

Building resilience to ensure teaching and learning continuity in the 2020 pandemic lockdown: a consideration of issues challenges and strategies at the National University of Samoa

by

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Abstract

This paper demonstrates the leveraging of technology to build resilience in educational systems to ensure learning continuity during disruptions due to pandemics or natural disasters. The paper describes how resilience is achieved through the implementation of the National University of Samoa (NUS) Moodle workplan for transitioning to the new normal of online learning when Samoa went into voluntary lockdown, in response to the threat of COVID 19. Previously, NUS conducted most of its courses in face-to-face (F2F) mode with some courses using blended delivery or blended mode of learning. But in early 2020, with the emergence of COVID 19, and the sudden lockdown of the whole country, it was crucial that NUS transition all its courses to online mode and hosted in Moodle, the university's Learner Management system. Key factors determining the scope of this implementation were: i) access to devices, ii) access to the Internet, iii) sufficient bandwidth to ensure uninterrupted and reasonably fast access to Moodle, iv) sufficient processor power of servers to handle the volume of processing iv) the number of simultaneous users on Moodle, vi) skill level of staff and students to use Moodle. The paper discusses the implementation details of this transitioning to online such as the conversion of courses to digital and uploading to Moodle, training of staff on the use of Moodle, and upgrading infrastructure. Challenges and issues encountered in this implementation which include access, bandwidth and congestion, and learner engagement, are also discussed as well as a set of recommendations to build resilience and ensure teaching and learning continuity in future lockdowns.

Keywords

Moodle, pandemic lockdown, online learning, COVID-19, resilience, National University of Samoa, teaching and learning continuity

A. Introduction

In recent years Samoa has faced increasing risk and vulnerability not only due to its remote geographical location, natural disasters such as cyclones, earthquakes as well as epidemics and the current COVID-19 pandemic (Government of Samoa,2020).

This paper describes the implementation of the National University of Samoa (NUS) workplan for transitioning to online learning when Samoa went into voluntary lockdown in 2020 in response to the threat of COVID 19. This lockdown was enforced when Samoa entered a State of emergency (SOE) upon possible threat of COVID-19. Previously, NUS conducted most of its courses in F2F mode with some courses using blended delivery or blended mode of learning. But in early 2020, with the emergence of COVID 19, and the sudden lockdown of the whole country, it was crucial that NUS transition all its courses to online mode and hosted in Moodle, the university's Learner Management system. As stated in the Pathway Development for Samoa (2022) “...the pandemic COVID 19 affected school attendance, highlighting the need for innovative practice and technological solutions (including improved internet connectivity) to ensure uninterrupted access to high-quality education for all.”

The use of Moodle for blended learning has been a priority at NUS for the last ten years and included the following developments. In 2017 – 2018, the installation and upgrade of Moodle LMS through assistance from the Commonwealth of Learning (COL) as part of its Technology enabled learning (COLTEL) initiative (Chan Mow, 2017). As well there had been ongoing staff workshops on using Moodle in 2017-2019 offered by various sections of the university. These were further enhanced by instructional design workshops on Moodle (Chan Mow, 2019), followed by an evaluative study on Moodle implementation under the COLTEL project implemented by the Faculty of Science Moodle team.

With the disruptions of classes in November and December 2019 due to the measles outbreak, natural disasters such as cyclones and flooding, and in January 2020 the impending and possible class disruptions due to the corona pandemic, there was an urgent need for NUS to act rapidly, to moving classes online and to the Moodle platform. Moodle was the preferred online platform because it was offered as open source without licensing and could be used both online and offline thus reducing issues of bandwidth.

In the light of the impending COVID-19 pandemic and the need to build resilience to ensure continuity of programmes, the NUS ICT and Computing sections were tasked, by management, to build and implement the NUS Moodle Workplan to enable staff and students to transition to emergency remote teaching primarily through

the use of Moodle. The NUS Moodle team consisted of members from the Faculty of Science (FOS) Computing dept, ICT division, and the ODL specialist from the Oloamanu Professional development centre (NUS, 2020).

A major goal and outcome of the Moodle Workplan is to build resilience within the university's educational systems. Resilience is defined by the Webster dictionary as "an ability to recover from or adjust easily to misfortune or change". The solutions and strategies implemented during the implementation of the NUS Moodle Workplan were intended to provide some valuable recommendations for best practice in building resilience within the university and hopefully extended to other school systems in the event of future disruptions or lockdown.

As stated in a briefing report by Tony Mays (COL, 2020) "*Resilience encompasses the ability both to cope with current adversity and to recover quickly from the challenges presented. However, it also entails the ability to recover in ways that seek to learn from the experience, to adapt and to mitigate the impact of future similar challenges.*"

The focus of this paper is to report on the implementation of the Moodle Workplan for NUS with its goals of building resilience for transitioning NUS programs from face to face to online mode. It attempts to answer the following questions:

- i) What were the key factors which shaped and determined the scope of the online transition of NUS programs during the 2020 pandemic lockdown?
- ii) What were the key activities implemented as part of the Moodle workplan to achieve the transition to online?
- iii) What issues and challenges were encountered in the implementation of the transition to online learning?
- iv) From this experience, what are recommendations for the future to ensure resilience and continuity?

B. Key Factors in determining online Implementation

On the outset of the implementation of the NUS Moodle workplan, the first step was to determine the goals NUS aspired to achieve from this workplan. It was clear from the outset that the main goal was to build resilience to ensure learning continuity as the whole country was forced into lockdown. The lockdown had come suddenly and most found they were unprepared for this new norm of working and learning from home. The sudden changes that were implemented quickly also brought about concerns related to technology use, the quality of education, lack of access to the necessary technology, limited knowledge on the use of technological tools, and poor internet connection. (Chan Mow, 2019; Duraku & Hoxha, 2020; Roy, 2020). Hence, the key factors which shaped and determined the scope of the Moodle implementation plan and the online offering of NUS courses on Moodle were: i) access to devices, ii) access to Internet, iii) sufficient bandwidth to ensure uninterrupted and reasonably fast access to Moodle, iv) sufficient processor power of servers to handle volume of processing v) number of simultaneous users on Moodle, and the vi) skill level of staff and students to use Moodle (NUS,2020). Such challenges as access, and quality of technology are the most common issues reported from developing countries (Aboagye, 2020; Duraku & Hoxha, 2020; Gillis & Krull,2020; UNESCO, 2020; Zalat, 2021).

Access to devices was considered an issue as most students at NUS have mobile phones but these were not suitable for Moodle access particularly in typing up assignments. It was apparent that other supplementary resources had to be offered to accommodate for this, such as hard copies of notes and assignments. As well, not all staff had access to computers at home for class preparation. To solve this, staff were allowed by the university to take their work pcs home. Access to the Internet was going to be costly for both staff and students particularly with the cost of prolonged usage during lockdown. This was resolved by negotiation with the two Internet providers for provision of zero data sim cards for both staff and students to allow free access to educational sites such as Moodle.

Another issue was the capacity of the NUS network to cope with the increased volume of usage due to staff and students now using the network for online learning. To prepare for lockdown and online implementation, NUS servers were upgraded as well as additional bandwidth to accommodate for increased network traffic due to increased usage and increased number of users. To boost internet provision, NUS secured a secondary Internet provider to serve as backup in preparation for lockdown and increased online usage.

An important prerequisite for online learning is the establishment of an online learning system. NUS had been fortunate in that from 2017 to 2019, the Commonwealth of Learning had assisted NUS with a baseline study to determine skill level; an infrastructure audit, an OER policy and a Technology enable learning policy and plan, the installation of Moodle LMS and DSpace for an OER repository, as well as a series of training workshops for staff on the use of technology.

Another important consideration was the skill level of staff and students in the use of online learning. NUS was fortunate to have had workshops on technology enabled learning from various sources including COL in recent

times. This was one of the urgent priorities in the implementation. However, due to the suddenness of lockdown, there was only time for training for staff before lockdown.



Fig 1. NUS lecturer in Moodle training before lockdown

C. Key Tasks/Activities

The following sections describe the set of key tasks and activities that were implemented to achieve online delivery of NUS courses. Key tasks in transitioning to online learning were: i) the conversion of course content to digital form, ii) registration of courses in Moodle; iii) Uploading of courses; iv) training of staff on the use of Moodle; v) actual use of Moodle for teaching, vi) awareness for staff and students, vii) backup plan for Moodle infrastructure; viii) additional training for staff, ix) student engagement and developing a community of practice, x) alternatives mode of online delivery, and xi) assessment.

1) Conversion Of All Course Content Into Electronic/Digital Form

NUS Management advised lecturers to convert all course content to electronic form as soon as possible, if not already in digitized form. Staff were advised to use a range of options for digitizing. These included: i) typing documents in a word processor, ii) scanning documents and save in digital format (e.g., pdf); iii) use of digital cameras (phone) to do screenshots of documents and save in electronic form; and iv) saving of course material or URL links from online sources directly into the Moodle course template

2) Registration Of All Semester One Courses As Well As Lecturers And Students On Moodle

Registration of staff and students was required in order to use Moodle. To expedite this process, the Moodle administrator with the help of the ICT team registered all courses offered in this semester along with their lecturers and students using bulk uploads. A flyer was sent out to all students on how to log in to Moodle. This flyer was posted on the NUS Facebook page.

3) Uploading Of Course Content to Moodle

Lecturers had to upload digitized course content into Moodle. To assist with this the NUS Moodle team offered the following: i) face to face workshops/tutorials on Moodle basics- offered upon request from faculties; ii) Flyers, online tutorials and Moodle resources hosted on the NUS Moodle site.

To expedite the upload process and provide monitoring and support, members of the NUS Moodle team were allocated to each faculty. In terms of monitoring, each faculty Moodle support personnel was expected to provide regular updates on the status of faculty upload by course and faculty. These updates were sent weekly to NUS management and these statistics were used to track progress of uploads per faculty. At the beginning of lockdown only 34% of the 316 courses were registered on Moodle. However, by the end of lockdown, 100% of NUS courses were online. A copy of one of the weekly update summaries appear in table 1 below. To motivate faculties, prize money was offered to the first faculty to achieve 100% course upload.

Moodle support personnel were also expected to provide helpdesk to faculty staff and students and direct queries to relevant personnel before and during pandemic lockdown. The ICT division had also setup an additional file server to store large files in zipped folders. This feature was crucial to the uploading of recorded videos which in some cases and for some courses were the main instructional tool for teaching courses on Moodle. Other space saving strategies included i) providing URL links to content residing in cyberspace and ii) the use of Google drive and Drop Box.

Table 1. Summary of Faculty/Section Uploads

(Source: Agnes Wong Soon on behalf of Moodle reps)

Section/Faculty	Courses Completed	%	Partial upload	%	No content	%	no activity	%	total no of courses
FOA	44	100	0	0					44
FOBE	46	100	0	0					46
FOHS	34	85	6	15					40
FOE	25	59.5	14	33.3	3	7.1			42
Oloamanu	6	85.7	1	14.3					7
FOS	58	90.6	6	9.4					64
CSS	6	26.1	11	47.8	6	26.1			23
Maritime	0	0	6	100					6
FOTE	11	28.2	20	51.3	5	12.8	3	7.7	39
TOTAL	230	74%	64	20.6%	14	4.5%	3	1%	311

4) Training Of Staff On Moodle

The Moodle team provided regular training for lecturing staff in the use of Moodle. Staff were encouraged to come to class with course descriptors, resources, access devices such as laptops, mobile phones. Initial training covered basic features such as logging into Moodle, uploading course content, and use of forums and assessment and grade book in teaching.

5) Using of Moodle in Teaching Of Courses Online

Due to the urgency of the task and limitations imposed by factors listed above, only limited services could be offered under this online initiative. Students were given a flyer and an online Manual on how to use Moodle. Lecturers could in turn teach students on the use of Moodle both during lectures and tutorials. This would strengthen what they had learnt and also flag unexpected issues.

After much discussion, the following was the recommended scope of online delivery of NUS courses during the pandemic lockdown. Both staff and students needed to download the Moodle mobile app to allow mobile friendly access via mobile phone. The offering of lectures would be limited to text, Power-Point lectures and Power-Point with audio. Videos and simulations were allowed for faculties such as Science, Technical education, Education and Health Science, to assist with practicals. Students were to be encouraged to download content onto their devices and to access offline from their devices to conserve bandwidth. There would be no direct streaming from the Moodle servers. For assessment, only internal assessments using assignments were recommended. One limitation was that competency-based assessments as well as online examinations could not be offered at this point in time. This was one of the tasks that the Moodle team were working on to come up with possible solutions and feasible alternatives.

6) Awareness for staff and students

Once finalized staff and students need to be briefed of the Implementation Plan using awareness sessions. Online flyers, brochures on use of Moodle, posts on the NUS Facebook, and website as well as email messages using allstaff and allstudent group email were used to inform staff and students on the details of the online implementation.

7) Backup/Contingency Plan for Moodle Infrastructure

Critical to the implementation of online learning was the stability of the network as well as the Moodle server and the additional fileserver. Several strategies had been compiled to provide backup and redundancy: These included: i) synchronization of the Moodle and file server with Google drive to allow for backup and alternative storage; ii)

as mentioned earlier, securing additional Internet bandwidth from a secondary provider to supplement our primary provision; and iii) the placement of backup Moodle servers in both primary and secondary ISP providers for redundancy.

8) Additional Training for Staff

After initial training sessions, based on the feedback of the Moodle team of instructors, the following areas were identified for further training: i) how to teach using forums, audio lectures, ii) If bandwidth permits, how to record and deliver live lectures using Moodle or Zoom, iii) how to create assessments using the quiz option of Moodle, iv) how to set and receive assignments in Moodle and lastly how to keep the gradebook in Moodle

9) Engaging Students and Staff and Developing a Community of Practice

Staff were encouraged to engage students as this was a point of continuous concern. Studies on the effect of the pandemic on teaching and learning point to the lack of student engagement as a common issue (Dhawan, 2020). Means of engaging students included the use of chat sessions, use of forums to engage students, sending email messages of encouragement, and use of live lectures via Zoom or Messenger to establish some form of online presence. Moodle reps and Helpdesk would also continue to monitor student engagement to ensure no student was disadvantaged. Staff were also encouraged to share their experiences and to help each other by sharing useful tips. In this way the staff would develop and nurture a community of practice providing support for each other.

10) Alternative Means of Online delivery

Staff were encouraged to use alternative applications to support online teaching to supplement Moodle. For example, the use of Messenger, Skype, Zoom, Facebook, Radio and tv broadcast. Another aspect of this was the provision of multiple modes of delivery thereby ensuring that no learner was left behind through the offering of classes via the various modes and across a range of modalities. Learners with no Internet access could also attend classes through radio and tv or given printed materials.

11) Assessment

Assessment methods such as assignments and online quizzes could be implemented in Moodle. However, NUS needed to decide on assessment of courses for semester 1. Possible options included i) offering of final exams fully online and ii) all assessments to be internally assessed and there would be no final exams. If final exams are to be conducted online, Moodle team could assist staff in creating online exams (using the quiz option and restricting time, exam is active) as well as assist in scheduling them. For example, the usual 3-hour exams perhaps could be split into say 3 x one-hour exams. Another option to be considered was that all assessments could be Internal Assessment or course work and no final exams. Additionally, if there were to be final exams, these exams could be all theory and with no practical component. In terms of long-term initiatives, NUS has also been working with COL on assistance with competency-based assessments (CBA) as well as fully online examinations.



Fig 2. Moodle team member offering Moodle training for staff

C. Issues In Converting Courses For Online Delivery

Numerous issues and challenges emerged in the implementation of the transitioning to online mode. Some of these issues have been mentioned previously and are described in the following section along with possible solutions.

1) Access of students to online courses from home

A serious concern ahead of online delivery was the affordability of student access to online courses. There was the issue of access devices as not all students had mobile devices or tablets to access online from home. Another issue with access was whether students all had sim cards and data to access Moodle from home. NUS management then approached both Vodafone and Digicel for donations and each company donated 1000 zero data sim cards which would enable student to access Moodle and all educational sites free. This donation of sim cards provided much needed support in enabling access to online courses in times of lockdown. The two companies continue to provide this much needed service to all students in schools in Samoa.

2) Bandwidth and Server Congestion issues

The ICT division had to ensure sufficient bandwidth for offering of courses simultaneously online. A real concern was the congestion of the network as hundreds of students attempted to access courses online at the same time. Bandwidth considerations amplify if there were live lectures via video streaming.

Another major issue was congestion of the network server in terms of volume of processing. Server processing power needs to be adequate to handle the volume of processing required of the server. To address this issue ICT division indicated that they will prioritize traffic to the Moodle server and deploy QoS to ensure that even in the event of congestion, critical applications like Moodle and accessing the webserver/fileserver for downloading bigger files (You tube etc) can still function. As well, a redundancy option implemented by the ICT section, was the virtualization of servers and creating another instance on another virtual machine for backup. To ensure preparedness, ICT division also needed to do stress tests on the network as well as volume/bandwidth calculations of possible scenarios.

3) Instructional delivery issues

Various issues needed to be resolved in using online instruction and delivery of courses. One such issue was the determination of what aspects of the curriculum could be delivered online realistically due to the short preparation time for this emergency initiative. Consideration needed to be given on whether staff should just focus on students accessing course content or should there also be an attempt to offer live lectures by video streaming – as mentioned above. Ideally, there was a need to allow for a mixture of media content such as stored video, live video, and PowerPoint. However due to bandwidth constraints, lectures were limited in form to text, PowerPoint, or PowerPoint with audio.

For video production, lecturers needed to have access to a camera, internet headphone and microphone. Hence these needed to be provided to staff upon demand.

As mentioned earlier, assessment was an issue and although Moodle offered assessment tools, additional time and dedicated workshops were needed to teach lecturers these skills.

D. Conclusion and Recommendations

The focus of this paper has been on the implementation of the transitioning of NUS courses from a hybrid mode of delivery using face to face supplemented by online delivery to fully online mode. This took place during the pandemic lockdown of 2020 when the country declared a state of emergency and went into lockdown for 3 months. The discussion focused on key activities as well as issues and challenges faced before and during the implementation of this transitioning.

As mentioned earlier, the main goal and outcome of the Moodle Implementation Workplan was to explore and implement strategies to build resilience to ensure teaching and learning continuity during the 2020 pandemic lockdown. And this is what NUS set out to do – not only to find ways to recover from the shutdown, but also to adapt and mitigate the impact of future lockdowns due to lessons learnt from these experiences.

From the NUS experiences during lockdown and the implementation of its Moodle workplan for transitioning to online, the following recommendations are made:

- i) The need to devise a plan with clear goals for the transition to emergency and remote teaching and learning.
- ii) Upgrade of servers, bandwidth, network capacity, and additional storage for increased utilization.
- iii) Adoption of multimodal range of course delivery tools to ensure student access
- iv) Establish a plan for access devices for staff and students.

- v) Devise a plan for internet access such as subsidized or zero data access as well as backup provisions for internet.
- vi) Provide adequate technical support for staff and students.
- vii) Prioritise capacity building for staff and students to ensure teaching and learning continuity.
- viii) Prioritise monitoring of staff and student engagement and development of communities of practice.
- ix) Explore and trial assessment strategies for online exams as well as competency-based assessments.

These recommendations mirror and are very similar to the recommendations in a set of guidelines on distance education provided by the Commonwealth of Learning (2020). The experiences shared here and the issues and challenges faced, are also very similar to experiences shared in the following studies (Aboagye, 2020; Duraku & Hoxha, 2020; Gillis & Krull, 2020; Liu, Chen & Pugh, 2021; UNESCO, 2020; Zalat, 2021), as well as the experiences of Latin American universities as shared in the report on a study on Latin American universities and their experiences during COVID lockdown (UNESCO IESALC, 2021).

In conclusion, the implementation of this transition has given much needed and valuable experience for both staff and students in strategies to build resilience to ensure teaching and learning continuity. It has also provided valuable lessons in issues that need to be resolved such as student access, training, bandwidth and server congestion, instructional delivery, assessment, as well as learner engagement. Despite the challenges, it is comforting to know that NUS is now prepared from this lockdown experience to transition back to fully online whenever the next lockdown takes place. As mentioned earlier, this is what building resilience is all about-". *the ability to recover in ways that seek to learn from the experience, to adapt and to mitigate the impact of future similar challenges.*" (COL, 2020).

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