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Technology in education – Pacific

# Teachers and Technology in the Pacific



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## ABSTRACT

Although digital literacy is increasing in the Pacific region, access to educational technologies within the education sector remains inconsistent for both teachers and their students. This report presents an analysis of current practices that support technology integration in the classroom, with a particular focus on the work of teachers in the Pacific Island states of Palau, Samoa, the Solomon Islands, and Vanuatu. Based on an analysis of academic and grey literature, and interviews with key stakeholders involved in the implementation of educational technologies in the region, several key findings emerge. Education policies and practices designed to improve the digital literacy and skills of teachers have expanded, and donor-driven investments in educational technologies have provided more opportunities for technology integration in the education sector across the Pacific. However, although teachers have increasing chances to learn about and engage with pedagogies and practices that incorporate educational technologies, existing poor infrastructure limit the opportunities to apply these new skills in the classroom. The report concludes with considerations for supporting more sustainable practices in the region that may allow teachers to integrate technology into their practice in meaningful ways into the future.

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## TABLE OF CONTENTS


**Abstract** 1
**Acknowledgements** 2
**Table of Contents** 3
**1. Introduction** 4
**2. Regional context** 5

2.1 Regional initiatives 8
2.2 Country-level policies and initiatives 9

**3. Teachers' capacity and perceptions about the use of technology in education 12**

3.1 Teacher competences and capacity development 12
3.2 Teacher digital literacy 14
3.3 Teacher perceptions on educational technology 16

**4. The use of technology in supporting the teaching profession: Barriers and Possibilities 17**

4.1 Current technology investments in education 17
4.2 Digital infrastructure and resourcing 19
4.4 Challenges in technology investments 21

**5. Technology for teacher training provision 23**

5.1 Teacher competency standards 23
5.2 National ICT policies 25
5.3 Pre-Service teacher training 26
5.4 Continuous professional development of teachers 26
5.5 Teacher collaboration – mentoring and peer learning 30
5.6 Public-private partnerships 30

**6 Discussion and lessons learned 32**
**7 Conclusion 34**
**REFERENCES 36**
**Appendices 43**

Appendix 1: List of Key Informants 43
Appendix 2: Interview protocols 44

# 1. Introduction

The Pacific is committed to improving education quality and inclusive learning for all its students. The Pacific Regional Education Framework (PacREF) 2018-2030 recognizes the pivotal role that technology can play in enhancing education outcomes in the region. It has set clear objectives for "*integrating ICT into learning programmes to create effective and efficient new ways of learning"* (USP & Pacific Islands Forum Secretariat, 2018, p. 8). This framework aligns with Sustainable Development Goal (SDG) 4 and the Incheon Declaration, emphasizing the use of information and communications technologies (ICTs) to strengthen education systems, disseminate knowledge, and enhance learning effectiveness.

SDG 4 targets several key areas where technology plays a crucial role. First, investing in technology infrastructure is essential for providing a reliable platform for digital learning. Understanding how to effectively use technology for teaching and learning is critical to integrating it into educational contexts to maximize its benefits. It is also important to ensure that both teachers and students possess the necessary digital literacy to utilize technology effectively in educational settings. Additionally, employing digital tools to streamline administrative processes and improve the overall management of educational institutions can significantly enhance efficiency. Finally, addressing social and cultural factors, such as safety, privacy, equality, and social cohesion, when integrating technology into education ensures that all students benefit equitably.

The Pacific region is undergoing an ICT revolution that could have major implications, particularly for democratic governance and the region's development (Asian Development Bank, 2020). However, implementing technology in the education systems of Pacific Island States remains a challenge. The Pacific Islands comprise a culturally, socially, and economically diverse region, with specific needs unique to small island states. The Pacific region includes eleven out of the twenty-five fully independent microstates in the world, each with different priorities and challenges compared to larger nation-states. In urban and increasingly in rural settings, Pacific Islanders are using new digital tools to communicate, form online networks, and coordinate. As of 2021, approximately 60 percent of Pacific Islanders now have access to a mobile phone, and this figure continues to climb (Johnson et al, 2021). This ICT transformation provides an opportunity for the Pacific to leverage technology to close development gaps by bringing better healthcare, education, and public services to a larger proportion of the population who would otherwise be left out.

Despite these advancements, the role that technology can play in supporting teaching and learning opportunities remains under-researched in the Pacific. Emerging evidence suggests that ICT provides enhanced opportunities for both teachers and students (Tulipe, 2021). However, there is a lack of research on current challenges in the Pacific around using technology as part of teaching and learning, as well as teacher attitudes and readiness to engage with ICT, particularly in rural and remote, outer-island settings.

There remains a need for a deeper understanding of how educational technology is being used to support the work of teachers to transform learning, particularly in the Pacific region (Johansson-Fua et al., 2020; Lai et al., 2020). Addressing these gaps involves conducting comprehensive research to identify effective strategies for ICT integration, understanding the specific needs and contexts of different island states, and developing tailored approaches that consider the unique challenges faced by these communities. While significant progress has been made in recognizing and addressing the role of technology in education across the Pacific region, there is still much work to be done. Continued investment in technology infrastructure, development of digital skills, and research into effective ICT integration in teaching will be crucial in ensuring that all students in the Pacific have access to high-quality, inclusive education. This commitment to leveraging technology in education is essential for the region's broader development goals, and the empowerment of community members.

## 2. Regional context

The Pacific Islands, encompassing a vast expanse of ocean and thousands of islands, represent a region rich in cultural diversity, yet also vulnerable to the impacts of climate change and natural disasters (Ras & Fabris, 2021), poor educational participation and learning, rapidly changing economic structures, high migration rates and high youth unemployment in many areas (Weber, 2017). Employment opportunities in the Pacific are often limited, particularly in rural and remote outer islands. High levels of unemployment and underemployment prevail, especially among youth and women. Limited access to education, skills training, and economic opportunities exacerbates this issue.

Many Pacific Island nations rely heavily on industries such as agriculture, tourism, and fisheries, which are vulnerable to external factors such as climate change, natural disasters, and fluctuations in global markets, further impacting employment stability. Gender-based violence and violence against children are significant challenges in the Pacific region. Cultural norms and traditional gender roles often perpetuate inequalities and contribute to high rates of domestic violence, sexual abuse, and exploitation. Women and children, particularly girls, face barriers to accessing justice, support services, and educational opportunities across the Pacific.

The role that technology can play in enhancing the skills of citizens in the Pacific is a relatively recent area of interest for governments in the region, supported by donor-driven initiatives to improve infrastructure and digital connectivity. In the education sector in particular, there is now consideration as to the role technology can play in supporting the learning needs of students in the Pacific. Like in many contexts globally, this focus was likely accelerated by the COVID-19 pandemic. In the Pacific, many countries experienced prolonged school closures, with Ministries of Education and communities moving to provide teachers with online and remote support mechanisms to ensure continuity of learning for students. However, there remains a lack of evidence on the extent to which technology is being used in education systems across the region post-COVID 19, including an examination of the

effectiveness of technology use to support teachers. The following section explores in more detail, some of the enabling conditions supporting and restricting teachers from using technology.

**Education in the Pacific**

Education systems in the Pacific region face additional challenges due to inadequate infrastructure, limited resources, and disparities in access and quality, which is compounded by geographical remoteness and diversity of cultural and ethnic identities. Remote and rural communities often lack adequate school infrastructure, trained teachers, and educational materials, hindering children's access to quality education. Moreover, low literacy rates and high dropout rates persist, particularly among marginalized groups such as girls, children with disabilities, and those from low-income families. Studies focused on student achievement and teacher professional learning indicates that the region also continues to struggle with numerous challenges at the system and school levels, which impacts on the overall quality and preparedness of teachers in the region, and their capacity to support student learning.

Results from the latest Pacific Islands Literacy and Numeracy Assessment (PILNA) indicate that too many children in the Pacific region are still not meeting expected levels in reading, with a significant proportion of students performing at the lowest levels (Pacific Community, 2022). Given that foundational literacy provides the building blocks for engagement in lifelong learning, low literacy outcomes remain a critical concern for many countries in the Pacific. Teacher quality also has a significant impact in student learning outcomes. In the Pacific, most teachers are trained and have acquired the minimum level of training at pre-service and/or in-service (Pacific Community, 2021). However, despite a growing number of trained teachers across the Pacific region, many countries are facing a teacher shortage and teacher attrition. PILNA data shows that 80 percent of teachers experience stress and 70 percent report being overwhelmed by their job (Pacific Community, 2022). This is a concern as high workloads and poor teacher mental health and well-being, especially post COVID-19, can have significant policy implications for the delivery of quality education in some Pacific Island nations, including teacher resourcing and allocation, teacher supports, salary and employment conditions.

**Access to technology**

Access to technology is one of the biggest challenges in relation to the implementation of educational technologies. While some countries have made significant strides in expanding digital connectivity, others continue to face challenges in ensuring widespread access, particularly areas impacted by geographical isolation. Internet penetration rates in the region range from around 20 to 60 percent, with higher rates typically found in more developed countries like Fiji, Samoa, and Tonga. However, in countries such as Papua New Guinea (PNG) and Vanuatu, where infrastructure is limited, internet access rates are lower, particularly in rural and remote areas. Investment from the Australian Government through the development of a 4,700km fibre optic cable (the Coral Sea Cable System) to Papua New Guinea and Solomon Islands has brought high-speed internet connectivity and improved access and reliability to communities in these countries, but this is concentrated in urban areas (DFAT,

2018a). Mobile connectivity plays a crucial role in bridging the digital divide in the Pacific Islands, with mobile phones serving as the primary means of accessing the internet for many people (Watson & Fox, 2021). Mobile penetration rates are relatively high across the region, enabling access to communication and basic internet services even in remote areas. However, fixed broadband access remains limited, with many households relying on mobile broadband for connectivity due to the lack of infrastructure for fixed-line internet services.

Improving achievement in literacy and numeracy has been identified as a shared goal by governments across the Pacific Island countries, including opportunities for the integration of ICT into learning programs (Pacific Islands Forum Secretariat, 2010). In response, governments, development partners and non-state actors in the Pacific Islands have implemented various initiatives to promote digital inclusion and expand access to technology. Projects such as the Pacific Regional Connectivity Program, funded by organizations like the World Bank and the Asian Development Bank, aim to improve internet infrastructure and connectivity in the region. Community-based initiatives, such as internet cafes, community access centres, and mobile internet vans, aim to provide opportunities for people in remote areas to access technology and digital services. However, despite efforts to improve access to technology, significant challenges persist in the Pacific Islands (Mangisi-Mafileo, 2007). High costs, limited infrastructure, and geographical barriers continue to hinder efforts to expand connectivity, particularly in rural and remote areas where access to electricity and other basic amenities is often inadequate. Socio-economic factors, including poverty and low levels of digital literacy, also contribute to disparities in access to technology, with marginalized groups facing greater barriers to connectivity.

**Teacher uses of technology**

For teachers in the Pacific, technology use is often hampered by factors like internet connectivity and availability of devices, particularly in remote areas (Kaye, 2016; UNESCO, 2021). Where access is available, teachers in the Pacific region have reported using technology in a variety of ways, including interactive whiteboards, tablets for activities and games, access to online resources, and in some better resourced settings, targeted ICT sessions in computer labs or on laptop computers (Ferrière & Ailincai, 2022; Kaye, 2016).

During the pandemic, virtual classrooms and video conferencing tools became seen by governments as increasingly important tools for the region. Although there is little formal research on COVID-19 responses across the education sector in the Pacific, media discourse and published policy briefings suggest that the experiences of teachers in the region were similar to other low-income contexts (Dabrowski et al, 2022). While stakeholders interviewed in this study noted that teachers were supported by their respective Ministries and education departments through the provision of learning materials including online lesson plans and television broadcasting, there were also reported difficulties around teachers accessing such resources, as well as the ongoing lack of resources in family homes to support remote learning. PILNA results showed that at the school level, technology was not widely used to support continuity of learning during COVID-19. Less than a quarter of school leaders surveyed, reported using email (24.3%), web-based (24.3%), radio (22.8%) or television (16.7%) to deliver learning content to their students.

Importantly, teachers in some parts of the region, for example Samoa, appear to have been forced to take leave without pay during a declared state of emergency (UIS, 2020). Although there is insufficient evidence to suggest this issue was widespread, it would help to explain why teachers' uses of technology did not accelerate in ways observed in somewhat comparable contexts. Table 1. below provides a summary of PILNA results relating to technology availability and access in the Pacific region, as reported by teachers, school leaders and students. There is a disparity in the perceptions of resource availability for teacher use, with school leaders reporting higher percentages than teachers. However, students in the PILNA survey reported higher levels of access to a computer or laptop for their use, compared to reported rates by school leaders.

**Table 1. Availability and access to technology in the classroom in the Pacific region, PILNA 2021**

| Technology availability and access | Yes (%) | No (%) |
|---|---|---|
| Computers/tablets for teacher use (School Leaders) | 56.9 | 43.1 |
| Computers/tablets for teacher use (Teachers) | 23.1 | 76.9 |
| Computers/tablets for student use (School Leaders) | 32.9 | 67.1 |
| Computers/laptops for student use (Grade 4 Students) | 49.6 | 50.4 |
| Computers/laptops for student use (Grade 6 Students) | 50.2 | 49.8 |
| Attended PD in ICT at least once in the last 3 years (Teachers) | 51.5 | 48.5 |
| Communicated with parents by email/social media (Teachers) | 31.5 | 68.5 |
| Sometimes had something upsetting said about me on the internet (Grade 4 Students) | 16.1 | 83.9 |
| Sometimes had something upsetting said about me on the internet (Grade 6 Students) | 15.0 | 85.0 |

Although the pandemic has highlighted contextual issues specific to the Pacific, it is important to acknowledge that teachers in the region already experienced challenges around access and resourcing well before the pandemic. Importantly, the low levels of student and adult literacy in the region also likely impact on teacher ability to use educational technologies in their work.

### 2.1 Regional initiatives

As interest in the use of educational technology increases in the Pacific, numerous regional strategies and initiatives have been developed to support technology use and application in the education sector. Governments across the Pacific have now begun to invest in education reform initiatives designed to promote the integration of technology in schools. At a regional level, the Pacific Islands Forum Secretariat (PIFS) is leading the development of a regional digital transformation strategy to support the adoption of digital technologies across various sectors, including education (UNCTAD, n.d.). The strategy aims to promote digital literacy, improve access to ICT infrastructure and services, and foster innovation to drive economic growth and social development in the Pacific region. Specific to the education sector, the PacREF, endorsed by the Pacific Islands Forum Education Ministers, provides a regional policy framework for improving education quality, access, and relevance in the Pacific. The framework recognizes

the importance of ICT in enhancing teaching and learning outcomes and includes strategies to integrate technology into education systems across the region (USP & Pacific Islands Forum Secretariate, 2018).

In an effort to promote greater data integration to inform education policies, the Educational Quality and Assessment Programme of the Pacific Community (EQAP), in collaboration with UNESCO Institute of Statistics (UIS), has developed a cloud-based system that allows for the integration of education data, the Pacific Schools Information Management System (PacSIMS). It has seven modules, integrating student information, finance data, large scale assessment, curriculum-based assessment, teacher, leadership effectiveness and staff administration data on one platform. Each module is designed to be linked to the national Education Management and Information System (EMIS) and collates information for specific needs, such as student learning assessments, information on teacher competencies and school fees. To date, at least four countries have integrated PacSIMS into their EMIS, with some adding additional modules for tracking including water, sanitation and hygiene, transport and disaster risk management (Naisoro, 2021).

Under the PacREF, the University of the South Pacific Institute of Education and ITS Division, is implementing the Waka Moana Learning Hub. The Hub hosts a range of resources, professional learning materials and research to support the teaching and learning of literacy, numeracy and cognitive skills for students across the Pacific (USP, 2024). Designed as an information repository, the Hub uses a multi-modal approach incorporating online, print, in-person and radio to ensure access to educational resources across the Pacific region.

### 2.2 Country-level policies and initiatives

There are also numerous examples of country level initiatives focused on increasing digital access and literacy across the region. The Cook Islands marked a significant milestone in its journey toward digital advancement by recently introducing its inaugural National Digital Strategy for the period 2024 to 2030. Developed in partnership with the United Nations Development Programme (UNDP) and the Government of Cook Islands, the strategy *Utilizing Digitalization to Accelerate the Achievement of the Sustainable Development Goals in the Cook Islands*, emphasizes bridging the digital gap among islands and communities (UNDP, 2024). It particularly addresses the gender disparity in digital access between women and men, girls, and boys, while also focusing on the needs of the elderly population, with the overarching goal of ensuring universal access to the benefits of digital technologies.

The Fijian government has also implemented various initiatives to promote ICT in education. The Ministry of Education has partnered with telecommunications companies to improve internet connectivity in schools and provide training to teachers on integrating technology into their teaching practices, including digital skills amongst pre-service teachers. There have also been interventions designed to provide children with access to devices, including the now redundant "One Laptop Per Child" program, which aimed to provide laptops to primary school students to enhance their digital literacy and access to educational resources (Kumar, 2020). Implemented as part of 2015 education reforms, the program was halted because of budget deficits arising from tropical cyclone Winston in 2016 (Kumar, 2020).

Palau also launched a similar program focused on equipping every child with their own device (Island Times, 2020). Palau's Development Plan 2023 – 2026 outlines priorities to support ICT sector development and regulation. This means supporting equitable conditions for the adoption of technology and innovation in Palau for all citizens regardless of socio-economic status. This includes improving resilience of the network, sustainability, and improved customer access and mobile coverage throughout the country translating to high-quality, low-cost internet services (Republic of Palau, 2023b). Palau has also drafted a National ICT Policy 2025 – 2027, currently tabled for discussion. Two initiatives for the Ministry of Education include leveraging digital technologies and expanding digital skills in the education system and enhancing lifelong learning opportunities for digital skills and inclusion. Inclusion is a key objective of the policy with specific outreach to under-represented groups including women and girls, persons with disabilities, senior citizens, and other populations with limited access to opportunities.

In Vanuatu, the development of the National ICT in Education Policy and the National ICT Strategic Plan aims to guide the integration of ICT in education and support the development of digital literacy skills among students (Republic of Vanuatu, 2013). The government has partnered with international organizations and NGOs (for example, Catalpa) to provide training and capacity building programs for teachers on using technology in the classroom. Additionally, Vanuatu has implemented projects to improve internet connectivity and establish computer labs in schools across the country.

In the Solomon Islands, the Inclusive Digital Economy Scorecard[1] is a tool used to assess a country's progress in fostering an inclusive digital economy, and which evaluates various aspects of the country's digital ecosystem, such as connectivity, digital skills, regulatory environment, and inclusive policies (UNCDF, n.d.). Similarly, Papua New Guinea launched the National ICT in Education Policy and the Digital Learning Materials Policy to guide the integration of ICT in education and promote the development of digital learning materials (PNG Education News, 2014). The government has also collaborated with international organizations and private sector partners to establish ICT training centres for teachers, and working with partners to provide funding for the procurement of ICT equipment for schools (PNG Education News, 2014). Under a partnership with SIL PNG, Save the Children Australia and Callan Services, PNG's Department of Education is digitalizing the Grade 1 and 2 curriculum reading materials into a Talking Book format for mobile phones (SIL, n.d.). For the first time, the technology allows children to hear books spoken in their own minority languages. Some of the books have also been made available in sign language.

In Samoa, the Ministry of Education and Culture (MEC) has prioritized the integration of ICT in education through initiatives such as the Samoa e-Learning Platform (Ariu, 2020). This platform provides access to online resources, digital textbooks, and interactive learning materials for students and teachers. The government has also invested in

[1] The inclusive digital economy scorecard (IDES) is a policy tool developed by UNCDF to help governments set the priorities for their countries' digital transformation. It identifies the key market constraints hindering the development of an inclusive digital economy and helps to set the right priorities with public and private stakeholders, to foster a digital economy that leaves no one behind (UNCDF, n.d).

infrastructure upgrades to improve internet connectivity in schools and support the implementation of digital learning initiatives (Samoa Ministry of Education and Culture, 2021).

**Bilateral initiatives**

The Australian Department of Foreign Affairs and Trade (DFAT) has supported several regional education initiatives with the aim of fostering digital innovation and connectivity in the Pacific region. During the pandemic, while many countries relied on digital platforms to support continuity of learning, access to resources and professional development opportunities were hindered in teaching communities (Pacific Community, 2021). In response, Science Circus Pacific (SCP) was introduced to build capacity in science, technology, engineering, and mathematics (STEM) education and communication in the Pacific (Science Circus Pacific, n.d.). Science Circus Pacific activities transitioned to remote delivery, which provided the opportunity to create and model a range of experimental and conventional remote program delivery approaches. Activities were implemented in four countries (Samoa, Fiji, Kiribati, and Tuvalu), to build the capacity of ministry officials, NGO staff, teacher trainers and teachers in remote teaching approaches, workshop design and skills to facilitate workshops in a remote learning context, such as the use of video-based instruction, digital platforms, or home-based learning approaches. Participants were given devices and digital resources to produce short videos for online teaching, using social media platforms, television, and other outlets to showcase science content.

Under the Kiribati Education Improvement Program (KEIP) funded by DFAT, a trial was introduced in 2018 to provide teachers and students with curriculum related learning materials, pre-loaded onto tablets. The Kiribati Tablet Trial (KTT) was designed to address the shortage of printed and other learning materials to support targeted teaching and learning in English. Each intervention school was provided with a package including 40 tablets, a charging station (powered by solar cells), and a motherboard which is used to wirelessly transmit pre-loaded data to each tablet. The teacher was also provided with a tablet and a wireless projector to allow them to show content from their tablet.

The purpose of the KTT was to strengthen teachers' use of English as the language of instruction, support students' comprehension of English, and provide additional access to learning support for Year 4 students who struggle with literacy. An evaluation conducted by NORC at the University of Chicago found that the program had a positive impact on students' reading skills, with significant effects in reading made-up words, fluency and comprehension (NORC, 2019). The program was also found to have a positive impact on teachers' English skills, which was consistent with teachers' own reports of improved skills. However, the program did not appear to have an effect on struggling readers. The study identified two key conditions that contributed to the success of the KTT: 1) the tablet content was aligned to the curriculum, and 2) teachers integrated the tablets and other project resources in their classroom teaching (NORC, 2019). Despite the small sample size, the positive results for English suggested that the KTT could be expanded to other parts of Kiribati to promote English learning (NORC, 2019). However, further evidence is needed to understand the cost-benefit and long-term sustainability of the program, given the high initial capital investment, and support for maintenance and software updates.

In partnership with the New Zealand Ministry of Foreign Affairs and Trade (MFAT), Commonwealth of Learning (COL) has collaborated with the National University of Samoa (NUS) to conduct a pilot project using generative artificial intelligence technology to provide online learner support (mEducation Alliance, 2023). The project was expanded to provide course content and massive open and online courses (MOOCs) to 1,700 learners across the Pacific region. The Government of Japan has also supported the MEC in Samoa with the provision of new ICT equipment and devices which were loaded with educational content, lessons and software aligned with the curriculum (UN, 2023).

# 3. Teachers' capacity and perceptions about the use of technology in education

International evidence suggests that technology is more effective when it is used to enhance the ability of teachers to meet different student needs, requiring investments in infrastructure as well as teacher training to improve practice (World Bank, 2023). It is important to acknowledge that there is very little information in published research or literature on the capacity of teachers to use technology in the Pacific. While there is some evidence to suggest pre-service teachers have opportunities to engage with technology as part of teacher training programs (Sharma et al., 2020; Raturi, 2021), there is less evidence of teachers using technology as part of their daily practice.

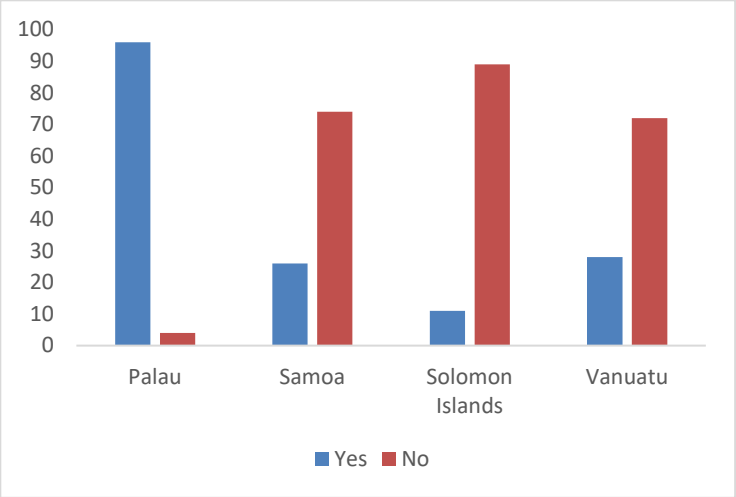
## 3.1 Teacher competences and capacity development

Teachers have an important influence on student learning, and teacher capacity development is essential to any educational reform, including those that aim to improve the capacity of teachers to integrate technology into their practice. Examining the results of large-scale data sets in the region provides insights into some of the structures that support teacher capacity in the use of educational technology, as well as the barriers teachers continue to face in relation to implementing technology in their teaching. Primary school teachers who participated in the PILNA contextual questionnaire in 2021 had the opportunity to report on the frequency of attending professional development in the 'Use of ICT' in the past three years. Table 1 shows that nearly half of the teachers surveyed (48.5) said they had never attended professional development that focused on the use of ICT. Just over 30 per cent of teachers said they had participated in a use of ICT professional development once or twice in the past three years, while the remaining percentage of teachers had attended three or more times in the past three years. Figure 1 shows the percentage of teachers who reported receiving professional development in the use of ICT in the four focus countries. Nearly all teachers surveyed in Palau reported having received ICT training, while the majority of teachers surveyed in Samoa (74%), Solomon Islands (89%) and Vanuatu (72%) did not. "*Teacher preparedness also is hindered by the locality, like the geographical location…how and where they are and how badly they can be affected by the network availability*" (EQAP representative).

**Table 2. Frequency of attending professional development in the use of ICT in the past three years**

| Frequency | Percentage |
|---|---|
| **Never** | 48.5 |
| **Once or twice** | 31.3 |
| **Three or four times** | 10.8 |
| **More than four times** | 9.4 |

**Figure 1. Percentage of teachers receiving professional development in ICT use in the last three years**




In Samoa, the government's commitment to ICT integration in the education sector recognizes the need for effective use of ICT as critical to quality teaching and learning (Samoa Ministry of Education, Sports and Culture, 2018). This includes equal access and opportunities for teachers and students to use ICT from early childhood education to secondary levels. The National Information and Communication Technology in Education Policy 2018-2023 emphasizes the importance of teacher training in ICT as a means of improving student-centred teaching methods, through the use of mobile computers, APTUS routers and resources in the SchoolNet Learning Centres (MESC, 2018).

In Vanuatu, the National ICT in Education Policy guides the integration of ICT in education, focusing on enhancing teachers' digital literacy skills. The Vanuatu Institute of Teacher Education (VITE) provides comprehensive training programs combining theoretical and practical components, ensuring teachers are proficient in using digital tools in their lessons. Partnerships with NGOs and international organizations such as ITU and Kacific (ITU, 2020) have further supported these efforts by offering capacity-building programs (Republic of Vanuatu, 2013; VITE, n.d.; Pacific Community, 2021). The Solomon Islands have also made strides through the Solomon Islands National University (SINU), which offers ICT-focused training programs for in-service teachers. The SchoolNet project, supported by the Asian Development Bank, aims to connect schools to the internet and provide teachers with training on using online resources. Additionally, ICT training centres have been established to offer courses on creating digital content and

using interactive whiteboards (Asian Development Bank, 2017; Asian Development Bank, 2023; Solomon Islands Ministry of Education and Human Resources Development, 2019).

Despite these initiatives, the quality of ICT training varies, and challenges persist for teachers seeking to improve their digital literacy. In Samoa for example, while training programs are comprehensive, stakeholders interviewed as part of this study suggest there is a need for ongoing support to address teachers' readiness and attitudes towards technology, particularly in rural and remote areas. In Vanuatu, the effectiveness of training programs is often limited by infrastructure challenges and the need for continuous professional development to keep up with rapidly evolving technology (Republic of Vanuatu, 2013; VITE, n.d.). The Solomon Islands face similar issues, with infrastructure limitations and the need for consistent internet access posing significant barriers to effective ICT integration (Asian Development Bank, 2017; Solomon Islands Ministry of Education and Human Resources, 2019).

### 3.2 Teacher digital literacy

Teacher digital literacy is crucial in the Pacific, both so educators can effectively integrate technology into teaching practices as learning outcomes for students, but also as a means by which to support inclusive practices in a changing context (Reddy, Chaudhary, & Hussein, 2023). Proficient teachers can prepare students for the demands of the digital age and equip students with skills that improve their work and migration opportunities. Additionally, at both school and tertiary level, teacher digital literacy enables schools to leverage technology to overcome geographical barriers and provide quality education even in remote and underserved areas of the Pacific region.

The proficiency of educators in employing innovative teaching methodologies is an important contributing factor to student capability, including in ICT. However, data derived from the OECD's Teaching and Learning International Survey (TALIS) reveals that many teachers internationally have limited understanding when it comes to integrating technology into their teaching and learning practices. This highlights the urgent need to offer timely training to educators on digital pedagogies, to enhance opportunities for knowledge sharing on what works, and for who, among teachers (OECD, 2020 as cited in Dabrowski et al, 2022). To enhance teacher training and development, it is recommended to provide access to necessary tools, online professional development modules, and coaching or mentoring to build capacity on a large scale. The TALIS survey revealed that only 60 percent of teachers had received professional development in ICT use, with nearly 20 percent expressing a strong need for development in this area.

Although research specific to the Pacific is limited, similar challenges have been observed in comparable contexts. In low-income contexts such as the Southeast Asian region for example, it has been reported that many countries still face issues of insufficient expertise among teachers in using ICT, and disparities in digital literacy among educators significantly hinder the successful integration and effective use of technology (Nietschke & Dabrowski, 2023). Issues around effectively training teachers to develop digital skills become more complex in the Pacific States, given lack of opportunities, teacher shortages in the region, and the fact that some research suggests teacher attitudes towards technology are not always positive (Ferrière & Ailincai, 2022). Without opportunities to learn to use technology, and

chances to apply educational technologies as part of practice, potential stigma and concern around the merits of technology is likely to grow.

Progress is being made, particularly in relation to pre-service teacher training. Interviews with key stakeholders in the region outline some of the ways in which governments and teacher education institutions are now attempting to incorporate ICT into both pre-service teacher training (for student teachers) and in-service training programs (for experienced teachers). The University of the South Pacific (USP), based in Fiji, provides both pre-service and in-service training for students in the Pacific region, as well as those from Australia and New Zealand. According to one senior lecturer in the Primary Education Program at USP, digital skills training is integrated into the pre-service course, through immersive learning using flexible modes and Moodle as a learning management system. Students are also assessed through the use of videos of teaching practice, and digital resources are incorporated into programs to make learning more relevant and interactive. MOOCs, as well as demonstration videos and simulations, aim to make learning more interactive, and to provide students with an opportunity to engage in their learning through more effective communication and collaboration exercises. Similar practices were outlined by teaching staff at the NUS, who described using blended pedagogical approaches, a combination of in person and online lesson activities, and drawing on tools such as Kahoot, to make assessment practices more engaging. Although there was little evidence as to the existence of virtual learning communities, one lecturer at NUS did describe mentoring pre-service students into the beginning stages of their career. However, in both the university contexts above, it was noted that issues with internet connectivity continued to be a major challenge for student teachers to engage in online learning, as well as to use their learnings when they began teaching in local schools.

While online teacher training has potential to reach more teachers in low-resourced and geographically challenging contexts, this is not widely practiced in the Pacific. Many pre-service and in-service training programs are still conducted face-to-face by bringing teachers to a central location or sending expert trainers or head teachers out to schools. In the Cook Islands, the government has been implementing digital literacy programs in schools to enhance students' and teachers' skills in using digital technologies for learning. These initiatives include training workshops and the integration of digital resources into the curriculum (UNDP, 2024). Tonga's Ministry of Education and Training has also been working on improving digital literacy through programs like the Tonga National ICT Policy and the Tonga Education Network (TENet), which aims to provide internet connectivity to schools and enhance digital learning opportunities. However, low levels of teacher digital literacy and preparedness to incorporate technology as part of their practice threaten to jeopardise the success of programs designed to enhance student digital literacy and use of technology.

Bilateral partners are also assisting Pacific Island governments to improve teacher digital skills. For example, DFAT's education program in Kiribati, EduKAiT, supports the continuous professional development of teachers in primary and junior secondary schools through the use of tactile and technology-based resources in the classroom. Similar practices are also observed in Palau:

**"Computer literacy and computer savviness – teachers can feel defeated very easily. They need word processing skills. And how to use the Discussion Forum in Moodle for sharing resources, uploading notes, and other kinds of collaboration. Teachers also need support in using Moodle for assessment." (Lecturer, Palau)**

However, despite progress being made in initial teacher educator training, it appears that most teachers are not encouraged to use ICT in their current teaching practice, and the emergent digital skills (including the use for both general work and teaching) of teachers do not always progress. Stakeholders interviewed also suggested that new graduates find it difficult to integrate ICT into their teaching practice. This is due to poor infrastructure, lack of devices and a crowded curriculum that "*does not allow teachers time to incorporate ICT into their teaching*" (Key stakeholder, Samoa). Interestingly, there is also little evidence of support from school leaders or school boards in terms of supporting teachers to use technology in Pacific schools, beyond the purchasing of resources. For example, as part of a separate study conducted by the authors of this report (Nietschke & Dabrowski, forthcoming), several schools and classrooms in Samoa were observed. In all cases where computers and tablets were present, school leaders reported not having teachers with sufficient expertise to use ICT, or not having electricity to sustain them. There is also little evidence in available literature on school leader attitudes towards technology.

### 3.3 Teacher perceptions on educational technology

Research highlights both the optimism and challenges teachers in the Pacific region face regarding ICT integration in education. Many teachers in the region view ICT as a transformative tool that enhances student engagement, provides access to diverse educational resources, and prepares students for a technology-driven world (UNESCO, 2018). However, attitudes to using technology do appear to vary. One study conducted by Kaye (2016) suggests that while teachers acknowledge the potential benefits of technology for enhancing learning experiences, most teachers experience challenges related to skill in using technology, as well as infrastructure. Specifically, limited or inconsistent access to devices and internet connectivity pose barriers to widespread adoption. It is not surprising therefore, that some studies suggest teacher attitudes towards the value of technology range from ambivalent to negative (Ferrière & Ailincai, 2022).

A willingness to engage with educational technology is reflected in countries like Fiji and Vanuatu, where targeted initiatives have significantly improved digital literacy among students and teachers alike, and where teachers see technology as an inevitable part of their practice. There also appears to be a growing sense that technology will shape educational practice in the region:

**"The future of education in the Pacific will shift towards using more ICT tools in classrooms. This will include more use of the internet as well as smartphones, computers, and other paperless learning platforms. This is important for learning to be ongoing and also address other social issues that can affect the learning and schooling processes….**

**schools are encouraging students to use smartphones to access lessons, tests, assignments, virtual labs, and quizzes." (Teacher, Vanuatu)**

However, the optimism of teachers towards technology is tempered by substantial barriers such as inadequate infrastructure, limited access to reliable internet, and insufficient professional development opportunities (Johnson et al, 2021). These challenges are especially pronounced in remote and rural areas, where resources are scarce and technological support is minimal.

The cultural context of the Pacific plays a significant role in shaping teachers' attitudes toward ICT. In many Pacific Island countries, there is a pressing need for more culturally relevant content and resources to support educational technology integration in classrooms (Cave, 2012). Of relevance, research suggests there may be scepticism by teachers and parents about the rapid introduction of technology in the classrooms of the Pacific. Concerns about the impact of technology on children's education and wellbeing, and the overuse of electronic devices, has also been cited by educators working in Pacific nations. Yet there is also little research on how prepared teachers are to support students as they navigate online spaces. This is important, as device access has increased, risks facing children online have also increased. According to a 2019 study by the Fiji National Substance Abuse and Advisory Council, 56 percent of Fijian primary and secondary school students surveyed reported experiencing cyberbullying (Alasa, et al., 2022). In Samoa, 18 percent of Samoan children report experiencing cyberbullying. In Papua New Guinea, a study conducted by ChildFund PNG found that 32 percent of children surveyed in PNG had experienced cyberbullying (Child Fund Alliance, n.d.). Across the Pacific region the PILNA survey found that 16 percent of Year 4 and 15 percent of Year 6 students reported "sometimes" having something upsetting said about them on the internet. Reflecting international trends, these rates are likely to be much higher, and to increase as access to devices and online platforms expand in the region.

Equally, concerns over the digital divide remains a significant concern for many educators. Interviews with school leaders and teachers in Samoa also suggested there were concerns about unsupervised access to the internet and distractions in the classroom. These concerns, together with the lack of a set of policies to safeguard internet use, represent areas for further exploration in the Pacific region.

# 4. The use of technology in supporting the teaching profession: Barriers and Possibilities

## 4.1 Current technology investments in education

In the Pacific region, efforts to integrate ICT in education are underway to enhance learning opportunities, improve access to quality education, and prepare students for the digital age. As a result, many governments are formulating policies and guidelines to promote the responsible use of ICT in education, ensure data privacy and security, and address issues of digital divide and equity in access to technology.

**Infrastructure development**

Governments and international organizations are also investing in ICT infrastructure, such as internet connectivity, computers, and digital devices, to improve access to technology in schools and communities across the Pacific region. Fiji has been investing in improving digital infrastructure, including internet connectivity in schools and communities, including during the COVID-19 pandemic (Okyere et al., 2023). Initiatives like the Rural Telecommunications Project (TFL, 2022), aim to expand internet access to rural areas, thereby improving connectivity for educational purposes. Similarly, Papua New Guinea has been working on enhancing digital infrastructure through projects like the National Transmission Network (NTN), which aims to improve internet connectivity across the country, including in rural and remote areas (The National, 2020). However, in the Pacific, even when infrastructure is established, issues with ongoing funding and support can mean initiatives that support technology are unable to be sustained.

**ICT integration in curriculum**

Education authorities are revising curriculum frameworks to incorporate ICT skills and digital literacy into subject areas, ensuring that students are equipped with the necessary competencies to navigate the digital world. In the Pacific, many countries have undergone significant curriculum reforms to integrate ICT and digital skills into education practice, emphasising the ambitions of governments to move students into the digital age. The integration of technology into the education sector is reflected in reforms to pre-service programs for student teachers, indicative of government desire to increase the digital skills of teachers and by proxy, their students. Countries such as Fiji, Samoa, Vanuatu, Tonga, Papua New Guinea, and the Solomon Islands have all introduced ICT courses at secondary, tertiary, and vocational levels, and emphasized practical skills as well as ongoing digital literacy practices. These efforts aim to equip students with essential competencies for the modern workforce and foster a Pacific 'digital generation' (Reddy et al, 2022).

**Engagement with families**

The rapid shift to remote learning during the pandemic saw an increase in the level of teacher-parent engagement on student learning through the use of technology. The PILNA survey showed that only 32 percent of teachers in the Pacific reported communicating with students or parents by email or social media. In the four focus countries, teacher-parent engagement through the use of technology was highest in Palau (84%), followed by Samoa (48%), Vanuatu (11%) and Solomon Islands (5%). Evidence suggests that strong teacher-parent engagement has a positive effect on student learning outcomes. In Vanuatu, student achievement in Grade 4 was found to be significantly higher in schools where teachers reported communicating with parents/students through email, social media and by phone. In Samoa, schools relied on a range of strategies to communicate with parents including social media and email. Ministry staff referenced the term 'second teacher' to describe the role parents played in facilitating and supporting the remote learning model. Teachers were also reported to have set up Facebook group chats to communicate with older students. Similarly, respondents at Palau Community College discussed the importance of

family support in their online in-service training courses for teachers. One example cited outlined the ways in which families were supporting teaching and learning practices, for example, '*one of our students was fortunate enough to have his daughter at the house while he was zooming in…and so the daughter was able to show the dad how to share screens and do all of that stuff*.' However, issues with connectivity and parent confidence in using social media platforms were cited as major challenges in sustained parent-teacher interactions throughout the pandemic. In some contexts, including Samoa, internet remains unfamiliar to many parents, who have little experience or confidence in their abilities to keep their children engaged with online learning.

**Online learning platforms**

In the Pacific, as in many other regions, the pandemic resulted in more teachers moving to zoom and other social media platforms to support continuity of learning. Teachers who participated in the PILNA 2021 questionnaire were asked if they prepared learning materials that were available to students online and whether or not they communicated with students or parents by emails or social media during the period of disruption. Nearly 75 percent of teachers across the Pacific responded that they did not prepare learning materials that were available to students online. In fact, 87.4 per cent of teachers did not deliver their classes online. 68.5 per cent of teachers responded that they did not communicate via emails or social media with students or families during the period of disruption.

Educational institutions are developing and utilizing online learning platforms and digital resources to deliver distance education, provide supplementary learning materials, and support remote and marginalized communities with access to education. The use of an online learning management system to support teaching and learning is more commonly adopted by higher education institutions and teacher training colleges. The USP uses Moodle and Zoom to deliver teacher training courses for remote students. Similarly, the Kiribati Teacher College uses an online platform, The Hub, for teacher training. However, due to low level skills, there remain concerns from some stakeholders that the skills of teachers do not match the ambitious aims of current education reforms in many countries in the Pacific, although there is acknowledgement that there is a lack of evidence as to current teacher capacity.

> **"When we moved online, we saw very few teachers who are ready to use technology on their own, but it didn't mean that there was none." (Stakeholder, EQAP)**

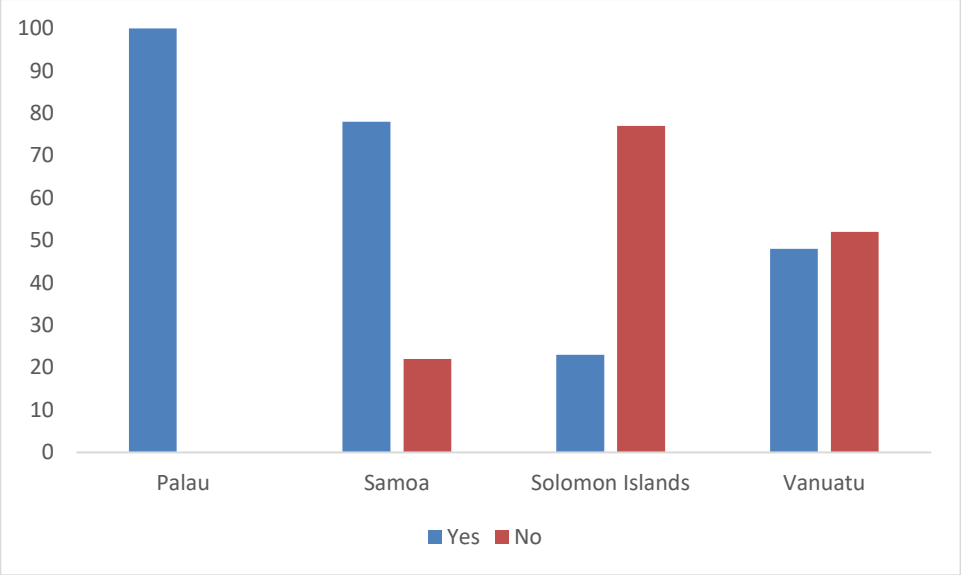
### 4.2 Digital infrastructure and resourcing

Infrastructure and access remain major barriers to engaging teachers to use technology in the region. In the Pacific, even when infrastructure is established, issues with ongoing funding and support can mean initiatives that support technology are unable to be sustained.

PILNA is administered to representative sample of Year 4 and Year 6 students in 15 Pacific Islands countries. PILNA also includes questionnaires which are administered to all sampled students, teachers and principals and enables an exploration of learning environments and attitudes of students, teachers and school leaders. Teachers and school

leaders were asked a series of questions about school and classroom resources, including computers, mobile phones and social media. When teachers were asked about the availability of digital resources to support classroom teaching, all teachers in Palau and 80 percent of teachers in Samoa reported having access to computers or tablets for their use. However, less than 48 percent of teachers in Vanuatu and less than 20 percent of teachers in Solomon Islands reported having access to a device for their use (Figure 2). In the Pacific region, there were more teachers who reported having access to computers or tablets at school (56.9%) than those who did not (43.1%).

**Figure 2. Availability of ICT resources for teacher use, PILNA 2021**




For the *Teacher Development Multi-Year Study Series: Vanuatu* (Cassity, et al., 2023), the PILNA results show that teachers and school leaders in urban schools report significantly better resource availability, and Year 6 teachers report more resources than Year 4 teachers. Overall measures of resources reported by teachers and especially school leaders are significantly associated with achievement levels in several estimations. For example, access to electricity, books and computers/tablets were found to be positively associated with student achievement.

According to stakeholders interviewed for the Pacific E-learning for Science Program (PeP), many teachers lack access to resources, and see technology as an opportunity to deal with professional and geographical isolation. According to stakeholders, teachers who participated in the PeP have become more confident in using Zoom and the PeP application in their classrooms, however there remains a lack of evidence if this is a true reflection of teacher competence in these contexts, particularly given conflicting perspectives in research and self-reported data from PILNA. However, unreliable internet and electricity connection remains a barrier, and the lack of financial support beyond the project highlights risks to the sustainability of both teacher skills and confidence to continue using the PeP app. There also remains difficulties of teachers, as well as students, having access to devices as well as data in the region.

**"Using technology for education really can enhance education, and it can be so simple and effective…but access to gadgets has a serious impact on equities." (Representative, EQAP)**

**"We still need to address the gap and create more equity especially for students coming from low socio-economic backgrounds – not every parent can afford to give their child a tablet, laptop or even smartphone." (Representative, EQAP)**

Vanuatu's government has been distributing tablets to schools as part of the One Laptop Per Child (OLPC) initiative, aiming to increase access to digital devices for students and teachers in remote areas (Chaturvedi, 2022). In Samoa, the MEC has been providing laptops to teachers and students through initiatives like the Samoa e-Learning Foundation, which aims to improve access to digital devices and resources (Reddy et al., 2022).

### 4.4 Challenges in technology investments

The challenges faced by teachers in the Pacific region regarding ICT integration are complex and multifaceted. Access to ICT resources is a significant constraint for teachers in the Pacific, heavily influenced by geographical disparities. In countries like Fiji and Papua New Guinea, access rates to ICT resources vary dramatically, from 46 percent in Fiji to 86 percent in Papua New Guinea. This disparity is even more pronounced in rural and remote areas, where infrastructure is often lacking, exacerbating the digital divide. Teachers in these regions struggle with limited access to computers and affordable data, which hampers their ability to integrate ICT effectively into their teaching practices (PILNA, 2021). This digital divide also highlights the need for targeted interventions that address the specific needs of teachers in under-resourced areas. This issue was highlighted in the recent Teacher Multi-Year Development Study in Vanuatu, which highlighted access to computers and IT experience as a significant barrier for many teachers, particularly in rural areas. Addressing this issue requires not only policy adjustments but also substantial investment in ICT resources and training (Cassity et al., 2023).

The lack of access to ICT tools, as revealed by PILNA data, where over 75 percent of teachers did not have access to a computer or tablet in their classrooms, severely limits their ability to apply what they have learned in teacher training programs. This gap between training and practical application underscores the need for a holistic approach to professional development that includes not only theoretical knowledge but also hands-on experience with ICT tools. Training programs must be continuously adapted to address the evolving technological landscape and the specific needs of teachers in different contexts (Pacific Community, 2021). While donor investments play a critical role in providing ICT resources, their effectiveness is often undermined by inadequate infrastructure. Investments in computers and tablets are less impactful without reliable internet connectivity and ongoing technical support. This mismatch between resource provision and infrastructure readiness highlights a critical area for improvement. Ensuring that donor investments are accompanied by comprehensive infrastructure development plans is essential for maximizing the benefits of ICT integration in education (Asian Development Bank, 2017; Solomon Islands Ministry of Education and Human Resources Development, 2019).

**Teacher shortages**

In many Pacific Island nations, like in other geographically disparate settings, the current shortage of teachers presents obstacles to the successful implementation of educational technologies (Hennessy et al., 2022). One of the most pressing issues contributing to teacher shortages in the Pacific is the emigration of qualified educators (Voigt-Graf et al., 2007). Countries such as Papua New Guinea grapple with the loss of skilled teachers who migrate to urban centres or overseas in search of higher salaries, improved working conditions, and professional development. This exodus leaves rural and remote schools understaffed, exacerbating disparities in educational access and quality. Furthermore, limited training opportunities and professional development programs hinder efforts to recruit and retain teachers in the Pacific (Hogan et al., 2022). In the Solomon Islands, for instance, aspiring educators face challenges accessing teacher training institutions and ongoing professional development. This shortage of trained teachers, particularly in subjects like science and mathematics, compromises the quality of education and undermines efforts to meet the diverse learning needs of students.

Inequitable distribution of teachers compounds the issue of shortages, with urban areas typically benefiting from better access to qualified educators compared to rural and remote regions. Vanuatu exemplifies this disparity, where geographical challenges and inadequate infrastructure make it difficult to attract and retain teachers in remote islands (Cassity et al., 2023). Consequently, students in under-served areas face barriers to accessing quality education, perpetuating socio-economic inequalities, and hindering national development efforts. Moreover, inadequate resources and infrastructure pose significant challenges to teacher recruitment and retention in many countries in the Pacific (Quinn & Buchanan, 2022). Despite government efforts to improve incentives for educators, such as hardship allowances in Fiji, poor working conditions persist in many rural schools (Voigt-Graf et al., 2007). Inadequate housing, lack of electricity, and limited access to basic amenities discourage teachers from working in remote communities, further exacerbating teacher shortages, and compromising the quality of education provided to students.

Teacher shortages are likely to continue globally, including in the Pacific. However, the role that technology can play in responding to teacher shortages in the region remains underexplored. Lessons learned during extended periods of remote learning in international contexts (see Dabrowski et al, 2022; Donnelly & Patrinos, 2022), suggest that with family support and access to resources including technology, many students did not experience learning loss, and indeed, some thrived. In Vanuatu, PILNA data showed large differences in Grade 4 student achievement between schools that reported using online learning and those that did not. While technology is unlikely to replace teachers entirely, technological interventions for learning, including sophisticated remote learning modalities and artificial intelligence technologies, may provide a stop-gap measure to mitigate the ongoing impacts of teacher attrition (Edwards & Cheok, 2018). Although the Pacific may not currently be prepared to implement such advanced methods due to infrastructure barriers, lower cost mechanisms such as chatbots delivered through messaging platforms are now being trialled- and they show promise in supporting student needs as well as responding to teacher shortages (Ajzenman et al., 2023; Edwards & Cheok, 2018).

# 5. Technology for teacher training provision

Technology plays an important role in teacher training, offering opportunities for educators to enhance their skills, knowledge, and instructional practices, as well as develop skills that students require for labour market participation and mobility. Using technology for teacher training and professional development can equip educators with access to a wide array of resources, collaboration platforms, and innovative learning experiences, and expand the reach of training programs in geographically disparate contexts like the Pacific. Technology can also facilitate personalized learning, foster collaboration, and networking, and empower educators to meet the diverse needs of students. Although research demonstrates the expanding role of educational technology to deliver teacher training in a cost-effective way, the evidence related to the use of technology in enhancing overall achievement at scale remains contested (Dabrowski et al., 2020). The following section examines current practices for supporting the use of technology as part of pre- and in-service teacher training provision.

## 5.1 Teacher competency standards

Efforts to integrate ICT skills into teacher competency standards vary in the region, as reflected in national teacher standards and national ICT policies, and the inclusion of ICT in Pacific teacher standards frameworks has evolved significantly. Aspirations for integrating technology into education to enhance teaching and learning outcomes have shaped expectations for teachers in the Pacific, though the focus on educational technology has evolved over time. Initial efforts were primarily focused on providing basic ICT training to teachers and integrating ICT literacy into teacher education programs. For example, the Pacific Islands Forum Secretariat highlighted the need for improved ICT infrastructure and teacher training as part of broader educational reforms (Pacific Islands Forum Secretariat, 2010). By 2020, many Pacific Island countries had developed more detailed competency standards that included specific references to ICT skills. These standards aimed to ensure that teachers not only possessed basic digital literacy but were also capable of integrating technology into their pedagogical practices. This shift was driven by the recognition that effective use of ICT could enhance student engagement, support differentiated instruction, and provide access to a wider range of educational resources.

In 2023, the updated Pacific Regional Standards for Teachers (2023) were published as a regional good as part of the teacher professionalism pillar under the PacREF (Pacific Community, 2023). The purpose of the Regional Standards is to provide a framework that makes clear regional agreement on the professional attributes, knowledge and understanding, and skills or practice across teachers' careers (Pacific Community, 2023). The 2023 Regional Standards were an update of the Pacific Regional Teacher Standards published in 2010 (UNESCO, 2010). The review and revision process began in 2021 and was led by EQAP with technical input from ACER and participation of 15 Pacific Island countries. In 2024, a key stage in the dissemination of the Regional Standards includes the adaptation of the revised Pacific Regional Standards for Teachers (2023) by countries into their national standards, and the use of the regional standards for evaluation and improvement of teacher competencies. Both the 2023 and the 2010

versions of the Pacific Regional Standards for Teachers knowledge and understanding of ICT as part of Professional Knowledge and Understanding for teachers. This is defined as knowledge of how to use digital technologies to maximise learning for students and for the self (SPC, 2023, p. 14). As teachers progress to the level of a 'accomplished/lead teacher', they are progressively expected to utilize ICT skills and knowledge to engage learners and to improve their own teaching strategies. Similar aspirations about teachers' professional knowledge and skills are articulated in the 2010 Pacific Regional Teacher Standards, with a focus is on knowledge of ICT policy and the use of ICT to support student learning.

In Samoa, for instance, the MEC has now updated its teacher standards to include ICT competencies as a core requirement. Teachers were expected to demonstrate proficiency in using digital tools for lesson planning, delivery, and assessment. The introduction of initiatives like the Samoa Knowledge Society and the Innovative Lifelong Learning Lab (MILLL) provided professional development resources to support teachers in meeting these new standards (UNESCO, 2023).The Samoa Registered Teacher Standards 2019 (revised) also outlines guidelines emphasizing teachers' need to develop knowledge of ICT to support teaching and learning, as well as teachers designing lessons to include students with special needs including ICT to support student engagement (UNESCO, 2020).

The Solomon Islands also saw significant developments in this area. The Solomon Islands National University (SINU) included ICT training as a core component of its teacher education programs. The SchoolNet project, supported by the Asian Development Bank, aimed to enhance teachers' ICT skills by providing access to digital tools and resources, thereby aligning with the updated teacher competency standards that emphasized ICT integration (Asian Development Bank, 2017). The Ministry of Education and Human Resources Development (MEHRD) has also developed digital competency standards for both teachers and students. According to the National Professional Standards for Teachers, a competent teacher is expected to have knowledge about literacy, numeracy and information and communication technologies (Solomon Islands MEHRD, 2019). Similarly, the Fiji Professional Standards for Teachers also provide substantial detail about teachers' use of ICT. Teachers are required to develop knowledge and use ICT in practice by creating and maintaining supportive and safe learning environments. As part of the Standards, teachers should understand how to use ICT in learning and teaching to enhance learning and teaching programs and outcomes for all learners in all teaching areas. Teachers are also required to use ICT safely, responsibly and ethically, including safe and ethical use of ICT and social media at all times (UNESCO, 2020).

Palau does not have published teacher professional standards, but the government has established programs to support uptake and use of digital technologies for teachers as outlined in the National ICT Policy 2023-2026 (Republic of Palau, 2023a). Palau articulates the importance of learning opportunities for digital skills for inclusion, particularly for women and girls, remote populations and senior citizens. The School Technology Resources Policies & Guidelines Handbook 2018 includes guidelines on addressing cyberbullying in schools with the recognition of increased use of digital technologies as a platform for cyberbullying (Palau Ministry of Education, 2018). The

Handbook also outlines the use of the school Internet networks and technology resources in a safe, legal, ethical and responsible way.

The Teacher Standards for Vanuatu 2014 make two references to teachers' use of ICT (Vanuatu Ministry of Education and Training, 2014). First, that teachers use available technology. Second, that teacher use and update their technical skills according to the location in which they work. The Standards do not give detail on these references. On the other hand, the Vanuatu National ICT Policy Framework 2021, Pre-Consultation Draft extensively outlines how the Government will actively promote digital literacy and open access to ensure that Vanuatu is inclusive of differently-abled citizens (Government of Vanuatu, 2021). The Framework emphasizes the importance of digital literacy across all education sectors – ECE, primary, secondary, tertiary, TVET and continuing adult education.

### 5.2 National ICT policies

Many countries have now developed national ICT policies that address teachers' and schools' knowledge, skills and responsibilities related to digital technologies and ICT. National ICT policies fill in detail that teacher professional standards do not. In the Solomon Islands, teacher professional standards are included in the Solomon Islands Teaching Service Handbook (Solomon Islands MEHRD, 2011). Teachers are expected to develop professional knowledge about ICT and its importance in teaching and learning, as well as understanding strategies to use ICT skills to support teaching and professional activities. Solomon Islands National ICT Policy (2017) outlines the benefits of using ICT in education including classroom learning, up-to-date access to materials, and school management. The policy recognises the importance of ICT in 'bridging the divide that restricts opportunities for rural students' by connecting expert teachers with students (Solomon Islands Ministry of Communication and Aviation, 2017).

Samoa is also one of the only countries that specifically outlines and include the use of ICT in assessment practices and reporting. This is evidenced by way of review of Samoa's National Information and Communication Technology in Education Policy 2018-2023 (MEC, 2018) which addresses the need for teachers, school leaders, and MEC staff to develop knowledge and skills in the use of ICT to fully engage in digital society. In the classroom, teachers are required to use ICT in lesson planning and support of their teaching. Additionally, this policy suggests that teachers should be encouraged to support colleagues in achieving ICT literacy and observing cyber security regulations and inappropriate content in schools (Samoa Ministry of Education and Culture, 2018).

Vanuatu's National ICT in Education Policy also outlines clear goals for integrating ICT into teacher education and professional development. The policy emphasized the need for continuous training to ensure that teachers could keep pace with technological advancements and effectively incorporate digital tools into their classrooms (Republic of Vanuatu, 2013). The Vanuatu Institute of Teacher Education (VITE) played a crucial role in delivering these training programs, helping teachers acquire the necessary skills to meet the updated competency standards.

The shift towards more detailed and ambitious ICT focused policies demonstrates a commitment to leveraging technology to improve educational outcomes. However, significant challenges remain, particularly in ensuring equitable access to ICT resources and addressing the digital divide between urban and rural areas.

### 5.3 Pre-Service teacher training

Pre-service teacher training can equip teachers with the skills and knowledge needed to integrate technology in their practice. Institutes and organisations in the region now offer several programs to support beginning teachers to engage with technology. In pre-service teacher education programs, print mode is still widely used due to a lack of equitable access to internet in the region (Sharma et al, 2020). However, there are some examples of pre-service and teacher training programs which attempt to build teachers' digital capacity and integrate innovative modalities into established pedagogical practices.

In Fiji, pre-service and teacher training programs offered through the Fiji National University (FNU) aim to enhance teachers' digital literacy and enable them to integrate technology effectively into their classrooms (Fiji National University, 2021). In Papua New Guinea, initiatives by the Papua New Guinea Department of Education focus on integrating ICT into teacher education programs, reflected in the Teacher Education Curriculum Framework (PNG Department of Education, 2020). Similarly, the University of Papua New Guinea (UPNG) offers training programs to equip teachers with digital skills. Vanuatu has been working on improving teacher capacity through the Vanuatu Institute of Teacher Education (VITE), which offers programs to enhance teachers' ICT skills and incorporate technology into teaching practices (Vanuatu Institute of Teacher Education, n.d.).

The Solomon Islands government, in collaboration with teacher training institutes like the Solomon Islands National University (SINU), has been implementing training programs for teachers to integrate technology into education effectively. Similarly, Samoa's MEC and the NUS continues to provide professional development opportunities for teachers to enhance their digital literacy and incorporate technology into their teaching practices (Sade et al., n.d.). In this context, significant efforts are being made to enhance pre-service education and integrate Information and Communication Technology (ICT) into the educational system. Pre-service teacher education in Samoa includes compulsory ICT literacy courses to ensure that future teachers are proficient in using digital tools for teaching and learning. Additionally, the NUS offers specialized courses in computer basics and applications, and programs that include minors and majors in computing for those intending to teach computer studies in secondary schools. This approach ensures that pre-service teachers gain both theoretical and practical skills that they can apply in their teaching careers, however the reality is more complex:

> **"Some of the younger teachers that that are better with technology, they said they go into the schools and even though they've had some training… they can't use it. You know there's no resources, there's no connection." (Lecturer, NUS Samoa)**

Due to ongoing issues around access and infrastructure, there remains a disconnect between what is learnt during pre-service training and what is applied as part of classroom practice. As one lecturer described, "*that's the big problem…. when they go out at school…. they go back to what they know".*

### 5.4 Continuous professional development of teachers

Professional development is crucial because it equips educators with the necessary skills to effectively integrate technology into their teaching. Supporting teachers to continue to engage with technological developments can also enhance student learning outcomes by focusing on ways to maximise engagement and address educational inequities.

Significant efforts are underway to improve in-service teacher training for ICT integration in countries in the region, but these efforts face both quality and implementation challenges. Across the Pacific region, PILNA results show that nearly 50 percent of teachers reported having no access to professional development in the use of ICT in the last three years. In the four focus countries, nearly all teachers in Palau reported receiving some ICT skills training, while the majority of teachers in Samoa, Solomon Islands and Vanuatu have not received any ICT training in the last three years. This is an interesting finding, in that it contradicts the perspectives of support regarding training reported by universities and teacher training institutes.

In Samoa, the MEC has implemented compulsory ICT literacy courses for in-service teachers, supported by international collaborations with UNESCO and the Government of Japan. Projects like the ICT in Education initiative aim to enhance digital literacy and support blended teaching and learning. Additionally, professional development workshops provided by the Samoa Knowledge Society and Soifua A'oa'oina offer resources for integrating ICT into teaching practices (UNESCO, 2023). These targeted investment in teacher capacity development may be starting to see some dividends in improved student learning outcomes. Analysis of PILNA data shows that of all the professional development undertaken by Samoan teachers in the last three years, the only professional development topic that is significantly associated with student achievement in reading and numeracy is ICT (Table 2). This finding supports the limited international evidence on teacher professional development in ICT and its impact on student learning (World Bank, 2023). However, the report suggests that successful professional development programs (whether online or in person) should have relevant content that is accessible to teachers and aligned with their needs and interests to promote greater adoption in the classroom setting (World Bank, 2023). A recent study in Samoa, co-funded by DFAT and MFAT, examining the alignment between policy and school level practices identified a lack of digital infrastructure as one of the barriers to improved teaching in the classroom (Nietschke & Dabrowski, forthcoming). When teachers in the study were asked what resources and support they would further require to enable student learning, some teachers identified the need for access to technology and the internet as the main priorities.

**Table 2. Correlations between teacher professional development (PD) and student performance in Samoa, PILNA 2021**

| Professional development in the last 3 years | Reading | Numeracy |
|---|---|---|
| **Reading** | 0.05 | 0.06 |
| **Writing** | 0.04 | 0.06 |
| **Numeracy** | 0.06 | 0.06 |
| **Classroom-based assessment** | 0.03 | 0.04 |
| **Curriculum** | -0.01 | 0.02 |
| **Student welfare** | 0.03 | 0.04 |
| **Classroom management** | 0.04 | 0.06 |
| **Inclusive education** | 0.07 | 0.06 |
| **Leadership skills** | 0.05 | 0.07 |
| **Use of ICT** | 0.08* | 0.09* |

*Sample average (or correlation) is statistically significant at p<=0.05 level. Correlation with student achievement is based on combined Y4 and Y6 samples.

Palau's Ministry of Education (MoE) creates training programs through a facility providing digital skills for teachers to ensure they have the skills to maximise the use of digital technologies in their classrooms. The MoE's remote learning plan is an example of parent awareness and teacher technology workshops and follow up to enhance learning and access in remote areas (Palau Ministry of Education, 2020). Under the National ICT Policy, both the MoE and the Palau Community College provide in-service and on-demand skills training for teachers, principals and communities. The integration of ICT in education and the professional development of teachers has seen significant advancements, particularly driven by the impacts of the COVID-19 pandemic. Through the Higher Education Emergency Relief Fund from the CARES Act by the US Government, Palau was able to procure new technologies, including laptops for students and teachers, and improve internet access (UNESCO, 2023). Professional learning initially focused on basic computer skills and using platforms like Google Suites for remote learning. Each of the 17 public schools in Palau has a tech team, composed of teachers selected by principals, to provide direct assistance with technology. This initiative was seen by stakeholders interviewed as part of this study to have improved communication with the MoE and provided better access to online resources and professional development.

The Ministry of Education (MoE) in Palau has become a key provider of professional development for teachers, focusing on how to effectively use technology in educational settings. All teachers are provided with laptops, yet many classrooms still lack essential equipment like projectors, reducing the ability of teachers to apply their learnings. The Palau Community College (PCC) and the MoE play crucial roles in supporting teachers and the broader

community to achieve digital literacy. However, as the quotes below demonstrate, the capacity of teachers to engage with technology is still in a very emergent stage of development:

> **"All teachers have laptops…and learning to use apps." (Palau, MoE)**

> **"We still have online courses…which I think is great because it also builds a technological confidence for in-service teachers because they're learning how to zoom, they're learning how to share their screens." (Stakeholder, Palau Teachers College)**

Educational technology is now also included across the curriculum, and the MoE in Palau emphasizes the importance of digital citizenship, aiming to enable all teachers, students, and community members to participate fully in a digital world. PCC supports technology integration in classrooms through in-service training for teachers, offering online and hybrid courses. Lecturers, who are experts in computer and digital literacy, create course materials based on their experiences from workshops and training sessions. They acknowledge the fear associated with new teaching technologies and emphasize continuous self-professional development through online research and follow-up training to ensure the practical application of skills learned (PCC, 2023).

The Government of Samoa, in collaboration with international partners like UNESCO and the Government of Japan, has also launched several projects aimed at strengthening the educational framework through ICT. One prominent initiative is the "ICT in Education" project, which builds on the resources created through the Samoa Knowledge Society and the MESC's Innovative Lifelong Learning Lab (MILLL). This project provides both virtual and physical professional development resources for educators, aiming to enhance the quality of education by equipping students and teachers with essential digital skills needed for the modern digital age (UNESCO, 2023). The project targets approximately 20 primary and secondary schools, particularly those marginalized due to geographical location, socio-economic status, and gender, and aims to increase digital literacy for education, especially among teachers, to support blended teaching and learning and to enhance efforts to address the digital divide in education plans and strategies (UNESCO, 2023; UNDP, 2022).

Bilateral partners are also assisting Pacific Island governments to improve in-service teacher training in ICT. For example, DFAT's education program in Kiribati supports the continuous professional development of teachers in primary and junior secondary schools through the use of tactile and technology-based resources in the classroom (DFAT, 2018b).

According to a consultant working with the Kiribati Teachers College (KTC), there are a number of quality technology facilities to enable teacher training through a learning management platform through the Hub. The KTC also incorporates demonstrations and the use of YouTube videos as teaching resources. Teachers are provided with teaching guides and materials saved to USBs and links to internet resources, as outlined by key stakeholders who describe the ways in which "*we got the system set up so that teachers on outer islands can access on the internet, the documents and the current teacher guides and resources get loaded up onto the system*." Teachers who have

been exposed to ICT training are observed to be more confident and willing to adopt digital pedagogy in the classroom. However, there is low level uptake when teachers return to the classroom due to limited internet connectivity and electricity (especially in the outer islands), lack of digital devices and poor management and maintenance of digital resources when they are available. For example, in an evaluation of the teacher training program one respondent noted that it would be "*really good to have some projectors and other things so we can show experiments from YouTube and other sources*." As a result, teachers have limited opportunities to practice using their digital skills and continue to rely on photocopies and paper-based resources to teach.

### 5.5 Teacher collaboration – mentoring and peer learning

Research indicates that professional learning communities and peer mentoring significantly enhance teachers' ability to effectively use ICT in their classrooms (El-Serafy et al., 2022). In the Pacific, teacher collaboration is viewed as essential for developing ICT skills among teachers, as it enables shared learning, resource pooling, and continuous professional development. Collaborative environments also allow teachers to mentor each other, share best practices, and collectively address challenges, which is particularly important given the limited resources and varying levels of ICT proficiency in the region. Peer support can also help to build confidence, reduce the isolation often felt by teachers when integrating new technologies, and foster a culture of continuous improvement and innovation in teaching practices, and to overcome the perspective that "*very few teachers are ready to use technology on their own''* (EQAP representative).

There is still insufficient evidence to outline the way in which teachers with strong digital skills mentor or coach their peers, beyond one interview conducted with a Senior Lecturer at NUS in Samoa. However, as part of stakeholder interviews, one lecturer at the USP observed that some teachers have gained confidence in using technology, primarily through collaborative efforts with colleagues via online chat groups for resource sharing and feedback. This collaborative approach, especially among peers, was also highly motivating in the Solomon Islands. Interestingly, although much research around confidence in using technology suggests older teachers generally feel less prepared and confident in adopting technology-based teaching practices compared to their younger counterparts, this perspective was not shared by interviewees in the Pacific. For example, in the Solomon Islands, it was noted that location often shaped motivation to engage with technology.

> **"In remote areas, people are hungry for information. We had an increase in participation in rural areas...it doesn't matter about age." (Key Stakeholder, Catalpa)**

These insights also indicates that the right support and collaborative environments can enhance teachers' readiness and confidence to integrate technology, regardless of age or location.

### 5.6 Public-private partnerships

It is the collaboration between governments, private sector organizations, and non-profit entities that facilitates the provision of ICT resources, software applications, and technical support to schools and educational institutions in

the Pacific region. Many of these partnerships were initiated during the pandemic but some have continued to be fostered to bring greater access to online and remote educational resources using high, medium, and low-technology tools. For example, in Samoa and Fiji, partnerships were forged with local internet providers to deliver free or low-cost data packs for students and teachers to enable remote learning during COVID-19 school disruptions. Since then, a joint initiative between Ciena, Digicel Fiji and Southern Cross was launched to provide high speed internet access and online learning resources to schools in Savusavu, Fiji. This project has been hailed by one of the principals as "*empowering our students with the best in learning…Access to online resources is also helpful to our teachers in furthering the education experience*" (Ciena, 2023).

International evidence suggests that technology interventions implemented by non-government organizations and non-state actors have larger impacts than government-led interventions (World Bank, 2023). This is often due to NGOs, research organizations and think tanks having deeper technical expertise to implement Edtech interventions (World Bank, 2023). These projects are also typically smaller in scale and thus, are easier to evaluate. For example, Catalpa International, through its New Zealand MFAT funded project in the Solomon Islands, partnered with a local internet provider to offer low-cost connectivity for teacher professional development activities. However, it was noted that there were no plans by the Solomon Islands Ministry of Education and Human Resource Development (MEHRD) to negotiate a continuing public-private partnership at the end of the project. There has also been a reported growth in education and technology donor-funded projects throughout the region, particularly from DFAT and the World Bank. For example, Imagine Samoa is an NGO focused on Science, Technology, Engineering, Arts and Maths (STEAM) education in Samoa. It is a collaboration with the MEC, National University of Samoa (NUS) and external donors to introduce STEAM into formal and informal settings, including teacher professional development.

However, the sustainability of donor driven initiatives continues to be raised as a concern in relation to the embedding of educational technologies in the education sector, especially schools. Some stakeholders suggest that although Ministries of Education are '*pushing technology forward as a means of facilitating many things, that uptake on the other side is still is still problematic…* (EQAP, key stakeholder).

> **"A lot of funding is tied to donor funding and when a particular project or program finishes or there's just a particular allocation for advancement of technology…it just stops there." (Representative, EQAP)**

> **"You know, there is disconnect once the funds stop…. and the deal as always, is after this time we will hand over, and you take over education… but when the times to hand over comes, the Ministry isn't ready." (Lecturer, NUS)**

The efforts to improve ICT integration through policy reform agendas in the Pacific's education systems are an important starting point in improving teacher capacity to use technology yet more support at governmental level is needed. While there appears to be strong donor support and policy interventions focused on improving educational

technologies in the Pacific, governments need to ensure that donor driven investments can be sustained in the long term. Addressing geographical disparities through targeted resourcing, enhancing teacher qualifications by focusing on the integration of ICT skills, ensuring practical application of training, and aligning donor investments with infrastructure needs are all critical components. Furthermore, investing in continuous professional development tailored to the specific contexts and needs of teachers, particularly those in rural and remote areas, is essential. These strategies must be supported by robust policies and sustained funding to create an inclusive and effective educational environment that leverages technology to improve learning outcomes.

# 6 Discussion and lessons learned

This study aims to explore how teachers in the Pacific engage with and use technology in education, as well as to identify the barriers and opportunities they face. Based on a review of literature, policies, and interviews with stakeholders involved in supporting the work of teachers in the region, the findings suggest there are significant challenges associated with the integration of ICT in schools and classrooms. Pacific Island nations face unique barriers related to geographical isolation and associated costs of establishing and maintaining a digital network to support teaching and learning.

External investments from bilateral donors and international organizations continue to be key drivers of technological innovation and adoption in education systems in the Pacific, with the majority of initiatives to foster technological integration led by donors rather than government or the community. Resourcing of ICT initiatives have enabled the procurement of necessary technologies and the enhancement of internet connectivity in schools, thus supporting ICT integration efforts. In addition, an improved policy enabling environment that emphasizes continuous professional development and targeted resource allocation to support teachers can help with greater technology integration in the classroom.

However, there are many challenges that continue to impact on teacher access to technology. One major issue is geographical disparity, with access to ICT infrastructure varying significantly between urban and rural areas. Teachers in remote regions and outer islands often face limited access to computers, internet connectivity, and affordable data. This digital divide exacerbates educational inequalities, making it difficult for teachers to utilize ICT effectively in their classrooms. Infrastructure limitations further compound these challenges, with differences also described between countries and communities. Many teachers also lack reliable internet access at home or in the workplace, hindering the practical application of ICT skills acquired through training.

Professional development gaps also present a significant barrier. Although numerous training programs are available, with dedicated teacher education and professional development focused on improving teacher competency in using ICT, the transition from theoretical training to practical application can be problematic for many teachers due to a lack of opportunities to apply their learning. As a result, the research presented in this

report suggests that many teachers may revert to traditional teaching methods, due to discomfort and lack of confidence with new technologies or limited of ongoing access to devices or data in their school context.

Enhancing teacher motivation to use digital tools for flexible delivery is important. However, our research suggests that teacher perceptions as to the value of educational technology, and their motivation to use technology as part of their practice, are key barriers to the integration of technology in classrooms in the Pacific. While in some cases, research suggests that older teachers or those less familiar with technology find it challenging to adapt, feeling overwhelmed by the introduction of new tools and platforms, there are also examples of more experienced teachers acting as mentors. However, this appears not to be a consistent practice for teachers in the region. Promoting digital literacy among teachers can be achieved by providing dedicated support through peer mentoring approaches, where experienced teachers mentor their peers, fostering a collaborative learning environment. This support helps build confidence and proficiency in using digital tools, which is essential for integrating technology into teaching practices effectively. There seems to be more opportunities to enhance these collaborative approaches at the secondary and higher education levels, particularly in the establishment of communities of practice for sharing online resources (e.g. YouTube videos), digital pedagogical approaches using low tech (e.g. projectors for demonstrations in classrooms) and the use of high-tech (e.g. learning management systems for formative assessment practices).

Barriers around motivation, access, and opportunities to apply pre-service learnings in the real world can undermine the value of continuous professional development and support systems. However, there are opportunities for education systems in the Pacific to support teachers to use technology more effectively, in both pre-service and in-service training programs:

- Integrating the use of technology and digital skills into teacher quality standards can help set clear expectations and benchmarks for educators.
- University teaching staff could continue to model diverse teaching modalities, including digital and blended pedagogies, to prepare pre-service teachers adequately.
- Continuous professional development with ongoing training and follow-up support is crucial to help teachers adapt to new technologies and integrate them effectively into their teaching practices.
- Promoting opportunities for teachers to apply digital skills learned during pre-service training in actual school settings is essential for reinforcing their competencies. This hands-on experience is critical for building confidence and proficiency in using ICT tools in the classroom. The establishment of teacher networks and communities of practice can help to facilitate informal learning and build confidence through feedback mechanisms.
- Making offline resources accessible to teachers, such as lesson planning ideas, classroom activities, and homework assignments, can help overcome connectivity issues and ensure that teachers have the necessary materials to deliver effective lessons even without constant internet access.

- Although research in the Pacific remains limited, it is also important for Pacific nations to explore the potential of digital access and assistive tools to support disadvantaged and at-risk students to promote inclusivity. These tools can provide personalized learning experiences that cater to the specific needs and close the learning gaps for these groups of these students. Digital interventions should be resourced to specifically support at-risk students, ensuring they have access to necessary digital devices, internet connectivity, and personalized learning tools.
- Encouraging private sector and community involvement in providing resources to support learning is also vital. Partnerships with local telecommunication provides have been successfully trialled during the COVID-19 pandemic and continue to be used for some project-based support for zero-rated services. There appears to be willingness from the private sector to support ICT educational initiatives and this could be leveraged further through formal public-private partnership arrangements to support teachers in the classroom. Similarly, international and local NGOs groups have helped fill the gap during the pandemic by providing digital resources and online teacher training activities. However, these need to have close oversight by government to ensure quality and alignment with national curricula and teaching standards.

There is clearly a need for more studies into the obstacles teachers face in integrating ICT into their teaching practices. Issues such as teacher attitudes, readiness to use technology, and specific challenges in rural and remote settings need further exploration. Addressing these gaps requires continuous support and development to ensure that all educators are adequately prepared to leverage technology in their teaching. By addressing these areas, education systems in the Pacific can work with teachers to create a flexible and supportive learning environment that leverages technology to meet the diverse needs of student communities.

# 7 Conclusion

Although access to technology has expanded across the Pacific region, significant challenges remain, particularly in relation to the work of teachers in the education sector. While there has been progress in expanding access to technology and developing teacher readiness through targeted training programs and supportive policies, substantial challenges remain. Geographical disparities, especially infrastructure limitations, as well as gaps in training and professional development continue to hinder the effective use of technology in many classrooms in the Pacific.

The integration of ICT in education in the Pacific region holds great promise for improving educational outcomes and promoting digital inclusion. However, achieving this potential requires addressing significant barriers related to infrastructure, professional development, and policy implementation. International evidence shows that well-designed policies, supported by political commitment and strong institutional structures including capacity and resourcing of teaching practices, have the best chance of success. While there is strong political commitment to

support technology integration in the education sector in the Pacific, there are existing gaps in the policy enabling environment to support effective technology adoption at the school level. Government ownership and leadership is critical to drive technology integration through appropriate resourcing (both financial and human resources) and support mechanisms to unlock potential opportunities for example, through public-private partnerships.

It is crucial to invest in robust infrastructure that facilitates the use of educational technology in schools. This includes ensuring reliable internet access and providing necessary digital equipment, particularly in remote areas. School-level support structures, such as ongoing professional learning can help teachers to navigate and use ICT as part of their practice. These support structures are essential for maintaining teacher confidence and ensuring the effective use of technology in the classroom. Furthermore, policies that promote digital engagement and responsible use of technology among teachers, students, and the broader community are vital in promoting technology adoption and use in schools.

Further research is needed to understand the specific challenges and opportunities related to ICT integration in Pacific education systems. This includes studying the impact of ICT on student learning outcomes, identifying best practices for professional development, and exploring innovative solutions to address infrastructure limitations. Research should also focus on the role of digital citizenship in promoting responsible technology use and the ethical implications of ICT in education in the Pacific, particularly as device ownership and access to data increases. Additionally, research in the region should investigate the long-term sustainability of ICT initiatives and the factors that contribute to their ongoing integration.

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# APPENDICES

## Appendix 1: List of Key Informants

- Postgraduate Course Convener/Founder, Science Circus, Australian National University
- Curriculum Consultant, Australia-Kiribati Literacy and Inclusive Education Program
- Education and Technology Consultant, Pacific Region
- Catalpa
- Educational Quality and Assessment Programme of the Pacific Community (EQAP)
- Lecturer, National University of Samoa
- Officials, Palau Ministry of Education
- Lecturers, Palau Community College
- Senior Lecturer, University of the South Pacific

## Appendix 2: Interview protocols

**Format**
The interview with key informants will last approximately 30-45 minutes. The interview will be conducted face-to-face or live via video conferencing software. If a live interview is not possible, the interview questions will be administered over the phone. The interviews will follow a semi-structured protocol, with key questions asked of all informants and scope to explore ideas/examples in more detail as they emerge.

Interviews will be recorded and simultaneously transcribed using software to facilitate later analysis. Data will be stored securely on the ACER Cloud platform for 30 days after the project concludes, and will be destroyed 5 years after the project end date. All personal information will be de-identified in reporting.

**Purpose of Interview**
The aim of the interview is to gain a range of perspectives on barriers and enablers facing educators in relation to using technology in their classroom. It seeks to understand how teachers are supported to use technology in the classroom. Areas of focus relate to teacher readiness to use technology, teacher participation in professional learning, and attitudes towards technology in school. The interviews aim to capture the perspectives of different stakeholders, providing a point of comparison among policymakers, development partners, implementing agencies, teacher educators, school leaders and teachers. These insights will be used to further clarify and understand the gaps identified in the literature review and the secondary analysis of large-scale data.
The interviews will consist of the following key questions:

**Policymakers/development partners/implementing agencies**

1. What key priorities/needs have been identified in the Pacific/your country to support teachers in the use of technology in the classroom?
    a. What key policies or initiatives are being implemented to respond to these priorities?
    b. Who are the main stakeholders in the implementation of these initiatives?
    c. What professional learning opportunities do teachers have to learn to use technology in the classroom?
    d. How are teachers supported to use technology in the classroom?

2. What do you think are the key challenges faced by teachers in using technology in the classroom?
    a. How are these challenges being addressed?
    b. In what ways could technology offer a solution to these challenges?

3. What are the key enablers or opportunities that exist in supporting teachers in the use of technology?
    a. What is working well at the systems/policy level?
    b. What is working well in schools?

4. What strategies or policies are needed to improve teacher preparedness in the use of technology (e.g. to support students, teacher development, parents and the community)?

5. Are there any recent projects, studies or reports relating to teachers and technology that you could share with us?

**Teacher educators, school leaders, and teachers**

1. How prepared do you feel/ do you think teachers are to use technology in the classroom?
    a. What opportunities are there for professional learning in using technology in the classroom?

2. What are the key challenges faced by you/the teachers you work with in relation to technology in schools/ the classroom (prompt if needed, access, time, skills, unintended consequences such as child safety, bullying etc)?

3. What do you see as benefits of teachers using and engaging with technology?
    a. What works well for professional learning?
    b. What is working well in the classroom, and for who?
    c. What works well in the community?

4. What extra skills do you/teachers need to develop to implement technology in the classroom?

5. What extra support is needed to improve your/teacher ability to use technology (e.g. professional learning, more time to practice, mentoring between teachers, family engagement etc)?

6. Can you give us an example of where technology has worked well for you/your teachers?