate change in their own words, and thus, no answers were recorded. For the term global
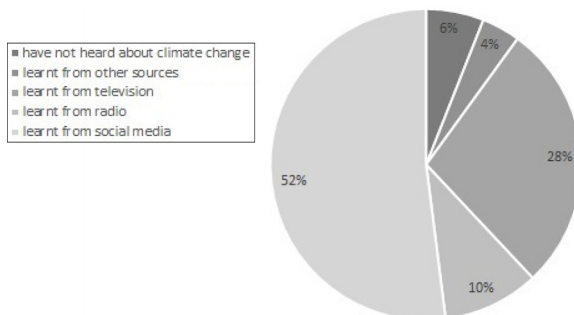

Figure 3.
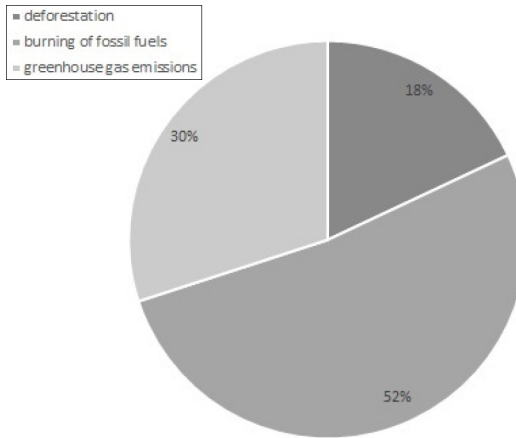Knowledge and common sources of information on climate change at Wantok Moana
(n = 27)

Figure 4.
Causes of climate
change mentioned
during the survey of
Wantok Moana
members (n = 27)

warming, most of the respondents (80%) showed appreciation of the term and most commonly matched it with rising water levels in rivers, cool-dry season and extreme weather conditions. A minority (20%) of the respondents did not show much understanding of this concept.

When asked to describe their understanding of sea-level rise, 84% of the respondents at Wantok Moana were familiar with the term. They mostly matched it with iceberg melting, tidal waves, high and low tides and floods. On the contrary, 16% of the respondents did not know what the term meant.

4.3 Factors affecting student's perception of climate change
According to Wolf and Moser (2011), individual understanding of climate change varies but is always contextualized within broader considerations. Direct and indirect experiences, traditional ways of knowing, ranging views on Personal and collective Responsibility and

Definition	Expert definition	Average % correct matching	Most commonly matched with
Climate change	Change in global weather patterns: long-term variation in global weather patterns significantly increases in temperature and storm activity, considered a potential consequence of the greenhouse effect (Mastrandrea and Schneider, 2008)	• 83% of the respondents showed an understanding of the topic • 17% of the respondents had no idea what climate change was	Changes in seasonal weather patterns (40%) Huge waves coming inland (14%) The level of the sea (13%)
Global warming	Global warming is an average increase in the Earth's temperature, contributing to changes in global climate patterns (US EPA, 2009)	• 80% of the respondents showed a significant appreciation of the term • 20% had no idea what the term meant	Cool, dry season these days (14%) Hot weather (12%) A rise in water level (12%)

Table 3.
Summary of results obtained through a survey on the perception of climate change at wantok moana

religious beliefs shape individual perceptions of climate change. Some of these factors also apply to Fijian students' perceptions of climate change. For example, the students at the University of the South Pacific contextualize climate change with the ocean and marine organisms. This perception is reinforced by the fact that Fiji, along with other Pacific island nations, is small and surrounded by the sea where people depend on marine resources for livelihoods.

Second, direct and indirect experiences such as flash flooding in Fiji yearly also shape students' perceptions of climate change. The increased incidents of flash flooding in Fiji are linked to weather patterns caused by climate change. Third, traditional ways of knowing also shape perception toward climate change. Individuals in modern, very urban societies are largely cut off from their natural environment. Modern lifestyles release individuals from directly experiencing changes in the environment and instead make them entirely dependent on mediated information about nature and climate change (e.g. news, television (TV) documentaries or stories told by others). This is a common feature in this century because individuals are more dependent on Facebook, Twitter, Instagram, TV, stories from elders and YouTube, newspapers and magazines to access information. There is not enough time to experience it personally.

By contrast, those working directly on land (or sea) and with natural resources, and predominantly many traditional societies, are still absorbed in their natural environment and depend on the land's subsistence and resources. Thus, their direct experience and knowledge of the environment can be expected to be quite different from that of urban dwellers. Fiji is a developing and agrarian community, where nature is part of everyday life, which enables direct relationships and experiences with the environment. This, in turn, is a critical factor in shaping their perception of climate change.

Besides, ranging views on personal, communal responsibility shapes people's perceptions of climate change. Public around the world have formed various attitudes about obligations that are strongly influenced by the dynamics of local culture, religious scopes and ethics. For example, recent evidence suggests that some individuals willingly acknowledge moral or civil responsibility for acting on climate change. In both cases, this responsibility does not need to be seen as reliant on political players or government actions. A study of Canadians shows that those who act on climate change do so because they feel dissatisfied by their governments that do not make significant emissions reductions (Wolf and Moser, 2011).

The comparative study of Britain and Swedish students, however, shows clear responsibilities that vary from responsibility for causing climate change (individual consumer behavior, policy, market structure and lifestyle) and breeding expectations different from the actions of individuals versus governments to solve problems. Thus, while a higher percentage of British students than Swedish students see individuals as the leading cause of global warming and the government lags far behind, youth from both countries put their hopes on the government to solve problems (Wolf and Moser, 2011). Students at the University of the South Pacific mentioned the lack of action on climate change adaptation and mitigation. This is one of the critical factors that shape students' perceptions of climate change as a serious environmental problem and their role as agents of change, who must act accordingly.

Finally, religious beliefs also shape what individuals think about climate change. Belief in a higher spiritual being plays an essential role in shaping whether people believe that human actions can affect climate or weather. The implication of belief in a divine power responsible for extreme weather (and possibly changes in it) is that people or governments are not considered to have control, influence or accountability for what is in God's hands. In

the polar regions, the Inuit Sila believe that climate change is more than "weather change." Cultural and spiritual beliefs indirectly interpret climate change as the world's ethical response to inappropriate human actions (Wolf and Moser, 2011).

5. Conclusion

In general, this study reveals that the participants believe that climate change is happening and is a severe threat for Fiji and the neighboring Pacific island countries. Perceptions of climate change show differences between the different student organizations engaged in environmental protection and climate change mitigation. This study's results have revealed essential findings not known previously in climate change risk perception in Fiji. The literature exposed an absence in similar kinds of community-based assessments in this region and that there is, therefore, a need for supplementary research in this area. Better research and modeling of current and future impacts of sea-level rise and public and stakeholder contribution in climate change adaptation is needed in all other vulnerable parts of Fiji and the Pacific. As this research's findings have revealed the importance of students' views and beliefs on climate change for designing risk management strategies, more research on other communities assessing their climate change risk perception and traditional knowledge will be useful. Such studies will help in addressing the underlying attitudes toward climate change in our society. This will also help policymakers get a better view of societal, traditional and cultural factors that need to be considered for future environmental management and planning.

HEIs have a significant contribution toward climate change preparedness and increase knowledge on climate change issues. The integration of climate change mitigation and adaptation in planning is essential to realize priority actions. To develop successful adaptation strategies and understand the concept of climate change vulnerability, methods for conducting vulnerability assessments and options are required. Finally, it is suggested that the results and analysis of this study offer researchers and educators an overview of research trends and help reveal new research directions. A possible future research direction would be to focus on specific themes and conduct a more in-depth survey.

This research and other recommended research in climate change risk perception have a significant potential to promote sustainable development and better climate change and adaptation planning in Fiji and throughout the Pacific. It is hoped that this research's findings would aid Pacific Island governments to see shortfalls in the current nature of governance in the region. Improving environmental management would help enhance Pacific communities' adaptive capacity to current and future climate change effects.

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