Evaluation of the MFAT Pacific E-learning for Science Programme (PeP)
Evaluation Report

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June 2023

Executive Summary

This report presents the evaluation of the New Zealand Ministry of Foreign Affairs and Trade's (MFAT) Pacific e-learning for Science (PeP) Phase I proof of concept. MFAT commissioned the evaluation in preparation for the design of PeP Phase II, with the objectives of assessing the performance of PeP in terms of Relevance, Effectiveness, and Value for Money; and to inform decisions related to the scale-up of PeP for Phase II. The evaluation was conducted between 17 October 2022 and 30 April 2023.

About PeP: PeP was designed as a 2.5-year proof of concept to test a model for e-learning in four Pacific Islands Countries reflecting a range of education contexts: Samoa, Vanuatu, Cook Islands, and Solomon Islands. PeP works to strengthen teaching and learning in science, and to strengthen the capability of systems-level actors to expand e-learning in schools. PeP's focus is on supporting teachers to deliver effective science lessons using high quality materials accessible through a co-designed app, Pacific Learn PeP works with departments of education to strengthen organizational capacity to support e-learning through the app, and related ICT systems strengthening. PeP is implemented by Catalpa, with partners Nanogirl, Wintec, and University of South Pacific (USP) Centre for Flexible Learning (CFL).

Summary Evaluation Findings

Relevance and coherence: PeP is highly relevant to the objectives of Pacific Governments and MFAT's development programme as an innovative programme supporting teaching and learning in science. Significant shifts in the operating context, with a profusion of actors and technology advances since 2019 (accelerated by Covid-19), have only enhanced the need for e-learning options in PICs. Digital inclusion in education is becoming an increasing focus for development, and e-learning is a tool to benefit from and extend digital inclusion.

Effectiveness: As a proof of concept, PeP has been highly effective in testing an innovative model for e-learning that meets the challenges of the country contexts, where many schools face difficulties connecting to internet or accessing resources. Progress towards outputs and outcomes is strong or moderate in three countries, but not in Cook Islands. Based on programme learnings, PeP revised one output from developing a regional repository to standards for quality assurance of teaching materials, and work on this has recently started. There is room to strengthen visibility around Gender Equality Disability and Social Inclusion (GEDSI) in PeP, which is not a focus of PeP's implementation, though was considered in the design.

PeP's approach to co-design of materials for e-learning with local science teachers and experts is a key strength.

The evaluation found the need to clarify key concepts including e-learning, digital inclusion and ICT systems strengthening to better reflect PeP's scope and targets. There is also a need to clarify the contribution of the regional work on standards to the theory of change.

The Pacific Learn app: The evaluation found that Pacific Learn is well-designed and user-friendly for its purpose, with room to strengthen quality of teacher learning materials. Teachers who use the app like the materials, but utilization varies due to a range of barriers. More information is needed to determine whether the app is the right e-learning platform to be taken to scale, based on cost, resources to maintain the app, comparative value with other solutions, and other education priorities.

Efficiency and value for money: PeP is managing resources efficiently, with strong adaptive management and communications by the implementing partner, and context-informed approaches to procurement and risk management. As a proof of concept, PeP has demonstrated value for money. By testing a model for e-learning through a regional program in a small number of schools in 5 countries using Pacific Learn, PeP has effectively demonstrated the potential for e-learning. More information is needed to assess the technology platform for delivering PeP for a scaled up Phase II.

Design process: options to assess

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Option 1

Extend access to the Pacific Learn app to more schools in up to 4 countries and maintain the focus on science.

Continue to develop more materials through the proven co-design process.

Make improvements to the app and partner with teacher training and curriculum departments, as well as ICT.

Assess the potential for a bring-your-own-device (BYOD) model, where teachers utilise their own phones.

Clarify PeP scope with regards to e-learning, digital inclusion and ICT systems strengthening.

Simplify the regional aspects of the PeP.

Option 2

Redesign PeP to integrate the activity fully within national education strategies and programmes. Partner with teacher training and curriculum departments, as well as ICT.

Maintain investment in co-design to develop more materials, continue support for teachers to use and engage with materials, support relevant aspects of ICT strengthening.

Make PeP contents and materials available to all teachers via alternative platforms such as Google classrooms, as identified together with national education ministries (following comparative analysis of different platforms for different contexts).

Simplify regional aspects, focusing on cross-learning between PeP countries.

Option 3

Separate but complementary to PeP as an operational e-learning activity (Options 1 and 2), provide regional support for PacREF's work to coordinate regional work on ICTs in education and develop regional strategies and standards for digital inclusion and e-learning.

This Option can be taken forward together with either Options 1 or 2, or as a standalone investment.

There are different risks, opportunities and costs associated with each option that will need to be explored through a dedicated design phase, supported by a comparative cost-benefit assessment of the technology and device options, close consultation with relevant actors from ICT and pedagogical departments in national education ministries, and across MFAT teams including Posts, ICT, inclusion and education. For additional details, Refer to Annex 5 Some practical considerations and questions.

Recommendations for PeP Phase I extension phase

The evaluation makes 17 recommendations to prepare for the transition and design of PeP Phase II. The first set relates directly to actions to be taken as part of PeP Phase I, while the second are for MFAT to build on the learning and insights generated by PeP.

1. Teachers engaging in Communities of Practice: Maintain the focus on strengthening teacher COPs and reassess strategies for teacher engagement and support by end of PeP to inform Phase II design. PeP is aware that teachers need and value support to develop their skills in TPACK and has provided a wide range of support to reach teachers, tailored to needs of schools in different contexts. However, attendance is low with possible barriers including teachers' limited time, connectivity issues and low awareness of the COP. Other areas to assess include incentives for participation in COPs and teacher support offered through PeP more broadly, such as formal recognition of participation and learning. Opportunities to engage teachers more actively in shaping e-learning may also generate more engagement, as demonstrated by other e-learning programmes such as PNG-Aus Partnership Secondary Schools Initiative (PASS). (See annex 1).

2. Teachers confidently using e-learning resources for teaching and learning: There is a perception among stakeholders that PeP materials may not fully align to national curricula, which undermines teacher confidence in relying on PeP materials despite PeP efforts from the outset, including consultation with Ministries and curriculum divisions to ensure alignment. PeP however does not cover every subject in the science curriculum, so teachers need to use both PeP and traditional resources to ensure full coverage for students. PeP is taking steps to clarify the alignment in each country via changes to the app and processes for ongoing engagement with relevant department staff. A public-facing event such as an official launch would also build visibility and awareness around the level of alignment.

3. Regional quality assurance mechanism (formerly Regional Repository): Facilitate a reflection process between USP, Catalpa and MFAT by end 2023 to assess progress, results and future potential at end 2023 as this work has only recently started. In parallel, MFAT should review the strategic contribution of this component to PeP, to clarify its contribution to the theory of change and overall PeP outcomes.

4. Assess Cook Islands progress, outcomes and engagement by end 2023, given long delays at start-up and lack of progress to date. At time of writing, only 1 school is participating in the Cook Islands. PeP has provided strong support and the Cook Islands Pacific Science Fellows participated actively and enthusiastically in developing materials for the app, however the programme has been beset with staffing and logistical challenges. Country engagement will be a criteria for taking PeP forward in countries in Phase II.

5. Theory of change and PeP MERL framework: Update outputs to reflect the changes to the Regional Repository output, and dependent outcomes, and clarify that COPs are for teachers, not Fellows. Track and report on device and equipment redundancy, if possible by using the systems introduced by PeP.

Strengthen metrics around use of Pacific Learn e-learning resources as this is a key metric for PeP success. Understanding and addressing reasons why teachers may not or may not use the app (or any platform) are essential for impact and outcomes. Disaggregate and compare data for remote and connected schools; and define 'remote' for PeP to inform a better understanding of PeP's achievements in inclusion, by extending learning to under-served schools. Strengthen GEDSI analysis in reporting.

Recommendations for MFAT: Phase II design and strategy

PeP has demonstrated its value as a proof of concept by generating significant learning and surfacing underlying questions related to e-learning, digital inclusion and models for donor programmes to support e-learning in the complex and fast-paced space of technology and education in the Pacific. Initiatives involving technology are complex, dependent on skills and resources across technology and pedagogy, as well as larger systemic factors such as infrastructure and costs related to electricity and internet connectivity. MFAT is committed to innovation, inclusion and quality education, and the following recommendations are intended to assist MFAT to maximise the sustainability and impact of its investment.

PeP Phase II design

6. Undertake a consultative co-design process to identify the best option for transitioning and scaling PeP for Phase II: The evaluation identified three broad options for PeP Phase II, which need to be explored and tested through a standalone co-design exercise. As noted above, there are different risks, opportunities and costs associated with each option, in close consultation with relevant ICT, e-learning and pedagogy specialists from national education ministries, and across MFAT teams including ICT, inclusion and education. The evaluation identified additional information needed for decision-making, which should be available and used in the design process.

7. ICT Systems Strengthening: In consultation with national counterparts, articulate PeP's strategy for ICT systems strengthening for each country, clarifying scope and ambition for this outcome area. Clarify the extent to which PeP will go beyond strengthening systems for implementation of PeP and Pacific Learn app and how this maps against broader national ICT policies and plans, and identify ways to strengthen coordination and learning across other ICT development projects underway in the different countries. This will assist in clarifying assumptions, dependencies and expectations relevant for Phase II planning on ICT systems strengthening support.

This is linked to the evaluation's assessment that the PeP theory of change does not reflect a clear definition of e-learning or the role of the Pacific Learn app as PeP's identified tool for e-learning. ICT strengthening approaches assisted in ensuring quality, effectiveness and sustainability of the PeP using Pacific Learn, and went further to provide complementary tailored support based on ICT self-assessments and at Ministry request. To strengthen effectiveness, this strategy should be articulated more clearly so that successes can be captured, shared and replicated. End of programme outcomes should be adjusted to clarify the scope and targets, so that the PeP can fit with and align to Ministries' broader plans for ICT-enabled learning, including lobbying for or coordinating with complementary support where needed.

8. Teaching science more effectively: Materials developed by PeP are open-source and suitable for use with different platforms that countries are using or starting to use. MFAT should commission an independent cost-benefit assessment engaging an economist and ICT education specialist to work with Ministries and Catalpa to compare a range of e-learning platforms and options, to develop an options paper to assist Ministries and PeP Phase II to select the best option for their context. Usability, appropriateness for local context, data and server costs, maintenance, technical expertise, opportunity cost of changing away from the current model, local capabilities, and popularity of the app are all factors to consider.

Recommendations for MFAT

PeP Phase II design (continued)

9. Teachers have enhanced TPACK for science: Assess the feasibility of aligning PeP TPACK activities with national teacher training processes and certifications to incentivise teachers to use and engage with materials. Strengthen the quality of the micro-courses for teachers.

10. Gender equality, disability and social inclusion: Strengthen visibility for PeP's approach to and commitment to GEDSI, noting that there are strong foundations in the design and support for gender equality and disability inclusion in the partner countries. Explore the opportunities to use PeP more actively to strengthen inclusion, including reaching children with a disability, remote schools, and children of all genders. Undertake a PeP GEDSI analysis, consulting with affected groups, to identify inclusive strategies and targets that will strengthen GEDSI in PeP for Phase II.

11. Theory of change and PeP MERL framework: Review the theory of change and MERL framework to clarify PeP's scope in terms of e-learning and ICT systems strengthening, explicitly reflecting the PeP's specific model for e-learning and role of the Pacific Learn app in outputs, outcomes and indicators.

In Phase II strengthen assessment and reporting on teacher learning outcomes through the app to inform improvements to quality of materials and strategic decisions about the future of the TPACK component of PeP. Revisit the feasibility of tracking changes in student performance in national science assessments.

Recommendations for MFAT

Strategy and policy direction

Internal facing – moving ahead

12. MFAT should work to build on its position as an early supporter of e-learning innovation and develop a clear policy position related to the distinct but related fields of digital inclusion in education and e-learning in Pacific Island Countries, which captures the significance of digital inclusion and e-learning for education now and in the coming years. This research should used to strengthen awareness and support planning in consultations across involved departments, including but not limited to the education, inclusion and DEVECO teams and Posts. MFAT should use this to clarify objective, definitions and overarching goals related to e-learning and digital inclusion.

13. MFAT should use the experience of PeP to start discussions within the department to promote awareness of e-learning as an essential tool for 21st century education across sectors within MFAT.

14. The Education team should consult with Posts to identify a roadmap and support needed to transition e-learning into national programming. This will look different in each country but is likely to require ongoing technical support through expertise embedded within education ministries.

15. Undertake internal discussions to explore how best to separate regional and national aspects of PeP for Phase II: to embed applied elements within countries (national/bilateral programming); and maximise the contribution of regional support for coordination and cross-learning between countries (regional support). This could include leading efforts to improve coordination of support from donor partners across different ICT projects.

External facing – enabling environment for sustainability and impact

16. MFAT Education team should tailor and use the above position paper to research and promote e-learning, digital inclusion and PeP outcomes at high levels within Education Ministries and MFAT to build understanding and support dialogue on the potential for ICT for different country contexts, and to strengthen commitment to progressing PeP and digital learning initiatives

17. Where countries are undertaking strategic education planning, actively engage to integrate e-learning for digital inclusion within national education strategies, noting both that e-learning is a tool to strengthen basic education and the risks posed by digital exclusion in the 21st Century in terms of both human and economic development.

Evaluation conclusions

- This proof of concept has demonstrated in a hands-on, applied way (learn by doing), the importance of investing in tools, capabilities, platforms and equipment to ensure that students and teachers have access to ICT-enabled education and will not fall on the wrong side of the digital divide.
- E-learning is complex, working across ICT and education systems and actors.
- PeP is a well-managed and responsive programme demonstrating the relevance of digital learning initiatives to strengthen education results in the Pacific.
- PeP has been innovative and has demonstrated important lessons for the growing interest in e-learning in the Pacific.
- Co-design of materials with teachers, connecting regional and national levels is a key success that should continue.
- Interest in e-learning is high but needs to be further communicated, promoted and integrated or activated into national education policies, strategies and plans.
- MFAT will benefit from an overarching strategy for e-learning, clarifying the primary objective: digital inclusion or specific education outcomes.

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Tetra Tech International Development was commissioned by New Zealand's Ministry of Foreign Affairs and Trade (MFAT) to undertake an independent evaluation of the Pacific E-learning for Science Programme. The evaluation focuses on progress made from the inception phase in 2020 to implementation up till the present.

Acronym list

Acronym	
BYOD	Bring your own device
CFL	University of South Pacific Centre for Flexible Learning
COL	Commonwealth of Learning
COP	Communities of Practice
GEDSI	Gender Equality, Disability and Social Inclusion
ICESD	International Cooperation for Effective Sustainable Development
ICT	Information and Communications Technology
IDC	International Development Cooperation programme
IoE	Institute of Education
JEPD	Job-embedded Professional Development
KEQ	Key Evaluation Questions
MFAT	New Zealand's Ministry of Foreign Affairs and Trade
MoE	Cook Islands' Ministry of Education
MoET	Vanuatu's Ministry of Education and Training
MERL	Monitoring, Evaluation, Research, and Learning
MEHRD	Solomon Islands' Ministry of Education and Human Resource Development

Acronym list con'd

Acronyms	
MESC	Samoa's Ministry of Education, Sports, and Culture
PASS	Pacific Academic Support Strategies
PacREF	Pacific Regional Education Framework
PeP	Pacific e-Learning Programme Phase I
PLD	Professional Learning and Development
PIC	Pacific Island Countries
STEM	Science, Technology, Engineering, and Mathematics
TOC	Theory of Change
TPACK	Technical, Pedagogical Knowledge and Content
USP	University of South Pacific

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PeP Evaluation key terms for digital inclusion and e-learning

- 21st century skills: The term 21st century skills refers to a broad set of knowledge, skills, work habits, and character traits that are believed - by educators, school reformers, college professors, employers, and others - to be critically important to success in today's world, particularly in collegiate programs and contemporary careers and workplaces. Generally speaking, 21st century skills can be applied in all academic subject areas, and in all educational, career, and civic settings throughout a student's life. *The Glossary of Education Reform (accessed 12/2022)*.
- BYOD: BYOD stands for bring your own device, and the most commonly accepted BYOD meaning is when employees use their own personal devices to connect to the organization's network and access what they need to do their jobs. This includes data and information that could be potentially sensitive or confidential. *What is BYOD? Bring Your Own Device Meaning and Policies | Fortinet, accessed 05/2023.*
- Digital inclusion: Process that aims to ensure that an individual – or a group – can access and use information and communication technologies (ICT) to participate fully in economic, social and cultural life. *Cedefop, Glossary. Terminology of European education and training policy, (accessed 03/2023).*
- E-learning: e-Learning is an umbrella term that refers to the use of any digital device or media (multi-media) for teaching and learning, especially for delivery or accessing of content. Thus e-Learning can take place without any reference to a network or connectivity. The digital device used by the learner to access materials need not be connected to a digital network, either a local area network or to the Internet (or even to a cell phone network if a Tablet is used as a terminal or access device). *COL, Open and distance learning: key terms and definitions, 2015 (revised 2020).*
- Information and Communication Technologies (ICT): refer to a range of technologies and tools used to create, collate and communicate information and knowledge. ICTs are used in daily life to prepare documents, talk to others by phone, listen to radio and watch television programmes. Some ICTs involve one-way communication, while others facilitate two-way communication. Some can include only one medium (e.g. telephone), while others can handle more than one medium (e.g. computer and television). *COL, Open and distance learning: key terms and definitions, 2015 (revised 2020).*

Source: Most terms above are drawn from the useful UNESCO International Centre for Technical and Vocational Education and Training resource TVETipedia Glossary (unesco.org)

Background: Pacific E-learning for Science Proof of Concept

The Pacific E-learning for Science Programme (PeP) is a 2.5-year 'proof of concept' targeted at Year 10 science teaching and learning with four Pacific countries – Vanuatu, Samoa, Cook Islands, and Solomon Islands. The Programme was designed to address the issue of low science outcomes in the Pacific through e-Learning. One of the key factors contributing to the low learning outcomes in science was the lack of qualified science teachers in the Pacific. In response, PeP Phase 1 aimed at building the confidence of Year 10 science teachers to deliver science lessons in the classroom by providing them with e-learning teaching resources and professional development courses as well as enhancing the e-learning infrastructure and system of the four participating countries. The Programme is implemented by Catalpa International together with Wintec, Nanogirl Labs, and the University of the South Pacific.

Inception: July – December 2020

Implementation: 1 January 2021- 30 March 2024

Four expected outcomes

- Teachers in participating schools are teaching science more effectively
- Teachers in participating schools are effectively using quality e-Learning resources in science
- Teachers and school leaders are engaging in communities of practice for the use of e-Learning resources
- System-level actors have improved organizational capability to support and expand e-Learning in schools

Three activity areas

- Unpacking of secondary science curriculum and developing e-Learning resources
- Developing secondary science teachers' capabilities through continuous professional learning
- Building the readiness and capabilities of the e-Learning ICT System

About the Evaluation: Purpose, Scope and Design

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Purpose of the Evaluation

MFAT commissioned Tetra Tech International Development to investigate and report on:

- The relevance, efficiency, effectiveness and sustainability, and inclusion in PeP Phase 1
- Recommendations to improve PeP Phase 2's relevance, efficiency, effectiveness and sustainability, and inclusive development
- Options to scale up e-learning in the Pacific (this may include additional subjects, Year levels, countries, or thematic areas) under PeP Phase 2.

Data Collection

Data collection took place from mid-December 2022 with a pause for the Christmas and New Years' holidays. The Evaluation Team has conducted interviews and focus group discussions with 19 stakeholders with 23 participants as well as teachers/principals and students through the online surveys. In Vanuatu, the Local Research Adviser conducted face to face interviews, focus group discussions and classroom observations with teachers, principals, provincial education officers and students in two purposively selected schools in two provinces.
On 22 February 2023, the evaluation team hosted a consultation with regional stakeholders. Online surveys with teachers and Year 10 students from participating Phase 1 schools across the four partner countries – Vanuatu, Samoa, the Solomon Islands, and the Cook Islands – were undertaken in March 2023.

Approach

Tetra Tech used a mixed methods approach to the evaluation, drawing on existing data and programme reporting, as well as surveys, focus group discussions and interviews with a broad range of stakeholders. In-depth school studies were conducted in Vanuatu, to provide rich information and test themes emerging from other sources.
Analysis was utilisation and solutions focused, so that findings, lessons learned, and recommendations will be feasible and strategically aligned to MFAT's priorities. As part of this approach, the evaluation team worked to:

- Build an understanding of the changing world of e-Learning in the Pacific region
- Review PeP performance to identify successes to take forward and risks to mitigate
- Understand the modality: examining how MFAT could best invest for sustainable success at scale.

Challenges

The evaluation faced a number of challenges that needed to be understood and managed to avoid data bias and ensure that findings were rigorous and evidence-based:

- Timing for schools and science teaching affected engagement
- Online surveys allowed us to collect data in 4 countries but are less rigorous than in-person data collection. This was mitigated through triangulation with other sources
- Reaching students in remote schools with limited access to devices or internet: affected the number of students who responded to surveys.
- Cyclone Judy: Only 2 teachers and 0 students were able to complete the online survey as the cyclone hit during data collection. The evaluation local adviser was able to complete face-to-face data collection before and after the cyclone.

*List of stakeholders who have participated in the data collection is listed at the end of this document – Annex 2

Evaluation Objectives

Relevance	Assess the extent to which this e-learning initiative and approach remain a relevant priority for Pacific governments and the International Development Cooperation programme and whether the focus remains appropriate.
Effectiveness & Sustainability	To assess progress made toward achieving the e-learning for science outputs, short- and medium-term outcomes and the likelihood of achieving sustainable benefits over the longer term.
Efficiency & Delivery Approach	To assess the extent to which implementation of the initiative is efficient and whether value for money was achieved.
Scalability	To assess the benefits and risks associated with a scale up (including technical and geographical scope, cost, country level buy-in, coordination with other programmes) and provide options and recommendations for MFAT and Partner consideration.

Evaluation Findings

- Responding to the key evaluation questions set out in the Evaluation Plan, the report organizes the Evaluation Findings according to evaluation objectives: Relevance; Effectiveness and Sustainability; Efficiency and Delivery Approach; and Scalability.
- Findings are an assessment of 'performance to date', which forms the foundation for assessing the potential and direction for PeP Phase II scale-up.

OECD DAC Network on Development Evaluation, 2021

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Relevance and Coherence: Is PeP doing the right things? How well does the intervention fit?

This section presents the key findings on how relevant the programme is in responding to the priorities, policies and needs of the key stakeholders, including teachers and students in participating countries, the International Development Cooperation Programme and partner country and regional development priorities.

It responds to Objective One of the evaluation: To assess the extent to which this e-learning initiative and approach remain a relevant priority for Pacific governments and the International Development Cooperation programme, and whether the focus remains appropriate.

Relevance: Summary against evaluation questions

Evaluation question	Assessment
To what extent does this e-learning initiative and approach remain a relevant priority for Pacific Governments and the IDC programme?	**HIGH relevance:** Initiatives to advance e-learning and digital inclusion align closely with the goals of Pacific governments and the IDC programme. PeP has potential to make significant contributions even where Ministries face challenges delivering basic education, but requires specialised capabilities and support that need to be balanced against other critical priorities, as in Solomon Islands. A context-specific approach is needed to assess relevance for different countries.
Does the focus remain relevant?	PeP has 3 areas of focus: Science learning outcomes: **HIGH relevance**, but other subjects would also benefit. Teacher digital, science and pedagogical skills: **HIGH relevance**, particularly a general focus on digital and pedagogical skills. Skills in teaching subjects other than science are also needed. Ministry ICT systems: **HIGH relevance** to support Ministries to develop systems for ICT, but this should be integrated within a systems approach, within broader ICT policies and frameworks such as the Solomon Islands 5 year digital education plan.
To what extent has the operating environment changed since commencement of implementation?	**SIGNIFICANT change** to the operating environment since 2019 includes: **COVID-19** has led to the need to invest in learning recovery and even greater resource constraints for education in some countries. This can be seen as an impediment to the introduction of e-learning, but e-learning should be understood as a tool for basic education and addressed to mitigate the digital divide between more and less developed nations and regions. **Travel bans and lockdowns** between 2020 and 2022 affected the PeP mode of delivery, plans for face to face training and mentoring, logistics and costs. This made remote management more challenging, but ultimately led to stronger locally led approaches. There has been a **profusion of actors and initiatives** in digital learning, generating greater urgency for an effective framework and platform for coordination and collaboration. **LIMITED** change to challenges around connectivity, access to devices, teacher skills and systems for ICT in education within the PeP countries. However this is shifting, and could transform very fast (or not).
How has PeP adapted to changes in the operating environment to remain relevant?	In response to COVID and travel restrictions, PeP restructured its team and employed ICT Coordinators in each country as the PeP ICT Coordinator was unable to travel. This allowed implementation to proceed in Vanuatu, Solomon Islands and Samoa. Where local specialists were not employed (eg Cook Islands), implementation stalled. PeP responded to shifts in context at national level through regular communications with MFAT Posts and national counterparts, and adapting workplans. PeP has sought to connect with UNICEF and others delivering ICT learning support, to some extent.

Context: e-learning in the Pacific

The evaluation assessed the changes to the strategic and operating context since the programme's inception in July 2020. PeP was an innovative, pioneering initiative at the time it was designed, but the environment has changed significantly due to the COVID-19 pandemic, combined with the velocity of developments in ICT and digital education. The evaluation found that:

- **Digital inclusion in education is a high priority globally**

There is global recognition of the significance of digital inclusion in education since at least 2017, which is linked to the achievement of SDG 4 Education 2030 by UN agencies including UNESCO, UNICEF. Digital learning is linked to connecting students to future job opportunities, and reducing inequalities by ensuring every child has access to high quality content. Digital Education | Sustainable Development Goals Fund (sdgfund.org)

Teachers and governments need support to develop digital competencies (ICT and pedagogical) and ICT education policies and guidance (UNESCO 2021) and this is a long-term agenda. This is relevant for all participating PeP countries, and other countries in the region.

E-learning is one aspect of digital inclusion that focuses on using ICTs to support and extend the reach of teaching and learning interventions, thereby exposing users to ICTs.

- **Investment has increased since the pandemic at both national and regional levels, but effective coordination mechanisms are not in place.**

There is increased momentum since the pandemic, when ICT was recognised as a tool that can provide access to quality education during school closures (UNESCO 2022). Multiple activities addressing digital learning are current within countries and regionally, but coordination is ad hoc and depends on individuals. Has been described as a "Wild West" of new initiatives.

- **Science** remains an area for improvement across many Pacific education systems, but other subjects would also benefit from a digital platform and resources for lessons and teacher professional development.

COVID-19 has led to the need to invest in **learning recovery** and even greater resource constraints for education in some countries. This can be seen as an impediment to the introduction of e-learning, but e-learning should be understood as a tool for basic education that also plays a role in mitigating the digital divide between more and less developed nations and regions.

- While there are more actors and initiatives, many challenges around connectivity, access to devices, teacher skills and systems for ICT in education remain. This could change fast however, with new infrastructure coming online, and the velocity of change in ICTs globally.

The need for support for digital inclusion in the Pacific

Defining the problem the PeP is seeking to address is important to clarify its objectives and support identification of the pathway to scale-up. UNESCO identifies key challenges across the Asia-Pacific and globally (Policy Brief 2022):

- A large portion of marginalised and disadvantaged learners are **excluded** from remote and digital learning opportunities
- Inadequate **digital competencies** are the greatest barrier for teachers to use tech for teaching, globally
- There are considerable divides between the Pacific and the rest of the world, within the Pacific region and within Pacific nations, with **internet usage rates varying** from more than 90% in advanced economies to less than 15 % in the region's least developed economies
- **Policy guidance** needs to align digital transformation across sectors and levels of government, but this is limited.
- **Education financing gaps** are predicted to increase in two-thirds of low- and lower-middle income countries, while it is estimated that universalising digital learning these countries will require US$200 billion annually in additional funds.
- Many countries lack the proper **systems and capacity to monitor** students' learning and target ICT interventions, particularly for marginalised students, this was further exacerbated by the COVID-19 pandemic.
- The **COVID-19** pandemic worsened the trend of children spending more time online and interacting digitally, exposing them to **increased risks** linked to cybersecurity, cyber safety, and issues of privacy and data ownership; this also led to increase mental health issues and isolation among students.
- The UN Special Rapporteur raised concerns about the increasing influence and role of private technology companies in terms of ownership of users' data and **protection of users' rights** and the need to protect education as a basic human right and a public good.

These issues are live for all participating PeP countries, to varying degrees.

Fit with MFAT International Development Cooperation Programme

The evaluation review of policy and strategic document and interviews with key informants at Posts and in Wellington demonstrated PeP's ongoing relevance to the IDC programme, across a number of divisions and locations.

PeP directly aligns with the goal of the Education programme: **Supporting people to acquire skills, attributes and values they need to thrive in a changing world.**

PeP engages directly with the challenges and opportunities of a changing world and is an early and innovative investment in ICT in education through the development of a platform (Pacific Learn app) and materials for e-learning to address shortfalls in science teaching and student outcomes. The overarching goal of the PeP aligns with MFAT's intentions in terms of Values; Target Outcomes; Priority Areas; Strategic Cross-cutting approaches.

Beyond the Education and Training programme, PeP has synergies with MFAT's **Inclusion** unit and **Development Economy and Prosperity** (DEVECO) digital unit and could draw on and contribute to strategies across these areas of work. The digital unit has focused primarily on connectivity infrastructure and cybersecurity development in Pacific countries to date. Stakeholders conceded limited knowledge of programming for and managing ICT-led development outcomes, reflecting the global divide between ICT and other sectoral competencies, such as education. PeP offers a pathway to strengthening MFAT's effectiveness in the delivery of ICT-enabled services and digital inclusion.

"Refreshing [MFAT's] digital [development] strategy [in the Pacific] and [improving] digital inclusion [are] things we want to be focusing on." MFAT key informant interview.

With its focus on using e-learning to strengthen teacher capacity and student outcomes, the PeP is relevant to the achievement of fundamental education priorities and needs identified by Pacific partners and reflected in strategies underpinning country 4YP. However, in one case (Solomon Islands), there is open debate over whether e-learning is a priority investment where basic resources and education systems are in doubt, and different actors present different views. This will need to be further explored in-country. Other countries face similar challenges.

MFAT strategic cross-cutting approaches

We embed evidence-informed ways of working, including through:

- Education system strengthening
- Inclusion
- Innovative delivery mechanisms

MFAT Education and Training Target Outcomes		Assessment
Public services are strengthened to deliver high quality education: education systems are supported to improve the provision and management of quality and equitable education.	✓	PeP Outcomes target ICT in education systems strengthening
Education supports good governance, democracy and inclusion in societies: all learners have opportunities to fulfil their potential and become active, engaged and productive citizens	✓	Inclusion is a strong driver for the PeP, ensuring remote schools and the Pacific have the opportunity to participate in the global digital revolution
Learners leave the education system with the skills they need for employment: education systems deliver relevant and recognised skills that open pathways for further training and meaningful employment.	✓	PeP offers a practical and applied opportunity for teachers and learners to experience and build skills in the use of technology
Education enhances culture, language and identity: our investments uphold the mana of Pacific ways of knowing and being and learners are confident of their place in the world	✓	PeP's investment in co-design of science curriculum materials has resulted in culturally appropriate materials and content that is appreciated by teachers. PeP materials however are only available in English language.

Relevance to national priorities

TETRA TECH
International Development

"Science implementation in Samoa really needs an injection in the arm. I think we're good at theory but it's practicality and application we lack in so this programme has so much that is games or application and practical application that I really like and enjoyed" (Samoa stakeholder interview)

Countries are engaging with **ICT in education,** but this is at an early stage

- 3 out of 4 countries (Samoa, Solomon Islands, and Vanuatu) have ICT in national education plans and policies, with other initiatives also underway.
- Understanding of the potential for e-learning varies, which impacts engagement and prioritisation of PeP. Connectivity challenges and data costs continue to create challenges.

Countries continue to need resources to support locally appropriate **science** teaching and learning:

- Science learning outcomes remain low in the Pacific due to low access to qualified science teachers, lack of labs, and low access to supplies, particularly contextually relevant supplies, for science activities. PeP content makes learning with locally available resources (e.g., household supplies) more accessible. One teacher noted: "[the programme] is able to help to address one of the main problems in the Solomon Islands – teacher resources. That's why I believe that if the content between the national curriculum and app content can be aligned, it will be great."
- Another teacher noted that "PeP aligns well with broader education objectives – improved teacher professional development, measurements, learning outcomes…"
- Locally appropriate materials that align with national curriculum are high priorities for teachers in all countries, as evidenced through stakeholder interviews.

Inclusion remains a critical issue facing schools in all participating countries, particularly Solomon Islands, Cook Islands and Vanuatu where many schools are remote. Schools in remote areas achieve poorer education outcomes. Textbooks and printed resources are often unavailable and travel for teacher training or support is costly and difficult. Stakeholders consider **digital inclusion and e-learning** as potential solutions, despite connectivity challenges.

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International Development

Effectiveness: Is PeP achieving its objectives? Sustainability: Will the benefits last?

This section responds to Objective 2 of the evaluation: To assess progress made toward achieving the e-learning for science outputs, short- and medium-term outcomes and the likelihood of achieving sustainable benefits over the longer term. As PeP is a proof of concept, the evaluation looked for early evidence of success to build on, and shifts required for a long-term outlook.

Effectiveness: Summary against evaluation questions

Evaluation question	Assessment
Assess progress toward achieving e-learning for science outputs, short and medium-term outcomes and the likelihood of achieving sustainable benefits over the longer term.	
What progress has been made towards achieving outputs and outcomes?	**Outputs** are largely achieved or well underway in 3 countries, with the exception of the regional standards (formerly repository) activity and sufficient teacher participation in Communities of Practice. **Outcomes are on track** across all domains to varying degrees in 3 countries, but the small scale and extent of progress limits likelihood of sustainability without ongoing support for PeP. With the programme continuing to March 2024, there is time to embed outcomes and strengthen conditions for sustainability.
What is the likelihood of achieving sustainable benefits over the longer term?	Sustainability is assessed in terms of local ownership at regional, Ministry and school level, sustainability of maintaining the Pacific Learn app and PeP strengths and weaknesses. There is a **high** likelihood that **improved capabilities** of teachers in ICT and science teaching are sustainable at individual level. PeP is also contributing to shifts in awareness and interest in e-learning among educators that will generate ongoing demand for greater digital access, inclusion and e-learning. **Materials** developed under PeP can be delivered on any platform or device, so provide a lasting resource to strengthen science teaching. Sustainability of PeP at scale is **uncertain** under the current model (Pacific Learn app, data package and smartphones), but more information is needed to inform feasibility of suitable adaptations to the model.
To what extent has equity and inclusion been considered and effectively integrated within PeP Phase 1?	Equity and inclusion was considered in aspects of the design, but is not a strong theme in reporting or visible to stakeholders. Based on Nanogirl's role developing inclusive e-learning materials and some gender disaggregated data, integration of equity and inclusion is assessed as **moderate.** Without a documented GEDSI analysis or strategy, opportunities to maximise PeP benefits in terms of gender and disability are not fully explored. There is an opportunity to work with partners to develop a framework for GEDSI analysis for digital inclusion in the Pacific that would fill the current gap and contribute to broader development practice to strengthen GEDSI in programmes for digital inclusion. The program makes a strong and important contribution to addressing exclusion caused by remoteness, which could be made more visible.
Is the MERL Framework fit for purpose?	The MERL framework is **fit for purpose** in that it reflects the theory of change and provides a clear framework for tracking progress and results. However, the Pacific Learn app is missing from outputs and outcomes. Some additional data and analysis required to evidence achievement of intermediate and end of programme outcomes, and the regional standards output needs to be updated and separated from the output related to development of materials. Goals and targets related to ICT systems outcomes

Effectiveness – Progress against Outputs and Outcomes

The evaluation uses a 'traffic light' system to assess Progress against Outputs and Outcomes according to the PeP programme logic. This is presented on the following page.

Outcomes and outputs marked green are making strong progress; those in orange are making moderate progress as per the Key below. There were no examples of No progress (red).

The evaluation drew on all sources to make this assessment, including:

- Review of PeP progress reporting
- Interviews with implementing partners, national counterparts and MFAT staff
- Remote online surveys with teachers and students
- Data collection with schools in Vanuatu.

The evaluation presents an overview of the whole programme logic on the next page, then zooms in to separate assessment of Outputs, the Learner-focused outcomes and ICT-focused outcomes.

Note that since the start of the evaluation, PeP has been extended to March 2024, which allows for more time to achieve and deepen outputs and outcomes that have been delayed in large part due to the impact of Covid-19 in 2022.

Key

- Strong progress
- Moderate progress
- No progress
- Not assessed

Effectiveness – Progress against Outputs and Outcomes

TETRA TECH International Development

Students in Y10 are confident, critical thinkers in science

Participating Education Systems are effectively supporting T&L through ICTs

Sphere of direct influence

End of Programme Outcomes

- Teachers are teaching science more effectively
- Teachers are confidently using e-learning resources in ways that support T&L in science
- Teachers and School Leaders are engaging in Communities of Practice
- System-level actors have improved organizational capability to support and expand e-learning in schools

Intermediate Outcomes by end 2021

- Teachers have enhanced TPACK for science
- Teachers & School leaders are regularly engaging with e-learning resources
- System-level actors have enhanced understanding of how to design, deliver & support e-learning

Outputs and Influence Activities

- Hardware procured and in place
- E-learning tools and regional repository established
- Contextually appropriate e-learning resources & JEPD co-designed
- Contextually appropriate PLD modules co-designed
- Teacher fellows' community of practice established
- E-learning specialists mobilized in each country
- Steering Committee meetings functioning

Iterative cycles of feedback and design

Effectiveness: Progress towards outputs

TETRA TECH International Development

Output	Assessment of progress at April 2023
Hardware procured and in place	**ACHIEVED** Data indicates that the equipment required for PeP have been procured, sent, installed, and provided to all participating schools, including in Cook Islands although implementation is behind schedule. Schools also received training on how to use the smartphones, the projector, speaker, and Pacific Learn app; some issues emerged with securing these equipment when not in use and ensuring that classrooms have the necessary electric supply to power the projector and speakers, which were addressed.
E-learning tools and regional repository established	**PARTIAL** 100 teaching activities, 34 teaching tips (Job-embedded professional development), 9 micro-courses with 42 lessons total developed. This aspect of the Output has exceeded the PeP target. **E-learning tools** and subsequent adaptations have been largely responsive to the feedback collected through each cycle. However, the **regional repository** activity with USP and Catalpa has been revised from what was originally envisaged, and joint work on a regional system for Quality Assurance for curriculum content is just beginning. The approach has shifted towards developing a quality assurance process to support curriculum development units within Ministries to find high-quality resources that are aligned to their curricula (approved in October 2022).
Contextually appropriate e-learning resources & JEPD co-designed	**ACHIEVED** Feedback from Teacher Fellows and stakeholders report that the e-learning resources and JEPD are contextually appropriate. There was feedback from teacher fellows from one country who said that the content in the app may be more locally appropriate than what was used in the past. Feedback from the Teacher Fellows has been incorporated and is seen to have strengthened the localization of the content significantly.
Contextually appropriate PLD modules co-designed	**ACHIEVED** Feedback from stakeholders and Teacher Fellows report that professional development modules have been co-designed with the support of the Teacher Fellows and that their feedback, for the most part, have been incorporated. Both Wintec and Teacher Fellows expressed that the content design process worked well and were pleased with the level of contextually appropriate content.
Teacher fellows' community of practice established	**ACHIEVED (except in 1 country)** COPs started via WhatsApp in 2021 and Zoom in 2022. The approach is being revised again to strengthen engagement this year. Training participation records indicate attendance varied. Those who participated found it enriching, but attendance was low. The COP has not been active in Cook Islands. Note that COPs are targeted at teachers, not Fellows, and that the TOC should be updated to correct this.
E-learning specialists mobilized in each country	**ACHIEVED** Local PeP teams in each country are working effectively with Ministry counterparts to implement PeP. All countries have now recruited and mobilized e-learning specialists and ICT Coordinators are embedded in the Ministries, after delays in Cook Islands.
Steering Committee meetings functioning	**ACHIEVED** Stakeholders report that the steering committee meetings run well and are fit-for-purpose, through regularity and attendance varies. Updates presented by Catalpa are considered useful and stakeholder note that Catalpa communicates well and is pro-active in raising emerging issues appropriately.

TETRA TECH
International Development

Factors slowing progress on outputs

Regional Repository – revised and adapted

PeP has reviewed the goal and scope of the Regional Repository output and in October 2022 the Steering Committee approved a proposal from Catalpa to replace this activity with a regional system for quality assurance of curriculum materials that can be used in e-learning. This is considered a more effective approach to respond to teachers' needs to access certified quality materials for teaching.

The evaluation identified several factors that have undermined the success of the Regional Repository:

- Strategic alignment: The regional repository was to be hosted by USP Centre for Flexible Learning (CFL), but the relationship with Catalpa and with the other aspects of PeP, which focused directly on developing resources for the Pacific Learn app, was not clear.
- Contracting arrangements: USP COL and Catalpa were separately contracted by MFAT to jointly deliver the Regional Repository, but the strategy, resourcing arrangements and responsibilities to bring the partners together were unclear. A facilitated partnership brokering exercise may have assisted the partners to identify assumptions, goals, expectations and resourcing to progress the initiative and potentially link PeP's e-learning to MFAT's support for OFDA and leverage benefits for the region. Currently, USP's role in PeP is not well-defined or evident, beyond contributing expertise in Steering Committee meetings and consultations.
- Duplication of existing initiatives: Catalpa's research showed a history of donor partners establishing regional repositories, which remain unused. Their consultations identified that it would be more effective to use PeP's regional structure to consult with country partners to agree standards for quality assurance of existing curriculum materials available online, so that teachers can have confidence to draw on the wealth of resources that exists.

Since the revised approach was approved in October 2022, it is early to assess progress towards this outcome. Clear objectives, roles, resourcing and long-term outlook will be important drivers of success.

Communities of Practice – ongoing effort to improve results

PeP identified in reporting that programme Communities of Practice have not been well-attended in terms of numbers (see further detail on p27). COPs are hosted online for teachers delivering PeP, in order to provide teachers with an opportunity to exchange knowledge and experience.

The reason for the low attendance is not clear and the evaluation found that efforts to support teachers to learn together and build their capacity to engage are highly valued by teachers. The evaluation did not find one simple explanation for the low attendance, noting that feedback from those participants who did attend the COPs was very positive.

Based on evidence collected, some explanations are:

- Teachers do not have time to prioritise their participation in the PeP COP amongst their other commitments. Time pressure is one of the challenges in engaging with the PeP, noted by teachers.
- Internet connectivity is often poor (17/33 online survey respondents), making it difficult for teachers to join remote meetings.
- Teachers may not be aware the sessions are on. In some cases the evaluation found that Steering Committee members were unaware that PeP was facilitating teacher COPs, and this may have flowed on to those implementing activities.
- Note that survey data on teacher COP attendance was inconclusive, with a number of teachers reporting attendance at more COPs than convened by the PeP. Possibly they were attending non-PeP COPs, which confused their responses.
- Some teachers would prefer COPs and trainings to be conducted in person.

The evaluation ruled out a lack of interest or engagement in PeP as a reason for the low attendance. 24/33 respondents rated COPs at the highest rating of 5 for usefulness.

Looking ahead, PeP is starting the current school year by trialling different approaches and platforms to generate greater engagement in the communities of practice and will continue monitor and report on progress in quarterly reporting. PeP is adapting support for teachers across the programme, including instruction through mentoring and school visits.

Effectiveness: Progress towards learning outcomes

Intermediate Programme Outcomes	Assessment
Teachers have enhanced TPACK for science	PeP's e-learning tools, job-embedded professional development (JEPD) content, and micro-courses have been developed and provide teachers with opportunities to enhance TPACK for science. The trainings and subsequent refresher trainings provided by PeP offer another opportunity through which teachers' TPACK can be supported.
Teachers and School leaders are regularly engaging with e-learning resources	Teachers and school leaders are engaging with e-learning resources, but note that they do not use resources very often due to constraints on time and access issues. PeP reporting indicates that of 91 active teachers, 67 have completed at least one teaching activity on the app, an increase from 60 teachers in the previous quarter. For these 67 teachers, a total of 498 teaching activities are marked as being completed. (Note however that anyone can click through content and mark it complete without pausing to read content etc). Evidence for teachers' enhanced TPACK for science is in the positive feedback provided by teachers and school leaders about the Pacific Learn app content. The evaluation survey found that 12 of 35 teacher survey respondents had completed micro-courses, and 16 had completed teaching tips. Feedback on both was positive. 23 of 32 teachers in the survey responded that they used PeP materials in class often or regularly, but Metadata indicates that use varies widely (see page 33).

End of Programme Outcomes	Assessment
Teachers are teaching science more effectively	Project reporting indicates that teachers believe they are teaching science more effectively through the use of PeP materials and equipment. Survey feedback from 22 teachers who provided comments was positive. Example: "Doing micro-courses helps me a lot in preparing students work and also preparing myself before presenting to class."
Teachers are confidently using e-learning resources in ways that support T&L in science	Project reporting states that teachers feel they are confidently using the equipment, the app and that they value using its content to support teaching and earning in their classrooms. The evaluation survey found that 32 respondents said that students learned effectively or very effectively using Pacific Learn materials. This is supported by survey responses from students, data collection in Vanuatu and key informant interviews.
Teachers and school leaders are engaging in Communities of Practice	COPs first started in 2021, in Samoa, Solomon Islands and Vanuatu. In Cook Islands, multiple were scheduled but there was no participation. The evaluation found variable awareness about the COP on behalf of ministry staff. In Solomon Islands in 2022, 9 COPs took place, mostly attended by 6 male teachers. One was attended by 10 men and 1 woman. In Vanuatu, 9 sessions were convened. Attendance varied from 2 participants to 11 (5 male, 6 female). In Samoa, 7 sessions took place between April and October 2022. The first session was attended by 16 teachers (12 f; 4 m), but attendance dwindled to 1 in September, and 2 in October. Those who participated were highly engaged. PeP is currently testing alternative ways of convening to deepen teacher engagement. Gender representation in COPs reflects the gender breakdown for teachers across each country.

Note on evaluation surveys: Survey responses are not equally representative of all countries. Of the respondents for the teacher survey, 19 were from Solomon Islands, 10 were from Samoa, 2 from Vanuatu, 1 from Cook Islands, 4 no nationality (11 women; 24 men). The student survey was completed in Samoa (31 female and 45 male respondents) and Cook Islands (3 female, 12 male, 1 non-binary respondents).

Effectiveness: Progress towards ICT systems outcomes

End of programme outcome	Assessment
System-level actors have improved organizational capability to support and expand e-learning in schools	It is difficult to assess the extent of PeP's achievement against this outcome in the absence of a clearly defined strategy and targets, and the broad scope of this area. PeP has provided technical assistance, tools and training on key aspects of ICT support for e-learning with ICT and curriculum development units within Ministries. ICT readiness self-assessments undertaken by Ministries at baseline and end of 2022 indicate greater capacities in some areas, but understandably also show the need for ongoing technical support or outsourcing arrangements to deliver or expand PeP. ICT capacity development is a long-term investment, and skilled individuals are in high demand. It is important for PeP to articulate the scope of its contribution so that achievements can be recognised and the need for complementary resources can be identified. PeP conducted ICT policy mapping and used the ICT self-assessment tool as a framework for guiding support. Three out of the four countries independently have or are developing ICT in Education plans or policies: Samoa – National ICT in Education Policy 2018 – 2023; Solomon Islands – ICT in Education Master Plan 2019-2023. Vanuatu has drafted an ICT in education policy/ guideline with the support of PeP. In Solomon Islands, PeP serves as an opportunity to 'pilot' ICT in education and implement some of the pre-existing ICT Master Plan activities, including opportunities for teachers to be provided basic training in ICT and pedagogies (Interview, Solomon Islands). Obstacles to sustainability that are beyond the scope of PeP are: • ongoing challenges with access to the internet and high cost of data remains a challenge for all participating countries, and particularly in Solomon Islands and Vanuatu. • e-learning is yet to be resourced within national strategies and business plans.
Intermediate outcome	
System-level actors have enhanced understanding of how to design, deliver and support e-learning	By engaging education counterparts and teachers in the development of materials for the Pacific Learn app, strengthening systems to manage the programme and training education staff in the use of equipment for e-learning, PeP is achieving this intermediate outcome. PeP has responded on Ministry requests to provide training that in some cases goes beyond use of the Pacific Learn app or maintenance of equipment provided by the Programme. Training is ongoing in 2023, with PeP continuing to deliver training to Ministries on request. In addition to learning materials, the Pacific Learn app includes 9 microcourses to enable users to access and utilise e-learning resources safely and effectively. These have been completed by 191 users across the four countries (Vanuatu 40; Solomon Islands 94; Samoa 53; Cook Islands 20). The evaluation's technical review of the app has questioned the depth of microcourses and quality of questions to assess user's content acquisition (learning). There are opportunities to strengthen these materials by adapting materials to more actively test application of skills, however the broad feedback from participants is positive. System-level support has focused predominantly but not exclusively on the use of the app, data and management of project tools. ICT capacity building support through training reached varying numbers of participants across countries. Best attended trainings in 2021-2022 were ICT Tools training in Solomon Islands (9 males, 1 female); Vanuatu (5 males; 0 female); Samoa (5 male; 2 female and 4 male; 3 female). In each country. 9-10 opportunities were provided between March 2021 and November 2022. The lowest engagement was in Cook Islands.

Additional outcomes

- Learning continuity during the pandemic: Samoa televised PeP materials during the 2022 lockdown
- Student-centred learning: Teachers find PeP materials a welcome addition to the limited student-centred materials available for use, particularly for science
- Pacific Science Fellows: connecting teachers with international technical experts and others across the region has generated significant cross-learning and energy to invest in development of teacher science resources and capacities
- PeP and the Pacific Learn app provided an entry point to generate interest among teachers and ministry staff in e-Learning beyond the Pacific Learn app with Ministry staff in some countries requesting additional ICT skills building

"I've used it a couple of times. It has things that makes you want to spend hours using it. "

Vanuatu study I: Remote school

Two different schools in Vanuatu shared their experience of PeP. Their reflections underscore key themes emerging through project reporting, interviews and surveys. See Annex 6 for more detail.

Hog Harbour Junior Secondary School is 2km away from a village on the island of Santo, with 280 students, more girls than boys. The principal says the location is good: sheltered from the worst of cyclones, and relatively safe from the impact of earthquakes. The school connected to electricity in 2020, but still relies on a solar battery to use the projector to deliver PeP lessons through the smartphones. Internet is intermittent. The school's two science teachers and principal want the programme to continue and want to see more lessons for more subjects.

Both the male and female science teacher appreciate the Pacific Learn app, equipment provided and teaching and learning materials available through the app. They like working through the smartphone, believe children engage and learn from the PowerPoints and videos available, and state that the materials help them to be better teachers. They are yet to see conclusive evidence of improvements in results but expect that this will come with more time.

One teacher highlighted a concern that the Pacific Learn app materials should cover the whole curriculum and that all should align to curriculum standards, to ensure that students did not miss important subjects and then perform poorly in annual tests.

She felt that teachers may be at risk of relying too heavily on the materials which could lead to them neglecting teaching the topics that are not included on the app.

The evaluation observed a lesson and found that students were attentive with the use of equipment. The observer wrote: "*You could see that students were interested in the learning process because they were not just listening to the teacher but made good use of as many senses as possible, like they listen, interact with the teacher, saw the slides and were thinking creatively as they were solving the problems/ tasks set.*"

Both male and female students interviewed said they like science, and that the projector and short clips their teachers used stopped them 'feeling sleepy' and helped them understand.

The provincial education officer noted the value of PeP and e-learning in providing children a chance to interact with technology. Despite the prevalence of technology and its increasing relevance to society and the job market, many children in the area have no devices or internet at home, so it falls to schools to meet this gap. He also highlighted that francophone schools were unhappy to be missing out on the opportunity to participate in PeP, since the programme is only offered in English.

Photos: Hog Harbour Junior Secondary School classrooms and computer lab. Taken for the evaluation March 2023.

Vanuatu study II: Urban school

Epauto Secondary School is a large secondary school in Vanuatu's capital city, Port Vila. There are 102 students (52 male; 50 female) enrolled in Year 10. Epauto school is close to a tele-communications tower, but issues related to contracts with different providers mean the school often has difficulties connecting to internet. Construction of a new science lab has recently started.

The school principal is a strong supporter of PeP as a way to encourage his teachers to use ICTs in teaching. He said: *"Students coming in are more, ICT is like, it's …more friendly to children and so, not only are they smart in using it, they're interested in it. So, we have to keep moving in that direction."*

He has used school funds to purchase additional projectors so that more classes can engage. He has been encouraging maths teachers to use ICTs with limited success compared to science teachers who have access to Pacific Learn. He considers that PeP is a useful resource for teachers, and that lessons shown over the projector are more engaging for students. He considers that it is too early to assess whether this has led to improvements in science results, but he expects this will come in time. The main challenges faced by the school in using PeP are teacher turnover, since it takes time to retrain new staff.

The school's two science teachers both see greater engagement from students when they use PeP materials to teach classes, and they believe it improves students' understanding as well. *"When they see the notes projected onto the wall when we are using the portable projector or even the installment of the other big projector, they can be able to sit quietly and their focus is so much deeper than if it were just reading from a piece of paper note,"* said one teacher. She noted that students have requested direct access to the app materials.

Both teachers value the lesson resources, and want to see coverage extended to the entire science curriculum. *"I not only like it, I love it!"* said one. She appreciated the ability to zoom in on the screen, which also helps children with poorer vision. She noted that the resources fill a gap for teachers and students, as they do not have access to textbooks. One of teachers had participated in a WhatsApp Community of Practice meeting, and noted that she would prefer support to be face-to-face, due to connectivity and ease of interacting in person. The other had attended a number of Zoom COPs, and enjoyed them. One of the teachers has completed one micro-course, but her colleague had completed only half a programme.

Male and female students who participated in group discussions were enthusiastic about e-learning and science, saying watching videos and participating in activities made it easier to concentrate and remember.

Photos: Epauto Secondary School classrooms, March 2023.

Equity and inclusion in PeP

Inclusion is one of the four principles that underpins New Zealand's ICESD and was identified as a priority area for the evaluation to assess. The evaluation found significant potential to expand and nuance PeP's inclusion lens to strengthen its contribution as a pioneering programme in the emerging field of digital inclusion and e-learning, specifically. Assessing PeP as a proof of concept, the evaluation finds that there is considerable value in clarifying the programme's ambition and strategies for inclusion, noting that digital inclusion is an emerging field with unique contributions to make across different dimensions of exclusion including remoteness and disability.

Digital inclusion: The UN Special Envoy has said: "Digital divides reflect and amplify existing social, cultural and economic inequalities." The evaluation found that one of the drivers for national counterparts to engage with e-learning is to ensure that countries are not left on the wrong side of the digital divide.
Remoteness emerged as a key issue facing schools, and PeP works in a range of urban and 'remote' areas, meaning away from the capital or connectivity. PeP struggled as to whether remote schools should be a criteria for inclusion in the programme, noting both the possibilities and challenges. Remote communities are often cut off from training and resources. PeP's online materials are seen as a way to fill the gap left in the absence of textbooks, which are too expensive to print and distribute, particularly for the Solomon Islands and Vanuatu.
PeP has made significant efforts to respond to the challenge of remoteness by providing offline options and solar panels where electricity is limited. Connectivity still remains a challenge for engagement, however. It would be valuable to track the differences in outcomes between remote and connected schools and establish whether additional support or strategies are needed to meet the needs of these schools, as well as to better capture PeP's important contributions.

Gender and disability inclusion: Through its design, PeP established sound foundations to support the inclusion of girls by selecting science as the learning focus, and Nanogirl as technical partner to promote girls in STEM. Subject choices include sexual and reproductive health, which are critical knowledge areas underpinning gender relations. PeP reports gender disaggregated data related to teacher and student participation in activities and seeks to assess whether gender influences children's response to activities. It is not however clear how this information could be used to identify or address gaps. Some data suggests that e-learning offers potential to address the problem of boys' low engagement in school, but this has not been explored in detail. The Pacific Learn app was designed to meet Accessibility Standards and accessibility guidelines are shared with content creators and administrators.

Stakeholders from governments, schools and partners, however, noted that gender and disability inclusion were not a priority area for the programme whilst agreeing that inclusion is important. As a proof of concept, opportunities to explore some aspects of inclusion in depth have been limited, and a decision was made to limit the current program to English language schools, which could be changed in future.
There is therefore a need to strengthen visibility around GEDSI in PeP. The remaining months of the current phase should be used to deepen the understanding of the issues to and potential to respond through PeP to inform Phase II.

	Strengths/ Opportunities	Gaps
Digital Inclusion	• PeP addresses digital inclusion for the Pacific at regional and national levels by engaging teachers and students with ICTs through e-learning. • PeP addresses digital inclusion within nations by working with remote schools with limited access to services, including internet.	• PeP is delivered in English-only, excluding vernacular or Francophone users. • Pacific Learn app is accessible only to registered users, limiting sharing of learning. • No use of disaggregated data in terms of school remoteness and access to internet to assess the impact of the digital divide in schools.
Gender Equality	• PeP topics, partnership with Nanogirl and STEM for girls • PeP tracks gender disaggregated data among teachers, principals and students reached through PeP activities.	• Little evidence emerged that GEDSI is a priority in implementation • Not visible to stakeholders
Disability Inclusion	• Pacific Learn designed to meet accessibility standards • Potential for reasonable adjustments to engage students and teachers with a disability.	• In line with emergent practice in PeP countries, disability data is not collected • No accessibility guidelines for PeP are available • No evidence of adjustments in place identified

Country profiles

VANUATU

PeP Phase I in Vanuatu has been effective and relevant. The programme helps to fill a gap in the Vanuatu education sector with regards to the lack of science teachers. Stakeholders report that the programme is progressing well in participating schools, with teachers and principals trained in how to use the app and related equipment provided. The e-learning resources and teachers' professional development content are said to be very helpful. They engage students better in the learning process. Teachers report that the Pacific Learn app and its detailed and informative content that is more student-centered is an attractive feature for teachers and a key success factor to the programme. Stakeholders also believe that the programme in Vanuatu is ready for a scale-up and they would be interested to see more schools, subjects, and year levels included. Vanuatu wishes to be able to use PeP in francophone schools.

Online Survey Results:

- Two teachers responded to the online survey and both report that they regularly use the Pacific Learn material in class
- Both teachers believe that the students enjoy lessons when they use the Pacific Learn materials and activities in class

"[on what has worked well] As a teacher, the two things – (1) I can understand what was in the lesson plan and how it relates to the objectives in our old syllabus. All the formats and steps to follow. We have some video links that were provided. Teaching tips that teachers could use to complement the lessons. (2) Student engagement and interaction is better. The approach seems more student-centered." (Vanuatu Stakeholder)

SOLOMON ISLANDS

PeP aligns well to MEHRD's priorities, particularly complementing and supporting the implementation of its ICT in Education Master Plan in 2019. It is said to fill a gap with teacher resources since there is a lack of textbooks and printed materials for teachers. For example, teachers often look for materials from multiple sources in order to develop a teaching plan. With the app, teachers have access to most of the information and additional materials they need in a useful structure all in one place. According to the Pacific Learn Metabase, the Solomon Islands has the highest completion rate of the four countries in terms of micro-courses and utilizing the additional resources available in the app. Barriers to engagement are poor connectivity in the country , the lack of tech savvy teachers and contextual issues beyond the programme's control. The capacity to manage PeP long-term is a key consideration for Solomon Islands, due to resource constraints facing the sector.

Online Survey Results:

- 84.2% of PeP teachers believe that the programme is 'very important' (5 out of 5) to improving science learning outcomes in the Solomon Islands
- PeP teacher respondents rate the Pacific Learn app as 'good' (47.4%) and 'excellent' (52.6%)

"in terms of the PeP and use of PeP resources for use in learning programmes they have added value when those things are not available." (Solomon Islands Stakeholder)

Country profiles

SAMOA

Through the partnership with the Ministry of Education, Sports, and Culture (MESC), the PeP has been well received by schools, including teachers and students. Samoan PeP teachers have the highest completion rate, making up 45.32% of all teaching tips completed across the four countries. The PeP is said to address Samoa's needs as its resources facilitates practical application of lessons that are interactive and enjoyable. A key success factor is the local PeP team within the ministry. This has helped to ensure PeP implementation continued during COVID-19. The contextually sensitive content is another factor that has helped the programme. Although Samoa has had a strong start to the programme, it is also evident through Metabase data that that has declined dramatically and is likely due to changes in staffing at MESC to drive the programme with schools.

Online Survey Results:

- 90% of PeP teacher and principal respondents believe that the PeP is 'very important' (5 out of 5) for improving science learning outcomes in Samoa
- The top barrier to engagement mentioned most by teachers is that connectivity is poor (54.8%; n=17), second is lack of time (38.7%; n=12)
- 93.42% (n=71) of students report that they enjoyed learning science last year
- 53.94% (n=41) of students reported that language was a barrier to learning in science lessons

"I tried some of these activities with the students in my school and they never forgot the activities. It was reflected in the tests" (Samoa stakeholder)

COOK ISLANDS

Implementation in the Cook Islands has been slow due to school selection delays, COVID-19 staff shortages, and resourcing challenges accessing remote schools. Phase I saw the programme implemented in only one school. Feedback gathered indicate that the learning resources are locally relevant and would likely be effective if teachers took it up. Challenges in uptake may be due to issues with connectivity, lack of capacity to use technology, English being a second language, lack of time teachers have as they wear multiple hats in schools. Success has also been further undermined due to the absence of an active science adviser to champion the programme in the schools.

Online Survey Results:

- The Cook Island principal reported that the Pacific Learn app is 'good' (4 out of 5) and believes it is 'important' (4 out of 5) for improving science learning outcomes in Cook Islands
- 43.8% of student respondents (n=16) voted for 'conduct experiments with local materials' and 'watch videos on a projector' as their top two favourite learning activities
- 92% of students reported finding science lessons difficult to understand

"… being very remote, our teachers don't have a lot of science content knowledge, processes, and the capabilities for science. They don't have a good grounding in that. I think the merit of the programme is going to be good for that purpose." (Cook Island stakeholder)

Is the PeP MERL Framework fit for purpose?

Assessment

The evaluation found that overall the MERL Framework is fit-for-purpose in line with the PeP theory of change, and is used effectively to track results. However, there is potential to update some areas to reflect insights learned through implementation of the proof of concept, and clarify PeP's results, achievements and areas to refine.

The **MERL framework** aligns to the theory of change developed during PeP design and inception, with indicators and baseline data where available. Easy edits include updating the TOC to reflect approved changes to the Regional Repository output and dependent outcomes, which are conflated with development of e-learning materials. It also mistakenly indicates that the Communities of Practice are for Teacher Fellows, when they are targeted at teachers. Overall, it is broadly fit for purpose, noting that the proof of concept has generated deeper understanding that would allow for more concise definitions and measurable outcomes now than when designed. For example, terminology and assumptions underpinning the outcomes related to ICT strengthening are not very clear, as this outcome area is very broad within the theory of change. PeP's approach to ICT strengthening is not well-captured in the current targets and indicators, which are not tightly defined. This makes it difficult for reviewers to quickly grasp the achievements towards this outcome area.

The Pacific Learn app is not referenced within the PeP theory of change or MERL framework, though it is central to PeP's model for e-learning. It would be useful to make the development and contribution of the app explicit within outputs, outcomes and reporting to strengthen visibility and accountability.

Data: An early decision was made not to assess changes in student science results through national EMIS as national exams were not well aligned with PeP learning objectives. With the extension of the programme, it would be useful to consider whether it is now feasible to collect this data at school level, comparing against science outcomes in schools not participating in PeP, and noting any limitations with the data.

It is not currently possible to compare results in remote and connected schools easily, as data is not disaggregated and inclusion for remote schools is not an explicit theme within the theory of change. This would be useful to inform how effective the programme is at reaching these schools and extending the reach of education.

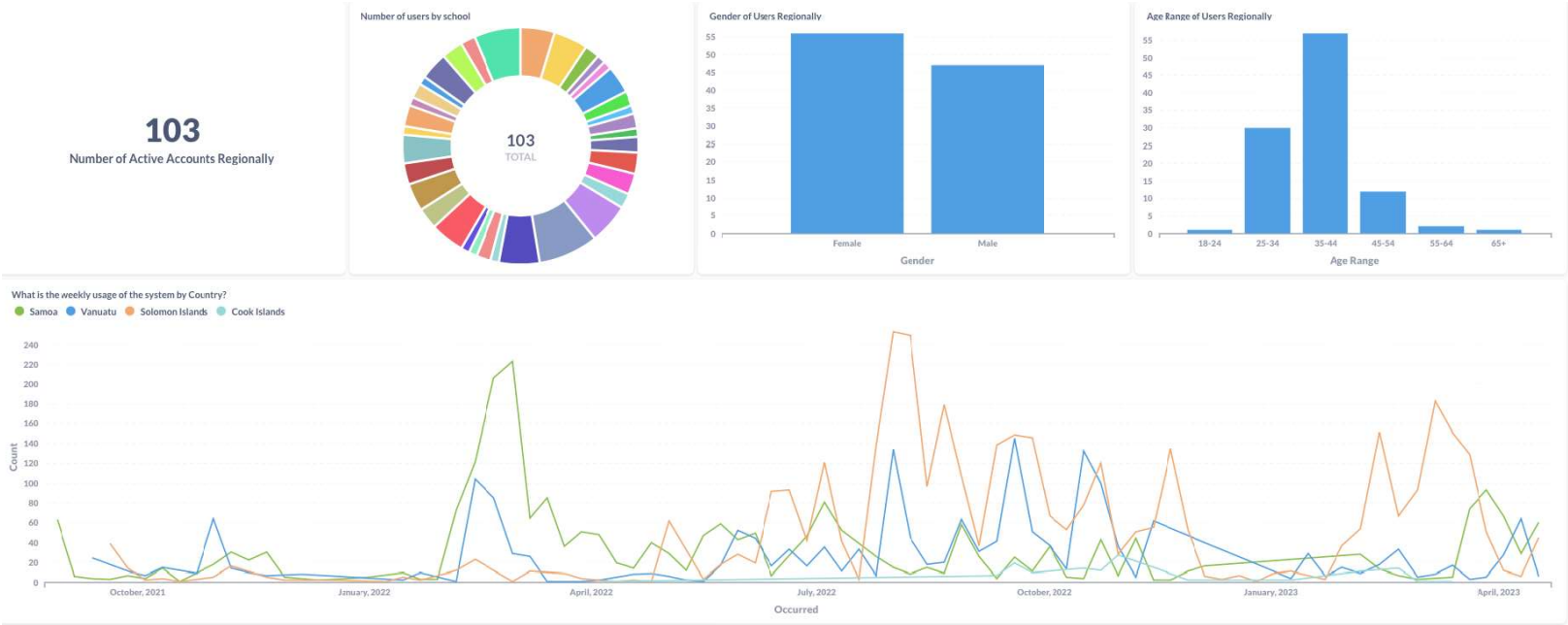
There is potential to make greater use of quantitative data available through the use app Metabase to track and report monthly delivery of PeP lessons and completion of teacher resources. This is a key metric to understand the uptake of e-learning resources and validate the e-learning model using the Pacific Learn app.

At output level there is potential to track and report device redundancy at national level.

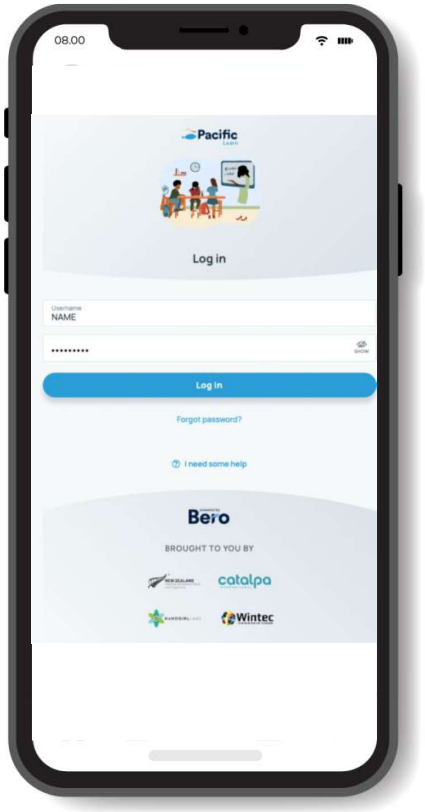
Reporting: PeP implementing partner Catalpa presents a rigorous, evidence-based report against the results framework in 6-monthly updates. Information is largely qualitative, with some quantitative data presented. In line with a proof of concept approach, PeP provides explanations of challenges and proposed responses. Gender-disaggregated data is tracked and reported, however data related to disability is not included. This reflects challenges related to reporting on disability that go beyond PeP.

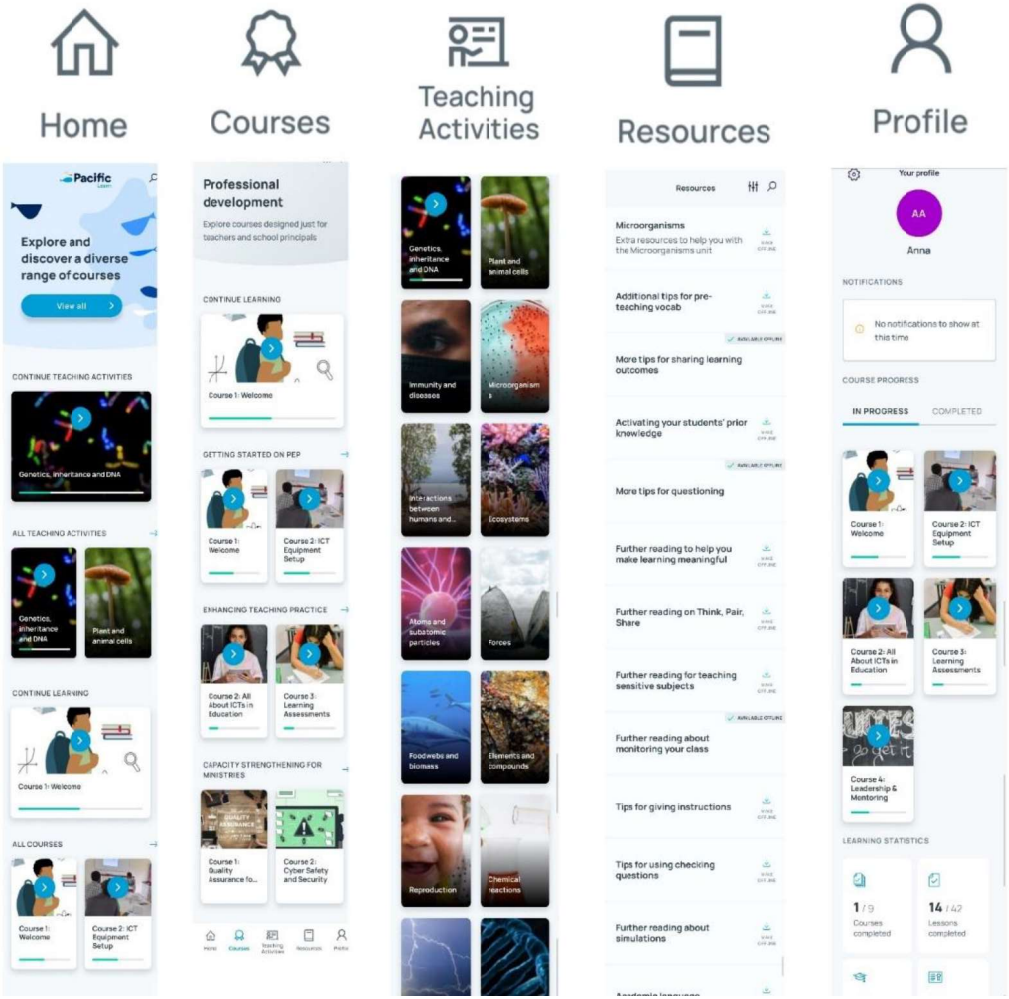
Pacific Learn app Metabase: April 2023

- This image is a segment of the data regularly generated by PeP through the Pacific Learn app Metabase, updated by Catalpa in April 2023. This data feeds directly into reporting against the Results Framework.
- This snapshot shows that there are 103 teacher users across the 4 participating countries, disaggregated by gender and age, which is valuable for user analysis, including for analysis related to gender inclusion.
- It also shows the weekly usage of PeP, which indicates significant bursts of usage as well as troughs and plateaus where the app is not being used at all. This data is critical for analysis and reporting and should be cross-referenced against teacher and PeP schedules to explain and explore the reasons behind the variance. There is potential to strengthen the use of this data.
- The collection and analysis of this data provides an opportunity for PeP and education counterparts to gain experience in the use of data analytics for education strategic decision-making and has been used to contribute to PeP ICT systems strengthening outcomes.



Pacific Learn





TETRA TECH International Development

This slide presents screengrabs from the Pacific Learn app as it appears on users' smartphones. It shows the user experience, as the user clicks through log-in to the home screen to the various resources available.

The app was designed using a 'mobile-first' approach, accessible through smartphones distributed through the programme, and also via computer. This choice was deliberate, to use affordable technology that is familiar to many teachers.

It can use closed networks for sharing data between phones where internet access is not regularly available or data is too costly.

The assessment of the app is at Annex 1.

The overall finding is that Pacific Learn is a high quality app, that users like and want to use.

Some areas for strengthening are also identified, to deepen the quality and impact of outcomes.

Sustainability remains an ongoing concern, due to the cost of maintaining an app which will need to be continually updated and outsourced and the ongoing costs of data. It is however not clear whether other models may be cheaper, whilst continuing to engage teachers in using the materials.

Monthly data plans
(reported by Catalpa April 2023)
Samoa: $17 NZD = 29 GB data monthly
Vanuatu: $40 NZD = 17 GB data monthly
Solomon Is: $42 NZD = 3.7 GB data monthly
Cook Is: $29 NZD = 2 GB data monthly

TETRA TECH
International Development

Efficiency: How well are resources being used?

Value for Money: Do economic and social benefits outweigh costs?

This section of the report responds to Objective 3: To assess the extent to which implementation is efficient and value for money has been achieved?

Efficiency and Value: Summary against evaluation questions

Evaluation question	Assessment
To what extent is implementation efficient and has value for money been achieved?	**Efficiency:** PeP is efficient in that allocated resources are being well-managed by the implementing partner, with effective, tailored systems in place to manage risk related to procurement and sustainability of equipment. Startup investment in the tech development was necessary to deliver on the PeP design, and on-costs related to the high cost of data were anticipated and managed to the extent possible by PeP continually reviewing data contracts. The performance of MFAT and Catalpa in managing the programme has been strong and the challenging operating environment, including the onset of COVID-19, is reflected in a low rate of spend. The regional model has not proved efficient for MFAT to manage, in terms of high administrative effort required to oversee the program across 4 countries. **Value for money:** As a proof of concept, PeP has demonstrated value for money. By testing a model for e-learning through a regional program in a small number of schools in 4 countries using Pacific Learn, PeP has effectively demonstrated the potential for e-learning. This had previously been in doubt. PeP has established a firm base for countries to further explore the options for scaling and embedding e-learning in education systems. The value of using e-learning to complement or replace elements of paper-based learning in contexts where it is prohibitively expensive and impractical to distribute materials such as textbooks was clear to stakeholders, despite connectivity challenges.
To what extent was value for money achieved in delivery and management, in comparison with progress against intended results?	
What could be done differently to improve VFM outcomes?	The Regional Repository initiative was hampered by separate contracting arrangements for implementing partners USP and Catalpa, which meant there was no clear structure linking the two entities, contractual expectations, governance and accountabilities. Alternative platforms for e-learning, other than a bespoke application (Pacific Learn app), may provide better value for money in the long term by providing a sustainable solution with lower on-costs. This requires a cost-benefit assessment to explore the options, complex cost factors involved, as well as the effectiveness, appeal and scalability of the app, which is highly rated by teachers, though usage varies.
Is the delivery and management approach fit for purpose?	The delivery and management approach should be reviewed for the next phase, to enable more strategic national engagement and ownership, and clarify the objective and contribution of PeP at regional level. Benefits of the regional approach, related to cross-learning and technical advice provided for development of tech and materials, should be maintained.

Value for Money: a proof of concept in 4 countries

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As a proof of concept, valued at NZD 5 million, PeP has tested the cost and feasibility of delivering e-learning across 4 countries using a regional approach. It has generated significant learning in an emerging field, which will allow MFAT and Pacific national partners to make informed decisions about investments in digital learning going forward.

The evaluation found that the programme implementation has been well-managed by Catalpa, with strategies to mitigate risk related to distribution of equipment, a responsive approach to management and informed, contextually appropriate choices about quality and type of equipment delivered to schools.

However, the programme by nature generates on-costs, related to the high cost of data and investment in equipment and delivery. PeP was affected by the pandemic, which resulted in delays, high costs for delivery and a rapid shift to remote support for the programme in the face of lockdowns in 2021 and 2022 which prevented travel. PeP was able to adapt swiftly and effectively.

In terms of mode of delivery, as a regional programme, PeP has benefited from efficiencies in being able to develop curriculum materials and roll the Pacific Learn app out across four countries. However, implementation of e-learning has required a national approach, due to complexity and contextual factors. PeP now has specialists in each country to support partners to take delivery forward. There have also been lessons identified around contracting arrangements for implementing partners, which contributed to the slow progress in taking forward the regional repository (now quality assurance mechanism).

This was a strong model for the proof of concept, but may not be the best approach for a scaled-up Phase II. The evaluation found many questions around the choice of technology platform for e-learning, with MFAT and country partner stakeholders noting they lack detailed technical and contextual knowledge of ICT systems needed to make informed decisions as to preferred platforms or systems for e-learning in their contexts, and in the face of continuous evolution of technology. For this reason, the evaluation will recommend an independent but co-designed comparative cost-benefit assessment before the end of the current phase.

Value for Money Challenges "It would need to demonstrate extraordinary change to justify the cost." (Post)	**Successes** "E-learning is worth it, if it achieves strong science outcomes." (National stakeholder)
• Exorbitant cost of data and power, especially in Vanuatu and Solomon Islands • Cost and large amount of equipment supplied will be difficult to sustain at scale (smartphones, projectors, batteries, speakers) • School selection included remote schools where need is high, but operating costs are high and ICT readiness is low • Separate contracting for Catalpa and USP COL led to confusion over responsibilities and resourcing, undermining regional collaboration • Pandemic added to cost, slowed delivery and spend • High administrative burden for MFAT Education Team supported by Posts • Pacific Learn app needs to be contracted to external suppliers • Ongoing maintenance of app requires skilled app technicians to work effectively with content designers • Access to Pacific Learn app is restricted to registered users • Equipment delivered to Cook Islands for up to 5 schools not in use as only 1 school is actively using the technology or content.	• PeP successfully tested an innovative model for digital learning in four distinct Pacific country contexts • PeP provides an applied opportunity to address the growing digital divide between Pacific and the world, which is difficult to quantify • PeP is a valuable investment to test technologies to reach remote schools • High quality of Pacific Learn app and contents that can be used across different platforms • The Pacific Learn app is open source, so can be managed by any supplier with the specialised skills, which are high level. • Efficient, adaptive management and national level support provided by Catalpa facilitates achievement of output targets across 4 countries • PeP has been able to deliver equipment relatively inexpensively, with Catalpa reporting procurement of ICT infrastructure at less than 10% of project budget • Quality equipment delivered to respond to Pacific climate challenges (salinity, poor infrastructure) • ICT systems approach to address equipment risks supported by PeP generates long-term benefits • Insights include critical learnings for MFAT, implementing partners and national counterparts

TETRA TECH
International Development

Options for scale-up

Assess the benefits and risks associated with a scale up and provide options and recommendations for MFAT and Partner consideration.

This section of the report presents the evaluation's recommendations and options for MFAT and PeP as the programme moves to completion in April 2024 and prepares for PeP Phase II.

The report considers the lessons from PeP to highlight strengths to build on and challenges to avoid in taking the PeP from a proof of concept to a scaled-up, long-term initiative.

Successes to take forward

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What worked well?

Catalpa's co-design approach

- Resulted in a well-designed Pacific Learn app by teachers for teachers, with strong technical support provided by Catalpa, Nanogirl and Wintec
- High quality, if basic, learning materials adapted to country contexts were used by teachers for science lessons, sometimes across different year levels.
- Local science teaching specialists welcomed the chance to develop student-centred science materials with Nanogirl.

An opportunity for teachers to participate in building ICT and science teaching skills

- Many principals, teachers and Pacific Science Fellows are passionate advocates for both e-learning and science, and PeP provides the opportunity to deepen this commitment
- PeP fills a gap for teachers by providing access to online resources for TPACK and science lessons that can also be used offline. There are few other opportunities for training, particularly for teachers in remote schools.

Strong technical and management support at national level

- PeP specialists based in each country were essential to progress implementation, providing technical advice and management support.
- Lead implementing partner Catalpa has performed strongly through responsive management, and deep contextual and technical knowledge and PeP teams are appreciated across countries
- Equipment met context-specific needs, including mobile phones, electricity solutions and closed connection for remote schools.
- PeP is agile: As a small project outside government processes, PeP has been able to introduce the Pacific Learn app, develop a system for co-design of contextualised teaching and learning materials and deliver equipment and training to teachers, who are using PeP materials in Year 10 classrooms across 4 countries.

PeP supported Ministries to action some aspects of ICT strategies

- PeP built ICT systems strengthening around the use of the app. This included:
  - Demonstrating the value of data analytics as a tool to guide responsive management for involved education staff
  - Introduction of ICT Capacity self-assessment promotes better self-awareness of overall needs at national level
  - Microcourses for Ministry and teaching staff on the app provided basic ICT knowledge
  - Ministries received support to develop ICT guidelines and strengthen relevant aspects to the programme, such as using data for decision-making; equipment tracking and management.

Challenges to mitigate

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What were the lessons?

Within sphere of PeP influence

- Regional repository: a lack of clarity around partner roles and resourcing
- Dual regional and national focus created efficiency challenges for MFAT
- Structural gap between ICT education and curriculum development roles made it difficult to address both ICT systems capacity development and materials development equally
- Limited integration with national education policy, structures and resourcing
- Teachers lack time and incentives to use resources consistently/ frequently
- Not all materials align with national curricula which undermines teacher confidence and utilisation; and the full science curriculum is not covered

Beyond PeP control

- High costs of data particularly in Solomon Islands and Vanuatu; high costs of electricity
- Poor connectivity in Solomon Islands, Vanuatu, Cook Islands
- Competing priorities and lack of resources to meet even basic education needs in some countries
- Turnover and restructures at Ministry level created implementation challenges
- No active forum to lead coordination with regional actors made it difficult for PeP to influence and collaborate
- Covid-19 travel bans slowed delivery (but pushed national engagement)

Considerations for scale-up

- What is the value-add of PeP's regional approach in the medium to long-term? As a proof-of-concept, PeP benefited from a regional approach to test the PacificLearn app and co-design process with Nanogirl, Wintec and Pacific Science Fellows. MFAT should consider a model that allows PeP to take forward the elements that strengthen quality and implementation of e-learning and move away from more complex components.
- Embedding e-learning sustainably at scale will require long-term investment and dialogue as governments develop capacities, skills, resourcing and infrastructure required to benefit from e-learning and work across technology and pedagogy.
- A greater role for curriculum and teacher training authorities to certify, launch and provide guidance on how to use PeP student and teacher materials may strengthen teachers' use of PeP materials.
- Challenges with connectivity and costs could change rapidly, which would remove one of the barriers to e-learning and make it possible to scale access to the Pacific Learn app and other materials available online widely. The evidence is that access to the app improves the science learning experience.
- The contribution of e-learning and basic education must be clear for countries struggling to meet basic education needs. As a tool for e-learning, the Pacific Learn app needs to demonstrate its potential to generate efficiencies and strengthen outcomes for students and teachers that justify investment in resource-constrained environments.
- Costs and benefits of developing quality materials and providing access to suitable equipment and data at scale, and the sustainability (cost, technical capacity) of maintaining the Pacific Learn app in partner countries are key considerations as MFAT considers a strategic position on e-learning.

Design process: options to assess

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Option 1

Extend access to the Pacific Learn app to more schools in up to 4 countries and maintain the focus on science.

Continue to develop more materials through the proven co-design process.

Make improvements to the app and partner with teacher training and curriculum departments, as well as ICT.

Assess the potential for a bring-your-own-device (BYOD) model, where teachers utilise their own phones.

Clarify PeP scope with regards to e-learning, digital inclusion and ICT systems strengthening.

Simplify the regional aspects of the PeP.

Option 2

Redesign PeP to integrate the activity fully within national education strategies and programmes. Partner with teacher training and curriculum departments, as well as ICT.

Maintain investment in co-design to develop more materials, continue support for teachers to use and engage with materials, support relevant aspects of ICT strengthening.

Make PeP contents and materials available to all teachers via alternative platforms such as Google classrooms, as identified together with national education ministries (following comparative analysis of different platforms for different contexts).

Simplify regional aspects, focusing on cross-learning between PeP countries.

Option 3

Separate but complementary to PeP as an operational e-learning activity (Options 1 and 2), provide regional support for PacREF's work to coordinate regional work on ICTs in education and develop regional strategies and standards for digital inclusion and e-learning.

This Option can be taken forward together with either Options 1 or 2, or as a standalone investment.

There are different risks, opportunities and costs associated with each option that will need to be explored through a dedicated design phase, supported by a comparative cost-benefit assessment of the technology and device options, close consultation with relevant actors from ICT and pedagogical departments in national education ministries, and across MFAT teams including Posts, ICT, inclusion and education. For additional details, Refer to Annex 5 Some practical considerations and questions.

Critical Risks for Mitigation

TETRA TECH International Development

Knowledge, capabilities, resources

- MFAT is at early stages of exploring digital service provision (previous emphasis on infrastructure), meaning there are gaps in knowledge to shape critical assessment and guidance of highly specialised e-learning initiatives; as well as limiting collaboration and strategizing between key departments (DEVECO) digital unit, Education, Inclusion team and Posts). Resourcing the development of an e-Learning and Digital Inclusion in Pacific Education strategy or policy brief would help.
- Government systems (capabilities and infrastructure) not ready to embed e-learning: long term support is required in each country.
- Limited IT capabilities across the Pacific make it challenging and prohibitively expensive to maintain and evolve e-learning platforms especially as AI and ICT is continually evolving.

Innovation, engagement and inclusion

- An “innovation model” is needed to continue testing and adapting the right model of e-learning in each country. An approach for maintaining agility and action within formal systems needs to be taken into account in future design.
- Changing the e-learning platform breaks current momentum and interrupts emerging confidence, familiarity and use of materials, which is still not robust. A clear pathway is needed without interruption from user perspective, however the cost of the current operating model is high. It is important to understand how teachers would feel about changing the platform.
- Opportunities for e-learning to drive inclusion are not realised in the absence of a strategic framework and progress across national education systems. National frameworks and guidelines should be developed, with technical support to connect to global best practice.
- Quality teaching materials: concerns about quality and coherence with national curricula undermines (time-poor) teacher uptake of materials available through e-learning programmes. Address this by identifying agreed standards and formal approval by national curriculum authorities. Co-design is critical to ensure contextually appropriate, quality materials, but it may be difficult to ensure quality at scale. Curriculum development co-design should be staged in line with available trusted technical support. Development of quality, co-designed materials draw on both regional and national level contributions and need to be strongly coordinated regionally and integrated into Ministry plans to ensure activities are resourced at national level.

Regional coordination

- Proliferation of overlapping initiatives by a range of government and non-government stakeholders is undermining value and effectiveness. Regional coordination platform and national ICT 5-year plans are required.

Security and infrastructure

- Ongoing poor internet coverage undermines equitable access to benefits of digital inclusion within and between countries. This should be continually monitored and technology and offline/hybrid solutions tested, including hybrid training and support options for teachers. This is also relevant to disaster contexts, ref. impact of Cyclone Judy.
- Cyber-security: systems and capability to protect materials and users requires sophisticated capabilities and resources.

Recommendations for PeP Phase I extension phase

The remaining months of PeP Phase I provide the opportunity to test, clarify and respond to key questions that will underpin the design of a sustainable, scaled-up PeP Phase II that responds to the current context for e-learning and digital inclusion. These recommendations are based on the evaluation findings around the lessons learned through successes and challenges of implementation, as well as assessments of gaps in knowledge that may undermine effective strategic decision-making by MFAT and national partners.

1. Teachers engaging in Communities of Practice: Maintain the focus on strengthening teacher COPs and reassess strategies for teacher engagement and support by end of PeP to inform Phase II design. PeP is aware that teachers need and value support to develop their skills in TPACK and has provided a wide range of support to reach teachers, tailored to needs of schools in different contexts. However, attendance is low with possible barriers including teachers' limited time, connectivity issues and low awareness of the COP. Other areas to assess include incentives for participation in COPs and teacher support offered through PeP more broadly, such as formal recognition of participation and learning. Opportunities to engage teachers more actively in shaping e-learning may also generate more engagement, as demonstrated by other e-learning programmes such as PNG-Aus Partnership Secondary Schools Initiative (PASS). (See annex 1).

2. Teachers confidently using e-learning resources for teaching and learning: There is a perception among stakeholders that PeP materials may not fully align to national curricula, which undermines teacher confidence in relying on PeP materials despite PeP efforts from the outset, including consultation with Ministries and curriculum divisions to ensure alignment. PeP however does not cover every subject in the science curriculum, so teachers need to use both PeP and traditional resources to ensure full coverage for students. PeP is taking steps to clarify the alignment in each country via changes to the app and processes for ongoing engagement with relevant department staff. A public-facing event such as an official launch would also build visibility and awareness around the level of alignment.

3. Regional quality assurance mechanism (formerly Regional Repository): Facilitate a reflection process between USP, Catalpa and MFAT by end 2023 to assess progress, results and future potential at end 2023 as this work has only recently started. In parallel, MFAT should review the strategic contribution of this component to PeP, to clarify its contribution to the theory of change and overall PeP outcomes.

4. Assess Cook Islands progress, outcomes and engagement by end 2023, given long delays at start-up and lack of progress to date. At time of writing only 1 school is participating in the Cook Islands. PeP has provided strong support and the Cook Islands Pacific Science Fellows participated actively and enthusiastically in developing materials for the app, however the programme has been beset with staffing and logistical challenges. Country engagement will be a criteria for taking PeP forward in countries in Phase II.

5. Theory of change and PeP MERL framework: Update outputs to reflect the changes to the Regional Repository output, and dependent outcomes, and clarify that COPs are for teachers, not Fellows. Track and report on device and equipment redundancy, if possible by using the systems introduced by PeP.

Strengthen metrics around use of Pacific Learn e-learning resources as this is a key metric for PeP success. Understanding and addressing reasons why teachers may not or may not use the app (or any platform) are essential for impact and outcomes. Disaggregate and compare data for remote and connected schools; and define 'remote' for PeP to inform a better understanding of PeP's achievements in inclusion, by extending learning to under-served schools. Strengthen GEDSI analysis in reporting.

Recommendations for MFAT: Phase II design and strategy

PeP has demonstrated its value as a proof of concept by generating significant learning and surfacing underlying questions related to e-learning, digital inclusion and models for donor programmes to support e-learning in the complex and fast-paced space of technology and education in the Pacific. Initiatives involving technology are complex, dependent on skills and resources across technology and pedagogy, as well as larger systemic factors such as infrastructure and costs related to electricity and internet connectivity. MFAT is committed to innovation, inclusion and quality education, and the following recommendations are intended to assist MFAT to maximise the sustainability and impact of its investment.

PeP Phase II design

6. Undertake a consultative co-design process to identify the best option for transitioning and scaling PeP for Phase II: The evaluation identified three broad options for PeP Phase II, which need to be explored and tested through a standalone co-design exercise. As noted above, there are different risks, opportunities and costs associated with each option, in close consultation with relevant ICT, e-learning and pedagogy specialists from national education ministries, and across MFAT teams including ICT, inclusion and education. The evaluation identified additional information needed for decision-making, which should be available and used in the design process.

7. ICT Systems Strengthening: In consultation with national counterparts, articulate PeP's strategy for ICT systems strengthening for each country, clarifying scope and ambition for this outcome area. Clarify the extent to which PeP will go beyond strengthening systems for implementation of PeP and Pacific Learn app and how this maps against broader national ICT policies and plans, and identify ways to strengthen coordination and learning across other ICT development projects underway in the different countries. This will assist in clarifying assumptions, dependencies and expectations relevant for Phase II planning on ICT systems strengthening support.

This is linked to the evaluation's assessment that the PeP theory of change does not reflect a clear definition of e-learning or the role of the Pacific Learn app as PeP's identified tool for e-learning. ICT strengthening approaches assisted in ensuring quality, effectiveness and sustainability of the PeP using Pacific Learn, and went further to provide complementary tailored support based on ICT self-assessments and at Ministry request. To strengthen effectiveness, this strategy should be articulated more clearly so that successes can be captured, shared and replicated. End of programme outcomes should be adjusted to clarify the scope and targets, so that the PeP can fit with and align to Ministries' broader plans for ICT-enabled learning, including lobbying for or coordinating with complementary support where needed.

8. Teaching science more effectively: Materials developed by PeP are open-source and suitable for use with different platforms that countries are using or starting to use. MFAT should commission an independent cost-benefit assessment engaging an economist and ICT education specialist to work with Ministries and Catalpa to compare a range of e-learning platforms and options, to develop an options paper to assist Ministries and PeP Phase II to select the best option for their context. Usability, appropriateness for local context, data and server costs, maintenance, technical expertise, opportunity cost of changing away from the current model, local capabilities, and popularity of the app are all factors to consider.

Recommendations for MFAT

PeP Phase II design (continued)

9. Teachers have enhanced TPACK for science: Assess the feasibility of aligning PeP TPACK activities with national teacher training processes and certifications to incentivise teachers to use and engage with materials. Strengthen the quality of the micro-courses for teachers.

10. Gender equality, disability and social inclusion: Strengthen visibility for PeP's approach to and commitment to GEDSI, noting that there are strong foundations in the design and support for gender equality and disability inclusion in the partner countries. Explore the opportunities to use PeP more actively to strengthen inclusion, including reaching children with a disability, remote schools, and children of all genders. Undertake a PeP GEDSI analysis, consulting with affected groups, to identify inclusive strategies and targets that will strengthen GEDSI in PeP for Phase II.

11. Theory of change and PeP MERL framework: Review the theory of change and MERL framework to clarify PeP's scope in terms of e-learning and ICT systems strengthening, explicitly reflecting the PeP's specific model for e-learning and role of the Pacific Learn app in outputs, outcomes and indicators.

In Phase II strengthen assessment and reporting on teacher learning outcomes through the app to inform improvements to quality of materials and strategic decisions about the future of the TPACK component of PeP. Revisit the feasibility of tracking changes in student performance in national science assessments.

Recommendations for MFAT

Strategy and policy direction

Internal facing – moving ahead

12. MFAT should work to build on its position as an early supporter of e-learning innovation and develop a clear policy position related to the distinct but related fields of digital inclusion in education and e-learning in Pacific Island Countries, which captures the significance of digital inclusion and e-learning for education now and in the coming years. This research should used to strengthen awareness and support planning in consultations across involved departments, including but not limited to the education, inclusion and DEVECO teams and Posts. MFAT should use this to clarify objective, definitions and overarching goals related to e-learning and digital inclusion.

13. MFAT should use the experience of PeP to start discussions within the department to promote awareness of e-learning as an essential tool for 21st century education across sectors within MFAT.

14. The Education team should consult with Posts to identify a roadmap and support needed to transition e-learning into national programming. This will look different in each country but is likely to require ongoing technical support through expertise embedded within education ministries.

15. Undertake internal discussions to explore how best to separate regional and national aspects of PeP for Phase II: to embed applied elements within countries (national/bilateral programming); and maximise the contribution of regional support for coordination and cross-learning between countries (regional support). This could include leading efforts to improve coordination of support from donor partners across different ICT projects.

External facing – enabling environment for sustainability and impact

16. MFAT Education team should tailor and use the above position paper to research and promote e-learning, digital inclusion and PeP outcomes at high levels within Education Ministries and MFAT to build understanding and support dialogue on the potential for ICT for different country contexts, and to strengthen commitment to progressing PeP and digital learning initiatives

17. Where countries are undertaking strategic education planning, actively engage to integrate e-learning for digital inclusion within national education strategies, noting both that e-learning is a tool to strengthen basic education and the risks posed by digital exclusion in the 21st Century in terms of both human and economic development.

Acknowledgements

The evaluation team would like to thank the representatives of the participating country governments from Vanuatu, Samoa, the Cook Islands, and the Solomon Islands as well as New Zealand's Ministry of Foreign Affairs and Trade (MFAT) in Wellington and at the Posts in Solomon Islands, Vanuatu and Samoa, Nanogirl Labs, and Wintec. The team would like to acknowledge the contribution of the two Vanuatu school communities who participated in face-to-face data collection, immediately prior to Cyclone Judy.

In particular, the team would like to thank Vena-Liz Upton for her support and critical input during the evaluation process, and the team at Catalpa International for the time and effort put into sharing information, insights and experience.

The evaluation team appreciates the high level of support and engagement it had from all the people and institutions with which it interacted.

TETRA TECH
International Development

Annex 1
Pacific Learn app: technical assessment

The evaluation ICT in education specialist reviewed the Pacific Learn app to assess the app's quality in terms of content relevance, instructional design, appeal, functionality and resourcing.
The assessment is presented here.
A case study presents lessons learned from another model of e-learning through DFAT's PNG PASS programme.

Pacific Learn app: high quality with opportunities to improve

TETRA TECH International Development

Content and interface

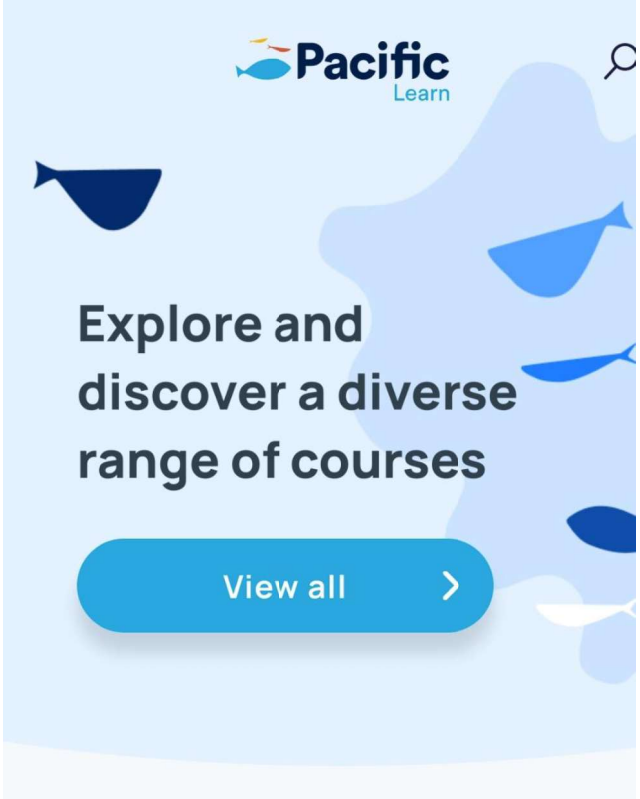
Criteria	Assessment
Functionality, Ease of Use, Appeal, Accessibility	• Attractive and aesthetic UX • Simple, clean design that is easy to navigate • Appropriate for users with entry level digital fluency • The experience is better when the user is online • App remembers user login
E-learning Content	• Reliable, curated content in a central location • Well-structured for users to engage as learners • Co-design of science topics is reflected in materials which demonstrate local Pacific perspectives • Lessons design (plan, teach, extend) in teaching activities is well structured as a guide to support student learning • Structure of content for TPACK is simple and clean with entry level rigour. Assessment of teacher learning is surface with superficial questions related to content acquisition

ICT systems

Criteria	Assessment
Management and Data	• A well-designed data dashboard and analytics enables tracking of impact and reporting • Opportunities to improve with more qualitative teacher reflection on content
Evolving Technology and Maintenance	• Velocity of change across global technology is a consistent threat for all applications • High volume and costs of maintenance: interface, version control, updating content and functionality • Ongoing build and maintenance requires specialist capacity of skilled app developers
Integration and Cost of Support	• Integration to country systems is possible but complex • On-costs are significant • External support required for the foreseeable future for app 'backend' functions

Opportunities to improve

- Offline functionality: it works better online
- Access to general content for non-registered users
- Collaborative functions enable users to participate more in a community approach to learning
- The assessment of learning (courses for teachers and ministries) are surface strategies used to assess content acquisition (yes or no responses) which should be strengthened.
- Further detail is required to quality assure the functionality of all links in both online and offline modes. Several links do not work (additional resources – missing content/student assessment in one teacher activity has no option for students to demonstrate a positive outcome, which negatively biases the data represented on the dashboard / offline mode icons exist where there is no functionality to download resources from external online sites).
- App enables limited opportunities to progress broader transferable digital literacy skills compared to laptops.
- Opportunity to make more explicit links between principles and practice in 'Courses' and 'Teaching Activities'.
- Opportunities to improve digital literacy and fluency of educators as digital citizens and also designers of learning (beyond being an end user of one type of technology), noting PeP complementary initiatives include training in Zoom, Google meet and calendar, sharing best practices on social media and buddies for teachers with lower digital literacy.



Lessons learned in Papua New Guinea
(Secondary and Higher Education)

TETRA TECH International Development

- The use of Google as a universally accessible and free platform enabled equitable access for students, teachers (school-based teams) and system leaders at all levels from all provinces. Most professionals in PNG have existing Gmail addresses.
- By providing easily accessible online tools, more localised approaches to capacity development are emerging across 12 provinces (PASS), and 6 Higher Education Institutions (STEM Nau). Local and internal capacity has leveraged and accelerated professional and student learning, enabling the conditions for more sustainable and context-relevant approaches to capacity development within provinces and respective institutions.
- Broad use of free Google applications used in synergy with WhatsApp is effective as a sustainable mechanism for all activities, and teams are now exploring other online collaborative tools (Miro etc)
- Mobile handsets are practical and effective for access. Low-cost refurbished Chromebooks change the way educators work, learn and collaborate.
- Partnership with Lite Haus International has enabled the procurement of very affordable refurbished Chromebooks (flex) and; Niunet, which provides a Niunet Box (similar to a RACHEL - Remote Area Community Hotspot for Education and Learning) a local solution to provision regardless of power supply and internet access.
- In-country support for face-to-face capacity development and establishing strong community relationships with Capacity Development Specialists enabled the integrity of broader online models and PLN/CoP.
- Open-source Websites with all learning resources accessible to the public enable the capacity development of educators beyond the partnership teams.
- Initially supported the installation of GenSat and Fibreoptic; however, the connection of the Coral Sea Cable and installation of infrastructure (towers) has changed the ease of access across the country. The costs associated with data are ongoing.

PNGAus Partnership Secondary Schools

PASS EOPO
(1) Improve Secondary School (STEM Education) capability (government reform) (2) Empower Leadership (women) (3) PNGAus Public diplomacy.

STEM nau! Community of Practice

STEM Nau CoP EOPO
(1) Improve Higher Education Capacity (STEM Education) (government reform) (2) Empower Leadership (3) Sustainable mechanisms for cross-institution collaboration

Annex 1: List of Stakeholders Consulted

Stakeholder	Method	Role in the Pacific E-learning for Science Programme
New Zealand's Ministry of Foreign Affairs and Trade (MFAT) – Education Division	FGD	Strategic oversight and governance of the PeP - working with Catalpa International as well as focal points from the various Ministries of Education across the four partner countries – Vanuatu, Samoa, the Solomon Islands, and the Cook Islands
MFAT DEVECO Division – Digital unit	KII	
MFAT Posts – Vanuatu, Samoa, Solomon Islands	KII	Represent New Zealand's interests in the country by working closely with the respective MoEs and the local PeP team to ensure smooth implementation and coordination
Catalpa International (4 team members)	KII	Responsible for implementing the PeP
Wintec	KII	Implementing Partner
Nanogirl Labs	KII	Implementing Partner
USP Centre for Flexible Learning	KII	Implementing Partner
Ministries of Education (Focal Points) – Vanuatu, Samoa, Solomon Islands, Cook Islands	KII	Key points of contact to ensure smooth implementation and coordination between the partner countries, MFAT, and Catalpa
Pacific Science Fellows – Vanuatu, Samoa, Solomon Islands, Cook Islands	FGD	Provided local perspectives and examples in the review of the Pacific Learn content to ensure strong suitability to the local contexts
Phase 1 School teachers and principals – Vanuatu, Samoa, Solomon Islands, Cook Islands	Online Survey	PeP Participants
Phase 1 Year 10 students - Vanuatu, Samoa, Solomon Islands, Cook Islands	Online Survey	PeP Participants
School teachers and principals in two schools – Vanuatu	Interviews	PeP Participants
Year 10 students in two schools – Vanuatu	FGD	PeP Participants

Annex 2: Document reference list

Primary Reference Documents

Key Programme documentation reviewed	
Catalpa International	**MFAT**
E-learning for Science in the Pacific- Request for Information	Activity Concept Note: Science e-learning
Pacific Learn Metabase (Cycles, 1, 2 and 3)	Aggregated data from MFAT July 1 2021 to 30 December 2022
PeP Activity Description and Implementation Plan	AMA E Learning July 2021- October 2022 Final
	Cover note for Pacific Multi-Country Governance Group, 22 August 2019
PeP Activity Design Document	E Learnings for Science in the Pacific AMA July 2021
PeP Inception Report	Education and Training slide deck
PeP Progress Reports and Annexes (Q1 to Q8)	Education Multi-Country Programme Business Case
	e-learning for science in the Pacific: Activity Design and Implementation Plan
	Email: RE: e-learning activity consultation
	NZAID AMS - Programme Activity Authority - Crown Expenditure

Annex 3: Document reference list

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Annex 4: Some practical considerations and questions

Continue with minor adjustments or a comprehensive redesign?	Pros	Cons
Build on progress in current countries, where sufficient engagement is demonstrated.	Strong advocates for PeP in-country	Questions around financial sustainability and integration into National plans
4 countries max: it's challenging to manage across contexts. A design could assess the feasibility of bringing in a new country, if MFAT is approached with a request (strong engagement and interest is essential).	Value of building on success of co-design process for materials that are popular and meet a clear need	Concerns about coordination with other e-learning initiatives
New subjects and year levels with materials developed using PSF co-design; a process to select on the next phase to be agreed across participating countries due to the benefits of cross-learning.	Pending stronger assessment of teacher utilization, PeP offers a largely popular approach that teachers like and meets needs, noting challenges with connectivity	Challenging to manage from NZ as a regional program
Build on PeP success to expand the work on co-design with Pacific Science Fellows and partners Catalpa, Nanogirl and Wintec to other subjects as identified by Ministries.	While ICT readiness is still emerging nationally, PeP is a spearhead to maintain engagement in a hands-on way that is directly affecting T&L for subject areas	Questions about impact connected with questions around MFAT and countries' vision for digital learning and digital inclusion
Drop Regional QA mechanism unless it proves its value – too complex and the strategic contribution is not very clear/ strong at this stage	With continued strong national -level support from ICT specialists PeP is being implemented effectively	
Determine whether the Pacific Learn app is the right platform for the participating countries and whether it is feasible for PeP to support differentiated approaches.		
Clarify scope and ambition of PeP's ICT systems strengthening strategy.		
Clarify digital inclusion strategy and priorities with each country: what do they want to achieve?		
Make improvements to quality of some aspects of the app.		
Work towards greater strategic alignment with national curricula and certification for teacher support and learning materials.		
Consider a greater role at regional level for coordination through PacREF		
Assess potential for splitting PeP across national programming and regional programming, or a hybrid model		