

Teaching and Learning with Technology

Pushing boundaries and breaking down walls



Som Naidu &
Sharishna Narayan (Editors)

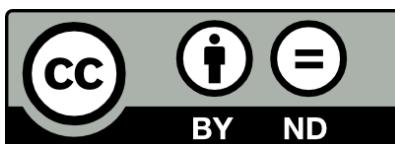
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Som Naidu & Sharishna Narayan (Editors)



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FOREWORD



PROFESSOR RICHARD K. COLL

Deputy Vice-Chancellor (Education)
The University of the South Pacific

It is not uncommon for modern universities to operate multiple campuses, in multiple geographical locations internationally. However, the University of the South Pacific (USP) is unusual in its structure, demographics, location, and stakeholder base. It is one of only three genuinely regional universities, distinguished in that it is owned by 12 member states (in the South Pacific) and its geographical location, spread over some 33 million square kilometres of ocean. This provides unique challenges, given USP has always been committed to providing as equitable access to quality education as possible given the complexity of its operating environment. This is made even more challenging, given the variation in size and infrastructure in its member countries. Some member states, like Fiji, are reasonably well developed, others are small island states (Nauru is a single island state, circa 6 km x 4 km in size), with small populations (in the 1000s), highly isolated by the vast Pacific Ocean, with modest resources and information and communications technology infrastructure.

From the onset, the university has provided face-to-face and distance education. In the last 10 years, it has moved from

more traditional models of distance education, exemplified by print modes of learning where students are sent hardcopies of workbooks and supported by (at that time) a unique satellite tutorial system, to a genuine flexible mode of learning more recently, that is characterized by substantial online and blended learning modes. The university's recently completed Strategic Plan 2013-2018, signalled the challenges and ambitions facing the University. This plan stipulated that the university would, by its completion in 2018, ensure 30% of its undergraduate programs would be available online and 60% of undergraduate programs offered by flexible modes. These targets were achieved with a substantial investment in infrastructure, and professional development support provided by the Centre for Flexible Learning.

By the beginning of 2019, the university found itself in the enviable position of being able to kick on with further development and evaluation of the success of these efforts. The work of the university captured in the Strategic Plan 2013-2018 was complemented by substantial support from international donors such as the New Zealand Ministry of Foreign Affairs and Trade and the Japan International Cooperation Agency, which has resulted in the refurbishment of USPNet, the University's satellite communication system. This work is ongoing, however, and along with the planned rollout of fiber optic cables to many member countries, it means the university can move forward with renewed confidence and put further emphasis on how we can better use technology to enhance learning, teaching, and support services. We can now focus on the pedagogy and not so much on technological and infrastructure limitations (although some resource limitations are still pertinent in some member countries). This book showcases projects that seek to move this agenda forward.

The genesis of this book lies in a longstanding commitment by USP to do its utmost to provide high-quality tertiary education to its diverse student body. I warmly congratulate Professor Som Naidu and this team of dedicated professionals and welcome the contributions to the scholarship of teaching that they showcase in this important work. The book is remarkable in the diversity of its topics, testament to the complexity of the environment in which USP operates, but also to the enabling opportunities modern technologies provide to tertiary institutions. I am sure it will be of great interest to the various stakeholders from member states of USP and to educators and scholars working in complex and diverse educational environments.

PREFACE



PROFESSOR SOM NAIDU

Pro Vice-Chancellor
Flexible Learning and Director,
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The University of the South Pacific

Interest in the influence of technology on learning and teaching is of critical importance and one on which debate has been raging for some time (see Clark, 1994). Dubbed as the “media versus method debate” (see Becker, 2010; Moffat, 2013), proponents of the importance of a focus on teaching method led by Richard Clark have argued that technology in itself cannot influence learning. Their suggestion is that technology is a vehicle much like a delivery truck that has no influence on the quality of the goods it delivers (Clark 1983, p. 445). The counter argument, led by Bob Kozma, suggests that technology certainly has the potential to influence learning and teaching (see Kozma, 1994).

We think that the influence of both, the medium and the method, on learning and teaching is closely connected and difficult to separate. Therefore, instead of taking sides in this controversy, we believe the more useful question is to ask how we can optimize the attributes and affordances of technologies to

improve learning and teaching and empower learners and teachers.

As a multimode educational institution, the use of technology at the University of the South Pacific is critical to all its learning and teaching activities. In the early days of its establishment, these technologies included the printed text with limited audioconferencing. Currently, they include a wide range of online learning technologies including audio- and videoconferencing over the Internet, as well as print online. In order to examine how these technologies are used to empower learners and teachers, the university made available a small amount of money to help staff integrate technology in teaching and learning and study its influences. Expressions of interest to access these funds were called from across the institution on innovative applications of technology integration in learning and teaching. This call sought proposals for investigations into how technologies can leverage dimensions of the learning and teaching transaction articulated in the learning and teaching policies of the university, especially the “Flexible Learning Policy” (The University of the South Pacific, 2017).

Invitations for full proposals needed to include clear identification of the issue or problem and/or gap in our understanding of the issues, unanswered questions, and a clear methodology including plans for data gathering, and its analysis and interpretation. It also needed to include a detailed budget with costs for staff time designing and doing the research, data gathering, analyzing, reporting, and writing. A carefully orchestrated program of design and development as well as evaluation of the impacts of their activities on the learning and teaching transaction was developed for grant recipients. This comprised regular group-based workshops as well as individual consultations to ensure that all the recipients had the support they needed, were moving at the same pace, and achieving their goals and aspirations.

Projects in the first round of this initiative covered issues and challenges around designing for mobile and blended learning, assessing learning outcomes in large online learning contexts, embedding academic literacy, and using technology for specialist needs such as disability support.

Mobile technologies such as laptops, tablets, and mobile phones are becoming increasingly affordable throughout the Pacific. Along with improving connectivity, these tools provide exciting opportunities for the design and development of innovative approaches to learning and teaching. Three projects in this book explored the use of mobile devices for improving the learning and teaching transaction at the university. One of these, “Designing for mobile learning” by Fulori Manoa, Jope Tarai, Romitesh Kant, and Smita Singh, highlights that with improving access to mobile devices and connectivity, there is a heightened imperative for developing educational content and designing learning experiences that are mobile friendly. This is also one of the key messages of the work that is reported in the chapter “Evaluating students’ perceptions of blended learning” by Eroni Racule and Ralph Buadromo. This work highlights the importance of careful design of different kinds of blended learning environments in order to optimize learning opportunities. A good example of this kind of work is reported in the chapter “Engaging with living histories” by Ralph Buadromo, Sanjeet Chand, Nicholas Halter, and Ariti Taufaga. This project involved the design and development of a mobile application that helps students engage in collaborative collation, curation, and communication of local knowledge about key historical sites in Fiji. The work reported here demonstrates how critical affordances of mobile tools such as their ability to capture, store, and share information, when combined with powerful learning strategies such as collaboration and fieldwork, can leverage learning outcomes. This is a particularly potent finding because fieldwork is not normally associated with the study of history, a subject that is seen as too boring because of its focus on historical and often static information. The work reported in the chapter by Pita Tuisawau, “Collaborative reading online with Perusall,” is

another strong example of combining a powerful learning strategy with the affordances of technology. In this case, the technology is Perusall, a tool that helps support group-based reading online. It addresses the problem of a lack of interest among students in reading as well as encouraging collaborative reading online. An important contribution of this line of investigations is the shift of emphasis from motivating the learner to study to developing motivating learning environments to encourage the learners to want to study (Ng, *in press*).

A contentious issue in learning and teaching is the assessment of learning outcomes, and it is especially so in the context of online learning, specifically in the case of large online cohorts. The chapter “Using peer assessment for formative assessments in large online classes” by Krishan Kumar, Bibhya Sharma, Gavin Khan, Salsabil Nusair, and Sunaina Nair shows how peer assessment strategies can be deployed to help out not only with the challenge of marking and grading but with using the opportunities that peer assessment affords as a learning strategy. Placing this kind of responsibility in the hands of students will need careful design and orchestration. The work by Rajni Chand “It rains a lot here”: Online assessments versus Mother Nature, Irene Mary Chief and Parijata Moeava on “Supporting flexible assessment of competencies with ePortfolios”, and Evan Naqiolevu on “Researching learning and teaching technologies for flexible learning” offers critical insights on how students as well as their teachers might approach these challenges in online learning contexts.

A further challenge in the contemporary educational space is the transition to learning in tertiary educational settings that is heightened in technology-dense and increasingly self-directed and flexible learning environments. It is an issue that is compounded in settings where language also poses a challenge. This is the focus of the chapter “Supporting the transition to tertiary level: How students engage with academic literacy” by Fiona Willans, Ralph Buadromo, Tilisi Bryce, Rajendra Prasad, and Aluwesi Fonolahi. The work that is reported here responds to

the need to do more to support students in making the transition to tertiary studies in online learning contexts by embedding academic literacy support and explicitly teaching and assessing academic and communication skills in context.

Two projects led by Mansour Assaf show how contemporary technologies can be used to help with various other educational challenges, namely assisting persons who are physically or financially challenged. These are “Enabling students with severe disabilities to communicate with learning environments” by Mansour Assaf, Rahul Kumar, Krishneel Sharma, and Sharishna Narayan and “Providing equal educational opportunities with a technology-based scholarship platform” by Mansour Assaf, Krishneel Deo, Sarvesh Chand, Divnesh Prasad, and Sharishna Narayan.

A key objective of this whole initiative has been to push traditional boundaries of the teaching and learning transaction and break down the walls among contributors to this process. The acts of teaching, often seen as the sole responsibility of the teacher, are unsustainable in a technology-dense educational environment. They require not only subject matter knowledge but also technological and pedagogical knowledge (see Kurt, 2018; Mishra & Koehler, 2006). However, few tertiary teachers will have adequate expertise in all these three areas, which means that the majority will need the support and the close cooperation of learning experience designers, educational technologists, and media producers. Teaching can no longer be a private affair confined to the four walls of the conventional classroom, for the contemporary classroom may not have walls, and teaching is not simply about the communication of the subject matter knowledge. As such, this initiative has been as much about building capacity among teaching staff in the integration of technology in their teaching.

In this book, we have been keen to show how teaching staff made sense of the challenges as well as the opportunities that technologies posed, as well as how they dealt with these, and the lessons they learned. Capturing their experiences has required some serious introspection and critical reflection. These are their stories. Like the voyages of pioneers, they reflect deep insights on their lived experiences that included extensive travel in the region. We hope that these stories will encourage and entice you to embark on your own journeys in teaching and learning with technology and tell us your story.

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DESIGNING FOR MOBILE LEARNING

Fulori Manoa, Jope Tarai, Romitesh Kant, and Smita Singh

It is late afternoon, and Alosio, aged 38, rides out on horseback to collect his cattle but first he will make for higher ground. Smartphone in hand, he rides up a hill to where the mobile network signal is strongest. Accessing the Internet, he downloads learning materials, usually lecture videos, as these are harder to download closer to home. Nightfall finds Alosio back at home after a tiring day; after dinner, he retires to bed but his day is not over. Making himself comfortable, he accesses the videos he downloaded earlier and watches a couple of lectures before he sleeps. Alosio is a remotely located University of the South Pacific (USP) student. Owing to his location, Alosio is not connected to the grid, he uses a solar panel to meet his electricity needs; because of this he has to be smart about his device usage. He has a laptop and he does use that, but it needs a lot of power to get it fully charged. His smartphone requires much less electricity and he can still access his learning materials. Knowing this, he has invested in a more expensive smartphone model, one that is able to keep up with his learning needs.

Abdul, aged 24, was in town, in Savusavu, one day and he had some free time. He was on his smartphone and he decided that he would try to use his time wisely and log on to Moodle. Abdul, as a working, part-time USP student (also studying remotely), knows the value of time. So, he opened up the Web browser, typed in the URL and waited, and waited, and waited. Finally, he was able to log in, he was looking at the Moodle page but he was not able to access his learning materials. He could see

the links to the lecture videos, and the notes but he was unable to download them. This was the only time that Abdul tried to access Moodle on his smartphone. He has not tried again and he will probably not do so unless he is sure that not much time will be taken up trying to log in. Closer to exam period, Abdul will sometimes transfer notes and videos onto his smartphone from his laptop, but this is not something that he is very enthusiastic about.

Sanjeshni, aged 32, is a remotely located USP student who lives about half an hour out of Savusavu. She finishes work in town at 1 p.m. every day and she has to catch the bus home at 2 p.m. This is to enable her to spend quality time with her children as well as to finish up the household work. If she misses that bus, she has to wait until 3 p.m. for the next one, which is also the last one. This does not give her ample time to access all her learning resources at the USP in Savusavu. With access and time being challenges that she faces, she recalls fondly the semester that she took a course that she felt was designed well for access on her smartphone. Using her smartphone, she could easily access the quizzes, videos, and her notes. She would use her smartphone to engage on Moodle while traveling and when her household work was finished and she was relaxing with her children in front of the TV. She liked the experience, and it worked well for her and her schedule. Currently, she does not use her smartphone as much for Moodle because the courses she is taking have “too many Word documents” and she finds that she cannot download them successfully. If she does, they are difficult to read, and this has put her off.

Jone, aged 24, is a remotely located USP student who splits his time between Nadi and his village in Ra. He usually travels down to his village on Fridays, and on this particular Friday, he discovered that he had not completed a quiz that he was being assessed for and that was due that afternoon. On his visits to the village, Jone does not take his laptop, so he had to use his smartphone to complete the quiz. He found he could—he completed his quiz with minutes to spare, and this experience opened his eyes to the learning possibilities available through his

smartphone. Whether during extended breaks in his plantation, while fishing, at home or traveling, Jone now regularly completes quizzes and forum postings from his smartphone; he also uses it to do his readings, watch videos, do research, and stay on top of his emails.

We (the authors) have changed the names of all our student participants to protect their identities, but their stories are real. This is their story and the story of other remotely located USP students and their interaction with mobile learning. It is also the story of how we, as researchers, are able to tell their stories.

WHAT MOTIVATED US TO TELL THESE STORIES?

As educators, as educational technology enthusiasts, and as scholars, we hear a lot about mobile learning, but what exactly is it? On surveying the literature on mobile learning, or m-learning, the simplest definition is that essentially (and because of the rise in technology), mobile learning is “learning with mobile devices” (Traxler, 2010, p. 130). Further, to qualify as mobile learning, the device used must be usually carried by the person, easy to use, and used continuously. The distinction has been made that the device must be “small” and “portable” (McConatha, Praul, & Lynch, 2008, p. 15) and that it must fit and be fully functional in the user’s hands (Brown & Mbati, 2015; El-Hussein & Cronje, 2010; Kukulska-Hulme & Traxler 2007).

As of 2018, Fiji’s rate of smartphone adoption stood at 43%; this number is projected to rise to 72% by 2025 (Global System for Mobile Communications Association, 2019, p. 14). It makes good sense that existing—some may say prevalent—technologies and students’ proficiencies are harnessed to enhance learning and teaching (DeGennaro, 2008). As educators here in Laucala, we see our students constantly on their smartphones. In tutorials, we see smartphones (and to a lesser degree, tablets) being used as learning tools. Students store their readings and activities on them and refer to these in their discussions. This, though, is in Laucala, USP’s main campus,

where they have face-to-face instruction, and access to learning resources is relatively good.

Although we teach online to students from across the USP region, and as we are from the region as well as having done a good number of campus visits, we were aware that access was an issue. That mobile learning is greatly beneficial to (or even a subset of) distance education is a well-established view that many hold (Brown & Mbati 2015; Crompton & Burke, 2018; Traxler, 2010). Due to smartphones and tablets being relatively cheaper (compared to desktop computers and laptops) and having an increasing level of functionality, we felt that these mobile devices could be especially beneficial to USP students studying remotely (we defined studying remotely as those students studying outside Laucala Campus; where access to instructors and resources is limited) through flexible mode. We hypothesized that mobile learning may help alleviate the problems of access.

Naturally, then, we started thinking about ways in which we could design mobile learning interventions for our online students to enable them to comfortably engage through their mobile devices.

However, prior to doing this, we knew that we had to find out what our remotely located online students were currently doing with their mobiles, in terms of studying toward their USP qualifications. We wanted to know if and how the benefits of mobile learning were already playing out on the ground. In short, we did not want to start designing for mobile learning until we knew who we were designing for and how they used their mobile devices.

In 2013, USP also introduced their tablet learning project (USP, 2019) and has recently put out the USP Mobile App; therefore, we knew that mobile learning was an institutional priority. This knowledge, compounded by USP's flexible learning drive, served as an added impetus to our study.

HOW DID WE GO ABOUT FINDING THESE STORIES?

In July, September, and October of 2018, we conducted and recorded semi-structured in-depth interviews in English with remotely located USP students. These students were located on Vanua Levu (Bua, Savusavu, Labasa) and in Western Viti Levu (Ba, Lautoka, Nadi). A total of 60 (27 males, 33 females) students chosen through purposive sampling (specifically maximum variation sampling) and interviewed. They ranged in age from 19 to 50 and were enrolled in 12 programs (ranging from pre-degree to postgraduate, with even more variation in majors), from across the three faculties and Pacific TAFE.

Apart from ensuring anonymity for our interviewees, to gain Human Ethics approval from USP, we needed to be able to show that no team member would be put in the potentially compromising situation of interviewing their own current students. We were careful not to let this happen.

Data collected during the interviews provided us with information on how students were able (or not) to use their mobile devices when enrolled in USP courses and how they use (or not) their mobile devices for learning. We also explored other apps and services that these students used regularly on their mobile devices. Moodle and access to Moodle were a primary focus due its status as USP's learning management system of choice.

We wanted to find out more about the experience of the student, to be able to answer the question, "How are students using their mobile devices to learn?" This is why we decided to use more qualitative research methods, most prominently in-depth interviews and to a lesser extent participant observation. We wanted to capture details, we wanted to be able to tell Alosio, Sanjeshni, Jone, and Abdul's stories. We also knew that qualitative research with a smaller sample size could reveal nuances and angles that could inform and enrich later quantitative research (Hoepfl, 1997).

Ideally, we would have liked to spend longer laying the groundwork for selecting our participants and identifying students to interview. We would also have liked to have had more days to actually carry out the interviews because, as it was, we felt a bit rushed. The dates of our interviews were stretched out but in reality we had only a few days at a time to carry them out. This was especially true in our first interviews as we were caught unaware by the fact that for many students, the last bus was much earlier than what we were used to and expected. This limited the number of interviews that we could carry out. It would have also enriched this study if we could have interviewed students in other countries within the USP region; barring that, identifying and interviewing students on other islands in the Fiji (apart from the main two) would have also been beneficial.

WHAT DID WE LEARN FROM THE STORIES?

Most students use or have used their mobile devices to access learning content but prefer laptops and desktop computers to complete learning tasks.

Out of the 60 students interviewed, 59 had used their mobile device (or someone else's mobile device) to access Moodle, their learning materials, or other USP course-related learning materials. Interviews as opposed to surveys were beneficial as initially some students would deny using their mobile devices as learning tools. However, after further questioning, it would become apparent that they had used them and that they still do. For most students, a mobile device meant a smartphone; three students also mentioned using their tablets but they also used their smartphones. Of the 60 students surveyed, 59 had smartphones. We found that due to the aforementioned criteria of a mobile device being portable and able to be functional in the user's hand, the smartphone was the best fit. For us, mobile

device became synonymous with smartphone in the context of this study; therefore, our recommendations are not just targeted at mobile-friendly design but rather smartphone-friendly design (Vázquez-Cano, 2014; Yavuz, 2016).

Most students who have ready access to laptops or desktop computers prefer to use them to access their learning materials on Moodle. This preference is due to the increased functionality. They are able to read documents without having to enlarge them and they are also able to work on and then upload their assignments. Nevertheless, these same students who use desktop computers or laptops will still use their smartphones once or more a week to check things like marksheets and their Turnitin similarity index. In addition, many of these students use their smartphones to catch up on their readings and messages.

Students see smartphones as a tool for flexible learning.

At the club. You know how your friends will take you and while you are there than you remember oh! I have to do my quiz, and you just worried that you cannot get your laptop at that time because someone can come and swipe it. But you get to do it there and then. (Alena, 22)

Students typically use their mobiles to engage with learning content on transportation to and from campus, during social gatherings, and at home. This supports the view that mobile learning takes place across different contexts (Matias & Wolf, 2013). We note that there is a call for designing course content that specifically makes use of this facet of mobile learning (particularly through active learning) (Dyson, Litchfield, Raban, & Tyler, 2009; Fisher & Baird, 2006; Martín, Carro, & Rodríguez, 2006; Sølvberg & Rismark, 2012) but this is not our focus in this reflection. Designing this way may not be the best approach if students will be accessing the same course content through

avenues apart from their mobile devices, but this is useful to remember this when designing instruction.

Some students prefer smartphones as they are easier to carry.

Sometimes when I come to school, like for laptops, I could not bring it because my laptop is very heavy so I just get my phone and I use it to access Moodle ... so when it [computer lab] is fully booked, I just sit around the library or somewhere and use my phone.
(Ropate, 24)

Students who do not have laptops or who find laptops cumbersome to carry rely heavily on their smartphones. Students found that the labs were usually crowded; therefore, they would rather find somewhere to sit on campus where they could bring out their smartphones and access their lesson content. This is important because students rely on the free Wi-Fi at their nearest campus; mobile data was an expense that was incurred only if funds were readily available.

More remotely located the students rely more heavily on their smartphones.

I do the research because from Ba to Lautoka the Internet is good there. Yeah, like from there I have 45 minutes to read it and check for other information there. And when I am traveling from Ba to Lautoka there is very good Internet services, I can also check my email there. [on using smartphone as a research tool] In Word I copy and paste or I just do the screenshots and it is easy to refer at home. (Preetika, 20, lives in rural Ba, where there is no Internet connectivity and travels most days to Lautoka

Campus, via Ba Town which is a 30-minute bus ride from her home.)

Of the students who rely heavily on their smartphones as learning devices, those who live and study in more remote locations (outside of the urban centers of Ba, Lautoka, Labasa, Nadi, and Savusavu) rely more heavily on their smartphones. They use their smartphones to do more, including but not limited to carrying out postings, taking quizzes, reading their notes, and watching their lecture videos. Reasons for their heavier reliance on their smartphones include connectivity and flexibility. For very remotely located students, who rely on solar power as their main source of electricity, a cloudy day would necessitate turning off the laptop and using their smartphone as this requires less electricity to charge. A student studying in a rural location preferred to carry their smartphones to their plantation to study in between working there. This was because they did not want to be ridiculed for trying to look like they were showing off their laptop and status as a university student. These are students like Alosio and to a lesser extent Jone.

Smartphone use is very heavy during exam period, assessment due dates, and natural disasters.

I can remember when I was out for my exam which requires me to do a calculation, then quickly I remembered that I have access to these formulas from Moodle notes, and on my way to school I went to Moodle, access my notes and luckily the exact same thing came in the exam ... it's exam time, there are lots of papers here with me and rather than digging in my bag, and taking out my papers I just retrieve it from Moodle by using my mobile phone and it does not have to be messy. (Hrithik, 31)

Students who would not otherwise regularly use their smartphones find them extremely convenient as a study tool during exam period. Students reported heavy use before they sat exams. Students also used their smartphones to meet deadlines for submissions when they were unable to access their laptops or desktops.

When discussing meeting deadlines, another theme that emerged was that when there were network interruptions on campus or when there was a natural disaster, smartphones were seen as lifesavers. As online students, these students have course coordinators in different campuses, and it was reported that sometimes they were not given extensions during floods and cyclones. In these situations, students used their smartphones to, among other things, obtain Internet access via a hotspot and to even type up and submit assignments.

Smartphones make for easier interaction and collaboration.

The Viber signs comes and then you can like there is a time like from 9–11am where the tutor is online and you can like text and ask on Viber online and whatever you text him and then he is responding at that particular time ... We had 6–7 students and we all drafted and do everything through Viber, and we practiced it through Viber, where we have the video. (Prashila, 39, on using Viber to communicate with instructors and to collaborate on group work)

Even though some students did not access Moodle on their smartphones every day, they did use them to communicate with each other for group assignments, discussion, and mentorship. Viber was the most frequently used because students found it easy send documents to each other through Viber. Students reported belonging to Viber groups with their peers and in some instances their coordinators or tutors. Students who had

communicated with an instructor through Viber rated that interaction as very useful as they were able to get instant feedback during a set time each week. A more mature-aged student (50) who was interviewed did not use mobile apps to communicate with their classmates in Fiji; they mentioned regularly using the free calls or credit provided by their mobile network.

Mobile literacy is a need.

It is also worth noting that many students lack the mobile technology literacy needed to better engage with their smartphone as a learning tool. For example, a few students complained that it was hassle always having to log on to see their student emails. On further questioning, it became apparent that these students did not know they could sync their student emails with their existing email apps. Like Sanjeshni, some students reported that they were discouraged from using their smartphones more often because they were not able to open up certain file formats that were uploaded onto Moodle. These students did not know or were uninterested in the availability of applications that would have enabled their smartphones to open those files. Still other students reacted like Abdul, where a bad first experience, or couple of experiences, colored their view of mobile learning. On the other hand, students with high mobile literacy would demonstrate the many ways they used their smartphones, for example, setting alarms for assessment due dates, conducting research, staying on top of their emails, and posting and engaging on Moodle. From their narratives, it seemed that these students are more engaged with their course content, and this is something we would like to investigate further.

Targeted design would improve the mobile learning experience.

Students shared with us the challenges they faced in accessing Moodle via their smartphones (see Table 1 for examples with our

proposed recommendations for minimising those challenges). These recommendations are interlinked, and some challenges can be solved in more than one way. For example, by subsidizing smartphones that have increased storage and capability and providing mobile learning orientation, many of these challenges can be overcome.

Table 1. Design recommendations to improve mobile learning experiences.

Challenges in accessing Moodle via mobile	Recommendations
Videos are too long or video files are too large because the videos are too long.	Shorten lecture videos (series of videos instead of just the one) and upload the files in formats and sizes that are readily mobile accessible.
File formats cannot be viewed (or are more difficult to view) via smartphones.	Upload readings and documents in PDF (Moodle Book and Word are not mobile friendly). Other formats are friendlier (e.g., like ePUB), but many students had not heard of these formats or were uninterested in downloading additional apps.
Because of mobile device storage capacity and capabilities, some students admitted to removing or deleting personal data (e.g., photos and apps) to accommodate larger files, which resulted in anxiety or loss of interest in some of the required course downloads or materials.	Ensure that uploaded content does not exceed certain size limits. USP or sponsor agencies could subsidize or sponsor smartphones with more storage and capabilities.

Most assessments are difficult to complete and upload via mobile devices.	Design more mobile-friendly assessments and activities.
For older students, mobile literacy was an issue highlighted. Some students were not aware of how to use their mobile devices for emails or Moodle logins.	Implement mobile learning orientation for staff and students, complete with training on apps for opening different files and how to use email apps to access student email. This could be incorporated into existing Moodle orientations and workshops provided for students and staff (especially but not limited to those staff members who teach in flexible mode).
Many students who were mobile savvy needed extra training on how to use their smartphone devices as learning tools.	Integrate Moodle with USP Mobile App to make it easier to access lesson content and receive assessment reminders. Implement training on the use of and design for Moodle App (from Moodle HQ).
It is inconvenient to have to log on repeatedly to access student email and Moodle.	Create folders and pages to house Moodle content so as to enable students to easily find their learning resources and minimize scrolling time.
When accessing Moodle via smartphone, scrolling down the page to find the required resources is too time-consuming.	

FINAL REFLECTIONS AND LESSONS LEARNED

Embarking on this research has been very useful; not only has it been fruitful, in terms of finding out how students are actually engaging with our content, it has also helped us become better teachers and online facilitators. Meeting students and being in

their contexts has helped us understand better the difficulties they face. This has given us an empathy that is driving us to help shape our course to deliver content and assessments that are relevant, practical, and achievable for all our students.

Our understanding and application of research in this field has also grown. Initially, we had tried to take on too much—we had wanted to carry out this exploratory research and then design mobile-friendly exercises and see whether they improved student engagement. We would then conduct more interviews, then test a further iteration before coming to a conclusion. We were giving ourselves 6 months to do this, and in hindsight, we see that this would have been too intensive given that we all had full teaching loads. Recognizing this, we shifted our focus earlier on to just the mobile learning habits of remotely located students and the ways in which this information could be used to impact design. This was a blessing in disguise as it enabled us to focus more on discovering and telling the stories of students like Alosio, Abdul, Sanjeshni, and Jone.

We are fans of design-based research (Barab, 2014; Barab & Squire, 2004), and our findings have also influenced our redesign of the UU200 Ethics and Governance Online Mode Moodle page to make it more mobile friendly; this endeavor has shown some promise in terms of student engagement. However, more thorough investigation and further iterations and testing are needed to be credibly conclusive.

We are also eager to continue to investigate mobile learning in Fiji, particularly its nexus with student engagement.

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EVALUATING STUDENTS' PERCEPTIONS OF BLENDED LEARNING

Eroni Racule and Ralph Buadromo

INTRODUCTION

Blended learning was formally introduced to the University of the South Pacific (USP) in the early stages of the University of the South Pacific's strategic plan for 2013–2018 (USP, 2013). Since its inception, there has been very little to no formal resemblance of a strategy or framework to guide blended course development; therefore, USP's blended courses tend to resemble a plethora of modes and media that may not be conducive to effective teaching and learning. The Centre for Flexible Learning (CFL) has been developing courses in blended mode (with teaching staff) since 2013, though most of these resemble online courses. Compounding this is the fact that not all teaching staff work with CFL to develop effective blended courses. Since the introduction of this mode of learning, the USP has placed a lot of emphasis—through its 2013-2018 strategic plan—on the transition toward technology-enhanced teaching and learning (particularly the move toward making more programs available in flexible mode) with very little done to evaluate its implications for, and impact on, students and staff and their practices. With more and more courses moving away from

the traditional face-to-face mode, an evaluation of the blended mode at USP needs to occur. USP (2019) defines a blended course as:

One that blends online and face-to-face delivery. Sometimes blended courses are referred to as hybrid courses. Furthermore, a blended course is one where a substantial proportion of the content, that is, 30-79%, is delivered online, typically uses online discussions, and typically has some face-to-face interaction between student and lecturer or tutor. Blended courses may also have a (print) *Course guide* or *Study guide* and can be offered to both Face-to-face and Distance and Flexible Learning students. (p. 26)

Therefore, USP's blended courses come in a variety of mix and match, with the gray area resulting from how lecturers have interpreted the institutional definition of a blend in terms of the liberties they have taken within the specification of the parameters (Racule & Hazelman, 2018). The literature on blended learning talks about a classification of blends. Bonk and Graham (2005, p. 13) classified blended learning systems into three major categories:

- (1) enabling blends – primarily focus on addressing issues of access and convenience;
- (2) enhancing blends – allow for incremental changes to the pedagogy but do not radically change the way teaching and learning occurs; and
- (3) transforming blends – blends that allow a radical transformation of the pedagogy.

When we (the authors) began this journey, the enormity of the task and the complexity of the subject never really dawned on us until much later in the planning phase. What started off as an attempt to evaluate this mode of learning and to also map out a

strategy to enhance current learning design practices at CFL turned out to be a more complex process than initially anticipated; as it had to encompass broader themes and other intricate issues that shaped the landscape of blended learning and teaching at USP. The primary objective of this project was to evaluate students' perceptions about their lived experiences while studying a course offered in blended mode. The secondary objective was to use these findings to map out a strategy to enhance current learning design practices for blended mode. As we delved further into the subject and began sourcing the literature, we realized that we were placing a lot more emphasis on blended learning while blended teaching did not receive the same attention. Hence, it was decided that we would evaluate both and conduct a comparative analysis between students' perceptions of blended learning and those of teachers. We drew up the plans and laid out new objectives. However, it was not until the first iteration of the survey questions that we realized the enormity of blended learning alone. At this juncture, we, along with the guidance of my supervisor (Pro Vice-Chancellor Flexible Learning & Director—Centre for Flexible Learning), decided to focus exclusively on blended learning as the scope would have been too broad if blended teaching were to be considered as well. We also realized that we had to digress from the secondary objective for a time, noting that if we were to map out a strategy or framework to guide and inform the design of blended learning experiences at USP, then an initial evaluation of the students' blended learning experience was necessary. We also came to a decision that the teacher's perspective on blended learning (which constitutes blended teaching) could be a follow-up to the project and also an extension of the work done in this area by Racule and Hazelman (2018).

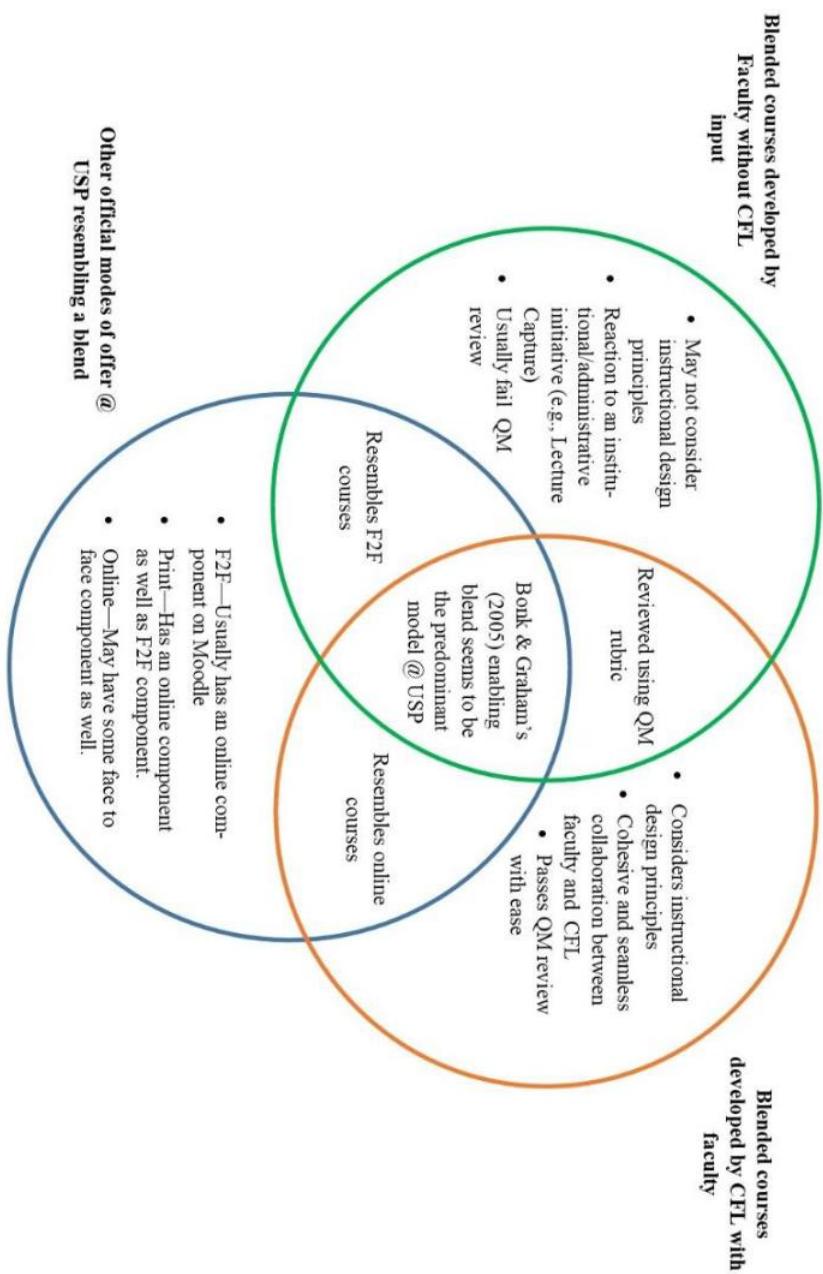


Figure 1. Blended learning landscape at USP.

In essence, the blended learning landscape at USP is somewhat interwoven into a web of three intersecting spheres, as shown in Figure 1. These are:

- blended courses designed and developed by CFL with faculty;
- blended courses developed by faculty with no CFL input; and
- other flexible modes of offer with some form of blend in these courses.

The common thread between these three spheres is the fact that most of the designs—whether intentional or not—seem to be rooted in Bonk and Graham's (2005) first classification of blend, which is an enabling blend. There is a genuine desire to make learning more accessible; therefore, there is an emphasis on providing equitable access to students from outside the main Laucala Campus. Unfortunately, these intentions are more often than not implemented at the convenience of the institution and the lecturer rather than the student.

The blended learning experiences evaluated and referenced in the project were not limited to the experience of students who enrolled in blended courses *per se*. The project took on a much broader scope to also include the learning experiences of other students; especially distance learners from other campuses outside Laucala who have had experience studying a course offered in other flexible modes (print and online). In USP's context, most courses offered via these flexible modes (and even the face-to-face mode as well) have traces of blend in them as there is always an online presence accompanied by face-to-face interaction. Although the official mode of offer for these courses may not necessarily be blended, the learning and teaching choreographies in these courses resemble that of a blended course. Hence, for this project—the term *blended course* was not confined to the official definition of blended (USP, 2019)

because it took into consideration the unique circumstances mentioned above.

DEVELOPING THE RESEARCH TOOLS

The research employed a mixed-method approach where qualitative and quantitative methods were used to gather data. An online questionnaire was designed to investigate students' perception of their blended learning experience. We used the *dimensions of flexibility* stipulated in USP's (2017) flexible learning policy as a guideline to frame the questions for the online survey. The questionnaire was designed and submitted to the University Research Ethics Committee for feedback and approval. Once approved, it was then pilot-tested among a small group of students before it was distributed to all USP students via a link on an email sent out weekly over a period of 3 months. Participation was voluntary and confidential, and there were incentive prizes offered to encourage participation. There were 56 questions in total, and all except two were closed-ended questions. We noted that responses to the survey spiked on the days the emails were sent out. There was also a marked increase in responses at the respective campuses where we carried out the in-depth interviews. Initially, the plan was to gather data using the online questionnaire only. But as the project panned out, we realized that the learning experiences and stories of distance learners in USP's regional campuses needed to be captured as well because of USP's context in regards to these flexible modes as well as the fact that the online questionnaire was limited in its ability to fully capture the testimonies of this group of learners. Four regional campuses outside Laucala were selected, namely Honiara, Kiribati, Labasa, and Lautoka; they represent a cohort of students whose socioeconomic status, access to USP staff and facilities, access to the Internet (cost and ease of access), in-country infrastructure, and cultural nuances (that would eventually affect such issues as their online and blended learning behavior) would generally be different from those of students based on the main campus in Laucala. Their voices needed to be

heard as well; otherwise, the data and information collected would have been too Laucala-centric and would not paint an accurate picture of their reality. These in-depth interviews were unstructured (participants were selected randomly) and intended to triangulate the responses from the online survey.

IN-DEPTH INTERVIEWS AT THE REGIONAL CAMPUSES

The campus visits provided their own set of challenges as we also had to consider other factors in the logistical planning, such as public holidays in the regional countries, the mid-semester break, study break, available flights, the accommodation, the tight schedule and timeframe, and liaison with the respective campus directors or their personal assistants. In one instance, we did not receive a reply to our request for a campus visit from a campus director until a couple of days before the scheduled trip. In fact, we received the reply only because we were able to meet the campus director in person as all campus directors were summoned to Laucala meeting. The delayed response added undue stress and pressure to the team, which could have been avoided had the written response from the campus director arrived earlier. But such were the challenges faced, we moved on, determined to complete the project at whatever cost.

The trip to the campuses was an eye-opener, and one of the first things that struck us was the overcrowding at most of these venues. Almost every inch of space was occupied or was waiting to be occupied by students with their devices. The campus directors had tried their best to accommodate most of the students by being very innovative with the use of space (Figure 2).



Figure 2. Innovative use of space at one of the campuses; tables built along the corridors.

We could not help but to feel for these students, especially in campuses where access to the building and facilities was limited as they were not open all day. Students shared their stories about the struggles, the strategies that they have developed to survive, and how they juggled life as a distance learner, part-time worker, and especially how they coped with this new mode of learning. What really stood out for us was the coping mechanisms that students in these regional campuses had developed to mitigate the challenges of being a blended learner. These include discovering and developing new technical and academic skills on the go, working around the limitations of access, the bandwidth, and other logistical issues that they encounter. For the most part, a huge number struggled in the early stages of this mode of learning as they were so accustomed to the hand-holding and spoon-feeding approach used throughout high school. With the absence of the “sage on the stage”, they have quickly learned to adapt and make use of other available resources to compensate for this loss. What you find on these campuses are closely knit groups of students who have formed communities of practice and have relied on one another for their academic survival. One thing is certain: by the time they reach their second and third years, these students will have become self-motivated and self-

propelled learners, developed good time management skills, perfected strategies that were developed through previous unpleasant learning experiences, and have become very vocal when it comes to raising awareness about their needs. We also observed an underlying political bureaucracy and hegemony on these campuses, which created an invisible hierarchy; we were able to ascertain who (apart from the campus director) was in charge on campus. This was borne out while probing or soliciting information from the interview respondents. In a couple of instances, the respondents would pause, cautiously look around, and then express their reservation about a particular staff member. Several students would use the interview to express their frustrations about a staff member or a process initiated by that staff member. Students in these regional campuses have developed a tenacity and desire to succeed at whatever cost. I found them to be much more independent and self-propelled than the average student at Laucala Campus.

RALPH BUADROMO'S REFLECTION

As an education technologist, I was always keen to explore learning technologies that could assist instructors design and develop effective learning experiences. When approached to be part of the research on blended learning, I took it as an opportunity to develop professionally and use the learnings to improve my own blended course development at USP. In this research project, I assisted the principal researcher in data collection and auditing of the final survey questions. I was assigned to collect data for the Kiribati Campus, one of two most remote USP campuses situated 2200 km away from the main Laucala Campus.

The campus has a new building that consists of lecture rooms, tutorials rooms, video conferencing, computer labs, a library, and staff offices. The campus has 25 staff comprising 8 academic staff including the campus director, while the rest are support staff.

The questionnaire was distributed via the link sent by the campus director to all Kiribati Campus students; those who had difficulty accessing the online questionnaire were given paper-based questionnaires to complete. Interviews were conducted in groups; these were organized by the tutors and a student learning specialist. With the students' permission, I recorded the interviews. They were hesitant at first because they assumed that the recording would be assessed by their tutors, but after explaining my intention, they became more cooperative. I noticed that students often misinterpreted most of the questions. I realized that most of them did not understand the definition of blended mode and most could not grasp the purpose of the interview. This was evident when I asked them a question referring to their blended course, and most would ramble about courses from their other mode of studies. Others would look to a fellow student for interpreting the question into their native tongue because they could not understand it.

The next few days, I took another approach to make them feel more comfortable by conducting an informal conversation rather than a formal interview. This made students open up, and I was able to gather relatable data regarding their perception of blended learning. In the group interview, I requested assistance from one of the student learning specialists to contextualize the interview questions and have them translated into *Ikiribati*. As a result, I noticed the students were more forthcoming and provided more in-depth responses. In most of their responses, they indicated that their physical isolation also affected their online presence. Most of the participants (many of whom were foundation and first-year students) felt isolated online and they envied the Laucala-based students for the face-to-face support and guidance from their instructors. They suggested that it would be ideal for them to have full-time campus-based tutors to guide them and offer support. In addition, I feel there is a need to have a rigorous and robust orientation program to assist them into the new learning journey.

The trip was a great learning experience. As I reflected on that week of data collecting, I realized the importance of ensuring that the survey questions were relevant and easy to understand. In the Kiribati context, the main emphasis would be on the language used, the students' ability to understand, the environment, and the need to focus on the target audience.

KEY FINDINGS

The survey questions were framed using the *dimensions of flexibility* stipulated in USP's (2017) flexible learning policy. The response rate was not as significant as one would have desired—1164 students responded, which represents approximately 6% of the entire student population. The response rate was not sufficient for drawing general and sweeping conclusions, but the findings could be used to observe the trends in students' perceptions of blended learning. Around 17.5% of the responses were deemed invalid because the respondents had not taken a blended course and thus did not complete the questionnaire (if they had not taken a blended course, they were directed to the end of the survey). The detailed results for this project were presented to various university committees and senior management teams and were discussed with reference to the same dimensions of flexibility (USP, 2017) and how these dimensions helped to shape students' blended learning experience.

Respondents to the survey were equally divided on their preferences for mode of study and generally positively disposed toward their blended learning experience. Around 85% of the students who responded found the content (of blended courses) to be engaging, interactive, and accessible, enabling them to complete assigned tasks most of the time. The students' experiences in engaging with the content was generally positive. There were some instances in the four campuses (Labasa, Lautoka, Kiribati, and Solomon Islands) where engagement with the content was hindered by the students' inability to access it due to overcrowding, competition for spaces and resources, or

regulations at their respective campuses. For instance, in Lautoka Campus, one of the participants mentioned that YouTube was blocked; hence, students cannot engage with the course content that is on YouTube.

There were mixed reactions when students shared their experiences of engaging with their teachers; while 76% of the participants from the online survey were generally satisfied with the availability and timeliness of their teacher's response to queries, while 82% of distance learners stated that teachers do not respond to their queries at all.

CONCLUSION

Overall, USP students had a positive perception of their blended learning experience. However, preliminary findings indicate that the regional students' perceptions of blended learning differed from those at the main Laucala Campus. Regional students felt that students at Laucala were somewhat more privileged as they had unprecedented access to resources, facilities, teaching staff, and other USP support structures. Students in the regional campuses had to compete for these resources; however, if they do obtain access, it is limited, and factors beyond their locus of control hinder them from fully utilizing it. As a result, their perception of blended learning is characterized by an experience that falls short of the optimal and is often marred by discontent, frustration, anxiety, and hopelessness. Nevertheless, these regional students have devised strategies for mitigating these experiences by developing good study skills and habits and by joining a community of peers who support each other.

RECOMMENDATIONS

The findings of this study suggest that the blended learning experience of students outside Laucala can be enhanced if USP commits to the following:

- (1) Enhance the face-to-face orientation program for first-time distance learners. There is an existing orientation program for all first-year students; however, this needs to be enhanced to cater for distance learners enrolling in print, blended, and online courses.
- (2) Develop and invest in a buddy system and nurture the existing community of peers on regional campuses, where senior students provide mentoring assistance for newcomers to ease their transition to the new learning environment and new learning style.
- (3) Invest more to the existing Pacific Technical and Further Education spaces at Lautoka and Labasa campuses to include Wi-Fi access, computer labs, and study spaces for their students so as to reduce the pressure on existing facilities at the main USP local center or campus.
- (4) Amend regulations in consultation with other USP sections such as Information Technology Services, Library, and Student Academic Services to enable students in campuses outside of Laucala greater flexibility and access to USP facilities (at least 18–24 hr access), open up social media sites such as YouTube, and increase bandwidth to enhance the students' blended learning experience;
- (5) Increase teacher presence at the regional campuses through increased local recruitment or more visits from teachers at Laucala, especially for 100-level courses offered via flexible modes (print, online, blended); this would help reduce anxiety levels for first-year students.

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ENGAGING WITH LIVING HISTORIES

*Ralph Buadromo, Sanjeet Chand, Nicholas Halter, and
Ariti Taufaga*

In 2014, Jo Guldi and David Armitage published *The History Manifesto* as a “call to arms” (p. i) for historians in response to a global crisis in the humanities. Essentially, the relevance of historians and the long-term analysis they provide has been undermined by short-term thinking. One of the key solutions they proposed was for historians to adapt and innovate in order to incorporate digital technology (what they termed “big data”; p. 9) into their scholarship. In Fiji, a similar crisis has been brewing. Student interest in history at the high school level is floundering. A sample study of Fijian high schools by Dinesh Naidu (2017, p. 130) has suggested students are disengaged from history because it is boring—out-of-date textbooks provide little stimulation or excitement. Compounding this boredom, Naidu’s research has also suggested that Fijian students and parents consider history irrelevant for future careers, prioritizing business, or law, or science. This trend stands at odds with history as it is practiced and presented at the local level, preserved in family genealogies, stories, traditional practices. According to the Pacific philosopher Epeli Hau’ofa (2000), Fijians and Tongans traditionally refer to the past in front of them (in Fijian, *gauna i liu*). In essence, it recognizes that the past and present are inextricably linked, and that history is alive and ever present. So, how do we redesign and reframe history as it is presented in academic institutions to engage with living histories in our local communities? This was the challenge when designing the Fijian History mobile app in an effort to make history popular and

exciting for the public. This chapter combines the perspectives of four individuals—a Pacific historian, a software engineer, an educational technologist, and a graduate student in education—who collaborated with undergraduate students at the University of the South Pacific (USP) to create the innovative mobile app.

The design of the app was framed within an educational research project evaluating the use of a collaborative content curation tool to support online assessments. Content curation, also known as aggregation, is “when an individual (or team) consistently finds, organizes, annotates, and shares the most relevant and highest quality digital content on a specific topic for their target market” (Hall, n.d.). The Fijian History mobile app would be the outcome of a process in which USP students collated, curated, and communicated local knowledge about key historical sites in Fiji. A group of 48 third-year history students in Semester 2, 2018, participated in the project, working in groups of five to compile historical data on buildings in Suva, the capital of Fiji. This data was presented in the form of written information (containing research about the history of each site arranged in a chronological timeline), images (both historical and current), and audio (students wrote scripts and prerecorded audio to be used in the mobile app). Students were asked to design, test, and revise the mobile app before it was launched to the public on 19 October 2018. In addition to the app, which has been downloaded from Google Play Store over 500 times (<https://play.google.com/store/apps/details?id=usp.fijianhistory>), a website was created (<https://fijianhistory.com>) to accommodate users without access to Android devices.

CONCEPT

The idea of a mobile app was first suggested by Ralph Buadromo, education technologist in the Centre for Flexible Learning, after years of experience designing and modifying online courses at USP. At the time, he was supporting staff in the history discipline of the School of Social Sciences, which was in a unique position as

one of the only disciplines at USP to offer a full undergraduate program online to students. Student feedback to this new online program stressed the need for greater flexibility as well as more practical and relevant applications in their courses. This is more broadly reflective of a key emerging issue in higher education—how to foster interactive and authentic learning in an online environment. This is particularly challenging for Pacific Island countries, which are characterized by significant diversity and often lack access to specific contextualized resources. Experimenting with app design was suggested as a way of addressing this issue in an exciting and innovative way.

One of the most significant changes to Pacific history in recent years is the growth of technology in the Pacific. Mobile phones and Internet access have brought many people in the Pacific closer together, and USP has converted many of its courses to online mode to take advantage of this interconnectivity. Despite the opportunities this brings, it also means that as teachers we are competing for student interest and engagement with a wide variety of alternative sources (e.g., news, social media, videos, games), and history teachers have struggled to make the subject relevant and contemporary for these new technologically minded audiences. This project was one part of a broader evaluation conducted by the history staff at USP to evaluate the effectiveness of online teaching and experiment with technologies and tools to overcome teaching and learning challenges. It was in response to student and stakeholder feedback that asked for more practical and relevant applications of history content and assessments to better prepare students for future careers.

One of the topics that appeared to capture student interest more than others was local history. Also known as public history, it refers to the study of history which aims to deepen and empower public connection with the past. When speaking about local sites, individuals, or events, we observed students were eager to speak about it because it was relevant to their daily experiences. Stories about their families, villages, communities,

churches, and schools were familiar and meaningful to them. Discussions in class were often lively and engaging when students were debating issues that were directly relevant to them and their local communities. When asked to speak in their own languages, it becomes clear that there is a depth of knowledge about the past learned from oral traditions and storytelling in family and communal settings. Yet these are rarely documented in academic texts, and students' experiences of formal schooling often teach them that the histories they learn at home are different from the so-called "official" histories written in books. Much of the official recorded histories of Fiji are outdated and have a colonial bias that favors European actors and imperial powers. As a result, local histories are largely undocumented. Limited research on the local history of Suva, the capital of Fiji where the largest USP campus is based, has been produced to date, and the teaching of history in Fiji is limited by a lack of up-to-date open educational resources. So, we devised a plan to empower our students to go out into the town, walk the streets, talk to the people, and engage with living histories.

Documenting living histories in the streets of Suva was the first important step toward making history relevant to local communities, but how to make it accessible was the next logical task. Technology was needed to counter two challenges in particular: accessibility and an overreliance on the written text. The first challenge was one made significant by the distances between islands and villages within the Fiji group. Most of the sources of Fijian History are concentrated in libraries in the capital, but people do not always have the time or the money to travel to Suva to find information. With the right technical expertise, a mobile app that could be freely downloaded on Fiji's high-speed Internet connection appeared to be a simple solution to the issue of accessibility. The second challenge was related to literacy, as students bemoaned the reliance on the written word in textbooks without sufficient visual or audio stimuli. Declining literacy rates continue to be a major challenge for teachers at university and one that was acknowledged publicly by the USP and Fiji National University Vice-Chancellors (Healey, 2018;

Nacei, 2018). For this reason, technology was needed to present information in a visually attractive and exciting way, with photographs bringing immediacy to historical subjects. Sourcing these images and gaining permission to use them was a complex issue that required the skills of a historian to train students in how to approach and use archives. Given that many cultures in Fiji rely on oral traditions and storytelling, incorporating an audio element was also crucial. For this task, the skills of an education technologist were needed to help students translate text to speech in a relatable and understandable way.

BUILDING THE TEAM

With a clear concept in mind, the next step was to build the team. Dr Nicholas Halter was the subject matter expert, with experience in researching and writing about Pacific history at USP. His played a supervisory role with his students, outlining the steps required to complete the research and providing feedback and advice when challenges were encountered. This was particularly important when speaking to members of the local community and visiting the national archives and museums to access information. Students were instructed on the ethical obligations of the researcher to gain approval to use personal information gathered in the archives or face-to-face interviews. Halter was also crucial for checking the veracity of the information gathered and ensuring the historical content generated was appropriate.

Given that the project was a student-centered one, the perspective of an education technologist was needed. As a learning technologist at USP for 4 years, Ralph Buadromo's role was to understand how students were adapting to this project as it progressed, observe what skills they were using, and what lessons they were learning. His goal was to improve the learning experience for them so that we could apply lessons learned in future classes and replicate this app design project in other contexts. Buadromo also provided advice on the educational pedagogy used during the project and together with Halter

implemented a quantitative methodology to assess the impact of the app on student learning. This app was an experiment in collaborative content curation. In the same way that Wikipedia crowdsources to find and generate content, this project put students to work on sourcing, validating, and presenting historical data. Numerous studies have highlighted the benefits of content curation for student learning and engagement (Deschaine & Sharma 2015; Flintoff, Mellow, & Clark, 2014; Lambert & Frisch 2013; Minocha & Petre, 2012; Zhong, Shah, Sundaravadielvan, & Sastry, 2013). Social media platforms such as Pinterest and Flickr and other free-to-use software such as Scoop.it, Learnist, Pearltrees, Storify, or BagTheWeb can help collect and share curated content. The rapidly changing nature of technology, however, has meant that many studies of content curation quickly become obsolete or outdated, and no studies have yet explored the possibilities of using mobile apps as a tool for content curation in undergraduate online teaching.

To ensure that the perspective of the students was at the forefront of the app design and implementation process, the skills of a graduate student in education were needed. Ariti Taufaga was an important team member who acted as a representative for the students, relaying feedback and monitoring their progress. As a graduate student, she was better able to relate to student issues and views, and engaged qualitative interviews with students to assess the impact of the app on their learning progress. Taufaga acted as an interpreter between the lecturer and the student, drawing on her knowledge of Fijian cultural cues and customs to identify when students were not understanding what the lecturer was asking for, and vice versa.

Finally, one of the most crucial skills needed was that of a software engineer. Sanjeet Chand was asked to join the research team for his skills in successful mobile app designs which have been focused on mapping (including the USP Campus Map app) and transactions (including the Snap Topup app). His passion has always been in designing new apps and programs to solve problems in everyday life, or at least to make tasks simpler and

easier for users. As the software engineer in this project, his role was to interpret what the students and other research team members wanted and build software that addressed their needs. At the time, he was working as a learning analytics specialist at USP, and his skills in data analysis were also important for monitoring the uptake and use of the app.

DEVELOPMENT AND IMPLEMENTATION

The process of developing and implementing the mobile app began with research, as students were sent out in groups to conduct archival research and interviews about specific buildings in the capital. This proved to be one of the most difficult aspects of the project, as students struggled to find and verify information. Suspicion about what they were using the information for was also encountered, particularly since land ownership is a sensitive matter in Fiji. To counter this, the students held a public consultation at USP to share what knowledge they had gathered and seek feedback on their research. Once students had compiled a chronological timeline and photographs, they recorded an audio guide in the Centre for Flexible Learning recording studio. Given that most history materials are heavily reliant on text and pictures, and many are written by foreigners, we thought it would be engaging to have recorded voices of students speaking to users in their own dialects and languages. It would make it a more exciting and authentic experience.

Once the data was gathered, it was the task of the software engineer to interpret what the students and other research team members wanted and build software that addressed their needs. This was easier said than done, because some user features were quite complicated to design, and there could be glitches within software if the functions were too complex or the software was poorly designed. Execution was the hardest part of this stage of the project, and there was a lot of backend work and experimentation to get the app up and running. There was a back-and-forth process of developing drafts, showing them to the

students, and then returning to the drawing board to revise and redesign. For example, one student reminded us that many Fijians had limited data to download content; we were therefore conscious of limiting the size of photographs and audio files to make the app easy to download and use while offline. Since many Fijians tend to own Android devices because they are cheaper than Apple devices, we decided to develop the app for Android only in the hope that if successful, donors would sponsor further development and expansion.

One key feature of the mobile app was using Google Maps to accurately pinpoint locations around Suva, and direct users on how to move around them. This had great potential for the local tourism industry, as many visitors rely on Google Maps to guide them around the town. Google is at the forefront of user design and geolocation, and there are future possibilities for incorporating images of local sites to a Google Maps interface to create an immersive 3D experience so users could tour the streets without leaving their homes.

One of the key challenges we faced was how to make the app appear professional while also keeping distinctive Pacific features. Incorporating student narrations was one feature which was crucial in making the app distinctively Pacific. Another was the logo and tagline “Sailing back in time.” These two items were discussed among the class, and it was quite difficult to come to agreement on what they should be. Some students wanted a distinctively Fijian symbol, while others did not wish to exclude other migrant communities and sites in Fiji. Since we were hoping to market the app to a global audience, we chose an easily recognizable image of the Fijian *drua*.

Another key challenge was testing and implementing design features that were suggested by the students. One of the features that we debated was creating a tool for users to comment and give feedback on particular sites. The advantage of this tool would be that members of the public could help correct and add information to the app, and it might inspire further discussion and

debate in an online space. The disadvantage of this tool would be that users would have to sign in to make posts and a third party would have to monitor the posts to ensure that nothing offensive is posted, which adds complexity to the app. Ultimately, it was decided that although this feature would be useful, it was not appropriate to include it in this stage of the app development. Despite these challenges, the mobile app was ready for a public launch within 3 months.

DATA GATHERING AND REFLECTION

In addition to developing the mobile app, one of the goals of this project was to evaluate the use of a collaborative content curation tool to engage student learning. We employed both quantitative and qualitative analysis of data from four sources to evaluate the success of this project: Moodle Learning Analytics API, Google Analytics, feedback surveys (quantitative and qualitative), and individual qualitative interviews with 10 students. The initial feedback and data received pointed toward the benefits of using technology like mobile apps to motivate and engage students. Not only was the content relevant to them but the knowledge that the information they produced would be presented to the public in a novel way was a strong motivation to conduct ethical and rigorous research. Awareness that the communities they wrote about would judge them accordingly based on their work was also a powerful factor in ensuring the students produced quality information. One unexpected benefit of the assessment design was that plagiarism was impossible, and so the common and tiresome task of detecting cheating was not necessary.

If students were to learn anything from the project, it was hoped that it helped them to realize that the local stories, myths, and legends preserved by their families, elders, and communities was no less valuable than the so-called “official” histories produced in books and taught in schools. Though they focused on inanimate buildings at first, the stories they discovered were “alive” because they were largely oral

testimonies, memories stored by local knowledge keepers that was constantly changing, adapting and growing over time. As we expected, the students found this extremely challenging because the information they sought was fragmentary, dispersed, and incomplete. As the students told us, chasing down people and sources in the streets was much more-time consuming and difficult than reading a book in the library. But we believed the outcome would be much more rewarding for students because the historical information they generated would not only be relevant to them, but it would also benefit the community by providing educational resources for local schools, encouraging history tourism for foreign visitors (particularly the regular cruise ships), and generating interest and enthusiasm among the local community.

Qualitative interviews were conducted at the end of the project with 10 randomly chosen students of different ethnicities, six of whom were female, and four were male. They were asked to share their experiences about the process of gathering information and also their opinions on the mobile app. "The History Mobile App provides easier and cheaper access for tourists and also for the locals who are interested in historical sites here in Fiji," said one Fijian male who enjoyed participating in the project. One outspoken female Fijian interviewee said that the mobile app project was rewarding but the students needed more time because more information could be gathered not only from the archives but also from the public. The regional students found the project more difficult due to language barriers but enjoyed travelling with Fijian students around town to gather information about historical buildings. A Tongan female and a Marshallese female noted that the short timeframe was the main challenge in carrying out this project, for they had to follow a long process of getting permission to access information. For some of them, finding adequate information about particular sites was very difficult.

When interviewees were asked if they preferred writing an essay to doing this project, only one opted for the essay, which

is the standard form of assessment in history courses. This Fijian male said that writing an essay would be faster and simpler, since it is an individual task and they could rely on sourcing information from the Internet. Another Fijian male preferred the mobile app project because it provided him the experience of teamwork and the development of practical skills to go out and gather information in the community. “It is challenging but we enjoy going through these challenges,” he said.

LESSONS LEARNED

Reflecting on the project, it seems remarkable what was achieved in such a short timeframe. With more time to gather and verify information, the mobile app content could have been more extensive and detailed. Some students commented that they had to make several trips to town to find people or information relevant to their topic. Since the project has been completed, minor errors have been pointed out in the content, which we have tried to correct immediately. It is hoped that what is missing in the app in its current form will inspire local community groups such as schools or churches to contribute their own data on particular sites.

How to encourage community engagement in this project remains a challenging obstacle. Considerable efforts to market the app were made in Fiji and abroad, with newspaper articles and radio interviews promoting the app to wider markets. Though initial feedback of the mobile app was positive, attendance at our community consultation session and public launch was low, and local ministries or nongovernmental organizations have yet to contact us about further development. To ensure the sustainable growth of this app, we need to find a way to encourage local groups or institutions to contribute their own knowledge. It is encouraging to see the idea has inspired some of our students to begin similar projects in their own countries. Graduates who have returned to Samoa and Kiribati are currently seeking funding for their own history apps for use in schools and museums.

New features could be added to the mobile app to improve its accessibility and user interaction. Users with Apple devices cannot download the app in its current form and must instead use the website, so expanding the app to Apple devices would be the next logical step. Ideally, the app could be used as a cross-institutional learning tool, connecting students in multiple universities to share knowledge and verify each other's information. This is significant for those Pacific diasporic communities who have access to valuable archival resources held by institutions outside the Pacific region. As mentioned earlier, it was decided during the development phase that a comment feature was beyond the scope of this project. Creating a way for members of the public to comment in real time on the app could address the issue of engagement and generate some fascinating new information to add to it. For example, students discovered many rumours associated with the buildings, and in some cases, ghost stories. They decided not to include these stories because they were unverifiable, but a comment feature would give space for these stories to be shared. In many international tourist ventures, it is precisely these rumours and ghost stories which encourage engagement by making history exciting and entertaining.

One of the benefits of using Google as a core feature of the app design is the ability to collect data on how individuals used the app and what sites they tended to look at. Significant time and effort were devoted to review the privacy policies of various apps to determine what features our privacy policy should have that would protect both the users and the app developers. The Google Analytics tools have been very effective in determining which sites the users prefer. As of October 2019, 3239 users have accessed the content. Of those users, 56.7% have accessed the content from their desktop, and 43.3% have accessed it from a mobile or tablet. The two largest proportions of users are aged 25–34 (33.5%) and 18–24 (27.5%).

The most interesting data collected is the popularity of particular pages. The Momi Bay Historical Park is rated as the

most popular site (10.1%), followed by the Origins of Suva, Suva Grammar, and USP (all approximately 5%). The popularity of Momi Bay may be attributed to tourism, with the gun battery being a key tourist attraction for visitors to Nadi. The popularity of the Origins of Suva page is likely due to the lack of available information on the indigenous history of Suva. There remains greater scope for promoting this mobile app to visiting tourists, particularly those on cruise ships that dock at Suva Harbour. Offering guided walking tours in association with the app may be a useful addition to stimulate engagement and use. Much more can be done to expand the app beyond the confines of Suva, and to document in greater detail indigenous historic sites, such as villages and natural features. For the time being, each year a new class of History students is tasked with documenting new sites to add to the app.

CONCLUSION

The success of the Fijian History mobile app should ultimately be attributed to the USP students who collated, curated, and communicated local knowledge about key historical sites in Fiji. The accessible and engaging user interface and design were in part due to the collaborative work between four people from different fields—an academic, a learning technologist, a software engineer, and a postgraduate student. Each of us contributed different expertise and skills throughout the project and monitored student and community feedback to ensure what was produced was ethical, accurate, and relevant. Given the rapidly changing educational landscape in high schools and tertiary institutions in the Pacific, it is important that innovative technologies like the Fijian History mobile app be supported to encourage students to take an interest in their own local histories.

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COLLABORATIVE ONLINE READING WITH PERUSALL

Pita Tuisawau, Danielle Watson, and Varunesh Rao

This chapter is a reflection on my experiences while conducting a research project involving the exploration of a collaborative online reading intervention (Perusall) at The University of the South Pacific (USP), Suva, Fiji. I have tried to capture key points of personal growth, learning, and development throughout the research project (Williams, Woolliams, & Spiro, 2012). While the results presented in a report I prepared for my institution (USP) reflect the academic aspects of my exploration, this reflection considers the less tangible elements of it, with a focus on how I approached the tasks and how I could have done better or differently.

BACKGROUND

As an instructional designer, one of the most common complaints I get from lecturers at USP is that “our students don’t read”. I had heard this complaint from teachers teaching our face-to-face (F2F) students on our main Laucala Campus in Fiji as well as from teachers teaching our regional students out in the other 11-member Pacific island countries.

These reading issues were in the back of my mind when I attended the uLearn Conference in Hamilton, New Zealand, in October 2017, where one of the keynote speakers was Professor

Eric Mazur the physicist and educator from Harvard University (Moala, 2017). While talking about peer instruction and his inverted or flipped classroom approach, Professor Mazur mentioned in passing a tool called Perusall (<https://perusall.com/>). He used this collaborative online reading and annotation tool for information transfer outside of the classroom, largely replacing the F2F lectures that he once used in his lecture theatres. He replaced his lectures with interactive peer teaching activities where students applied the concepts they learned from the readings they had done through Perusall outside of the classroom. Even though Perusall was a minor point in his excellent presentation, it was the major take away from that conference for my colleague (Ralph Buadromo) and me.

QUESTIONS

I wondered if we at USP could use this collaborative online reading tool to change the reading experience of our Pacific islander students for the better since they generally found collaboration helpful (Landbeck & Mugler, 1994).

There might be various reasons for this general reluctance or inability of Pacific islander students to read but one of my major observations as we move our USP courses online is that we are always trying to get them to read in an independent and solitary context. A considerable number of daily chores and activities for our Pacific island students, especially from rural areas, occur in a communal or collaborative context. Should we be surprised that a good number of these islander students struggle with an activity (reading) that has been up until now largely a solitary exercise?

In May 2018, with the support of our director (Professor Som Naidu), I was able to secure funding and assemble a team that included a lecturer (Dr. Danielle Watson), her assistant (Mrs. Ma'imoa Kabu), a learning systems analyst (Mr. Varunesh Rao), and an education technologist (Mr. Ralph Buadromo). Our thesis

was that that by introducing our Pacific islander students to collaborative online reading tools like Perusall, we would be giving an alternative (collaborative) way to read that is more suited to their communal culture and collaborative way of doing things. Because of this collaborative strategy, we hoped to see an improvement in their reading experience and therefore a better reading uptake than before.

We tested a number of free collaborative reading and annotation tools by trying out their collaborative reading and annotation features as well as their compatibility with Moodle and its marksheets. We tested Perusall, Google Docs, and the My Notes notation tool native to Moodle. We decided to go with Perusall for various reasons, including the fact that it easily integrates with Moodle, our learning management system (LMS); it is intuitive and easy to use for collaborative reading and annotation; Dr. Mazur is one of the founders; and it contains artificial intelligence self-marking capabilities.

PILOT AND METHODOLOGY

While investigating methods to measure the effectiveness of Perusall in the pilot, I came across Kirkpatrick's evaluation model, which, was originally developed for evaluating the effectiveness of training (Serhat, 2016). However, reading the article "Adapting Kirkpatrick's evaluation model to technology enhanced learning" by Ruiz and Snoeck (2018) gave me confidence that I could use this model (Figure 1) as a framework for the research project.

Kirkpatrick Model



Figure 1. Kirkpatrick model (Colman, 2019).

We used the Kirkpatrick evaluation model (Serhat, 2016) to evaluate the Perusall intervention. We evaluated the reaction of students to the Perusall intervention; whether learning occurred through the transfer of knowledge, skills and attitudes; whether there was a change in the behavior of students resulting in transfer of learning to other tasks and areas in their course; and whether there was further transfer or impact on society. Finding the Kirkpatrick model and the Ruiz and Snoeck (2018) article on adapting that model for use with educational technology were key discoveries for the project as they provided an intuitive framework for the research.

We piloted this technology based-intervention in Dr. Watson's first-year policing course, "Contemporary Issues in Pacific Policing" (PP101) in Semester 1 of 2019. The course had a great spread of students (53) from almost all the member island countries from the South Pacific. The intervention was set up as

five (Perusall collaborative online reading assignments worth 2% each spread over the 14-week semester. The control group consisted of 19 students who decided not to participate in the Perusall assignments.

Collection of data and findings

We uploaded one questionnaire and two surveys to the PP101 course page in Moodle to evaluate the students' reactions to Perusall. This was straightforward as students noted the negative and positive things about Perusall. For the second criteria (Learning), we collected and analyzed the results of five Perusall reading assessments. For the third criteria of Kirkpatrick's model (Behavior), we collected the results of three other assessments (quizzes, short-answer assignments, and group presentations) and compared the performance of the students who completed the Perusall assessments to those of the control group.

Collecting and analyzing the data for the first three criteria of the Kirkpatrick model was easier compared to collecting and analyzing the final criteria (Results). While it was easy to collect and analyse data from within the online course environment, it was harder to collect data from outside that environment to be able to evaluate the impact that Perusall had on society outside of the PP101 online classroom. This was because for the Reaction, Learning and Behaviour criteria, almost all the data was contained in the results of assessment activities and activity logs that were easily available in Moodle. Finding out the impact on society of the intervention would mean collecting data from the regional countries where the police students served. As a result, the fourth criteria (Results) is perhaps the weakest of the four criteria in terms of data collection and analysis.

As this chapter goes to press, we are attempting to compare the results of past offerings of PP101 to the 2019 offering to see if the introduction of Perusall made any difference to the pass rates.

The findings seemed to indicate that the students who used Perusall performed better on the pilot course than the students who did not. Listed below are findings from the analysis of data collected from the questionnaires, surveys, LMS and Perusall activity logs, and assessment results.

- The majority of the pilot students who used Perusall reacted positively to the intervention, with the two main complaints from the students being a lack of infrastructure in their location and a lack of confidence with the English language (see Table 1 below).

Table 1. Student reactions to Perusall from the questionnaire.

Pros (of Perusall)	Cons (of Perusall)
Engaging	Technical infrastructure issues at office
Interaction with peers	
Sharing of experiences	Embarrassed at level of English
Tutor-student interaction	
F2F classroom feel	
Asynchronous (flexible for policemen)	
Time convenient	
Comprehension	
Deeper reading	
Aide for study	
Enjoyment	
Ease of navigation	

- There was transfer of skills, knowledge, and attitude, as indicated by the gradual improvement of marks in the five Perusall reading and annotation assignments as the semester progressed. The first Perusall reading assessment saw 17 students scoring zeros, but this number decreased as the semester progressed. Furthermore, the number of students who scored full marks (2%) gradually increased as they improved on their reading and annotation skills. By the final two Perusall assessments, no students scored a zero (as in the first three Perusall assessments), and 23 students scored full marks. Figure 2a - 2b below shows the trend in the results for the five Perusall reading assessments.

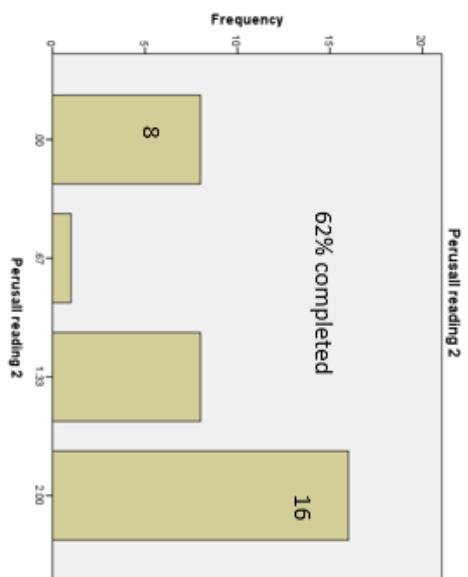
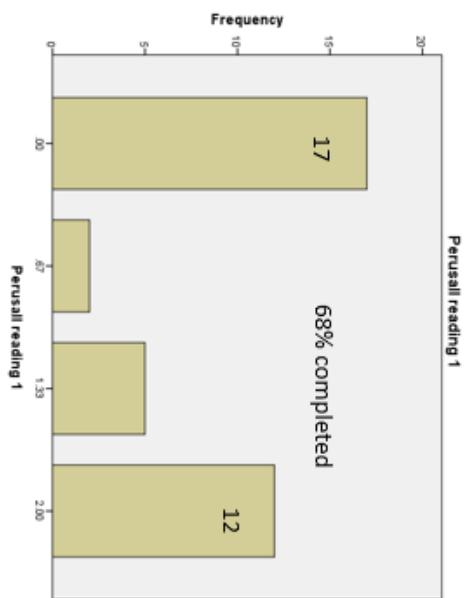


Figure 2a. Results of two Perusall reading assessments

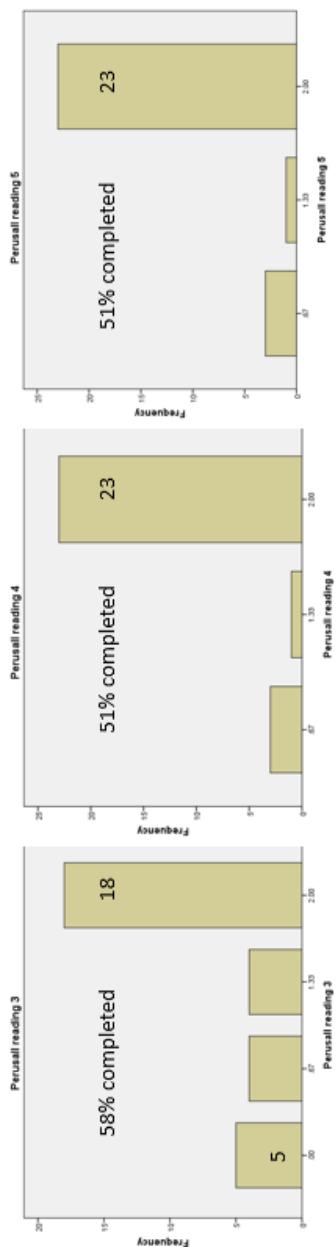
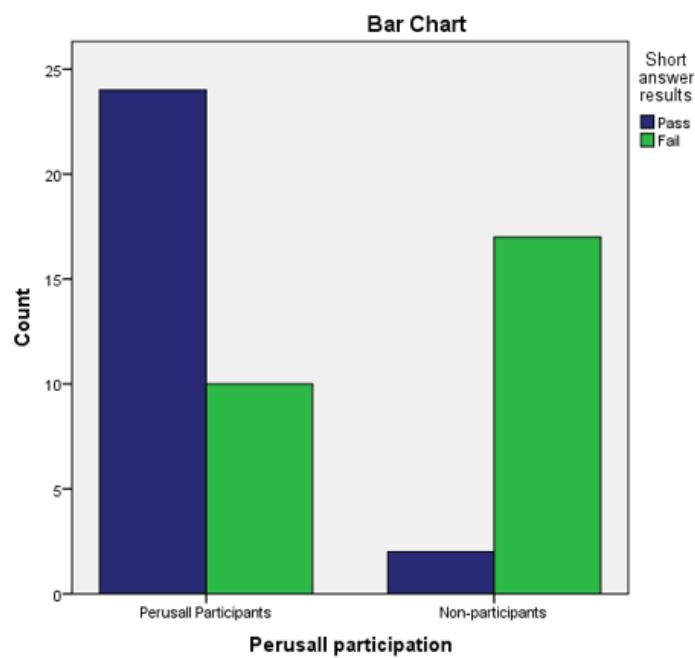
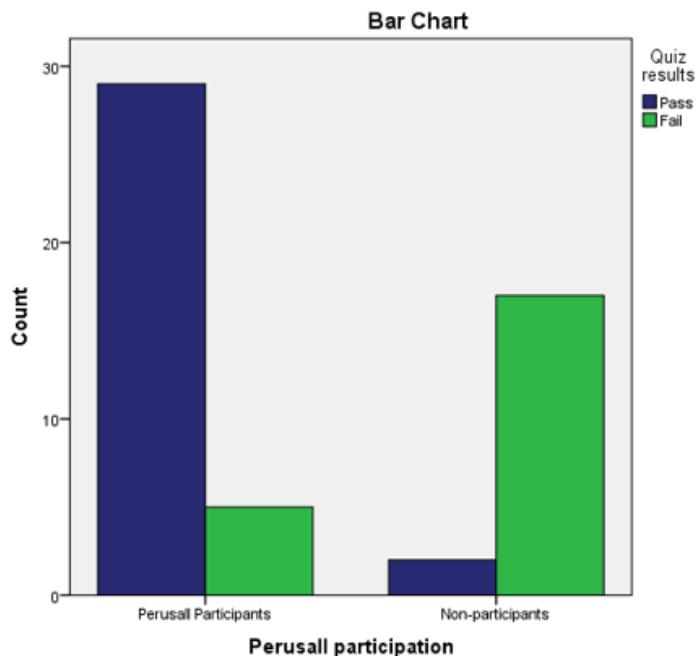


Figure 2b. Results of the three Perusall reading assessments showing gradual decrease of zero scores and increase in full marks (2%) as students developed reading and annotation skills.

- There was observable change in behavior in the students because of Perusall, as those students who used it for reading and annotating collaboratively outperformed the control group in the other three set assessments (quizzes, short-answer assignments, and group presentation). As the first of the three bar charts shows (Figure 3), more students from the control group failed the quiz assessments than passed, while the opposite is true for the students who participated in the Perusall readings. The second bar chart shows a similar pattern repeated for the short-answer assessment, while the final bar chart shows that although, the number of control students who passed the group presentation assessment now for the first time outnumber those who failed, none of the Perusall group failed this assessment. It was both disappointing and satisfying to clearly see the positive relationship that the use of Perusall had with the results from the other assessments. Satisfying from a research perspective in that the performance by the users of Perusall in the other three assessments proved our hunch that providing a collaborative online reading and annotating intervention would have a positive impact on the learning of our students. Disappointing from an academic and personal perspective in that the students who failed and chose not to participate in the Perusall intervention missed a great opportunity to improve on their learning.



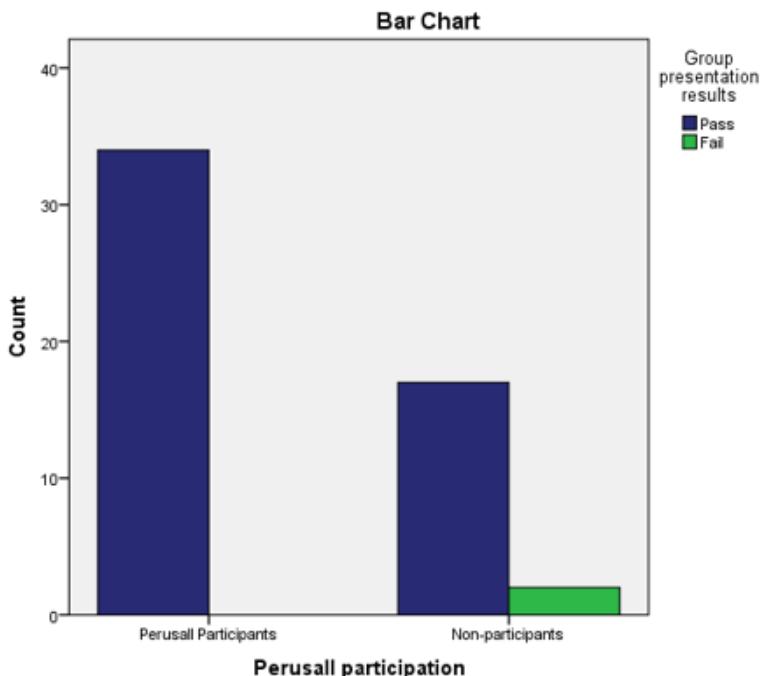


Figure 3. Comparison of results between Perusall participants and non-participants (control group) from the other three assessments (quizzes, short-answer, and group presentations).

- As mentioned earlier, the fourth criteria of the Kirkpatrick model (Results) was harder to collect and analyze. However, the impact that this technology-based intervention had on society could be typified by the following comment and commitment from a PP101 student who is a leading training officer in his nation's police training academy: "Being a first time to using Perusall I have already seen the usefulness of this tool to incorporate into my organization's capacity development exercise." Also, at the time of the writing of this reflection (December 2019), we still have to receive the final exam results for the PP101 course to compare with past

offerings to determine if the Perusall intervention made a difference to pass rates.

CHALLENGES

I encountered a few challenges from the outset of the project through to its completion. Below are some of the major ones that were a cause for stress at the time but were also valuable learning opportunities:

- One of the major challenges my project team faced was the loss of two team members (one right at the outset when we lost Mr. Buadromo to a rival institution and the second in the middle of the semester, when we lost our PP101 teaching assistant Mrs Kabu, who was a vital member of the team). It meant that the rest of the team had to take on extra work and needed to cancel or postpone some planned components, such as the interview visits to the region.
- Another challenge at the outset of the project was that the teacher of the original planned pilot (a language course) decided to withdraw for various reasons. We were fortunate that Dr. Watson was able and willing to step in at the eleventh hour and pilot the use of Perusall in her policing course.
- Probably one of the more serious challenges was when a team member (Varunesh), who was responsible for integrating Perusall with Moodle, suffered electrical burns at home, which put him out of action for a few weeks. It meant that we had to postpone the launch of the pilot from Semester 2 of 2018 to Semester 1 of 2019.
- Another challenge concerned gathering and analyzing the data from the questionnaire, surveys, logs, and course assessment results. The timely completion of surveys by the students was a challenge. We tried to give some

incentives, such as offering prizes for doing the surveys, but found that when surveys clashed with assessment deadlines, student response was low (19%) compared to times such as the start of semester (85%). Relearning the SPSS software was a valuable investment as it was very helpful for the analysis of the data.

- Because of the infancy of the use of collaborative online reading and annotation tools such as Perusall, finding information on the topic was a challenge. It was necessary to move outside the topic to find sufficient sources. For example, we had to consult research on F2F equivalents of collaborative reading.
- Another challenge was how to set up the control group. The decision of a group of students not to participate in the Perusall assignment (worth 10% of the total assessment) gave us an unplanned control group to compare with users of Perusall.
- Communicating (from our side) synchronously with the proprietors of Perusall has been a challenge because of the time differences. Communicating asynchronously has not been a problem. We are working to improve on our communication with this key stakeholder as we seek to roll out Perusall to other courses at USP.

LEARNING

My understanding of research has changed to a deeper level. I have carried out similar research before in conjunction with a pilot implementation of ePortfolios at USP, involved only the collection and analysis of the reaction of students to the intervention. This Perusall exploration, however, has involved the collection and analysis of data from assessment results in addition to the collection and analysis of the reaction of students.

I have grown both as an independent and collaborative researcher in that I have been able to add to my quantitative data-gathering skills as well as brushed up on my data analysis skills with the help of the SPSS software. In addition, I have grown in my appreciation and knowledge of Kirkpatrick's evaluation model (Serhat, 2016) and its variants. I have also grown in the area of the presentation of research findings as well as confidence in leading a research team not only for research but also for collaborating with the proprietors of the Perusall tool.

My assumptions about what information would be available changed throughout the research process. Some answers to the questionnaires and surveys needed further interrogation; we attempted this through emails and the discussion forum specifically set up in the pilot course for the intervention. However, the cancelled regional visits would have been ideal for further interrogation into the details of issues raised by students with regards to infrastructure and English language confidence issues.

Even though I have learned a lot about the research process, I still feel that there is still a lot to learn. What I would like to learn to do well are personal F2F interviews and group interviews particularly for our islander students who at times can be a challenge to interview because of their shy nature and cultural norms.

If I had another chance, I would probably give more priority to the regional visits and interviews to gather data on our regional islander students, who in general face key challenges but whose voices are often drowned out by the generally eloquent and online-savvy students who attend our main campus at Laucala.

CONCLUSION

To conclude, this research project has been full of positive results, including recommendations for rollout of the intervention, presentations, papers, workshops, and sharing and collaboration with other universities and software proprietors.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank the proprietors of Perusall (Dr. Lukoff in particular), teachers and students of PP101 in Semester 1 of 2019, Professor Naidu for his vision and support, and Dr. Watson and the project team members for their dedication and hard work.

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USING PEER ASSESSMENT FOR FORMATIVE ASSESSMENTS IN LARGE ONLINE CLASSES

Krishan Kumar, Bibhya Sharma, Gavin Khan, Salsabil Nusair, and Sunaina Nair

INTRODUCTION

Due to the ever-increasing number of new enrolments and delivery of courses in various modes at The University of the South Pacific (USP), undergraduate programs are faced with the challenges associated with a large and diverse student population. One of these is the large number of assessment tasks to be graded for each topic in a course. USP has four generic courses, which are part of degree programs—two to be undertaken in the first year of study and two in the second year. One of the first-year generic courses offered at USP through online and blended modes is titled “Communication and Information Literacy” (UU100), which has more than 2000 students enrolled each semester. The UU100 course has weekly assessments, and due to large student population, it becomes

very difficult to provide students with timely feedback on their assessments. With the increased use of information and communication technologies (ICT) in higher education institutes (HEIs) in the Pacific (Sharma et al., 2017; Sharma et al., 2018), proposing an ICT-related student-centered solution became evident. The proposed solution decided was to use online peer assessment (PA) through the Moodle workshop tool. The focus was on not compromising the standard of marking and setting a benchmark solution for other undergraduate courses.

PA is one of the 21st century learning and teaching strategies; thus, we wanted to ensure that students do learn through PA. We used the following definition of PA: “where students grade and give feedback about the work of their peers against particular criteria provided by course lecturer” (Adachi, Tai, & Dawson, 2018, p. 295).

Before engaging directly with incorporating online PA into assessments, we began to find suitable funding sources for this project. Meanwhile, the Centre for Flexible Learning (CFL) team in USP had embarked upon their ambitious technology-enabled learning project and sent a call internally to all university staff. We submitted our idea of using online PA through the Moodle workshop tool, and CFL decided to fund this project.

With the approval and support from the course coordinator of UU100, Mr. Gavin Khan, and Acting Dean of Faculty of Science, Technology & Environment Dr. Bibhya Sharma, we were on our way to carry out research work in the field of online PA. The research team comprised Krishan Kumar (project leader), Gavin Khan and Salsabil Nusair (learning designers), Sunaina Nair (assessment designer), and Bibhya Sharma (expert advisor). Since the class size was large, we did not want to face any technical glitches because the online PA strategy would be administered for 2 weeks (Panadero & Alqassab, 2019).

To get started, we checked if other HEIs around the world used an online PA strategy and investigated the best practices of using these strategies. The empirical review paper by Panadero and Alqassab (2019) provided all the latest research publications in the field of online PA and moderating variables to administer an online PA. After a comprehensive literature review, the best practices were outlined and formulated (Table 1) as a working framework to implement online PA in undergraduate courses offered in online and blended modes. For an online PA activity, it is important to select the appropriate moderating variables for setup using the Moodle workshop tool, as the moderating variables guide the successful implementation of online PA. The moderating variables with definitions were PA aids—rubric understanding and marking training on samples before engaging into PA process; PA grading—peers allowed to grade assessments of other peers by providing numeric rating, or a written comment, or a combination of both; anonymity type—bidirectional or unidirectional settings can be selected (Panadero & Alqassab, 2019, p. 1256). Bidirectional anonymity is when both assessor and assessee are anonymous, whereas unidirectional anonymity is when either the assessor or assessee is anonymous (Gielen, Dochy, & Onghena, 2010). The proposal with ethics form was formally submitted to secure the funding and obtain ethical approval to conduct the study.

Table 1. PA framework used.

Assessment selection	PA aids	Design of Moodle workshop phases
Select assessment which both lecturers and students are familiar with. Taking into consideration difficulty of task and level of study. Preferably formative assessment is suggested.	<ul style="list-style-type: none"> ● Instructional video, PDF guide for peer grading ● Criteria and rubric ● Training, i.e., mark the samples before engaging in peer grading ● Decide on self-assessment (optional) ● Privacy <ul style="list-style-type: none"> - Anonymity of assessor/assessee (bidirectional or unidirectional) - Teacher presence - Whether output of PA is confidential or public. 	<p>1. Setup phase: Initial setup of PA Moodle workshop description.</p>  <p>2. Submission phase: Students allowed to submit their assessment.</p>  <p>3. Assessment phase: Students are given online marking training before they engage with peer grading.</p>  <p>4. Evaluation phase: Lecturers check and confirm grading, Moodle workshop tool calculates final marks for students.</p> 

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- 5. Closed: Online assessment closed, and students get their final marks for submission and assessment with peer graders' feedback comments.
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LITERATURE REVIEW

Assessing large numbers of students in an online and blended course in HEIs is a challenging prospect for educational practitioners in the 21st century. Some of the major responsibilities of lecturers are identifying suitable online assessment methods, ensuring that students have achieved the desired learning outcomes of the course, meeting tight deadlines for marking, and providing timely feedback to students.

Assessments are assistive tools for lecturers in HEIs to assess the learning objectives of the course; they can be either formative or summative. Formative assessment is defined as “activities undertaken by teachers – and by their students in assessing themselves – that provide information to be used as feedback to modify teaching and learning activities” (Black & Wiliam, 2010, p.82), whereas summative assessment is defined as “assessing if the predetermined learning outcomes are achieved according to in-advance programmed objectives or if the requirements are fulfilled to an accreditation or certification to be granted” (Mohamadi, 2018, p. 29). For formative assessments, HEIs in the 21st century commonly use learning management system tools such as quizzes, forum submission, assignment dropboxes, and online PA. It is important for lecturers to understand how formative assessments operate in the online context and whether they are authentic and trustworthy (Baleni, 2015). With this notion, online PA using the Moodle workshop tool

proposed for this study opens up a window of opportunities for investigation in the South Pacific region and the findings will add to the existing knowledge on online PA.

Over the past decades, extensive research has been carried out supporting the use of online PA as an assessment tool (see Table 2). However, researchers have debated the usefulness of PA in tertiary education (Friedman, Cox, & Maher, 2008). In all occupations of life, people learn from and make assessments or judgements about each other—students learning in HEIs are no different. Students learn from explaining their ideas to colleagues and learning collaboratively while at the same time providing feedback on the quality of each other's work. Participation in such activities can occur both informally and formally. PA is a natural extension of the move from a teacher-centered to a student-centered mode of education, which emphasizes the active engagement of students in their learning; learner responsibility; metacognitive skills; and a dialogical, collaborative model of teaching and learning (Spiller, 2012). Students become assessors within the context of participation in practice; that is, the kinds of highly contextualized learning faced in life and work (Boud & Falchikov, 2006). Students mark and make decisions about each other's work and decide what constitutes good work according to assessment criteria and rubrics. Students' learning can be enhanced when students contribute to their marking criteria as they become more aware of the assessment culture. They can learn from others' mistakes and success and develop self-reflection. In addition, students learn to critique the work of peers, provide constructive feedback, and eventually become responsible for their own learning. Some of the application areas of online PA are highlighted in Figure 1.

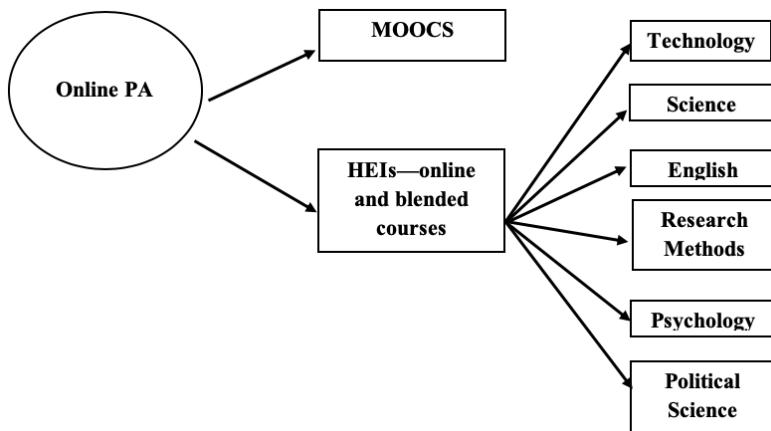


Figure 1. Application areas of online PA.

PA can provide a valuable method for enriching students' learning experiences (English, Brookes, Avery, & Blazeby, 2006; Topping, 2009) and is becoming increasingly used in tertiary education throughout the world, as highlighted in Table 2. Some researchers have found that students grade more leniently than teachers (Burgess, Clark, Chapman, & Mellis, 2013); others have found that students grade accurately and consistently compared to teachers, provided they have received defined marking criteria and sufficient training (Panadero & Alqassab, 2019).

The field of online PA has been studied around the world, as highlighted in Table 2. Most of the studies were carried out in the United States of America and in HEIs where subject domain varied. It was noted that smaller sample sizes are not significant to generalize the findings, as rigorous statistical analysis requires adequate sample size to prove hypotheses so that generalization is possible. Further research is needed in online PA with a larger sample size. Given that more than 50% of participants were females, studies with male opinions are also needed in literature on online PA. Researchers have tried testing the effects of anonymity and non-anonymity of peer graders on online PA (Table 2). The findings were mixed, with reports of positive effects of anonymity, where participants' performance,

perceptions, and attitudes were favorable under anonymous settings (Howard, Barrett, & Frick, 2010; Omelicheva, 2005; Raes, Vanderhoven, & Schellens, 2013; Rotsaert, Panadero, & Schellens, 2018; Vanderhoven, Raes, Montrieux, Rotsaert, & Schellens, 2015) and reports of negative effects of anonymity, where participants' performance, perceptions, and attitudes were not favorable under anonymous settings (Li, 2017; Peterson & Peterson, 2011; Yu & Wu, 2011). Two studies (Bloom & Hautaluoma, 1987; Yu & Sung, 2015) noted that there were no significant differences when comparing anonymous and non-anonymous groups in online PA.

Table 2. Best practices of studies carried out on online PA.

Study	Sample size	Education level	Gender distribution	Subject domain	Country
Bloom & Hautalouoma, 1987	96	HEI	50% female	Psychology	USA
Omelicheva, 2005	110	HEI	46% female from primary study and 40% female from secondary study	Political Sciences	USA
R. Lu & Bol, 2007	92	HEI	Not reported	English	USA
Howard et al., 2010	72	HEI	74% female	Technology for pre-service teachers	USA
Peterson & Peterson, 2011	86	HEI	88% female	Education or Research methods	USA
Yu & Wu, 2011	243	Primary education	51% female	Science	China

Raes et al., 2013	51	HEI	92% female	Education or Instructional Design	Belgium
Vanderhoven et al., 2015	69	Secondary education	72% female	Presentation skills	Belgium
Yu & Sung, 2015	65	Primary education	52% female	Science	China
Li, 2017	77	HEI	72% female	Technology	USA
Rotsaert et al., 2018	46	HEI	72% female	Education or Instructional Design	Belgium

Taking the findings in Table 2 into consideration, our study focused on anonymous online PA, as shown in Figure 1, since there has been no such study on online PA carried out in the South Pacific. Online PA has been a technological solution to online formative assessments; it is also in line with the sustainable development goals (United Nations, 2019), where each Pacific Island country invests heavily in quality education for all its people. Therefore, HEIs in the South Pacific region are continuously looking for ways in which ICT can be utilized to deliver quality education equitably throughout the region.

SETTING

This study involved participants from USP, which is a premier institution of higher learning for the Pacific region. The university is jointly owned by the Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Samoa; it has campuses in all member countries, of which the main campus is located in Fiji (Figure 2).

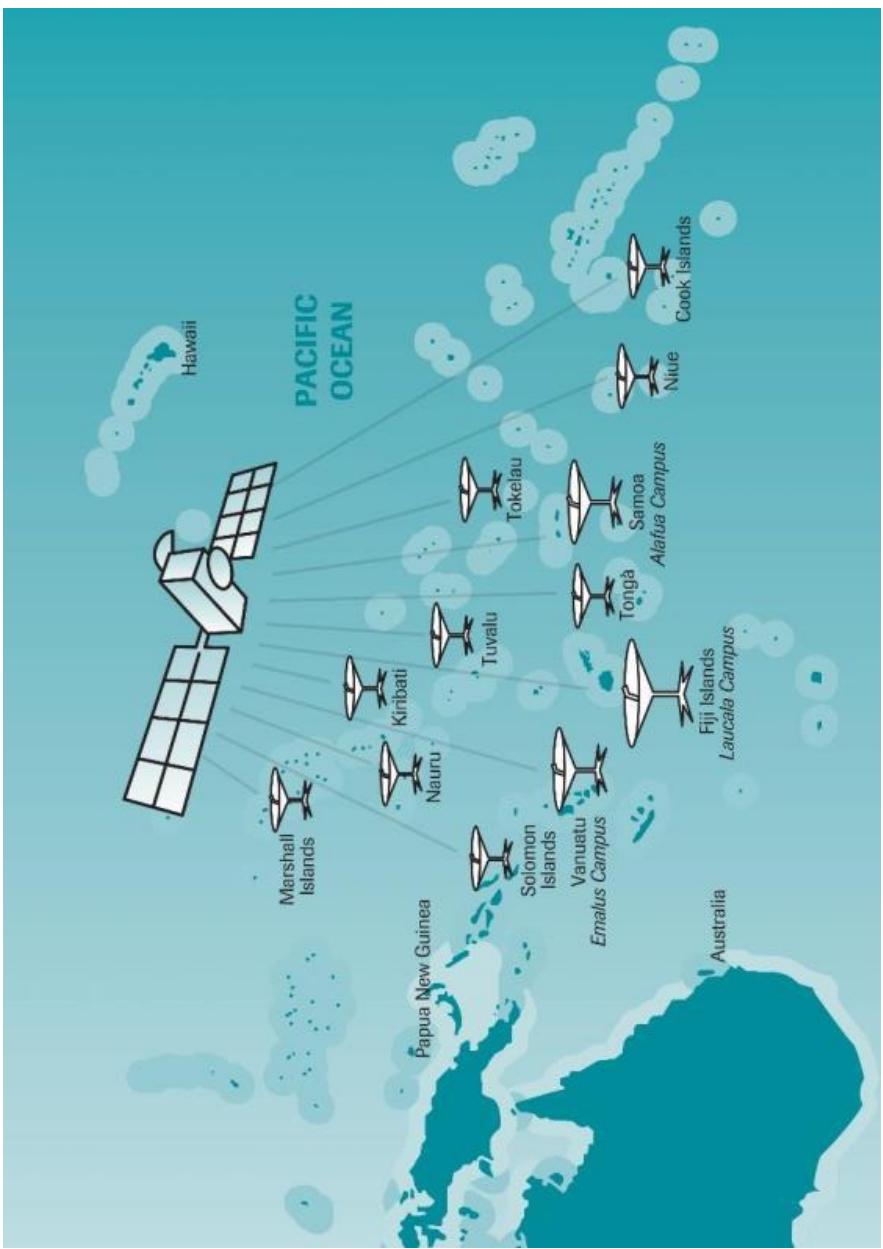


Figure 2. Member countries of USP connected through USPNet (USP, 2019, p. 48).

As mentioned, the first-year compulsory course chosen is UU100. It is a generic course where students from all undergraduate programs (with some exceptions) are required to complete this course. It is a semester-based 14-week course offered in Semesters 1 and 2 through online and blended modes. Students studying full-time from the main Laucala Campus (Fiji) are required to study through blended mode, and students from the other 13 campuses and 11 countries study it through online mode. The aim of UU100 is to ensure all incoming students develop competence and knowledge in information technology and information research (literacy) skills.

UU100 has no final exam; it comprises a number of formative and summative assessment components. Its formative assessments are 13 weekly topic assessments, online quizzes, and assignments, while summative assessments are ePortfolio activities. Assignments, ePortfolio activities, and the majority of weekly topic assessments have to be submitted online through the assignment and forum dropboxes in the learning management system (Moodle). The dropboxes are configured with the Turnitin plagiarism detection service (<https://www.turnitin.com/>), for which USP has a subscription.

Two weekly topics were selected for the online PA task. The first topic, titled “Simple text-based reports”, comprised an information technology assessment testing procedural knowledge in Microsoft Word 2016. The second topic, titled “Critically evaluating information resources”, comprised an information literacy assessment where students were tested on critically evaluating and selecting the best resources for their assignments.

The following PA aids were selected: instructional video and PDF guide for peer grading, criteria and rubric, training before engaging into peer grading, inclusion of self-assessment, and privacy of the peer graders. Under the privacy option, the anonymity of the assessor and assessee was bidirectional, as shown in Figure 1.

Since the major investigation of the study (research questions RQ 1 and RQ2) was on the reliability and validity of peer graders, only assessments with five graders were used for analysis. For the assessment titled “Simple text-based reports”, 326 submissions were extracted, and for the “Critically evaluating information resources” assessment, 114 submissions were exacted. For the purpose of understanding, Table 3 shows a sample of eight online PA records with grades of the “Simple text-based reports” assessment from the peer graders’ and the facilitator as well as that from Moodle, extracted from Moodle MySQL database. The total mark allocated for this assessment was 16. A similar format was also extracted for the “Critically evaluating information resources” assessment.

All assessments were also graded by a group of facilitators as an independent variable for comparison. The Moodle grade (the average grade from the five graders) was a dependent variable, and the grades of each peer grader and facilitator grade as independent variables. The moderating variables were gender and mode of study (online or blended). The difficulty of the task and the level of support provided were the same for both blended and online mode as control variables.

Table 3. Online PA data set for the “Simple text-based reports assessment” extracted from Moodle.

Assessment	Grader 1	Grader 2	Grader 3	Grader 4	Grader 5	Facilitator grade	Moodle grade
A1	13.9	11.2	14.4	13.7	12.4	13.5	13.1
A2	15.4	15.1	14.9	15.1	14.6	12	15
A3	7.6	12.2	16	6.7	11.8	10	10.9
A4	15.7	13.1	13.6	14.3	13.1	14	14
A5	8.8	9.6	7.2	10.9	7.6	10.5	8.8
A6	15.4	11.4	13.9	14.7	13.3	12.5	13.8
A7	15.1	11	12.3	16	13.4	15.5	13.6
A8	12.3	14.9	14.3	13.7	13.5	12	13.7

To continue using online PA in UU100 in other semesters, we had to run a post survey to capture students' perceptions of and attitudes toward online PA. UU100 is compulsory course and comprises students from various programs; therefore, a survey would capture the views of a variety of students. There were three sections to the survey: section 1 captured demographic information of the participants, comprising education level, mode of study (online or blended), study type (full-time or part-time working or part-time not working), program of study, and previous experience of online PA, whereas sections 2 and 3 captured students' perceptions of and attitudes toward the online PA strategy. The survey was administered online using Google Forms survey module after pilot testing. The survey was opened in Week 12 for a period of one month, and students who completed it were rewarded a bonus 1% mark toward their course work. Students who completed both assessments ("Simple-text based reports" and "Critically evaluating information resources") were allowed to participate only on a voluntary basis. The survey captured a total of 846 responses out of 1160 participants who completed both online PA activities.

The subsections and item constructs with descriptive analysis of sections 2 and 3 are shown in Table 4.

Students' perceptions of and attitudes with average mean (M) and standard deviation (SD) of each sections are as follows: adequacy of support and training provided ($M = 4.30, SD = 0.75$), feedback given to peer's mark ($M = 4.00, SD = 0.73$), usefulness of feedback received ($M = 4.19, SD = 0.75$), validity and fairness of peer marking ($M = 3.90, SD = 0.75$), and attitudes ($M = 4.00, SD = 0.87$). Overall, the students recorded a higher mean on adequacy of support and training provided, feedback given to peer's mark, and usefulness of feedback received. Thus, the results indicate that students had a positive experience as online PA enabled them to broaden their skills and knowledge and learn from their mistakes and those of their peers. However, a lower mean for validity and fairness of peer marking indicates that not all students perceived that online PA grades were valid and fair.

The attitudes of students toward online PA were positive as they preferred online PA strategy as an alternative form of assessment and had a voice in the assessment process. Students also stated that anonymity is important for online PA and recommended that other courses use this assessment strategy.

Table 4. Survey results on perception and attitude of students, adopted from Kumar et al. (2019).

Constructs, individual items, and Cronbach alpha values (N = 846, overall alpha = 0.870)			
Perception of adequacy of support and training provided (alpha = 0.84)	Mean	Std deviation	
I found video and user guide instructions useful in grading my peers' work.	4.37	0.74	
I referred to the peer assessment training instructions and rubric when commenting on and grading my peers' assessment.	4.26	0.77	
For each of the two assessments, I found grading the samples useful before engaging in actual grading.	4.33	0.75	
For each of the two assessments, I followed the guidelines provided during training for commenting on and grading peers' lab submission.	4.28	0.75	
For each of the two assessments, I followed the rubrics for grading peers' lab submission.	4.27	0.76	
Perception of feedback given to peer's mark (alpha = 0.705)	Mean	Std deviation	
The feedback I gave my peers on their assessments for this course included critical comments about any mistakes students	4.14	0.70	

made or any instructions they had not followed.		
The feedback I gave my peers on their assessments for this course was thorough and constructive.	3.93	0.75
Given the responsibility of grading my peers I felt empowered with a sense of providing fair grading	3.83	0.73
Perception of usefulness of feedback received (alpha = 0.777)		
Feedback from peers on both assessments helped me improve my skills in completing major assessments, i.e., e-portfolios and assignments, to the best of my ability.	4.19	0.77
Feedback from peers on both assessments helped me better understand the key concepts of topics titled “Simple text-based reports” and “Critically evaluating information resources”.	4.19	0.73
Perceptions on validity and fairness of peer marking (alpha = 0.81)		
The marks I got from all peers for both assessments respectively were accurate.	3.82	0.74
Peers gave me fair grades for both of my assessment.	3.88	0.74
Moodle workshop peer assessment tool allocated me a fair final grade.	4.00	0.75
I felt qualified to give feedback and grade my peers' assessment for this course.	3.96	0.76
I think my peers were qualified to grade and provide feedback on my assessments.	3.84	0.76

Attitude toward peer assessment strategy (alpha = 0.80)	Mean	Std deviation
I prefer peer assessment strategy over other methods of assessment.	3.61	0.96
I would like to see other courses also use peer assessment strategy.	3.85	1.00
I feel that peer assessment gives me a voice in the assessment process.	4.08	0.83
I find peer assessment strategy to be an alternative learning approach for applying the concepts taught in this course.	4.12	0.76
I think it is important that I do not know whose work it is that I am marking in peer assessment.	3.99	0.97
By engaging in self-assessment (i.e., assessing my own work and peers' work against a predefined solutions rubric), I was able to compare my solution with other peers' solution and improve my learning.	4.34	0.70

Due to the diversity of students in UU100 and larger sample size, the findings of the study can be generalized to the South Pacific and other regions provided online PA is carefully orchestrated. The research questions (RQ) were derived from literature, and relevant hypotheses (H) were then formulated to prove and answer the RQ. These were as follows:

- RQ1. How reliable is online PA in online and blended modes of delivery course?
- RQ2. How valid is the grade given by peers for the allocated assessment to grade?

- RQ3. What is the effect on student grades allocated by Moodle, with and without self-assessment?
- RQ4. How do the study modes of online and blended affect the grades of students, when PA is included?
- RQ5. Is there any significant difference in the Moodle grade of male and female students against the facilitator grade, when online PA is included?
- RQ6: What are effects of anonymity of assessor and assessee on students' perceptions?
- RQ7: What are the effects of anonymity of the assessor and assessee on students' attitudes toward online peer assessment?
- H1. PA data follows normal distribution.
- H2. There is no statistical correlation between peer graders and facilitator grade.
- H3. Student PA grades will be valid at the 0.8 inter-rater agreement.
- H4. The mean student grades or Moodle grade will be consistent with the facilitator grade.
- H5. There is no statistical significance between the online and blended mode Moodle grade and the facilitator grade.

The above research questions and hypotheses are not part of this reflective chapter but are provided for the purpose of understanding the research topic and how the study was carried out. The survey findings for RQ6 and RQ7 have been submitted for publication (Kumar, Sharma, Nusair, & Khan, 2019), whereas for RQ1 to RQ5 we are currently in the writing phase for publication in a journal.

CONCLUSION AND REFLECTION

This online PA study is the first of its kind from the South Pacific region and provides a contribution to the current knowledge of literature on online PA. The result of the post survey on students' perceptions of and attitudes toward online PA is disclosed in this chapter. Overall, the students had a positive experience provided they received support and training before engaging in online PA. Furthermore, the feedback given to the peer's mark and the usefulness of feedback enabled students to improve their learning. Students also had a positive attitude towards online PA but were a little concerned about the validity and fairness of marking. Therefore, with reference to the results of this study, HEIs in South Pacific region could adopt online PA strategy in their online and blended courses as a form of automated online formative assessment.

From the observations in this study, it is recommended that while designing online PA activities, it is very important to ensure that the activity is set to the standard of student understanding as students might have no or very little knowledge of this form of assessment. Furthermore, students must have mandatory *a prior* training and support sessions so that they understand the purpose of the activity and their roles and expectations. Students must be taught to interpret and use rubrics, argue opinions, and compare information. When designing an online PA activity, coordinators or lecturers must ensure that the assessment chosen is one that is familiar to both the students and staff; furthermore, that there is proper and structured monitoring of the entire cycle, such that there is no bias while the distribution of peer grading is undertaken; student dissatisfaction with the marks is recorded; and most of all, that the grades given by peers are valued. Students' perceptions of and attitudes toward online PA are totally dependent on the cycle of the activity, the knowledge the students have, and the support they receive during the entire process of online PA. However, this study has also shown that the benefits students receive from online PA greatly align to the graduate attributes of USP outlined

in every course (USP, 2004–2019). Future work recommended is to explore academics' perspectives of the use of online PA as a form of automated online formative assessment.

Finally, by engaging with the project, we were able to gain research skills, including writing proposals to securing funding and using web-based Microsoft Agile software for planning and scheduling task within the research group. We also experienced and learnt data analysis methods, including understanding and conducting content and construct validity and reliability of dataset. The handling of research funding budgets as per USP procedures and regulations was also another important learning experience. Finally, it was the effective teamwork which led to the successful completion of the research project.

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“IT RAINS A LOT HERE”: ONLINE ASSESSMENTS VERSUS MOTHER NATURE

Rajni Chand

INTRODUCTION

My journey to contact the remotest online learners in the region usually begins with an international flight to any of the University of the South Pacific (USP) member countries. If all goes well, flights are on time, and the accommodation booked is as recommended on travel websites.

My last trip to Samoa was not as expected. Maybe I am a “jinxed traveler” (as my friends always say). Anything can go wrong when I travel. Sure enough, after reaching the departure lounge passengers were told to expect flight delays. The reason given could have made my friends laugh. One of the windows of the plane had developed cracks and needed to be changed. Really—does that usually happen or is it because I was traveling? That delay led to messaging, emailing, and calling the hotel and campus staff that I would be arriving later than expected.

After a number of cups of coffee, some snacks, and all that the meal voucher given by the airline could pay, and finishing a novel, we finally left for Samoa. The flight was uneventful; airport

clearance smooth. The hotel staff member waiting to pick me, however, was not very amused. He had not been informed of the delayed flight.

The long road trip into Apia, where the campus is, reminded me of the many descriptions that Somerset Maugham had of Samoa in his writing (Maugham, 1921). In addition, it was raining as we drove into Apia that quiet evening, listening to Samoan songs playing over the car radio, and seeing young boys wearing their traditional *lavalava* and splashing in the rain puddles.

The next two days were routine, with the usual regional campus tutorials and consultations with campus-based course staff and campus administration staff. Given their experiences as regional staff with online students, it did not take them long to identify the challenges. Although it may sound routine, it was far from it.

TEACHING ONLINE AT USP

Teaching online components of courses at USP brings with it, among other things, unexpected challenges. Studies on online tests that are part of courses discuss much about the challenges, cheating, and plagiarism (Miguel, Caballé, Santi, Xhafa, & Prieto, 2015). Experiences at USP go beyond that. My task was to identify the challenges that large courses face where inclusion of online tests is concerned. That was what had brought me to Samoa, since students based at Alafua Campus were not performing well in their online tests. Thus, this fact-finding trip was part of the larger study being conducted for a Centre for Flexible Learning (CFL) research study.

“English for Academic Purposes” (UU114 as it is commonly known as at USP) is offered by various modes of study (face-to-face [F2F], print, online, and flexi school). F2F requires a full-time workload. Print is the distance -education mode, which is self-study using printed study material. Some tutorial support is

provided at campuses where and if there are course specialist staff. Online mode refers to a fully online mode with an asynchronous learning environment. Given connectivity issues in the region, students studying online have a choice to attend print mode tutorials. This campus-based tutorial support is much appreciated by these learners. Flexi schools are fixed-term full-time F2F course offered any time during the year. However, they are usually held during the winter (June–July) or summer (December–January) semester break. Staff travel from USP's main campus at Laucala (Suva) to teach an approximate 5 full-day sessions over 5 weeks at any of the university's campuses or sub-campuses.

With course student numbers ranging from 2000 to 5000 per semester from any of USP's 12 regional campuses, assessment grading has always been a challenging issue for the course team. Given the fact that students enrolled for the course are based at a range of campuses (those with most facilities and those with least), multiple assessment techniques have been implemented to assist in assessment administration, the nature of assessment, and assessment grading.

TRIP ON A RAINY DAY

I had arranged for a taxi for my ferry trip to Savaii for my third day in Samoa. Savaii is the other island in Samoa, and USP has a sub-center there. The 5.30 am pickup took me beyond Samoa's international airport to the jetty to board the ferry to Savaii. I was impressed with the organization as well as the condition of the ferry. The ferry ride was interesting. Sitting among families traveling, one could easily pick the non-resident returnees based on their luggage, language, and dress.

The distance from the wharf to my accommodation was not far; thus, I decided to wheel my overnight bag down the road to the hotel. It was an enjoyable walk, as I darted in and out of roadside shelters to avoid the unsteady misty rain. Again, the rain had become a companion to me for this trip. My accommodation

was tucked within a business complex. The room comprised a large sleeping space with an attached balcony. Downstairs, the hotel had a clean restaurant with very friendly staff who were more than happy to accommodate my vegetarian choices.

The trip to the sub-campus the next day started around eight in the morning. The hotel staff gave me the direction to the sub-campus: "Just across the road and few buildings up the road. The campus sign is there". The receptionist, however, casually suggested that I grab one of the hotel's complimentary umbrellas as I was walking out. "It rains a lot here, you know."

What was supposed to be a sub-center was a space tucked away behind the Ministry of Education, Sports and Culture Library. The rooms had computers, furniture, and space for tutorials. This was worth noting given the issues with infrastructure in regional campuses. However, I did not see any students. The students had definitely been emailed about my visit, date, and time of my arrival! A query to the lone staff in charge led me to understanding the meaning of "It rains a lot here". Whenever it rains, the Internet in Savaii is down; thus, emails cannot be received or sent. It made me think twice about our ambitious plans on going completely online. If something as simple as rain could carry so much meaning in Somerset Maugham's (1921) short story *Rain*, imagine its effect on a tropical country's teaching and learning environment.

Rain it did—steadily—as I had arrived into Apia and then to Savaii, and then during my morning walk to the sub-center. It continued to rain as I sat waiting for the students to get my second message and show up. As I silently stared at the rain, I realized the negative impact of rain in Savaii. Rain and its connection with the network, Moodle, and online learning, uploading of assignments, and online tests. Communicating with distance learners now had an additional perspective for me. My 20-plus years' experience of teaching by distance at a regional university had taught me much about challenges one can expect, as well as see first-hand the challenges many students face. Studying at USP

include challenges such as traveling miles to reach the town to attend a tutorial or to submit an assignment. It also includes traveling by a fiber boat to the sub-campus to sit for a test. In some situations, it includes climbing to the highest point on the island for better network reception to call the course tutor and ask more time for assignment submission. Teaching can include holding onto the table as the floor begins to rubble yet again during the aftershocks of an earthquake—as happened during a regional tutorial visit. If not for rain, studying at USP can be as simple as the click of the button to upload an assignment on Moodle. The diversity within USP regional's studying and teaching facilities, opportunities, and challenges is definitely not one many at other universities see.

While waiting for students to show up at Savaii's sub-campus, I sent out another email. A few students turned up. The majority of those who eventually arrived were print mode learners who also struggled with connection issues. One or two were online learners who shared their struggles with the online mode due to connectivity issues, distance, and isolation. Enthusiastically, I tried to take the online mode students through the Moodle pages to show them the various resources, quizzes, and material. After waiting for so long, I had no other option but to connect my external hard drive and use documents, resources, and activities stored there for the course. I had to fall back on using the printed course material that is part of the print mode. In my mind, I was already thinking about the options we may need for regional online students, if they enrolled from places like Savaii. I did not have to ask these students why they performed so poorly in their online assessments.

DESIGNING ONLINE ASSESSMENTS

Designing online resources, tests, and courses seems very simple if a staff member is based at Laucala Campus. However, in a region where connectivity infrastructure requires much work, it leaves one to ponder the challenges that students studying by

various modes of study face in this part of the world.

I had begun designing online tests for all modes of UU114 due to the inability of staff to cope with the marking load. It was also an ambitious plan to use the facilities that the online mode and Moodle provided. After designing the tests, I ticked and crosschecked most components to ensure security, standard requirements for such tests, and sampling of online critical review tests. I had ensured that a large question bank was set up in the absence of a remote proctor. Although students at campuses with support staff managed to attend tutorials and were given guidance, students based at campuses such as at Savaii depended totally on tutorial visits and online material found on Moodle. Yet forces beyond our control played a role in the poor performance of students attempting an online component of the course.

Prior to organising online tests, teaching as well as administrative staff at various regional campuses were approached to discuss the preferred test format. They were definitely the best to inform us based on their knowledge of the campus infrastructure. An analysis of the performance of students attempting online and a paper-based mid-semester test (MST) showed some common trends across all regional campuses. When students enrolled by print as well as online mode were offered a choice between a paper-based test and an online test, most of them opted for the paper-based version. What were the reasons teaching staff and students at regional campuses still suggested a paper-based test instead of an online test? Naturally, my first-hand experience during a rainy day in Savaii had bluntly given me the answer.

Students studying by other modes at regional campuses also opted for a paper-based test. To find out more on the preferences of students enrolled by other modes, a survey had been conducted earlier during this research.

In Semester 2, 2018, about 700 students were enrolled for UU14 by print mode. Out of these 700 students, only 200 opted for the online test while the rest preferred the paper-based test. These paper-based tests were sent to Laucala Campus for marking. Given the geographical distance, there were additional costs involved in printing the tests papers, invigilating, marking, and returning the marked scripts to the regional campuses.

Figure 1 shows the preferences of print mode students for each test type. It needs to be noted that even at campuses with a good network, students still preferred paper-based tests.

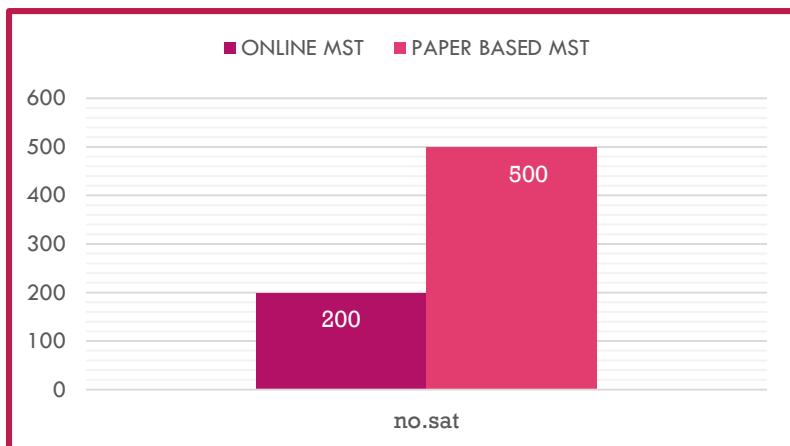


Figure 1. Preferred test format (online MST vs paper-based MST) of print mode students, Semester 1, 2018 ($N = 700$).

An additional analysis was conducted to ascertain the performance of the print mode students who had attempted the paper-based test against those who had attempted the online test (Figure 2). Those who completed the online test did not perform as well as those who had completed the paper-based test. More students who had attempted the online test achieved grades of A or A+; however, students who had attempted the paper-based test performed better in the other grades.

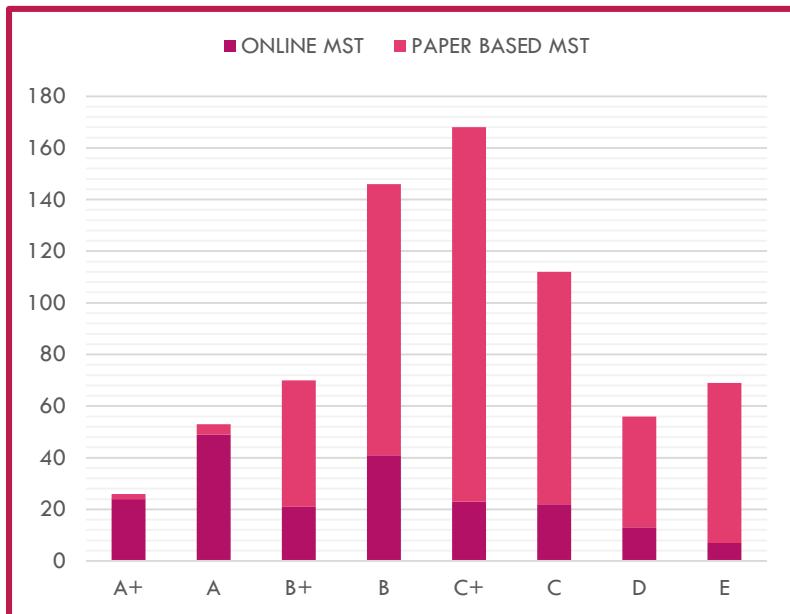


Figure 2. Performance of print mode students by test format (online MST vs paper-based MST), Semester 1, 2018 (N = 700).

An additional survey was conducted to ascertain the engagement of UU114 students at various campuses with USP's online learning platform (Moodle).

The following questions were included in the survey (Table 1).

Table 1. Survey—Online student engagement: Use the online learning platform (Moodle) for learning.

Online student engagement: Use the online learning platform (Moodle) for learning	
As a student for UU114, how frequently do you use the online learning platform (Moodle) for your learning? Please use the following scale:	
Questions	Scale: 1–5
PART A: Course	
1. Reading course material	
2. Checking weekly forums, course messages and emails and participating in discussion forums	
3. Submitting assessment tasks as instructed	
4. Visiting, calling or emailing the course instructor with questions about the material and/or assignments	
5. Attempting online activities for various assignments	
6. Attempting online quizzes	
7. Checking my grades	
8. Attempting the online pre-assessment activities	
9. Looking at sample essays and resources for assessments	

10. Viewing listening and speaking activities (links for YouTube etc.)	
PART B: Learner engagement	
1. I have issues with Internet access at home	
2. I have issues with Internet access on campus	
3. The campus computer labs lack well-functioning computers	
4. I am not too confident doing activities on Moodle	
5. I need a lot of time to locate resources on Moodle	
6. I face difficulty in understanding the instructions on Moodle page	
7. I prefer being instructed on the course content, assignments and test by a F2F tutor	
8. I participate in forum chats, and discussion forums	
9. I get frustrated while waiting for resources to be uploaded on Moodle	
10. I like to study online alone, rather than attending tutorials	
11. I prefer doing activities and test on paper, rather than online	
12. I face a lot of problem uploading my assignments on Moodle	
13. I face a lot of problem uploading my assignment for Turnitin checking	
14. I read class notices, emails and messages sent by the course instructor	
15. I am very confident using Moodle and know my way around Moodle	

As a comparison, the views expressed by students at the Tonga Campus are not very different from those shared at Savaii Campus during the tutorial visit. Students used the online learning platform mostly for accessing course material and for submitting assignments (Part A: items 1 and 3). Students found the network issues on their campus challenging (Part B: item 12). The request for a paper-based rather than an online test is thus obvious. It needs to be noted that the highest response was for receiving instructions on the course content by a face-to-face tutor.

WAY FORWARD WITH ONLINE ASSESSMENTS AT USP

Internet connection is thus a vital component where online MSTs are concerned. The survey showed students facing fewer Internet connection issues at home than on campus. This in itself needs to be further investigated, since visits to other regional campuses have also indicated poor infrastructure for computer labs, Internet connections, and network support. Most students are confident using Moodle; however, they indicated their frustration since the network issues were a deterrent when attempting online activities.

UU114, being mostly a writing course, has an overwhelming workload for the teaching staff. That was one of the reasons for opting for more self-correcting online assessments. These were to reduce marking as well as to provide on-time feedback. Studies conducted on online assessments have discussed issues such as teacher confidence and learner confidence. Where designing tests is concerned, teachers need to be trained in order to produce good test papers. Such challenges are not new where e-assessments are concerned. Teachers are initially hesitant to change their habits, as has been found in previous studies (Kuikka, Kitola, & Laakso, 2014; Liu & Kleinsasser, 2015; Rout & Patnaik, 2018). According to Kuikka et al. (2014), teachers find adapting to the new electronic system

difficult as they are used to their tradition exam preparation methods. Training workshops in designing online tests have served to boost the confidence of the UU114 teachers. Student confidence in online assessments can only be possible if they are given opportunities in attempting trial tests prior to the real test. In the case of UU114, trial tests on Moodle gave students the required confidence. However, with poor network it was not possible for many students to complete them.

One of the reasons for introducing online assessments for UU114 was the costs involved in test administration. With student numbers ranging from 2000 to 5000 per semester, the logistics and costs involved in printing test papers, hiring examination venues, arranging for personnel to supervise, as well as the marking load for teaching staff were becoming a very challenging issue. As was mentioned in the REAP project (University of Strathclyde, 2007), staff teaching writing courses are already overwhelmed with workload. Adding another assessment can be a very tiring.

Online assessment, if designed well, can be a very useful method for achieving any of the course learning objectives. However, the quality of the assessment task needs to be regularly monitored. Thus, this research project has provided a timely investigation on the choice of test method most suitable for a regional university like USP.

One of the flaws in online assessments can be cheating. While procedures in place do reduce opportunities for cheating, opportunities may allow students to cheat (Cluskey, Ehlen, & Raiborn, 2011). These include incidences where the online test is made available by the instructors for a week, giving students opportunities to copy questions and conspire with their colleagues for answers. Additionally, tests that are left open for extended periods provide opportunities for students to obtain assistance from their friends while completing the test. Revising test papers and designing additional tests reduce the chance for students to develop files for themselves and other students.

The practice of a tight test open window and a large test bank reduces the opportunities for cheating. UU114 uses a tightly regulated test attempt window and has a large test bank. With questions within test sections and choices for each question randomized, the chances of two or more learners viewing the same test paper, the same questions, and the same options for responses are reduced. This is aligned with the suggestions provided for online exams without proctor supervision (Cluskey et al., 2011).

Nonetheless, the introduction of some form of exam proctoring can reduce cheating. The university needs to invest in exam proctors such as Remote Proctor or ProctorU or biometrics recognition to reduce the possibilities of cheating during online tests.

CONCLUSION

While conducting this research, a few things became obvious about online assessments at USP. Although online assessments may sound great, as with all tests, they require proper design and planning. Paper-based tests are much easier to supervise if online proctors are not in place for online exams. USP still needs to review its infrastructure at regional campuses for better online learning and teaching. Campuses with fast Internet connections are still behind due to poor computer labs, non-functioning computers, and the lack of information technology staff on duty. While students may have expertise in using e-platforms for learning, the poor network frustrates them, and this leads to their missing deadlines for assignment submissions, fewer opportunities for familiarizing themselves with the course content, and performing poorly in online tests. One also needs to keep Mother Nature in mind as well.

When I finished my session with the students in that small tutorial room tucked behind the Ministry of Education, Sports and

Culture Library, the rain had ceased, and the sun was shining. The network was still slow.

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SUPPORTING FLEXIBLE ASSESSMENT OF COMPETENCIES WITH EPORTFOLIOS

Irene Yee Chief and Parijata Moeava

INTRODUCTION

The introduction and creation of ePortfolios at The University of the South Pacific (USP) is an initiative to explore the use of technology in teaching and learning. This is important to USP as the institution is a 12-member country university across the Pacific Ocean, where exorbitant travel costs are a pressure in identifying affordable and accessible higher education. The use of the open source software Mahara was introduced in 2007 as a third party ePortfolio software to enable students to demonstrate their work (Tuisawau, n.d; Yusuf & Tuisawau, 2011). Mahara is embedded within Moodle, the learning management system at USP, and is a space which enables learners to create, share, and engage within courses. They are able to put evidence of learning such as artefacts, reflections, and presentations to demonstrate competencies within their courses or programs. Learners are also able to share with their peers and contribute to one another's learning across the Pacific Ocean. As online and blended learning continues to gain momentum in terms of the numbers of students online, ePortfolio is part of the digital ecosystem. Our graduates are no

longer nation bound but are working across the South Pacific region as well as in the global economy. Therefore, ePortfolios can be a comprehensive part of the learner's record and exported by graduates to demonstrate their learning. As island nations acquire the Internet, it is pertinent to promote and use this e-tool to capture teaching and learning (Chief, Jione, & Totaram, 2016). The purpose of using ePortfolio was to enable learners to provide evidence of their learning in their pre-degree "Hospitality Workplace Practicum" course (CETH48).

LITERATURE REVIEW

Deneen, Brown, and Carless (2018) noted that ePortfolio adoption provided students the opportunity to understand assessment and its relation to technology and how these concepts relate to one another. At USP, the ePortfolio adoption was provided with rubrics and the use of technology to improve their competencies.

The ePortfolio at USP is attempting to be re-centered on the distinctive kinds of learning that they alone can foster: high-impact forms of mentored, inquiry-based learning (Bass & Eynon, 2017). This is particularly so where ePortfolios enable connection between students and teachers and among students in the teaching and learning space. They enable teachers to see evidence of learning from students located in far-flung geographical spaces. Yusuf and Tuisawau (2011) examined the use of ePortfolio in "Communications & Information Literacy" (UU100)—one of the first attempts of using ePortfolio at USP—via a Likert scale to collect data on students' perceptions of their ePortfolio. This exploratory study of 1597 students across the USP region provided descriptive data based on students' responses. The alignment of objectives, demonstration of learners' efforts, and evidence of learning are of concern for teaching and learning (Polikoff & Porter, 2014).

ADOPTION OF EPORTFOLIOS AT USP

Based on the number of courses reported in 2019, there were 15 courses and two programs that used ePortfolios at USP with a total of 6207 students (Koli, 2019). The breakdown is shown in Table 1.

Table 1. Courses and programs at USP using ePortfolios in 2019.

Type of course	No. of courses	No. of students
Undergraduate	8	5315
Graduate	5	140
Pre-degree	2	752
Total	15	6207

Apart from the two undergraduate programs, ePortfolio was used to introduce students to skills in information literacy (Singh, Jokhan, & Sharma, 2015) as well as demonstrating the achievement of objectives within undergraduate courses. As ePortfolio creation by teachers was voluntary, the choice to use ePortfolio would be intrinsic in their endeavors to provide a virtual space for students to demonstrate their evidence of learning. With a demand for pre-degree courses, ePortfolio was identified as an e-tool which could capture learners' competencies and be utilized and marketed to their target industry as part of the learners' résumés.

INSTITUTIONAL SUPPORT FOR THE USE OF EPORTFOLIOS

The ePortfolio toolkit is a result of an award of a Strategic Research Theme grant from The Research Office at USP for the team (Chief, Totaram, & Jione, 2017). This grant included staff from the Centre of Flexible Learning and Pacific Technical and Further Education (Pacific TAFE). The grant also provided the ePortfolio Working Group based at the Centre of Flexible Learning in 2014 with opportunities to identify needs which would address students' use of ePortfolio. Membership of the ePortfolio Working Group consisted of representatives from USP's Faculty of Arts, Law and Education; Faculty of Business and Economics; and the Faculty of Science, Technology and Environment. Through the grant and the support of the Centre of Flexible Learning, in 2017, Kristina Hoeppner from Catalyst IT, New Zealand, and the researchers presented sessions for pre-degree teachers of Pacific TAFE and all USP faculty staff as well as a public seminar at USP, where universities were invited to learn about ePortfolios. The design of the ePortfolio was developed to engage students, industry partners, and the teaching staff within CETH48.

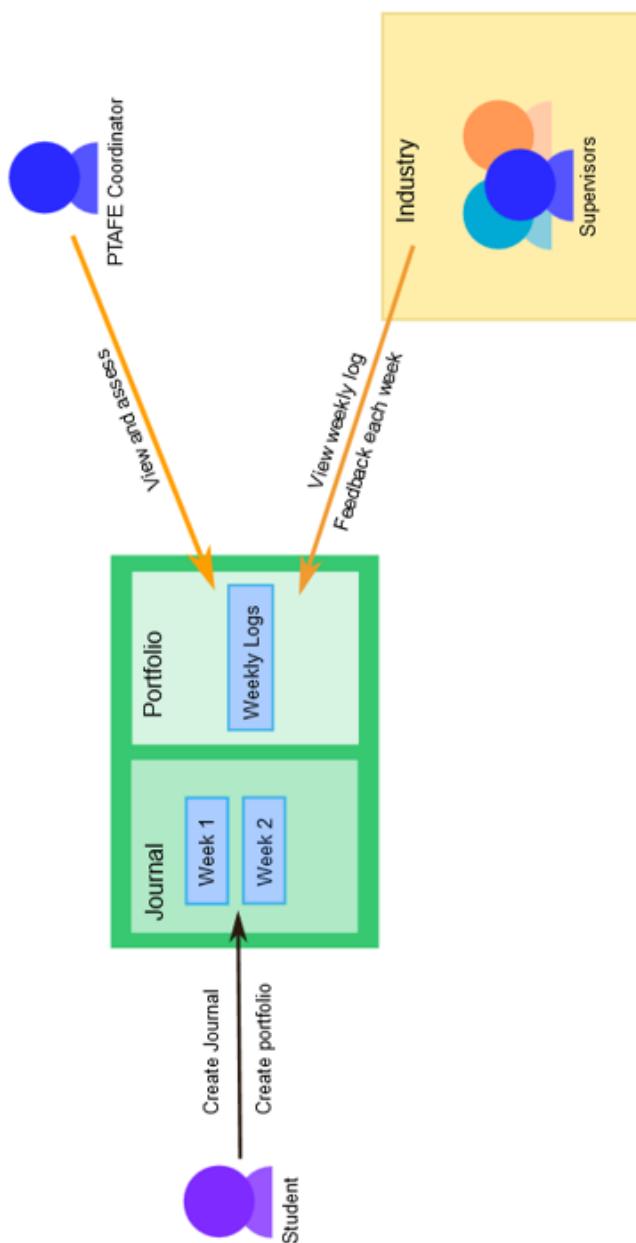


Figure 1. Engagement expectations of students, tourism industry, and USP.

The alignment of courses was in line with a recommendation in ePortfolio creation in higher education (Trimble, 2018). Based on the grant, the alignment of objectives provided the avenue for the ePortfolio to be assessed using rubrics. Wozniak et al. (2016) developed marking criteria to measure metacognitive skills where we could examine in our rubrics. The institutional approach to using the ePortfolio within Moodle also provided USP the opportunity to verify institutional records of students, work should industry request for a record.

This model for the use of ePortfolio (see Figure 1) was created by the course coordinator and the grant members. The design of CETH48 provided five sections: Food Service, Bar Service, Front Office, Guest Service, and Events; therefore, alignment of the objectives to the demonstration of evidence of learning could be provided.

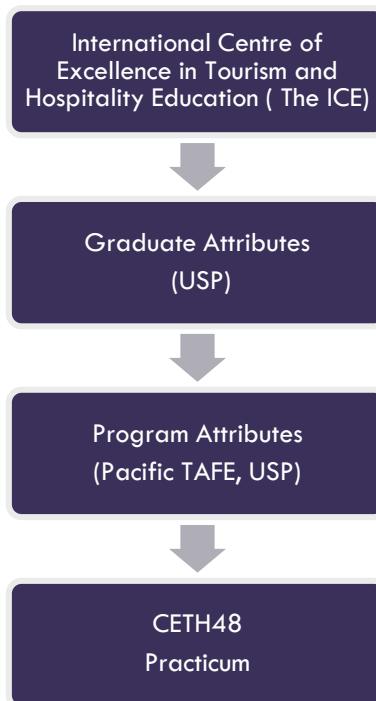


Figure 2. Alignment of course objectives.

EPORTFOLIO AT PACIFIC TAFE

With the introduction of Pacific TAFE at USP, an increasing number of learners at the pre-degree level, it was an opportunity to provide e-learning tools to adult learners to continue their lifelong learning. With an increasing penetration of the Internet within the USP region, technology to capture teaching and learning was a proactive step (Hassal, 2017). Due to time constraints, the present grant was able to assess 25% of the course, that is the Food and Beverage session, which consisted of 150 hours of the practicum. This research provided the avenue to examine students in CETH48 (for the Certificate IV in Hospitality Operations).

STUDENT PROFILES

All students who had successfully completed all seven courses in their program were ready for the industry practicum CETH48. Of a total of 21 students in CETH48, 8 were males, and 13 were females. All the students were out on practicum in different parts of Fiji. Most were on the main island of Viti Levu. The locations of the practicum were based on industry needs in one of the four areas of assessment (Table 2).

Table 2. Location of practicum of CETH48 students.

Location of practicum	Males	Females
Suva or 50-mile radius	1	7
Nadi or 50-mile radius	4	2
Sigatoka	-	2
Outer Islands (remote resorts)	3	2
Total: 21 students	8 (38%)	13 (62%)

METHODOLOGY

A written questionnaire and face-to-face semi-structured interviews were used to collect data within a 4–5-month period. Written questions gave learners time to think prior to a scheduled voice-recorded interview. This two-tiered step provided learners time to reflect on their learning. The student responses were transcribed and thematically categorized to provide learners' perspectives of their experiences, which were inserted into NVivo. Two student workers transcribed the voice interviews prior to data being analyzed in NVivo.

FINDINGS

Based on the collection of data, the following themes were emerged:

- Training for CETH48 practicum students prior to going to site locations was sufficient. Students had a good idea of the assessment. They felt they were prepared for the

exercise of 600 hours which they have to achieve to complete their practicum course.

- Students were able to access the ePortfolios during the practice sessions within USP campus in Laucala Bay. However, they were not able to access them as they were no longer registered (due to closure based on term-based access) or technical issues. The need to establish timelines for submitting deliverables such as the varying practicum timelines has to be made at the institution level. With over 6000 students using ePortfolios in 2019, it is imperative that the technology is stable and reliable.
- Strengthening of relationships between the university and the tourism industry is needed. This would enable students to complete their hours and also each of the respective sections of the practicum. To complete the practicum, students had to be placed at various tourism locations.
- Industry staff need to be provided opportunities to understand the ePortfolio so that students in practicum can be provided with mentorship in the workplace.
- Students indicated that they had a lot of difficulty in accessing Mahara in October–December 2018 (grant period) to put in their evidence of learning and had to resort to submitting evidence via email. This included logbooks, multimedia components, and PowerPoint slides.
- As a reflection, the methodology which required students to first write their response, reflect on their comments, then have a verbal interview enabled students to reflect initially on their written responses. The learners used this as a guide to provide a greater depth of response.
- Students demonstrated metacognitive skills in arranging their media components and in the context of their industry location.

Students' reflections on the practicum and the use of ePortfolio

Students provided responses to the interview. After providing consent, students were given written questions which they wrote answers to. Then there was a follow-up of a face-to-face interview, which was transcribed. The responses below are taken from transcriptions of the face-to-face interviews. Students' names have been removed and replaced with initials to protect their identity.

Yes, it has helped me enhance my understanding more in putting me in different types of hotels and it has helped me understand the standards and I have really learned a lot from it. It has made me come out of my comfort zone and be able to be bold. (AD)

The following comments relate to the usefulness of ePortfolio:

Yes, I would recommend it and it is very useful since it is just a flick of a button and whoever wants to get access to our ePortfolio gets to see what we have learnt and done in the industry which will give them better insight to what courses we have done and how things are done in terms of practicum. (LN)

ePortfolio is good, it's very educational and would like to recommend this class to be going the next students to come. (MV)

Yes, very useful to my future career. I've learn so many things, starting from front office, front of the house, back of the house and that we do in the hotel till those people who clean the hotel, environment, get to learn a lot, help each other in terms of team work. (MN)

Yes, I did, when I was at USP I didn't know anything regarding cocktails, food and beverage and when I went to Hotel H it was good, learnt so many things. For Hilton based on my view I wanted to doing service it was good learnt a lot of new things during functions the only thing I'm not sure of is to be in the bar, I need further training on that, For Hotel P, it was good, I did front office, learnt a lot of new things, a lot of check ins and check outs, it's good. (MV)

Students found the practicum useful in their application of what they learnt in the USP certificate program. The ePortfolio was able to document what they learnt on the ground when they had Internet access.

RECOMMENDATIONS

Based on the student interviews and reflection, we have made recommendations to improve the use of ePortfolio by students and teachers in certificate programs:

- A 4-5 month grant was a short period of time, which made it difficult to capture students' work. A longer period would enable analysis of existing ePortfolios as artifacts would be documented in greater depth.
- Mahara was not stable during the students' practicum. An external alternative needs to be considered to enable students to complete their CETH48 ePortfolio.
- Operational issues such as the availability of Moodle to students in CETH48 practicum across a 2-year period to enable students to complete 600 hours for CETH48 would assist students. ePortfolios were opened and closed according to the semester dates. Students in their locations were not able to put content in their ePortfolios when they were locked out by the institution. If the period

could be extended to 24 months, the flexibility would prove less frustrating for students.

EXPERTISE ACQUIRED FROM THIS RESEARCH

We gained expertise in taking a theoretical concept, that is, from creating an ePortfolio to capturing competencies to actualizing at the pre-degree level. We applied competencies and a framework to enable future students to work in. We learned to work with the tourism industry and also with students who were actively taking part in the tourism industry. The visits to the various sites using the grant gave us insights into what practicum students face in their workplaces. This reflection in action (Schon, 1983) enables us as practitioners to examine practice and revise the model.

The co-researcher, who is the coordinator of CETH48, learned to use qualitative data and to explore the use of rubrics in grading assignments. This project also gave us the opportunity to use the rubrics in actual assessment. She also learnt how to use the toolkit and additional features of Mahara and ePortfolio, along with details on the sound and video editing components, which can be used in other projects.

We also learnt that tourism industry personnel in many hotels in Fiji are not tech-savvy and require training on the basic use of ePortfolios. They were constrained by time; hence, found it difficult to fill in logbooks. This research project also gave us the opportunity to examine more up-to-date readings on the use of ePortfolio in higher education as well as in industry. The insight from this study based on the evaluation of competencies and students' work illustrated they were able to achieve competencies.

REFLECTION ON EXPERIENCE OF USING EPORTFOLIO

Based on our experience in this project, we are more determined to implement projects and action research using technology. However, a more realistic timeframe would have provided a better sequence of ideas and reflection would assist us in revising our tools.

The grant encourages more projects and in greater depth. It enabled administration to look at the start and end dates of terms. A new standard, that is, enabling practicums to have 12-month period access, would prevent the access issues that students faced in this research. The ePortfolio opened and closed based on semester dates; this led to frustration as students in their practicum worked on different timelines. Reliable and lengthier periods of access would encourage a greater use of ePortfolio. This would enable students to provide a greater sample of work, especially in using rubrics in grading in industry. Furthermore, training of tourism industry members would enable a better understanding by staff. It would also enable the use of logbooks of activities at the hotel completed each day to measure the 600 hours across the four sections of the CETH48 practicum. This evidence is provided in the ePortfolio by learners.

Building opportunities where students can gather evidence and then submit into existing systems may need to be examined and built in as part of the training.

Multiple points of access, which are part of flexible learning, would enable more students to graduate.

The logbook as an assessment tool was paper-based; hence, it is time-consuming to complete and obtain supervisor comments and feedback, which will require the student and supervisor to be physically present. The ePortfolio provided ease of access and flexibility for the industry representatives for commenting and providing feedback on the student performance, at their convenience, and obtaining instant access and updates without the student. Students were able to rework their submissions based on the teachers' feedback. The multiple attempts provided them with more opportunities for success.

Based on our experiences, we see the need to improve what exists and offer the use of this electronic learning space to pre-degree, degree, and postgraduate students.

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RESEARCHING LEARNING AND TEACHING TECHNOLOGIES FOR FLEXIBLE LEARNING

*Evan Naqiolevu, Flora Bentley, Vasiti Naucabalavu, and
Nitendra Gounder*

INTRODUCTION

Research in education is used to make informed decisions on the use of appropriate learning strategies and technologies to enhance the learning and teaching experience of students and faculty (Matters, 2006). At the Centre of Flexible Learning (CFL), Professor Som Naidu (Pro Vice-Chancellor Flexible Learning and Director CFL) has steered the section's work to more project and research initiatives. These are to guide its efforts to improve learning and teaching in all modes at the University of the South Pacific (USP), which serves students from 12 Pacific Island member countries spread across the vast Pacific Ocean.

This reflection piece gives insight into one of the several research projects and initiatives undertaken by CFL titled "Effective use and integration of technologies in support of

flexible learning at USP” with a focus on two learning and technology tools—Lecture Capture and BigBlueButton. The collective experiences of our team (the authors: a learning experience designer and three education technologists), will be interwoven into this narrative describing the purpose and process in collecting the data, and presenting and disseminating the results, as well as highlighting the lessons learned.

ABOUT THE RESEARCH

In mid-2018, the research commenced to ascertain students' and faculty's experiences in using a suite of learning and teaching technologies that are currently or have the potential to be integrated in the learning experience design and development of flexible learning courses at USP. The suite of visual and audio recording software and systems comprised the following:

- (1) Lecture Capture (<https://echo360.com/lecturecapture/>), a lecture recording system using Opencast, was introduced in 2017 to record face-to-face lectures in USP's three main teaching campuses at Laucala Campus in Suva, Fiji; Alafua Campus in Apia, Samoa; and Emalus Campus in Port Vila, Vanuatu. The recorded lecture videos are made available to the face-to-face students on Moodle, the learning management system at USP.
- (2) REACT (Remote Education and Conference Tool, <https://www.react-live.com/>), a videoconferencing platform, was introduced in 2012 to support interactive tutorials for flexible learning students throughout the USP region. Each of the 14 regional campuses has a videoconferencing room where students can interact with the lecturer and their peers. The recorded tutorial videos are made available on a repository linked to Moodle.
- (3) BigBlueButton (<https://bigbluebutton.org/>) is an open source interactive and collaborative web conferencing tool designed for online learning and is integrated with

Moodle. A video recording of the session is made available online but students cannot download the videos.

- (4) Google Hangouts is a communication platform that students and teachers with a Google account can access using mobile apps. This tool is not widely used at USP even though students' USP email addresses are linked to Gmail and other suite of Google tools. It has the capacity to support only small class sizes (up to 30 people), which is not attractive for most courses at USP.
- (5) Zoom (<https://zoom.us/>), a licensed web conferencing tool that can be used for group or one-on-one meetings, is being tested by USP's Information Technology Services and is proving to be a stable platform for the region. A video recording of each session is made available by lecturers via a link sent to students.

These five technologies are used to facilitate connectivity, interaction, and communication within the university community and to reduce the students' feelings of remoteness and isolation.

THE PURPOSE OF THE RESEARCH

Since the five tools had been introduced and integrated into the USP system, we decided to ascertain the perceptions of on-campus and regional students and faculty throughout the USP region. Each tool has the ability to record scheduled lectures and tutorial sessions before generating videos for students to access online. We set out to answer the following questions:

- How useful are these tools and the videos that are created for students and teaching staff?
- Are our experiences and stories at USP different from those globally?
- What do we want to do with the research?

This created discussions around setting out a plan to carry out the project and to use the data to possibly influence the preparation of guidelines and inform good practice and opinions on the tools that support flexible learning.

It was our intention to share the outcome of the research with the community through conferences and seminars, and in response to feedback to develop and facilitate workshops for faculty in the main teaching campuses at USP.

THE RESEARCH PROCESS: COLLECTING THE DATA

Therefore, in consultation with Professor Naidu, we drew up a mixed-method study to capture both qualitative and quantitative data. Without going into the details, we employed commonly used methods of gathering data such as an online survey and interviews targeting students and faculty; observation of the lecture, computer labs, and REACT facilities; as well as reviewing the literature on their commonalities—the use of web conferencing tools, and video recordings of lectures and tutorials.

This has been an interesting and challenging process for us since we had to become familiar with the institutional policies, procedures, and requirements for conducting research in the USP region. Before we could start the research, we had to go through an important part of the process, which was obtaining ethics approval. This required us to submit to the Research Office a list of requirements, such as the research proposal, interview consent forms, and interview and survey questions to be reviewed. Though time-consuming, it was agreed that this was necessary and important to have completed and approved to legitimize our research efforts and because it is ethical.

Obtaining ethics approval permitted us to organize and carry out interviews in Alaafua, Emalus, and Laucala campuses. After being informed, the campus directors in Vanuatu and Samoa granted approval to work on planning and logistics with their campus staff to accommodate our visit and organize interviewees. We felt this played a significant role in making our task easier and in obtaining a good number of students to participate in the interviews and informing faculty of our visit and request for interviews. We recognized the importance of having to create and build a network with colleagues not just in Laucala Campus, Suva, Fiji, but also in Alafua Campus in Apia, Samoa, and Emalus Campus in Port Vila, Vanuatu.

The student and faculty survey was easy to deploy around the USP region since we used SurveyMonkey (<https://www.surveymonkey.com/>), a licensed online survey and analytical tool, was utilized. We decided not to offer prizes as an incentive to attract participants. We thought to rely on students' and faculty's free will, which could have an impact on the number of respondents to the survey. The survey was a vital component in collecting quantitative and qualitative data.

The visits and observation of the campus facilities gave us an appreciation of the facilities USP students and teaching staff have access to and how they could have an effect on conducting recorded lectures and videoconferencing sessions as well as listening to and watching videos in the computer labs.

UNDERSTANDING AND DISSEMINATING THE RESULTS

Once we had collected the data, it was time to look through the 30 students and 28 faculty interviews, 320 students and 63 faculty member online survey responses, and observation notes from the campus visits. It would be fair to say that because of the broad research scope in looking at various tools, it became quite overwhelming to sift through the data.

The questions we raised were, “What do we do with this data?” and “How do we present it?” We quickly recognized it was a daunting task when preliminary results were to be presented at the Pacific Peoples’ Research Skills Symposium hosted by USP in August 2018 (USP, 2018).

However, after the first experience in presenting our results, we realized after much discussion that the scope of the research was quite broad. We decided to concentrate efforts around Lecture Capture and BigBlueButton. This was based on feedback concerning Lecture Capture and the recorded videos having an adverse effect on lecture attendance, and that BigBlueButton, which is freely available, had been considered but not familiar to many faculty members.

Opportunities to use and present the data arose through Professor Naidu presenting summaries to USP’s Senior Management Team, and our presenting to the USP community, for example, through TED Talks, CFL’s seminar series.

It was apparent through the research that there were some interesting yet not surprising results which showed that global and local studies and articles had found similar outcomes concerning students’ and faculty members’ fears and experiences (Edwards & Clinton, 2019); for instance, Lecture Capture “remains a contentious issue for some academics, who have raised concerns about issues ranging from intellectual property rights to the use of footage to undermine industrial action, as well as the impact on students’ attendance.” (McKie, 2019). We found similar sentiments highlighted in the interviews with academics and also in the responses from the survey; for instance, lecturers mentioned “most students are not attending the classes means they are able to learn from Lecture Capture (video)” and “attendance went down … the patchy attendance that resulted from Lecture Capture meant that the learning community became very fragmented”. This finding was supported in the survey, whereby of 37 lecturers, 81.1% (30) felt

the recorded lectures caused a decrease in attendance (Figure 1).

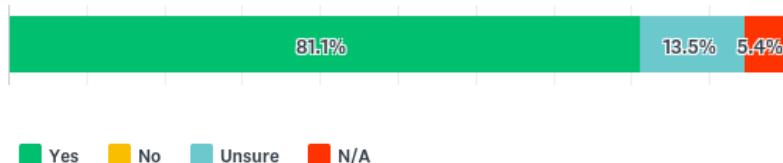


Figure 1. Teaching staff responses indicating whether “Having recorded lectures has seen a decrease in attendance to lectures.” ($n = 37$ respondents).

On the other hand, over 53.6% of students who responded to the statement “I chose to miss some face-to-face lectures because I knew they were being recorded.” indicated they did not miss lectures because they are recorded, while 30.4% did admit to not attending class (Figure 2).

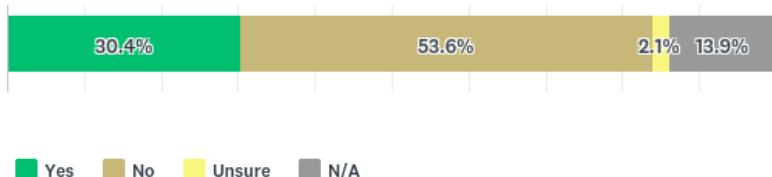


Figure 2. Student responses to the statement “I chose to miss some face-to-face lectures because I knew they were being recorded.” ($n = 194$ respondents).

When comparing the percentage of students who stated “No” (53.6%) to missing face-to-face lectures in Figure 2 with the percentage of lecturers (81.1%) in Figure 1 who saw a decrease in attendance to lectures due to introduction of recorded lecture video, the team felt this finding could definitely lead to another research topic. The research would be about why students would want to miss lectures and whether there may be an underlying issue about how lecturers and students connect in a classroom.

However, colleagues in the Faculty of Business and Economics also felt there was a need for further research with a larger sample on Lecture Capture's impact on students' performance, class attendance, and potential of copyright violation. They also mentioned that all 291 students (100%) who participated in their survey affirmed that "the university continue with Lecture Capture" (Sharma, Narayan, & Lata, 2018, p. 60).

Students saw value in the videos for preparing for exams and assignments, as well as catching up on lectures missed due to unforeseen circumstances. Meanwhile, several lecturers mentioned that they used the recorded lecture videos to evaluate their teaching style and interaction with students.

Given that few lecturers or even students were familiar with the webconferencing tool, we focused our efforts on another tool—BigBlueButton. As indicated in Figure 3, only 31.1% of the teaching staff had used the BigBlueButton tool available on Moodle.

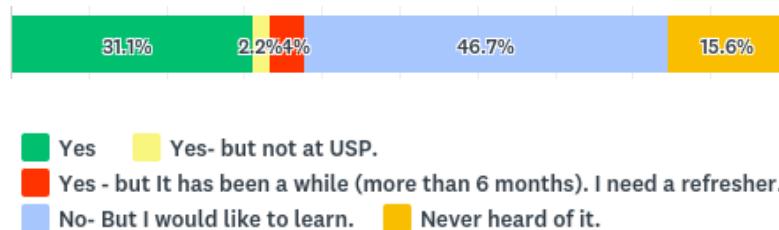


Figure 3. Teaching staff ($n = 45$ respondents to the question) indicating whether they had used BigBlueButton in their course.

Finding out that very few teaching staff knew about BigBlueButton was a major highlight for us, as we saw this as a need and an exciting opportunity to promote the tool and its integration into the USP courses to reach students in the region and rural areas. Therefore, we embarked on planning, designing, and facilitating workshops for teaching staff in the three main teaching campuses—Laucala, Alafua, and Emalus.

The feedback from the workshops was very positive about the potential of using BigBlueButton to interact and conduct virtual activities and discussions with students, and not having to compete with other lecturers for the best and convenient timeslots for REACT tutorial schedules. Unfortunately, the workshops demonstrated there were some shortcomings with BigBlueButton, such as the need for good Internet connectivity; lack of facilities to enable student to participate in BigBlueButton sessions; the need for headsets in the computer labs; and the reliance of the current version Flash Player to work. In the middle of our workshops in Alafua and Emalus around mid-November, a fire destroyed the Moodle servers at the main campus (Laucala in Suva). This caused a major setback since CFL was housed in the building that had been gutted by the fire. However, the team anticipated that these issues could be addressed when the new updated version of BigBlueButton is made available after Moodle undergoes an upgrade in early 2020, and when the platform becomes fully stable.

LESSONS LEARNED

This experience has been an invaluable learning journey for us. We thought to identify six lessons that would be of significance for future research initiatives for a team in the learning experience design and development field:

- (1) We acknowledge that USP is in a unique position as a regional institution applying and experimenting with technologies to incorporate our Pacific Islands context and experience. But the experiences of our students and faculty with recorded lecture videos are not different from the experiences and expectations of the rest of the world.
- (2) There was clear indication from faculty staff of their desire to adopt effective technologies to enhance learning and teaching at USP on the one hand, and their skepticism to fully embrace them on the other. The seminars and

presentations certainly play an important role in disseminating the data.

- (3) As a team, we appreciated the experience as a form of capacity development and for the opportunity to foster networking with students, and faculty and regional staff. The research process itself was an eye-opener for some of us, who capitalized on the experience to grow and learn about conducting and managing research initiatives from planning to completion. One of the roles of the CFL Learning Experience Design and Development Team is to bridge the gap between faculty instruction and student learning in the online environment by considering their feedback, particularly the students who use the recorded lecture videos for revision. Building relationships across regional campuses outside of Laucala Campus enabled us to share expertise and experiences. Getting to understand the issues and challenges our students and faculty face makes us more considerate and aware of the appropriate tools students and teaching staff can access to improve learning and teaching.
- (4) According to the feedback, staff and students are more than willing and seem excited to learn and use tools such as BigBlueButton or Lecture Capture with the integration of video into their course; however, the onus is on USP to address the underlying issues, facilitate the need to train lecturers, and push for more innovative learning and teaching methods that will create an ideal learning and teaching experience for students and faculty throughout the USP region.
- (5) Because we deal with technology, the challenge that faces the Learning Experience Design and Development Team lies in ensuring that the infrastructure allows for continuous access when using the learning technologies. This meant we were able to share our findings with the Information Technology Services team, who appreciated the feedback. The university needs to invest more in upgrading the infrastructure, networks, bandwidth, and

other related connectivity issues which pose as a hindrance to the effective and efficient use of these learning technologies.

- (6) A vital lesson for consideration is to look at the scope of research and to concentrate on a specific issue or learning technology that would be of importance to the USP community. Though Lecture Capture and BigBlueButton had become the main focus of the research, that decision took some time as we had to review the technologies that would be of interest and significance to the USP community. We found that the task at hand was broad; and in future when designing the project, it would be advisable to be specific about the issue and the learning and teaching technology concerned.

CONCLUDING REMARKS

Looking back on our experience in capturing the perceptions of students and teaching staff, it has been a highlight of our careers to be reacquainted and familiar with the research process at USP. At the same time, it has strengthened our work and beliefs in having a pedagogy-led approach to improve the learning and teaching experience at USP. The use of the recorded lecture and tutorial videos should not be seen as a threat but as supplemental and an alternative to lectures to provide students some flexibility for their learning (Edwards & Clinton, 2019).

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SUPPORTING THE TRANSITION TO TERTIARY LEVEL: HOW STUDENTS ENGAGE WITH ACADEMIC LITERACY

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INTRODUCTION

This project set out to evaluate a new approach to supporting tertiary-level academic literacy at the same time as disciplinary content of a course. The aim was to find a way to support students in making the transition from school to university, making more explicit the hidden curriculum (Christie, 1985) behind the learning and assessment of content (e.g., students' abilities to listen effectively to academic lectures, search for relevant sources, read a text with understanding before incorporating its ideas into their writing, communicate effectively through Standard English, and so on)—abilities without which they often fail to achieve the learning outcomes. These learning outcomes are typically presented as though they indicate mastery only of content (e.g., "Explain why it is

impossible to know exactly how many languages there are in the world”), when in fact they require students to master the abilities to interpret, to synthesize, to explain, to justify, all while working through English as a second language. Without these additional competencies, students may know some relevant information about the challenge of counting languages but be unable to demonstrate this knowledge to the satisfaction of the assessor. Being more explicit about these aspects of the learning process is what we mean by supporting the development of academic literacy.

The premise behind taking a discipline-specific approach to academic literacy is that students need to learn how knowledge is created, debated, and presented within specific disciplines, rather than learning a generic set of academic skills that can then be applied to any subject (Lea & Street, 1998). Moreover, students are considered more likely to see the value and relevance of skills if they are presented in the context of their own disciplines. This shift toward an embedded academic literacy approach is well attested in the literature (McWilliams & Allan, 2014; Purser, Skillen, Deane, Donohue, & Peake, 2008; Thies, 2012; Wingate, 2006, 2015; Wingate, Andon, & Cogo, 2011) but typically encounters two types of resistance: academic lecturers feel reluctant or unable to deal with matters of language or skills at the same time as content, and there is a concern that time spent dealing with these issues will reduce the depth of content that can be covered.

In our design of a new introductory linguistics course, we avoided both issues. Firstly, the course coordinator and principal researcher has a background in both academic literacy research and the teaching of academic English, as well as the discipline of linguistics, so it was relatively straightforward to design resources that deal with content and language at the same time. Secondly, by utilizing a virtual learning environment such as Moodle, we were able to supplement rather than replace the teaching of content with the academic literacy support, since

additional self-study material can be hosted online and used to meet the requirement of ten learning hours per week.

Our project evaluates the effectiveness of this design in three phases. The first phase, on which this chapter reports, attempts to understand the way the first cohort of students engaged with the additional academic literacy support, on the grounds that we need to understand how they made use of it before being able to determine whether it worked. The second phase evaluates the impact of this engagement on students' achievement in the course (Willans et al., 2019). The third phase will examine the long-term impact of the intervention on achievement in subsequent courses in the same program.

LEARNING DESIGN: HOW INTEGRATED LEARNING RESOURCES AND ACTIVITIES HELP US MEET BOTH CONTENT AND LANGUAGE LEARNING OUTCOMES

Introduction to Language Studies (LN111) is a 100-level linguistics course. It was redeveloped in 2018 with separate explicit learning outcomes for content, skills, and communication. For example, one weekly unit covers linguistic diversity. In terms of content, students should become able to describe approximately how many languages there are worldwide, in the Pacific, and in their own country, and to explain why these figures are only approximate. In terms of skills, they should become able to search Ethnologue (an online database about the languages of the world) for information about their own languages, as well as to select relevant information from a long academic text about linguistic diversity that will help them answer a forthcoming assignment. In terms of effective communication, they should become able to use articles, quantifiers, and plurals with accuracy when discussing the many languages of the world.

In line with other courses in the linguistics program, students watch a series of short online lecture videos each week, which introduce the main concepts and principles of the unit's content, and they complete at least one reading that covers similar ground. This content is consolidated during tutorial activities, which are conducted face-to-face for students learning through blended mode or provided via Moodle (with answers and an optional discussion forum for queries and collaboration) for those learning through online mode. Additional materials, which are not typically found in a mainstream academic course, are then embedded into each unit to support the development of academic literacy: "Preparing for lectures" prelistening notes to help students get the most of the lectures; "As you read ..." notes and tutorial activities to help them work with written texts; an "Exploring ideas" mini research task to complete using a Web-based resource before reporting their findings on a discussion forum; and a series of "Effective communication" notes and quizzes that cover accurate use of Standard English. To encourage completion of all activities, the quiz and discussion post are each worth 0.5%, while the tutorial activities are clearly flagged as being designed to support the major assignments: a heavily scaffolded written text using three prescribed readings, a group oral presentation based on independent research, and a longer written essay requiring students independently to extend their research of the same topic from the presentation.

Throughout each week, all learning resources and activities relate to the same content theme, thereby helping students acquire content knowledge, skills, and language proficiency simultaneously. From a design perspective, we therefore debunk the belief that an embedded academic literacy approach necessarily decreases the amount of discipline content that can be covered. See Willans (n.d.) for sample learning activities for each of the components.

ANALYTIC FRAMEWORK: WHAT DO WE MEAN BY ENGAGEMENT?

Too often, teaching and learning are evaluated on the basis of summative assessment data alone, using measures such as course pass rates to determine quality, without adequate understanding of what did or did not happen en route to the final grades. We therefore set up this initial phase of the research to evaluate the extent to which the students engaged with the additional support we had built in. Thus, we had to clarify what we meant by engagement, aware that we meant far more than logging on or turning up to class. We recognized that we were used to monitoring non-engagement, for example, by checking each week for any students who have not logged into Moodle at all, but we needed to ask more questions both about what students are doing when they do log in and about what else they might be doing to engage with a course while offline.

With this in mind, we settled on a model of engagement that comprised the following four elements: *access* (the extent to which students have accessed the materials designed to support academic literacy), *compliance* (the extent to which they have attempted tasks on time and in the expected sequence), *investment* (the extent to which they have gone beyond minimum requirements despite no obvious short-term gain), and *achievement* (the extent to which they have scored well on aspects of assignments that we have supported). This chapter reports on our investigation of the first three elements.

RESEARCH DESIGN: USING LEARNING ANALYTICS AND SCREENCAST-ASSISTED INTERVIEWS TO UNDERSTAND THE STUDENT EXPERIENCE

When the online materials were developed on Moodle, they were set up to enable participation tracking via the Early Warning System and activity completion. Throughout the semester, we

took weekly snapshots of trends, and we then ran an overall report to provide us with whole-class and individual data on who had accessed or completed which activities. This data provides broad insights into what the whole class was doing, as well as individual data for each student. To help us make sense of what the analytics data showed, we also conducted either individual or group interviews at four campuses: Emalus, Kiribati, Labasa, and Laucala. Where possible, these were conducted in the students' dominant language, using a research assistant to transcribe and translate if necessary. Some of these interviews used printouts of individual snapshots of Moodle activity (e.g., a bar chart showing individuals' activity over the previous weeks), which we asked students to discuss together. In most instances, we had the Moodle shell open on a laptop during the interviews, so we used screencast software to capture participants' navigation of the resources at the same time as talking. This enabled us to gain insights from the student point of view, watching whether they seemed familiar with the layout of the shell and the order in which to complete activities, as well as ensuring that we were talking about the same thing. We have therefore created a multilingual and multimodal data set that affords us a window into the learning experience (see Willans & Prasad, *in press*). This interview data has been used primarily to check what we think we are seeing from the Moodle analytics and to inform the design of a final feedback questionnaire. It also enabled us to intervene in the course delivery if we realized that students were confused or struggling, so it should be noted that the iterative nature of the course and research design has impacted the "purity" of the findings.

An online questionnaire was then posted on Moodle during Weeks 14 and 15 to attempt to quantify some of the students' reported views of the course. Some questions asked how often they completed certain activities (for which we had concrete data via the Moodle analytics already). The purpose of this type of question was to find out their perceptions of what they had been doing. Other items asked direct questions about why they behaved in certain ways, such as why they still posted on the

forum if they had missed the deadline or whether they enjoyed doing the research task or simply completed it to gain the credit.

We have therefore utilized a composite approach to our evaluation, integrating quantitative and qualitative approaches. Analytics data was gathered from all 180 students who completed the course, of whom 22 students were recruited to participate in either individual or group interviews, and 40 students returned the feedback questionnaire.

REFLECTIONS ON THE WAY STUDENTS ENGAGE DIFFERENTLY WITH ASSESSED AND NON-ASSESSED ACTIVITIES

A key finding from this phase of the study is that students prioritized assessed elements of the online activities over those that would not directly bring them credit toward their coursework, but that needed to be completed in order to do well in the assessments that followed. This is an unsurprising finding, but one that we can reflect on by considering four specific examples.

Firstly, students seemed to prioritize the activities that were directly assessed (the weekly quizzes and forums, each worth 0.5%, and the major assignments worth 10% or more) over those that carried no immediate credit (the online lectures, the tutorial activities, the readings, and the research tasks). This was clear from the completion tracking data, and then reinforced in the questionnaire by the number of students selecting *always* or *mostly* in response to how often they completed the quizzes and forums compared to other activities. While this is unsurprising, it highlights that students may think they are acting strategically by navigating straight to the parts that matter and then putting maximum effort into doing well in them. However, if they neglect the resources that contain the elements on which they are being assessed, they are unlikely to be able to do well. The concept of

studying for the test does not appear to have been transferred from more traditional modes to the online environment.

Secondly, students typically navigated straight to the assessed component of an activity rather than working through the learning material in that activity first. For example, the “Effective communication” quizzes contained notes, examples, and activities. Students could retake the activities as many times as they liked in order to improve their scores and, while a certain amount of guesswork might have enabled them to try different options in turn, our assumption had been that students would be more efficient if they made use of the notes to work out how to do better. However, during an interview at Emalus, one student was asked why she sometimes retook activities over and over again, and sometimes only took them once despite gaining a low score. She explained that she did not know some of the grammar topics, such as relative clauses, so she just had one attempt and then moved on. When asked whether she used the notes and examples to help her, she simply repeated that she did not know the topic so did not look at them. It did not seem to have occurred to her to use the grammar notes to learn how to use this type of clause correctly. In other words, she was invested in scoring more highly, but not invested sufficiently in the real point of the activity: developing her English proficiency. Another example of this type of behavior was the tendency among some students to post on the discussion forum without completing the “Exploring ideas” task first. These students typically made general comments about the week’s topic instead of reporting on what they had found during the task, and thus received zero for the post. They expressed frustration that they had not been given credit for posting by the deadline, apparently seeing the forum, but not the research task, as the assessment.

Thirdly, as a result of this very narrow understanding of assessment, many students ignored some of the support materials that had been deliberately added to ease them into tertiary study. This was particularly the case during the first half of semester, which prepared the students to complete a written assignment.

They were required to support their answer using three readings that we had assigned. To scaffold the task, we included notes to help students focus on the most relevant parts of each text, and then the tutorial activities helped them decipher the meaning of challenging paragraphs, take effective notes relating to the assignment, summarize points in their own words, synthesize ideas from different texts, and incorporate information smoothly into their writing with accurate referencing. Our philosophy was that the assignment itself was part of the learning process through which students learn to write as linguists, rather than a post hoc activity through which we assessed what had been learned. However, completion tracking data reveals that some online students missed out these tutorial activities altogether, and that some blended students who had been absent during tutorials made no attempt to use the materials later posted online. This suggests they saw no obvious rewards to be gained by completing the steps preceding the assessment. Indeed, as one student stated frankly in the “Any other comments” box in the tutorial section of the questionnaire:

There is no marks allocated for the tutorials so I don't bother to do it.

Finally, of the students who completed the “Exploring ideas” tasks on time and on task, 82% were consistently judged to have done only the minimum required to gain the credit, again focussing on complying with requirements rather than investing in the experience of learning more about their subject. Furthermore, 14% of the students consistently wrote posts that were judged to go beyond the minimum by providing longer or more detailed answers than required, but without showing evidence of critical evaluation or reflection on the task. Only 4% of them consistently wrote posts that were considered to meet these criteria.

To exemplify the difference, below are three posts from the first task, in which students were asked to search a list of video channels such as The Ling Space (<http://www.thelingspace.com/>), blogs such as All Things Linguistic (<https://allthingslinguistic.com/>), and podcasts such as Talk the Talk (<http://talkthetalkpodcast.com/>), before posting a link that they would recommend to their classmates. All three posts met the requirements and thus scored the full marks for the assessed task. The first was later reanalyzed (for the purpose of our research) as demonstrating low *investment*, since it did little more than post the link to a whole channel and gave no detail about its specific contents (Figure 1).

This second example was considered to demonstrate *medium investment*, since it provides more than one example, and it gives more detail about the contents of the resources. The explanation is also made more personal through the information about preferred medium of information (Figure 2).

This final example was considered to demonstrate *high investment*. This is not simply due to length, but due to the degree of reflection that the student shows, both about the task and about her own preconceptions about linguistics. She also makes a concerted effort to engage the interests of her classmates (Figure 3).

This analysis is in line with the responses to a questionnaire item designed to evaluate investment in this activity (Figure 4).

[https://www.youtube.com/user/thelingospace \(THE LING SPACE\)](https://www.youtube.com/user/thelingospace (THE LING SPACE))

I strongly recommend the "Ling Space" as a useful resource for us language and linguistic students. It helps us understand more about a topic that we learn and that it give itself more details to it. It even asked us question that we asked ourselves about a topic. So "The Ling Space" is my choice.

Vinaka.

65 words

Maximum rating: 2 (1) Rate... ▲

[Permalink](#) | [Delete](#) | [Reply](#) | [Export to portfolio](#)

Figure 1. “Exploring ideas” post with low investment.

Blogs about Language is quite easy and interesting because students can choose either to read or listen the information. I prefer listening because reading through computer gives me eye strain. The referencing is also stated, in that manner, the reader has a clearer idea that the information is valid. <http://languageblog.idc.upenn.edu/ml/>

The Ted Talks also provides us with the information with interesting graphics. For example, this video I watched "The real reason why mosquitoes buzz". I got to know that male and female have different buzzing sound. You should watch this video to know the three reasons why mosquitoes buzz. It is really interesting though. https://www.ted.com/talks/diy_neuroscience_that_annoys_buzzing_may_be_a_love_song

124 words

Maximum rating: 2 (1) Rate... 

[Permalink](#) | [Delete](#) | [Reply](#) | [Export to portfolio](#)

Figure 2. “Exploring ideas” post with medium investment.

To be honest, I was quite surprised and disappointed at myself for the misconceptions I had about Linguistics. I was of the view that Linguistics was all about the English Language (only)! Imagine my surprise when I found this to be quite off the mark.

I am happy the Lecturers had us conduct our own research because this activity allowed me to address some, if not all, of my misconceptions. I was able to find out first-hand what Linguistics is really about.

I am sure most of you have found a lot of informative and impressive articles or videos about Linguistics but I am sure you would not want to miss the opportunity to view a well-thought-out video.

<https://www.youtube.com/watch?v=bz21pFWAtMo>

The above link was quite helpful because it had a fun twist to it as it began by comically discussing what Linguistics is NOT! It discusses linguistics as the "scientific study of language, and/or the descriptions, and the nature of language to find out how language works" (Prof. Jürgen Handke, 2014, Marsberg University, Germany).

It also goes on to describe the central branches of Linguistics which are sound, structure, and meaning. It also gives more details on what these encompass. If you watch it, I guarantee that you will learn more.

There are also several branches that Linguistics can be linked such as Psycholinguistics, Computational Linguistics, Socio-linguistics, just to name a few. There's a whole lot more to Linguistics than I thought!

I hope you enjoy the video and, just like me, address some of your misconceptions about Linguistics.

264 words

Maximum rating: 2 (1) Rate... ▾

[Permalink](#) | [Delete](#) | [Reply](#) | [Export to portfolio](#)

Figure 3. “Exploring ideas” post with high investment.

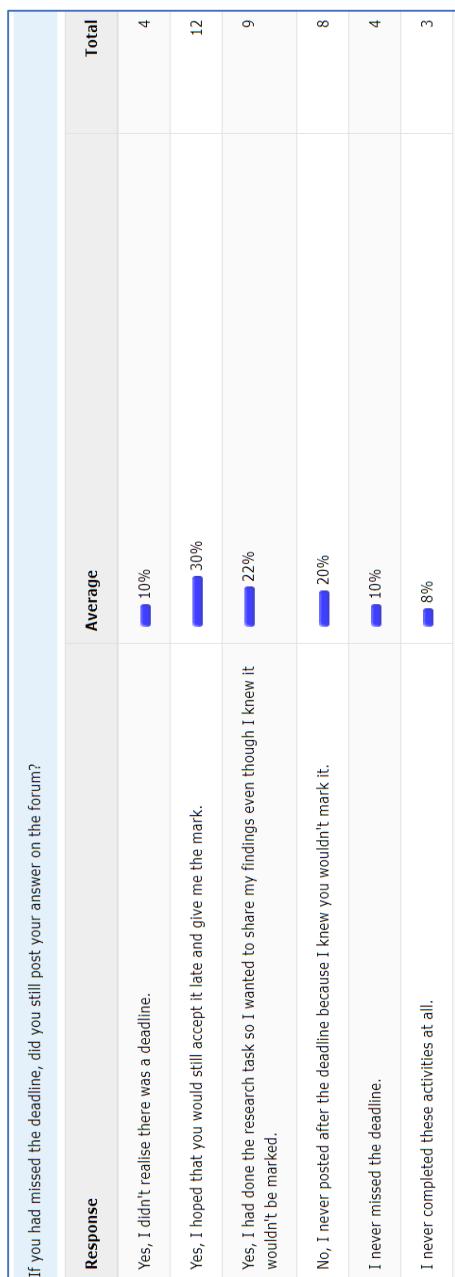


Figure 4. Responses to questionnaire item about late posts on “Exploring ideas” forums.

The 22% (of only 40 students, who were perhaps a more engaged group anyway, given that they completed the questionnaire) who said they still posted even though they knew it would not be marked can be said to be invested in the task. The majority of others either posted late in the hope of gaining the credit or did not post because they knew they would not gain it. The very small amount of credit (0.5% per week) was clearly driving their behavior.

In summary, the majority of students display strategic behaviors that are driven by assessment. While quizzes and discussion forums can be effective ways to help our students interact with course content, it seems we need to do more to keep reminding our students that these activities are included to help them learn new material rather than simply to assess them on what they already know. As our students transition from the heavily controlled school environment to the more independent style of learning expected at university, we need to help them learn to manage the apparent freedom to pick and choose which elements of a course to complete.

REFLECTIONS ON THE WAY ONLINE AND BLENDED STUDENTS ENGAGED DIFFERENTLY WITH THE SAME MATERIALS

While noting in the previous section that all students appeared to prioritize the immediately assessed activities over the learning resources and activities that had less tangible rewards, we hinted at slight differences between the way blended and online students did this.

Moodle analytics show that, while the assessed forum and quiz completion rates are similar across the two modes, the blended students appeared to prioritize tutorial attendance over completion of the online books (containing the lectures and much of the academic literacy support), while the online students prioritized the books over the tutorial activities. This may stem

from students' perceptions about what is involved when studying in different modes.

This was first noticeable among the blended students when they were asked to do a quick quiz on their phones at the start of a tutorial one week, testing some very broad points from the week's lectures. The giggles and strained faces indicated that many had either not watched the lecture videos at all or had not taken in the content to a sufficient degree to be able to answer some basic multiple-choice questions about what they had covered. Although this group knew that a substantial proportion of their course was delivered online, including the prerecorded lecture videos, it appears that many felt more accountability to the face-to-face elements and were still treating it as a face-to-face course in which they assumed that the majority of learning would happen in the classroom. This may be because we had kept the minimum 60% tutorial attendance requirement in place in order to encourage attendance, but had set no such minimum participation requirement for the online components, again indicating that students were fixated on complying with requirements rather than invested in getting as much as they could from their course.

In contrast, during the campus visits, it quickly became clear that many of the online students had not looked at the readings or tutorial activities at all, and they were not shy in admitting that this was because they did not gain any credit from doing so. For example, during the Kiribati visit in Week 7, the students acknowledged that they had not even opened any of the tutorial activities to see what they contained, but all showed they could locate them easily on Moodle. When they opened them, their expressions were again revealing. They were shocked to see how much explicit support and guidance they had been missing, and completion reports indicate that they started to use these activities from that point onward. Labasa and Emalus students were similar. They appeared to feel that tutorial activities can apply only to campuses where face-to-face tutorials are offered.

Meanwhile, a few Lautoka students emailed to ask if they could have tutorials at their campus, but the completion reports of these students showed that they did not click on the online tutorial activities provided, despite accessing the pages where they were located. Their requests suggest that they wanted the face-to-face contact with a tutor, rather than thinking they were missing out on any of the material covered at Laucala. Our logic had been to label these materials as “online tutorial activities”, to reassure the students that they were not missing out on what the blended students were doing in class. However, the word *tutorial* seems to have led to many students ignoring them altogether. These 100-level students have already somehow internalized the meaning of *tutorial* as something that applies only if you have a teacher on campus.

Once again, there are some important implications here for the way we educate students about what is involved in studying through different modes. Although students at Laucala can genuinely choose whether online or blended mode suits them best, we have to acknowledge that students at other campuses are not given this same flexibility. We are offering them the chance to study the same course entirely by distance, and therefore enabling them to study in any location and around their other commitments, but they are not choosing to study online rather than in blended or face-to-face modes. And, for this reason, many students around the region do still consider their offerings to be lower-quality or incomplete versions of the “real” course that happens at Laucala. As a team, we do not believe this to be the case at all, as we made sure that every learning outcome was achievable in both modes, that identical content was provided in different formats, and that nothing was covered in a face-to-face class that was not also covered in the online activities. But our research has shown that many blended students were treating our course as a face-to-face offering in which the weekly class mattered most, while many online students were ignoring core elements that they considered to be intended for the Laucala students only. We clearly need to do more to ease students into different modes of study, focussing more on how the activities and

resources are designed to support their achievement, rather than focussing on the minimum requirements, such as the tutorial attendance policy or the importance of completing all assessed tasks.

REFLECTIONS ON THE CONSTRAINTS STUDENTS FACE IN ACCESSING ONLINE MATERIALS AND ACTIVITIES

The project has also provided valuable insights into the practicalities of the learning experience of online and blended students, supporting the types of anecdotal evidence that we are all well aware of already. There are clearly significant issues with students lacking basic access to materials provided online, which limit what we can read into our data. One multiple-choice item was included on the questionnaire about such issues, eliciting the responses shown in Table 1.

Table 1. Technical difficulties reported in the questionnaire.

Activity type	Multiple-choice answers provided	Number of responses
Lectures	The videos froze while I was watching online.	18
	The files in the backup folder were too big to download.	9
	I couldn't open the folder once I had downloaded it.	12
	I couldn't find the lecture materials.	2
	No, I didn't face any technical issues with the lectures.	17
Reading	The files in the backup folder were too big to download.	10

	I couldn't open the folder once I had downloaded it.	15
	I couldn't find the readings.	4
	No, I didn't face any technical issues with the readings.	20
Exploring ideas	My Internet connection wasn't good enough to complete the tasks.	14
	I couldn't access the internet regularly enough to complete the tasks on time each week.	12
	I couldn't access some of the websites or resources you directed us to.	10
	I couldn't find the information I needed on the websites and resources.	5
	No, I didn't face any technical issues with the "Exploring ideas" tasks.	17
Quizzes	My internet connection wasn't good enough to complete the quizzes	12
	I found some of the actions (e.g., dragging and dropping, filling in the blanks) hard to do on my device or browser.	10
	I found it hard to read the instructions and do the activities at the same time.	4
	I couldn't find the quizzes.	0
	No, I didn't face any technical issues with the quizzes.	23
Tutorials	I couldn't find the online tutorial activities and answers. (online students only)	9

I couldn't find the copies of ppt slides and handouts that had been used in class. (blended students only).	8
No, I didn't face any technical issues with the tutorials.	23

It is gratifying to see that the fewest responses each time concerned not being able to find materials, as this is the aspect over which the course design team have the greatest control. However, some students clearly did struggle to find things, and several reported not knowing how to open files if they had downloaded the whole zipped folder at once. One student's response to the final open-ended question of this section is revealing:

Yes, I do have difficulty for week 2 readings and back up resources. I faced difficulties because no matter how many times I tried to open it it wouldn't. I've downloaded it already but it's still not working and that is why it is still hanging there and says "NOT CRITICAL, NOT COMPLETED".

It is concerning that it had never occurred to students to contact us to say that they could not find or open something that they knew they were supposed to use. This particular student is referring to something from Week 2, and it is clear that the situation was never resolved, either by seeking help from friends or campus staff, or by contacting the teaching staff. Do the students really not start our courses with the assumption that everything will be accessible? It is deeply worrying if they simply see problems like this as part of the online learning experience that they are expected to put up with.

Similarly, during an interview in Kiribati, a student navigated to an "Exploring ideas" task and demonstrated that, when she clicked the link to the required website, an error

message appeared: “Your connection is not private”. This was something of a surprise since the link worked perfectly from Laucala. The student had given up and just posted on the forum without doing the task, but had not received a mark since she had not discussed the source that they were supposed to explore (and she was clearly too honest to pretend she had done the task by utilizing classmates’ posts to guess what she might have found!). During the interview, the students discussed among themselves in Te Kiribati whether they had each managed to access the various online sites for the “Exploring ideas” strand; the detail of this discussion indicated, firstly, that they enjoyed this part of the course and all spent quite some time exploring the resources but, secondly, that this was the first time they had come together to discuss their experiences or indeed to seek each other’s help when something did not work. The students in the group knew each other well and all lived near the campus, but they had never got together as a study group during the first half of the course. There clearly is not a mentality among some of our online students to get in touch with others who might be studying nearby (using the class list posted online for them with email contacts), unless the course coordinator sets up a task that requires them to meet. Again, while we are encouraged to foster an online sense of community via icebreaker activities and regular discussion forums, we are perhaps ignoring the craving for face-to-face interaction that many say they want and yet do not necessarily take the initiative to set up.

It is also clear that a large proportion of the students had issues with Internet connectivity or other barriers to getting online. One respondent expanded on their answer about large file sizes, saying:

Most lectures I downloaded were too big and so sometimes if I had enough money I went to ATHKL to download them as it is more fast to download big sized files. As this costs money I sometimes did not go to ATHKL.

There is nothing new about this finding, but it is unclear what else we can do in the course design. The lecture videos were never longer than 10 minutes, and they were provided in several formats: the original .mp4 file (which they could stream from within the Moodle book or download separately from the backup folder), a .ppt version with the audio removed, and a Word document with the script. We could send out an entire copy of the course materials on a USB stick, thereby only requiring students to go online to do the weekly quiz, “Exploring ideas” task, and discussion forum. However, if we resort to this, it is only ethical to acknowledge that we are not yet offering fully online courses across all countries, and still need to embrace our earlier philosophy from the print mode days of meeting the needs of the region in whatever ways work. There is nothing wrong with offering Internet-lite versions of our courses, but if we do not acknowledge these workarounds, we are simply erasing the infrastructure issues from the institutional consciousness and thereby continuing to marginalize certain students. Moreover, as we increase our use of open educational resources, the gap between those who do and do not have access to materials may actually widen, due to basic Internet issues, as this post from an “Exploring ideas” forum shows (Figure 5). The OLAC referred to is the Open Language Archives Community (<http://www.language-archives.org/>); students had been directed to the site to see what they could find written in and about their own languages:

- The OLAC results has came up with 50 language resources of the *kwara'ae* language which is spoken by people in the central region of Malaita Province in SI.
- Due to slow internet connectivity and costly service charges I was unable to navigate further. However the results are quite what I have anticipated. [Based on the titles of these list of documents] As a speaker of this language, I have noted that most of the resources are authored by European missionaries who use language as a platform to integrate foreign introduced religious beliefs (mainly Christianity) into existing local belief system. As a result, prayer books, hymnals and the bible (although many now prefer to use the English version of the bible) are still commonly used in the islands up until today.
- A couple of other resources are co-authored by both expatriates and local educated individuals who may have served under the colonial administrations of those days. These works focus more on documenting social issues such as the land ownership procedures and traditional policies for electing community leaders.
- Thumbs up to creators of the Open Language Archives Community. It is indeed a very essential tool.

193 words

Maximum rating: 2 (1) Rate... 

[Permalink](#) | [Delete](#) | [Reply](#) | [Export to portfolio](#)

Figure 5. “Exploring ideas” post demonstrating technological constraints.

The impact of technological issues on students' ability to access materials obviously has a huge bearing on our findings. If we could be sure that all students had reliable, freely available access to all materials and activities, we could make assumptions about what they chose to access and the frequency with which they did so. In essence, we could assume that they would access the things that they thought were valuable, whether driven by intrinsic sources of motivation (such as an interest in finding out more) or extrinsic sources of motivation (such as the belief that completion of the activity would lead to a higher grade). If they missed out certain steps, we could say they were being noncompliant or insufficiently invested in the learning experience. However, many of the issues raised in the previous two sections may actually come down to students having to prioritize the activities that they think are most useful, since they are unable to complete them all due to data limits or costs. We somehow need to control for these issues in our analysis, since access is a hybrid construct that comprises both the conscious choices that students make and the constraints that are beyond their control.

CONCLUSION

In the first phase of this project, we have shown that it is possible to embed academic literacy support directly into a core content course, thus explicitly teaching and assessing academic and communication skills in context. The model we have used can be adapted to other disciplines, through collaboration between subject specialists and academic literacy specialists. Although the design phase is time-consuming, there is no additional work involved for the subject specialist once the course has been designed, since Moodle hosts the majority of the academic literacy support. If we could collectively move in this direction, we would be able to embed relevant academic and communication skills directly into the programs in which students need to apply them, rather than hoping that a generic, standalone Academic English course at the start of the program will suffice.

However, our research has shown that there is more to be done before we can fully exploit this type of learning design. Firstly, before we can embed further support into the learning resources, we need to do more to socialize our students into the alignment between these resources and the assessed activities. Secondly, we need to ensure that students understand that resources and activities are fully adapted to suit the different modes of learning, so that they do not assume that certain elements are not intended for them. Thirdly, we have to prioritize the provision of free and reliable Internet access for students wherever they are located, so that we can be sure they can actually use the resources and activities that we create to support them. When they are forced to pick and choose which elements they can afford to complete, it is unsurprising that they prioritize assessment over learning.

At the same time, we have shown the value of raising our own consciousness, as academics and instructional designers, of what students are actually doing when they learn. Learning analytics data is available for all courses but is currently underutilized. As well as being able to monitor what students are not doing, and thus intervening when students have not logged in recently or have not completed required tasks, such data enables us to understand what they are doing or what they are trying to do. Exploiting these insights helps us respond more effectively and efficiently to students' needs and queries in a timely manner, as well as reflecting on changes that need to be made to the learning design for future cohorts.

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ENABLING STUDENTS WITH SEVERE DISABILITIES TO COMMUNICATE WITH LEARNING ENVIRONMENTS

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INTRODUCTION

This chapter discusses the use of assistive technology for people with severe speech impairments.

Assistive technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities (Understood, 2013). Examples of assistive technologies include mobility aids (i.e., wheelchairs, scooters, walkers), and prosthetic and orthotic devices.

This chapter presents the outcomes of the design and development of Tongue Drive System (TDS) prototype that enables a user with severe speech impairments to use their tongue to activate a predetermined set of computer commands

associated with home appliances (i.e., TV set, sound system, air-conditioner) in order to lead a more independent life. This technology has been designed to enable students with severe disabilities to communicate with their learning environments.

In the following section, we provide a literature review that presents statistics-related data and work reported by other authors.

BACKGROUND

In the United States of America, it has been reported that about 5.4 million individuals are living with paralysis, and about 1.4 million are completely unable to move without assistance. According to recent surveys, the annual cost of health care provided to those individuals with disabilities exceeds US\$306 billion (Christopher & Dana Reeve Foundation, 2013). From the same source, in most of the cases the cause of paralysis is spinal cord injury caused by road accidents and violence. More than 50% of these individuals with severe disabilities are below 30 years old and need lifelong special care services, provided by more than 50 million health care specialists (National Institute of Neurological Disorders and Stroke, 2003).

The research community has been trying to address the issue of people with severe disabilities in order to improve their quality of life and reduce the cost of health care. Research has been conducted to develop advanced wearable assistive technologies to help with improving the lives of human beings living with complete paralysis. This process helps in taking advantage of recent improvements in information technology and wireless communications. These assistive technologies allow those people with severe paralysis to interact and communicate with other devices such as television set, radio, wheelchair, computer, laptop, and tablets. The objective is to extend the remaining abilities of a person living with severe disabilities to perform limited activities (Moon, Baker, & Goughnour, 2019).

If a student is permanently and totally disabled because of a physical or mental condition, he or she cannot engage in any substantial gainful activity. Only a physician determines whether the disability can be expected to last continuously for at least a year or can lead to death (Kumar, Sharma, Assaf, Sharma, & Naidu, 2019). A person with a disability is one who has a severe physical or mental impairment which seriously limits one or more functional capacities such as mobility or communication. The term *multiple disabilities* refer to concomitant impairments. Such disabilities include mental retardation-orthopedic impairment, the two combination causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments (Center for Parent Information & Resources, 2017). There are many medical conditions that can be classified as a security income or pay disability, such as musculoskeletal problems (back injuries), and senses and speech issues (language pronunciation and articulation), where an individual with a disability is not capable of generating any income (Assaf et al., 2018).

As reported in the literature, noninvasive and invasive brain-computer interfaces use electrode arrays to capture and record brain activity and send signals to a computer for further processing and actions (Hochberg & Donoghue, 2006). Brain activity is recorded by placing electrodes on the scalp, on the brain surface, or within the brain. Brain-computer interfaces can enable people who are severely paralyzed to communicate their wishes and operate word processing or other computer programs (Wolpaw, 2009). These have been developed and analyzed on non-human and human subjects (Hochberg et al., 2006; Vidal, 1973). However, these technologies have not become popular among users due to the high cost of equipment and other technical issues, such as the electrode lifetime, maintainability, robustness, reliability, and vulnerability to ambient noise and interference.

Since the majority of spinal cord injury patients still have control of their facial expressions, vision, and speech, non-invasive technologies such as eye trackers, head pointers, and speech recognition devices have been proposed and studied (Bauby, 1998). However, such devices have drawbacks. For instance, eye tracker devices may interfere with the subject's field of vision and cause neck and shoulder pain; and speech recognition devices are not effective in noisy environments. The TDS, with its new advances, is a low-cost, noise-tolerant device which incorporates user-friendly technologies that can operate at a wide range of bandwidths.

Assistive technology that can be used in the classroom is designed to help students who have learning disabilities. Whether students have physical impairments, dyslexia, or cognitive problems, assistive technology can help them to function within the classroom (Understood, 2014–2019). Assistive technology is any device, software, or equipment that can help students overcome any barriers to learning that their disability might present. Examples include text-to-speech technology and keyboards, as well as low-tech tools like lined paper and pencil grips (Understood, 2014–2019).

Since the mouth and the tongue are noninvasively accessible, the tongue can move rapidly and accurately within the oral cavity in a motion that is not influenced by the position of the rest of the body and since the tongue is capable of accomplishing manipulation tasks with many degrees of freedom, then a tongue-computer controlled based device is an attractive solution to be studied (Kandel, Schwartz, & Jessell, 2000; Lau & O'Leary, 1993).

The following prototypes are based on tongue-assisted technologies that have been developed and reported in the literature (Struijk, 2006): tongue-touch-keypad, tongue-mouse, tongue-point and mouth-joystick devices. These devices require tongue contact, tongue pressure, and the insertion of bulky objects inside the mouth, which may interfere with the patient's

breathing and may also cause irritation in the mouth if used for a long period of time.

A magneto-inductive sensor-based wireless tongue-computer interface provides people with severe disabilities with flexible and effective computer access and environment control. The system magnetic field generated by the movement of the tongue is detected by fixed position sensors that are transmitted wirelessly to a computer for processing and translation into control commands, which are used to control devices in a given environment such as a powered wheelchair (Huo & Ghovanloo, 2009).

A tongue-operated, minimally invasive, and wireless tongue drive assistive technology was reported in (Huo & Ghovanloo, 2009). The recommended assistive wireless system senses and classifies tongue motions and translates movements into user-defined commands. Interaction time with the controlled device depends on the number of commands to be processed. The proposed technology was applied to control a wheelchair and to demonstrate its effectiveness as well as its safety.

Students with severe disabilities are disadvantaged in terms of lifestyle, communication with others, and interaction with their learning environments. The problem is to propose a solution using information and communication technology tools and applications, and more specifically sensors and wireless communication, to help develop an assistive technology capable of facilitating disabled students with their learning and communication processes. Additionally, we consider the interaction and engagement of disabled students with the information and communication technology-based learning assistive prototype; as well as any required adaptations. In the next section we present system development and implementation details.

DEVELOPMENT AND IMPLEMENTATION

The proposed solution for this TDS wearable device takes into consideration design constraints, when it is appropriately interfaced with magnetic sensors and when being placed at optimal locations in a three-dimensional space. The mathematical model of the TDS including the magnetic sensors placed at optimal locations was studied and applied to generate data that is mapped onto tongue gestures.

Tongue gestures are translated into specific computer commands and then information is transmitted wirelessly to computing devices (e.g., tablets, laptops, and computers) or to the actuators (e.g., lights, air-conditioning, and television set) for further processing.

The proposed TDS system comprises three magnetic sensors—a control module (Raspberry Pi 3), a transmitter, and an Android device with Internet connection. The system is designed in such a way that it would work with any type of Android system, which then outputs the tongue gesture in form of speech or display. The TDS can be extended to control the computer mouse, the keyboard, and the movement of a wheelchair. In this study, the TDS language is limited to only five classifications (STABLE, UP, DOWN, LEFT, RIGHT).

Extensive computer simulations were performed and then a complete working prototype was implemented and tested and validated on three real subjects in a laboratory setting. It was found that the system's performance is as expected and that the prototype operates with high accuracy. The subjects involved in the design prototype have reported that the system is easy to use, but on the other hand operating the wearable device for a long time may cause discomfort.

A new wearable wireless assistive technology enables students with disabilities to operate a computer without using the keyboard and mouse. The proposed technology enables students

with severe disabilities to interact with and control their environments simply by moving their tongues. The TDS could help individuals with severe disabilities to live more independent lives.

It is important for the students to know and understand the main objectives of the proposed system.

The project prototype involves three main objectives, as detailed in Assaf et al. (2018):

- translate specific tongue gestures into computer commands
- sense the magnetic field created by a small generator applied to the student's tongue
- use wireless technology for communication information between the magnetic field sensing device and computers, laptops, and tablets.

The assistive TDS uses multiple magnetic sensors that are capable of detecting the position and movement in three different ways.

In this work, the data transfer is achieved through Bluetooth communication. After the signal has been filtered, it is transmitted to the Android device via Raspberry Pi 3's inbuilt Bluetooth module.

Figure 1a - 1c displays some shots of the TDS prototype in pilot testing. Three students volunteered to test and validate the TDS prototype in a laboratory setting.



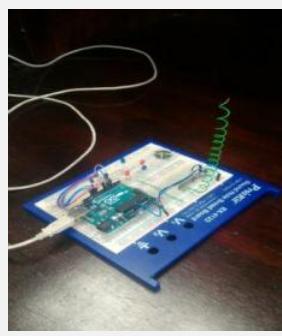
Prototype headset



Transmitter circuit



Transmitting station



Receiver circuit



Receiving station



Subject 1 during testing

Figure 1a. TDS system verification



Transmitter-receiver system



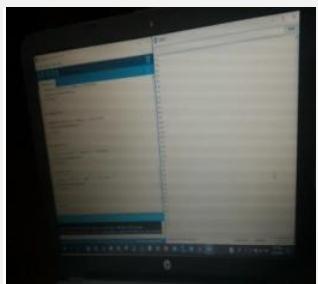
Tongue magnetic tracer



Manual verification of system



Subject 2 during testing

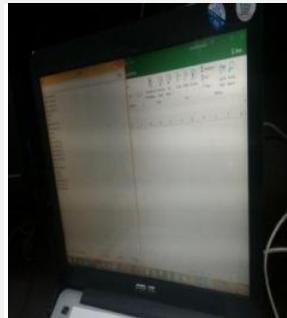


Software code verification

Figure 1b. TDS system verification



Subject 3 during testing



Verification of computer log file

Figure. 1c. TDS system validation.

The device, which has an installed application specifically designed to classify the oncoming signal, classifies the signal in question and gives the output in the form of speech and display. To quantify the time delay of the developed system, samples were taken for each class in the testing phase. The duration from acquisition till classification of the oncoming signal (tongue gesture) was measured for each class separately and then averaged.

Figure 2 given below shows the average time delay when classifying all the five gestures. It is apparent that the system responds faster to the oncoming signal as time delays are less than 0.25 seconds for all the tongue gestures

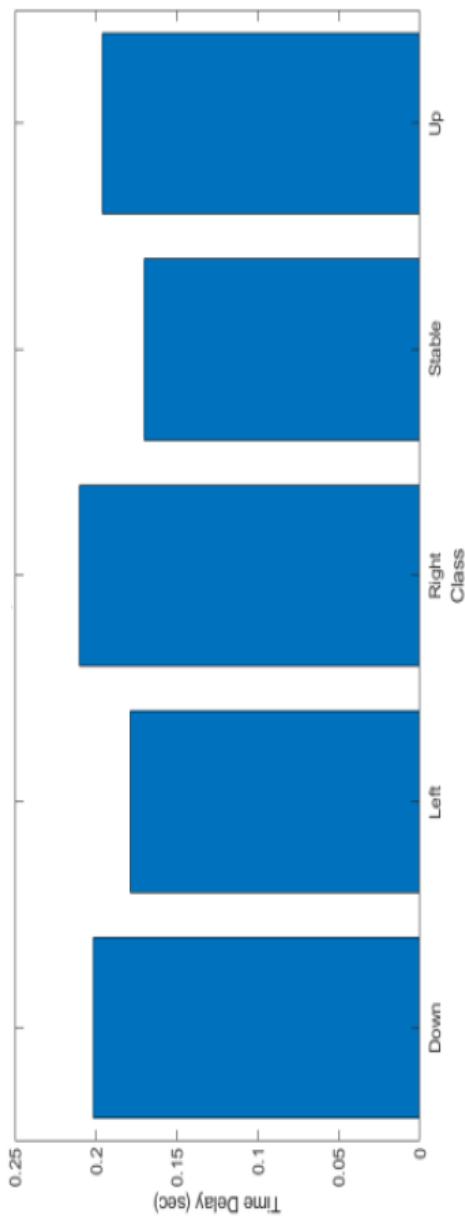


Figure 2. System average time delay (adopted from Kumar et al., 2019, p. 510).

Various classification algorithms have been used to train the classifier. Using 1500 samples of data, the following methods were used to train the classifier: these include neural networks, support vector machines, k-nearest neighbor, and family trees as well as ensemble-based classifiers. The best performance after comparison with the aforementioned methods is demonstrated by a shallow neural network classifier, which has an accuracy of 93.4%. Using neural networks is advantageous because not only does it have higher accuracy, but also due to its error function and output layer, we are able to analyze how confident the network is when it comes to the output class.

After the careful consideration of the end user's disabilities, the TDS system provides not only a portable solution but also proposes a new tongue driven language, which would enable the students with severe disabilities to interact with the environment and also with other individuals.

The next section presents reflections on the project in general and some comments from the developing team and participants in particular.

REFLECTIONS OF THE PARTICIPANTS AND DEVELOPERS

The TDS project introduced a new system that enables students with severe disabilities to communicate with their surrounding environments. The prototype can be further developed to include a larger set of commands and to create a special communication language that could be adopted and used to improve social lives and communities.

A team of four developers and three participants was formed to work on the project in Semester 2, 2018. The four developers are final-year students, and the participants are an academic staff and students in the School of Engineering and Physics.

When asked about his experience in the TDS project, Mr. K. Sharma (a student intern) replied:

I worked as a student intern for this project under the guidance of the project leader. My role in this project was to design the circuit for the prototype. This project has broadened not only my understanding of the various ways in which technology can be used in various settings when it comes to teaching and learning. There is scope for further developing this prototype. (Personal communication, July 5, 2019)

When asked about his experience in the TDS project, Mr. R. Kumar (a developer) replied:

I joined the TDS project team as a research assistant in September 2018 as I was very much interested in the theme of the proposed title. More so, I got attracted to the technology, which demanded my expertise in terms of robotics and machine learning. (Personal communication, August 5, 2019)

One of the main objectives of this project is training and capacity building. For that reason, we allowed students from the School of Engineering and Physics to join the team as student interns to gain practical engineering design and development experience. When asked how he got to know about the TDS project, Mr. K. Sharma replied:

I joined the TDS team as a student intern, since one of the members from the group had withdrawn from the team. Fortunately, he met me and told me that there was a vacancy for it. This was a golden opportunity for me to do something in USP which would make a heavy contribution weighing in my CV. (Personal communication, July 5, 2019)

The project enabled students to explore the application of assistive technology in education and the design and implementation of digital and analog communication circuits, to further improve their engineering knowledge and how this technology can be used to have environmental and social impacts.

We believe that all team members had good communication among themselves, and with the project leaders, and other stakeholders:

The importance of effective communication with a project's stakeholders is something that shouldn't be overlooked. I used a variety of techniques to identify the full range of stakeholders. Methods such as independent analysis followed by collective brainstorming sessions to consolidate the list to be considered. Taking time to reflect on who will benefit or will not benefit from a completed project, will also help to hone the scope of stakeholders. (Mr. R. Kumar, personal communication, August 5, 2019)

There were some difficulties faced during the design and implementation phase. We had to race against time to get the prototype ready as the components arrived late:

During the design phase, some team members were not contributing as expected. As this was leading delay in my work and all of a sudden the team stopped communication, thus, later found that the members were withdrawing from the team. During the implementation phase, there was some delay in arrival of the parts, which affected project timeline and outcomes. In the end we managed to successfully complete a working prototype using materials available in the laboratory as many benefits in enabling people with disabilities to

communicate with learning environments. This prototype has a very high operational accuracy; however, for even better performance the sensors need to be upgraded. (Mr. K. Sharma, personal communication, July 5, 2019)

I worked on this project as a research assistant because the theme for the project, which dealt with technology, interested me and I wanted to use my expertise in robotics to see how I could contribute towards the development of the project. While the project progressed, not only did I learn different algorithms to handle signals, but also had a chance to work extensively with the hardware related aspects of this project. Even though developing this prototype required tedious effort from both the students and the researchers, we were satisfied with the result when the final product was designed and tested with the actual subjects as the accuracies reached up to 97% which felt like we had achieved our objective. (Mr. R. Kumar, personal communication, August 5, 2019)

In the next section, we present our concluding remarks.

CONCLUSION

In general, in Fiji Islands and within the USP student community in particular, a large number of students are classified as disabled persons, and therefore, the proposed wearable wireless assistive devise would enable students with disabilities to operate a computer without using the keyboard and mouse and to interact with their environments simply by moving their tongues. The TDS could help individuals with severe disabilities to lead a more independent life.

Several meetings were held with USP staff and students for feedback on the prototype, which turned out to be very constructive and useful as it enabled the development team to improve the implementation and prototype testing. The Disability Resource Centre based at USP and the Fiji National Council for Disabled Persons helped us identify a couple of subjects who were keen to test the prototype; however, due to budget constraints, we were not able to hire a medical doctor on time to assist disabled subjects during testing and validation phases of the prototype. Therefore, we had to test and validate the prototype in a laboratory setting on our staff and students.

Student interns were happy and satisfied with the project outcomes, starting with the design and development phases and ending with the test and verification process, since it was the first time that they experienced such a large-scale project and its development and implementation phases. However, as they progressed with the project verification, they realized that system performance could be improved if artificial intelligence algorithms were applied. Overall, the team members including all participants and developers had a good experience of working together and with USP staff.

This project could be extended to include a larger set of commands; and further system optimization could lead to the development of a communication language for severely disabled persons.

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PROVIDING EQUAL EDUCATIONAL OPPORTUNITIES WITH A TECHNOLOGY- BASED SCHOLARSHIP PLATFORM

*Mansour Assaf, Krishneel Deo, Sarvesh Chand, Divnesh Prasad,
and Sharishna Narayan*

INTRODUCTION

The purpose of this chapter is to present the design and implementation of an automated blockchain technology-based platform for students' scholarship applications in tertiary education. According to the traditional system, scholarship bodies sourced funds from various local and regional public and private organizations. Financial aid is provided to students based on need or merit and heavily depends on the availability of funds (TARGETpostgrad, 2014). It uses distributed databases for maintaining student application and donor records. The proposed system exploits the benefits of blockchain (Rosic, 2019) as a decentralized architecture, offering a secure long-term investment mechanism, integrity, and transparency, in order to create a globally trusted scholarship system for needy students.

who wish to continue their university studies. Besides this, the proposed system represents an automated higher education marketplace that enables investors worldwide to invest in student tertiary education and the development of worldwide future professionals.

This work is based on a noble cause to support poor students:

Talented students should not be deprived of tertiary study for the lack of financial support from their families. This platform will create opportunities for the underprivileged students by outsourcing funds for their tertiary study that could not be possible by themselves. (Rashid et al., 2018, p. 5)

BACKGROUND

According to Rashid et al. 2018, (p. 2), blockchain technology is used in several domains such as healthcare management (Yli-Huumo, Choi, Park, & Smolander, 2016); clinical trials (Shae & Tsai, 2017); the pharmaceutical industry (Mettler, 2016); electronic government (Hou, 2017); logistics (Yuan & Wang, 2016); intelligent transportation systems (Lei et al., 2017); and higher education credit systems (Turkanovic, Holbl, Kosic, Hericko, & Kamisalic, 2018) due to its benefits in distributed data storage, transparency, and a decentralized environment where no third party is in control of the transactions (Roehrs, Da Costa, & Da Rosa, 2017).

In the higher education context, the potential of blockchain technology has been explored in relation to the creation, sharing, and verification of digital academic certificates and credit-based achievements (Bond, Amati, & Blousson, 2015; Third, Domingue, Bachler, & Quick, 2016).

TEDUCHAIN

TEduChain is the use of blockchain technology by deserving students to access financial resources for educational purposes. It is based on the premise that all deserving students should have access to financial resources to enable them to be able to undertake their studies (Rashid et al., 2018).

As described by Rashid et al. (2018), the objectives of the TEduChain are as follows:

- enable sponsors and students to attain funding by selling future revenue rights to investors worldwide;
- automate the investment process by using the concept of smart contract;
- convert investments (liquid assets) into tokens at any time.

With traditional systems, there is only one instance of the entire record and changing the contract information of any student maliciously would go undetected.

DEVELOPMENT

The TEduChain platform consists of two different operational frameworks—a relational database-driven administrative framework and a distributed ledger-based blockchain framework.

The administrative framework handles regular operations such as creating user accounts, resetting passwords, sending email notifications to the users, uploading profiles, modifying personal information, resolving conflicts among the entities, providing the dashboards, and other housekeeping functionalities. The administrative framework is based on a

relational database that stores all data, including data on students and investors. The blockchain database stores data on investors and their investments.

A dashboard enables all interactions on the platform. These include opportunities for updating personal information, submitting applications, uploading additional supporting documents, and monitoring the status of applications. Fundraisers also have access to the system via a dashboard for various functions.

The contract between students and sponsors are stored in new blocks based on the proposed framework. This framework enables the collection of all necessary information from the relevant parties.

IMPLEMENTATION

In this section, we present the TEduChain system processes and operations. Unlike other uses of blockchain such as for bitcoin and other cryptocurrencies, the goal with TEduChain is to collect funds for deserving students to access. Therefore, this is not a public platform. There can be only three groups of participants in this transaction. These are the students, the fundraisers, and the investors. Figure 1 represents the workflow in TEduChain (see also Rashid et al., 2018).

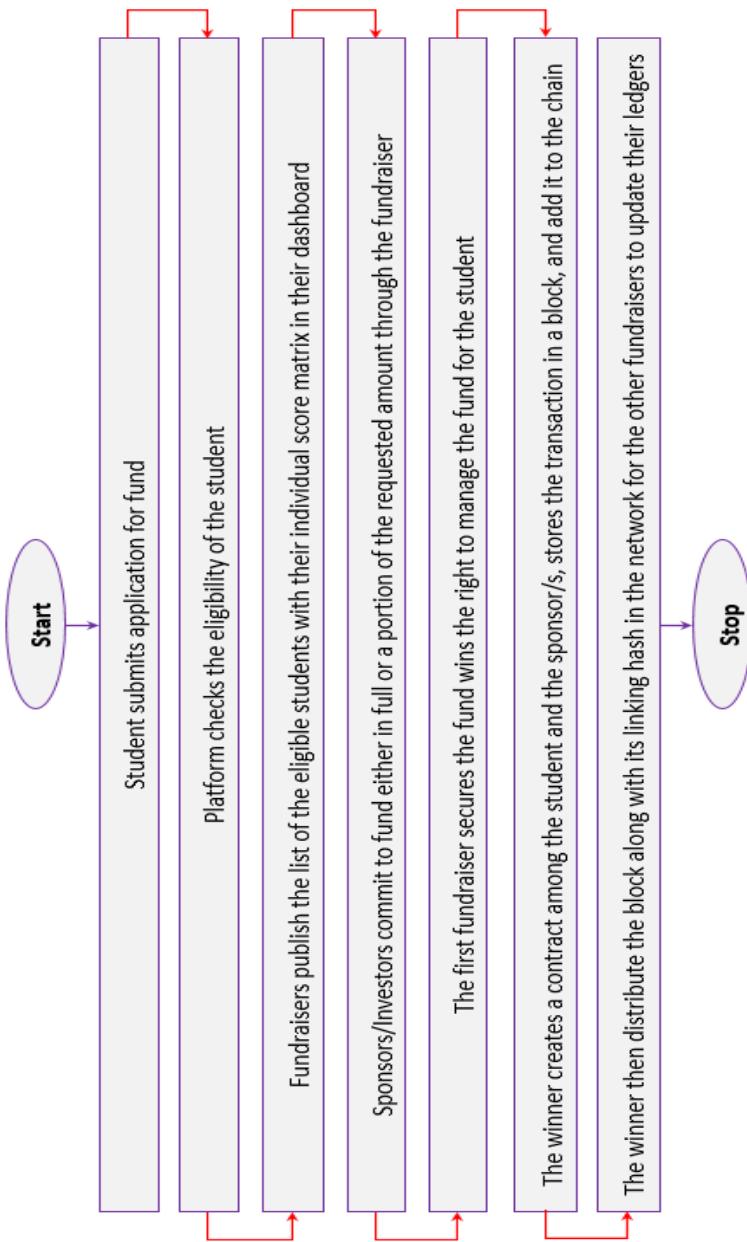


Figure 1. Workflow (adopted from Rashid et al., 2018, p. 3).

SYSTEM OPERATIONS

Below we present screenshots of the TEduChain system in operation taken during the test and verification phases. Figure 2 shown below presents the system authentication process.



Figure 2. Authentication process.

The TEduChain system's main website enables existing users to log in as well as new users to create accounts. Figure 3 presents the system application process.

A screenshot of the TEduChain Student Dashboard. The dashboard has a pink header with the text "Student Dashboard" and a yellow header with a menu icon. On the left is a sidebar with links: "Dashboard", "My Profile", "Submit Application", and "About us". The main content area is titled "Application Form" and contains several input fields: "First Name" (empty), "Last Name" (empty), "Email address" (value "divnesh44@gmail.com"), "Study Program" (empty), "Program Duration" (empty), "Program Cost" (empty), and a "Submit" button at the bottom right.

Figure 3. Application process.

Once a student has registered and logged into their student account, they are required to fill an application to apply for the scholarship. Figure 4 represents the fund sourcing process.

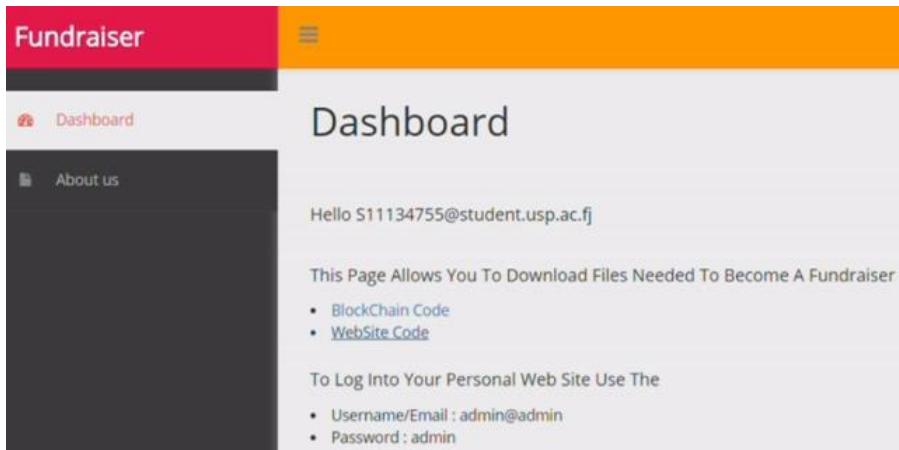


Figure 4. Fundraising process.

Upon registering and logging into their accounts, the fundraisers are required to download two pieces of software from the website: these are the backend blockchain code and a website for the fundraiser. Once deployed, the blockchain software asks the fundraiser to enter the IP address of the central server, as it will connect to it to receive updates about new fundraisers and students. The TEduChain system, when deployed in the public domain, will enable investors to connect with the fundraisers in order to invest in students' education. Figure 5 represents the investing process.

Student Name	Student Email	Course Name	Course Duration	Course Cost
Divnesh Prasad	divnesh44@gmail.com	BSE	4.0 Years	\$ 10000.0
DIVNESH PRASAD	divnesh@ymail.com	Software Eng	4.0 Years	\$ 50400.0

Figure 5. Investing process.

The investor website enables a user to select a specific fundraiser (scholarship body), browse through student profiles, and lastly select a student from the list of all registered students. The investor will be required to enter their credit card details and the amount they wish to invest on the student. The transaction will be completed only if the fundraiser is able to collect the total amount for the student.

REFLECTIONS OF THE PARTICIPANT AND DEVELOPERS

The project introduced a new system that gives students the opportunity to access funds for their tertiary studies. This involved crowdfunding and using blockchain technology to record transactions, which creates a secure, immutable, and transparent system. The prototype can be further developed to build a system that can be used in the South Pacific region and later deployment on a global scale.

A team of three developers (the authors) and one participant was formed to work on the project in Semester 2 of 2018. The three developers are final-year students, and the participant (Dr. M. Rachid) is an academic staff member in the School of Computing, Information & Mathematical Sciences.

When asked about why he considered joining the TEduChain project, Mr. K. Deo (a student intern) replied:

I joined the team at the same time as my fellow colleagues because blockchain is a fascinating technology and has recently been the hottest topic on the market. (Personal communication, July 5, 2019)

One of the main objectives of this project is training and capacity building. For that reason, we allowed students to join the team as student interns. When asked what he gained out of the TEduChain

project, Mr. S. Chand (a student intern) replied:

This opportunity allowed me to gain valuable insights in development and blockchain, which I believe strengthened my skills as well as diversify my skills. (Personal communication, July 5, 2019).

The project enabled students to explore the core of blockchain technology and improve their understanding of how it works and how it can be used to have a social impact.

Team members got on well together; we believe that they had good communication with their peers and supervisors. When asked about how communication was among all team members of the TEduChain project, Mr. D. Prasad (a student intern) replied:

I regularly communicated with our Supervisors via email and had regular face-to-face meeting as well, to discuss progress of the project progress and to address the next steps. (Personal communication, July 5, 2019)

Time factor was a challenging issue for this project. When asked about any issues faced during various phases of the TEduChain project, Mr. K. Deo replied:

I had to first learn about Blockchain technology and its principles. This was the time-consuming part of the project and the team spent various nights at the University finishing the tasks on time. (Personal communication, July 5, 2019)

In general, the team did not face any major issues; however, some of the difficulties during the development and implementation phases were as follows:

- Student interns had to learn about blockchain technology from the very basics.
- Meetings to discuss the project were held in the afternoons and over the weekends due to different schedules.
- The team did not have a special area or room to work together on the project; therefore, it was difficult to work at different geographical locations.

When asked about any issues faced during various phases of the TEDuChain project, Mr. S. Chand replied:

I managed to get over the technical issue by taking help from other staff at USP or by asking questions on stack overflow as for the programming bit. I gained the knowledge of how the Blockchain network operates, and the different mechanisms behind it. I have also got exposed to writing technical reports.
(Personal communication, July 5, 2019)

CONCLUSION

The team was able to develop and implement a working prototype of a tertiary education scholarship system using blockchain technology.

The system enables students to acquire funds for their studies from the public and investors in Fiji and the Pacific countries. This project could be extended by setting up the TEDuChain application on a public server to enable investors

from any part of the world to contribute to students' education in Fiji and elsewhere.

Student interns were happy to take part in the TEeduChain project and were satisfied with the project outcomes, especially since it was their first-time experience in such a large-scale project and they had to go through the development, implementation, and verification phases. However, as they did more reading, they realized that many system components could be optimized for better performance. Overall, they had a good experience working with USP staff and they learned a lot during this journey.

Further work can be done to improve the prototype into a full commercial product ready to be deployed on public domain servers, enabling local and international investors as well as regional and international students to take advantage and benefit from a global scholarship platform.

ACKNOWLEDGEMENTS

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Teaching and Learning with Technology

Pushing boundaries and breaking down walls

Som Naidu and Sharishna Narayan (Editors)

Technologies used at USP are definitely pushing boundaries and breaking down walls. During my 20 years teaching experience at USP, I have seen massive changes in the way technologies have enhanced teaching and learning. While writing my chapter for this book, I could not stop but reflect on these changes and how we at times take the simplest things for granted, yet they can disrupt our well-planned activities. Technologies have a place at our regional university yet before we push the boundaries, we definitely need to sit back and gauge the readiness of our students, the regional countries, and ourselves.

Dr. Rajni Chand, Senior Lecturer, School of Language, Arts and Media

I have had the pleasure of leading a team researching the impacts of technologies for flexible learning at USP. I certainly have learned a lot through the process and wish to share the team's lessons and experiences. It has been an interesting and rewarding journey that has enabled me to work with a dynamic team at the Centre for Flexible Learning, and to meet colleagues and students in our diverse university community.

Evan Naqiolevu, Learning Experience Designer, Centre for Flexible Learning

As a Teaching Assistant from a regional USP campus, I had a great experience working with CFL team in terms of writing proposals, acquiring funding, managing a team, carrying out the entire study and writing formal papers for publication. If one has an idea, it should be explored, as my idea has done wonders for me.

Krishan Kumar, Teaching Assistant, School of Computing, Information and Mathematical Sciences



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