Chapter 11
Climate Change, Disaster Risk Management and the Role of Education: Benefits and Challenges of Online Learning for Pacific Small Island Developing States

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Abstract Climate change and disaster risk management education in the context of the Pacific Small Island Developing States is crucial, but even more so, is ensuring that access to this education is available to those who require it. The Pacific Small Island Developing States are extremely vulnerable to the impacts of climate change and disasters and have limited capacity to address this so the move by the University of the South Pacific to develop a post graduate diploma in climate change program and make this fully available online is an important one. This paper presents experiences and observations of the benefits and challenges of online learning in the context of the Pacific Small Island Developing States. Special focus is given to the documentation of staff and student experiences from across the Pacific Small Island Developing States region. Lessons learnt are shared and recommendations for actions to address the challenges are proposed. As the only institution providing post graduate climate change and disaster risk management education online in the Pacific Small Island Developing States region, this paper is aimed at informing individuals who wish to engage in climate change and disaster risk management related online learning and institutions who would like to venture into this mode of climate change and disaster risk management education.

Keywords Climate change · Disaster risk management · Online learning · Pacific Small Island Developing States · Experiences

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Introduction

Vulnerable Pacific Small Island Developing States (PSIDS) currently face an unprecedented threat from the impacts of climate change and natural disasters (Carter 2015; Roy et al. 2018). The severity of the impacts of climate change and natural disasters on PSIDS are such that adaptation measures alone are no longer sufficient (Bataller 2010). Coupled with relevant education for Climate Change and Disaster Risk Management (DRM) however, is one way that the PSIDS can advance their adaptation and mitigation actions across all levels (Davidson and Lyth 2012). The role that education plays in the fight against climate change and the impacts of associated disasters is vital especially for PSIDS who are already pressed for technical expertise and the capacity to successfully implement national climate change and disaster risk reduction policies and projects (Barnett 2005; UNESCO 2019). Higher education in particular, plays an important role in educating students about climate change, however it has to include relevant and appropriate learning methods (Rees 2003; Cordero et al. 2008).

Online learning has significantly grown over the last decade and is emerging as the new paradigm of modern education (Pei-Chen et al. 2008; Li et al. 2016; Harasim 2000). The University of the South Pacific (USP) began offering online climate change and DRM courses in 2011 through its Pacific Center for Environment and Sustainable Development (PaCE-SD). The use of online and distance learning is critical to the development of the PSIDS where remoteness is a key challenge to a region which spans one-third of the earth's surface and consists of thousands of islands located far and wide across the Pacific (Bossu 2017). As a regional leader in education, USP may be an effective institution to lead efforts in designing corresponding online courses and resources. Online learning in the Pacific Islands has progressed over the last decade, largely owing to the move by USP to migrate courses from face to face modes to blended and fully online courses (ADB 2018; Bossu 2017).

An online course at USP is one where most or all of the content is delivered online and usually there are no conventional face-to-face classroom meetings (University of the South Pacific 2018). At USP's PaCE-SD, the Post-Graduate Diploma in Climate Change (PGDCC) program is offered fully online. This has been largely successful with steadily increasing enrollment numbers over the years, and benefits, challenges and lessons learnt from the delivery of the courses. While the benefits of providing climate change and DRM education online abound, the challenges are exacerbated by the geographical and socio economic features of different PSIDS creating an imbalance by default in adaptation and mitigation capacities of different PSIDS, one that may be reduced by education on climate change and DRM, hence the role of education in reducing PSIDS vulnerability cannot be stressed enough. Researches show that, the influence of education in developing countries is twofold due to its direct effect on aspects that reduce risk associated with climate change and disasters, and its mitigating effect on aspects that increase risks. (Wamsler et al. 2011; Armstrong et al. 2018).

This paper presents experiences and observations of the benefits and challenges of online climate change and DRM education in the context of the PSIDS. Special focus is given to the documentation of staff and student experiences from across the PSIDS in an effort to highlight the role that online learning plays in climate change and DRM education for PSIDS. Lessons learnt are shared and recommendations for actions to address the challenges are proposed.

Benefits of Online Learning in the Context of PSIDS—Experiences and Observations

Current literature reveals a myriad of reasons motivating institutions and students to engage in online learning (Yoo and Huang 2013; Johnson et al. 2015). The paradigm shift towards online learning is evident in PSIDS where higher education institutions are moving away from conventional teaching and learning methods to online modes of course and program delivery.

The benefits of online learning for developing countries like the PSIDS generally conform to online learning in other developing regions in the world. Information access, greater communication; synchronous and asynchronous learning; increased cooperation and collaboration, cost-effectiveness and pedagogical improvement are some of the pedagogical and socio-economic forces that influence the move towards online learning (Sife et al. 2007). More specific benefits to the PSIDS result from socio-economic, cultural and geographical circumstances as well as institutional organization and governing structures of higher education institutions. To this end, preservation of the "Pacific Way" and providing learners with a sense of community, while trying to address other forces such as globalization and advances in Information and Communication Technology (ICT), is paramount (Purcell and Toland 2004).

USP provides an ideal example of a higher education institution in the PSIDS Region that is moving from conventional face to face learning to online learning. The impact of online learning on student and overall institutional growth is still an area that is under researched although existing literature points to heterogeneous impacts (Hogan 2009; Purcell and Toland 2004). Despite the mixed impacts, important benefits that have stemmed from USP's online courses, particularly those under the PGDCC Program, cannot be overlooked.

Access to Online Tertiary Climate Change Education

An important feature of the PGDCC program is its online delivery. All courses in the program are offered online allowing students to study remotely from across the PSIDS. While the mode caters for access and cost-effectiveness (costs associated with airfare and daily stipend are minimized for some regional students), years of

experience teaching the courses have shown that student interests in the program are mostly twofold: the first being the nature of the subject area and its significance in the PSIDS region and second is the quest for attainment of a graduate certificate and (or) degree after completion of an undergraduate degree. In the case of the former, a lot of students either enter the program for the purpose of upskilling or because of the desire to change their career path. Students who enroll for the purpose of upskilling are mostly those who are already practitioners in the field and therefore need to upskill their knowledge to become more competent and marketable. The change of career path can be attributed to a lot of reasons however it is common knowledge in the region that because climate change is the greatest development threat of our time, more and more projects and programs are being implemented allowing for greater job creation and security in the field of climate change and DRM. The increasing quest for attainment of a graduate certificate and (or) degree in this field comes about as more and more people compete for jobs in the market. The online nature of the PGDCC program is therefore ideal for all learners with the interests stated above.

Pacific Consciousness in Learning and Teaching

While student interests serve as a critical determining factor for increasing enrollment into the program, other factors are critical in terms of the overall learning journey and experiences of studying climate change and DRM online. These factors are important considerations when dealing with online courses in any PSIDS higher education institution as well as other developing countries. Experiences from the PGDCC Program have shown that teaching and learning climate change and DRM online involves a lot of planning from the instructors and ensuring constructive alignment from the individual course up to the program level and the overall university graduate attributes. A very important benefit for the region and more so for USP, lies in the preservation of culture and the greater need for Pacific consciousness. The preservation of culture is, in itself, threatened by climate change and having the PGDCC program contributes to information sharing and documentation of the diverse cultures across the PSIDS. Because courses are offered at the postgraduate level, all teaching and learning resources and assessment tasks have to support critical thinking skills and cognitive learning in students; while addressing the need to build capacity for industries as well as livelihoods in general. Critical thinking skills and cognitive learning is enhanced and measured through the use of online discussions administered through the Modular Object-Oriented Dynamic Learning Environment (MOODLE)—the online learning platform used by USP. While formative assessments of this nature measure student learning, they also foster greater collaboration and interaction among students. Experiences and observations have shown that such collaboration goes beyond the bounds of the virtual classrooms to industries, further strengthening the community of practice and professional network in the region.

Challenges of Online Learning in the Context of PSIDS—Experiences and Observations

Over the past years, USP has worked alongside its member governments, development partners, and other education stakeholders to increase its online learning presence (Asian Development Bank 2018; Bossu 2017). The delivery of climate change and DRM courses online however, has encountered challenges from the design to delivery and evaluation and improvement stages.

Course and Program Design

From the design stages of the climate change and DRM courses offered at USP's PaCE-SD, challenges with content and relevance to the PSIDS and inclusion of diversity and cultural inclusion have emerged. The program includes four (4) courses all of which, in design, are an attempt to meet the growing needs and the demand for quality climate change and DRM education for the PSIDS region. Challenges that emerged from this include, difficulty of teaching a vulnerability adaptation tool that is regionally recognized and used at the national level in all USP member countries, difficulty of incorporating Pacific consciousness and cultural inclusivity in the courses, requirements for continuous updates as the science continues to evolve and include more conclusive evidence of the impacts and projections of climate change and related disasters for the PSIDS, designing assessments that are constructively aligned to institutional, school and program learning outcomes as well as assessments that can be implemented online and in the region. While it is unclear whether a needs assessment was undertaken during the preparation and design stages of the courses, in theory and practice, a needs assessment identifying specific learning needs would have contributed to addressing the challenges associated with design (Faxon-Mills 2013; Sava 2012).

Course and Program Delivery

Delivery of the climate change and DRM courses online was met with challenges relating to access, time management and independent learning, availability and access to Open Educational Resources (OERs), online netiquette, feedback and student support. Access to fast and reliable internet connections in the region has been, and still is a major issue for online learning in the PSIDS and this is in part due to the varied but generally high costs of internet services. In many cases, this is partly due to national telecommunication monopolies and further exacerbated by different socio-economic strengths (Asian Development Bank and Asian Development Bank Institute 2015; Ogden 2013; Wellenius 2008). The main regulatory barrier that

prevents a new entrance from starting up a business in a telecommunication sector in the Pacific Islands is the requirement to have an operating license granted by the government. In most PSIDS, the government owned monopoly provider has an exclusive license to provide telecommunication services for a fixed period, usually for a 10–15 year period. This form of license guarantees the monopoly status of the provider (McMaster 2006).

Time management and independent learning on the part of the learner is a challenge that exists for online learners and even more so, for learners in the PSIDS who have a full time job and need to travel frequently. Experiences from the PGDCC courses show that most of the students who are enrolled are working in a climate change and (or) DRM related field and given the nature of the job, need to travel frequently for work purposes. This creates pressure on the learner to make time for online learning simultaneously with their work demands. Women and girls have even more of a challenge as they have the additional responsibility of taking care of their households, working full time (if they are employed) and learning in an online environment (Kanai 2015). Education plays a more determinant role for women than for men in relation to their capacity to adapt to climate change so there is a need for women to have some understanding of climate change and associated risks (Wamsler et al. 2011; Armstrong et al. 2018). Creating a culture for independent learning has become a necessity for competence in online learning.

The availability of OERs with free licensing (such as the creative commons), and access to these OERs can be a barrier to enhanced online learning experiences (Weller 2014). As more and more OERs become available, and more higher education institutions utilise these, the need to create and deliver an enhanced online experience emerges, and this is not only in response to the 'competition' but also as a responsibility that the institution has to deliver quality Pacific-conscious education to learners from the PSIDS. OERs are a powerful tool for reducing inequalities in educational opportunities and promoting innovative strategies to improve the delivery of education across time zones, hence, their contribution to achieving Sustainable Development Goal 4 (SDG4) cannot be stressed enough. OERs make online learning more appealing owing to design, functions and access on different platforms and gadgets (Bliss and Smith 2017; Hegarty 2015).

In a region as geographically and culturally diverse as the PSIDS region, the delivery of online climate change and DRM courses needs to be inclusive of the different cultures and be wholly Pacific conscious to appeal to learners who are already experts in the climate change and (or) DRM field. The challenge of inclusivity is one that needs to be addressed at all levels of a higher education institution like USP. Accommodating learners with special needs is a challenge and specifically those who require special attention due to varying temperaments.

Student numbers in the PGDCC program have steadily increased over the years creating a higher demand for one on one feedback and assistance. Providing student analytics and monitoring progress has become more and more of a challenge, one that perhaps could be addressed with reducing the learner to educator ratio.

Evaluation and Improvement

Course evaluations over the years have confirmed an increase in the demand for one on one assistance. It is evident that while there are more and more available OERs, the added pressure on learners to be competent tech savvy learners has taken its toll on the learners. One reason for this is the fact that USP introduced MOODLE as a learning platform in 2008 and since then, more and more mature students are returning to study after at least ten (10) years of employment. The first challenge for them in a fully online program is mastering the use of the MOODLE platform. Including more OERs or components thereof creates stress on already heavily overloaded working students.

The need for educators who are competent using online open resources is a challenge and evaluations have shown the need to continue upgrading knowledge of OERs as they become available online. Completing the PGDCC program offered by USP has proven to be very useful for continuous provision of quality online climate change and DRM education.

Diverse cultural backgrounds are a challenge in an online learning environment if online learning netiquette is not adhered to. From experience, online netiquette is vital for creating an online learning environment where learners and educators are not bullied online. Online bullying has been known to discourage learners from continuing their course of study.

Lessons Learnt and Recommendations

Although unique circumstances in each USP member country lead to varying results and lessons learned, the following themes have emerged as recurring lessons, and should therefore be considered in parallel with the recommendations provided.

I. Delivering courses that accommodate constructive alignment ensures that intended learning outcomes are achieved and learners leave the program with the required skills. Constructive alignment needs to be enforced to ensure that assessments are contributing to meet course, program and institutional intended learning outcomes.
II. Pacific consciousness and inclusivity are required for a wholesome learning experience in the context of PSIDS. Design of course materials need to accommodate Pacific consciousness and inclusivity at all levels (including people with special needs).
III. Climate change science and DRM information is continuously evolving and curriculum and course updates need to be performed simultaneously and on a regular basis. A systematic and ongoing process of curriculum review and (re)design informed by up-to-date capacity needs of USP member countries is recommended. Course reforms should also be supported by needs assessments and high quality research.

IV. Online learning in the PSIDS region will only truly become fully accessible when telecommunication monopolies, political will and relevant institutional Memorandums of Understanding are aligned. It is highly recommended that higher education institutions like USP collaborate with governments of PSIDS to provide affordable internet services for online learners.
V. Online learners in PSIDS require additional funds to cover internet connectivity costs. Access and costs of online learning need to be factored into online course tuition fees—considering the available ICT resources at regional USP campuses and the number of students enrolled in online courses.
VI. E-learning resources play an important role in achieving intended learning outcomes and require collaboration to be fully utilized. Achieving intended outcomes requires that ICT for online learning initiatives be carefully planned, well-coordinated, based on empirical evidence, and that they adopt a long-term vision (Asian Development Bank 2018).
VII. Critical thinking skills are generally lacking for students who enter the program for the first time. Incorporating a diagnostic test before beginning the program is recommended to determine levels of understanding in the subject area.
VIII. Using a Research Skills Development Framework to guide the development and delivery of online rubrics for assessment tasks is encouraged as it fosters research skills. Academic staff need to build capacity in this area.
IX. Working students and students facing internet connectivity issues require some flexibility to meet deadlines. Flexibility needs to be built into course assessment requirements particularly submission deadlines for assessment tasks.

Conclusion

Long term investments by higher education institutions in formal, accredited and recognized climate change and DRM education could be the way forward as an adaptation and mitigation action implemented in parallel with national and regional adaptation and mitigation actions. The delivery of the PGDCC program by USP has contributed to the call by PSIDS leaders for capacity building and human resource development in the field of climate change and DRM. Having the program delivered fully online has resulted in a lot of benefits including access to tertiary education in climate change specifically tailored for the PSIDS.

While it is important to maximise on the benefits of online learning in a developing region like the PSIDS, challenges are still prevalent. Challenges with regards to course and program design, delivery and the necessary knowledge and skills required for effective online learning are areas that need to be addressed.

Recommendations and lessons learnt informed by years of observation and experience in the PGDCC program, although presented here, are not prescriptive for

all online courses and programs in PSIDS, however they will only improve online learning in a highly diverse and developing region if considered and properly implemented.

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