Structured access to curated open educational resources aligned to national school curricula: An experiment in the Commonwealth member states in the Pacific region

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Abstract

We have been witnessing a global experiment in delivering emergency remote teaching using distance learning, internet, web and related technologies, since the World Health Organization announced its assessment that 'COVID-19 can be characterized as a pandemic' on 11 March 2020.

The shift to digital has made more teachers and institutions realise the importance of structured access to open educational resources (OER) – learning materials having open licenses. However, availability of OER in a structured way alone, though important, may not increase the use and re-use by teachers and learners. Research evidence suggests that OER use is maximized when they are contextualised for local needs. A survey conducted by COL and the OER Foundation in 2020 highlighted the need for curated OER aligned to national and institutional curricula.

Since much before this unprecedented situation, the Commonwealth of Learning (COL) has been promoting the use of open and distance learning (ODL) to help build more resilient education systems. With a view to helping teachers and learners in the Commonwealth member states in the Pacific region have access to curated OER collections aligned to their national curriculum, COL and PACFOLD with the support of the Ministry of Foreign Affairs and Trade, New Zealand created a platform using EPrints – open-source software developed by the University of Southampton. The platform hosts nationally-defined OER collections with the flexibility of having choices of access points based on the local curriculum taxonomy. At the same time, by defining individual OERs in the collections using structured metadata schema, the national level collections ensure metadata level interoperability.

This paper presents the preliminary findings from a pragmatic attempt to support engagement with OER in the Commonwealth member states in the Pacific region. It also provides insight into the underpinning principles and architecture of the platform, the choices of access points associated with the OER collections, and the metadata schema used to define the collections. The authors of this paper discuss how teachers in the region can use or adapt the OER in the collections in their teaching, and share OER developed by them with all possible users as they respond to the COVID-19 pandemic by moving to remote, blended and/or online teaching. The authors also present the case of the Ministry of Education in Fiji which has started using the platform to organise a collection based on its national curriculum framework.

Keywords: Curated OER, Structured Access, National Curricula, Pacific

Introduction

Since its formation in 1987, the Commonwealth of Learning (COL) has been promoting the use of open and distance learning (ODL) to enable learning opportunities for the youth and adults that could not get access to traditional campus-based education. Of all the Commonwealth regions, ODL can play a particularly significant role in the Pacific where 'remoteness' is a challenge. The region has small island developing states and their population is scattered in rural and outer island locations with limited access to secondary and post-secondary opportunities. In addition, natural calamities such as tropical storms, volcanic activity, tsunamis and drought often disrupt the campus-based education provision in the Pacific Island Countries (PICs). The COVID-19 pandemic has exacerbated these already challenging circumstances.

ODL in the Pacific

The Pacific region has many leaders in education who support the 'development, progress and establishment of ODL' programmes (Bossu, 2017). The potential of technology-enabled learning in particular to address some of the challenges facing campus-based provision in the Pacific region has been recognised for some time (Kala, 2013; Kidu, 2018; Vaa, 2015). However, the potential of ODL in the Pacific remains relatively untapped (Hollings and Naidu, 2020; Mays, 2022).

During the pandemic, as happened elsewhere, the PICs also encouraged distance learning programmes using radio, television and the internet. However, students in the rural areas often faced barriers in participating in such programmes (Wilson, C, 2021) and these problems are not specific to this region but all over the world. Distance learning experiments around the world have exposed the existing inequalities among regions and countries in terms of access to technology and produced a mixed bag of results.

A 2021 study says that access to internet is better at the higher education level and indicates that a growing number of students in the Pacific region have access to digital devices and internet (Johnson, et al., 2021) which would make expanded use of technology-enabled ODL more feasible. Another World Bank report says that in the Pacific Island States (PICs), "there is potential for greater use of telemedicine and remote learning" and "health and education services are likely to also experience a shift toward digital-based delivery as a result of COVID-19" (Arahan, et. al., 2020). As the recent analysis of the World Bank on remote learning during the pandemic suggests, "hybrid learning is here to stay" (The World Bank press release, 2021). It seems likely that this will be the case in the Pacific as well.

It is imperative for all countries to learn from the local and global distance learning experiences gained during the pandemic, and build on the positive practices that have emerged. Improving the access to internet, and building resilient 'open education systems' that would enable youth to access quality distance education, access to quality Open Educational Resources (OER) for all possible remote learners seem likely priorities for the PICs.

Immediate response to COVID 19 in the Pacific

Thanks to the COVID-19 pandemic, there is a greater acceptance among those who are involved in education delivery that structured access to OER is key to the success of remote/distance learning programmes. OER can improve the effectiveness of ODL provision and reduce the cost. In general, access to quality OER improve the learning outcomes (Colvard, et al., 2018; Hilton, 2020) of ODL participants.

With a view to enhancing the capacity and efficiency of Pacific education sectors through greater use of innovative delivery mechanisms and technology, COL has initiated a project with the support of the Ministry of Foreign Affairs and Trade, New Zealand, and PACFOLD Learn -hosted by the University of the South Pacific - which is a partnership of practitioners and researchers in flexible and open learning. The initiative focuses on four areas viz. (1) Immediate response to COVID-19, (2) Supporting youth employment, (3) Building resilience in Pacific Education Systems and (4) Supporting Activities.

This paper discusses the developments regarding area 1. As an immediate response to COVID-19, the partnership supports the PICs in two ways: professional development for teachers in distance learning; and access to Open Educational Resources (OER) to support distance learning.

Courses on OER for Online Learning

The partnership offered three short introductory courses on 'OER for Online Learning' between March and November 2021, as the first of several strategies to support the teachers in the PICs. The objectives of the courses were to provide teachers with guidelines for teaching online using OER. From the feedback received, it was made clear that the courses served as a useful foundation for teachers on which more in-depth learning could subsequently be built. The partnership therefore will conduct such courses periodically to support teachers while traditional schooling remains disrupted due to the ongoing pandemic or other causes.

To support use and development of OER, the partnership has also published how-to guides on Re-versioning OER and Integrating OER in Teaching.

A regional OER collection for PICs

The partnership also developed and customised a generic online OER collection using EPrints- an open source software developed by the University of Southampton < https://www.eprints.org/uk/ >. Extensive customisation was done in the basic EPrints (version 3.4.3) to make it suitable for hosting OER with different choices of access points. Particularly, a metadata schema was developed to define individual OER records and the files associated with the records.

EPrints has pre-defined metadata input-forms for 18 item types which include Teaching/Learning Resource. EPrints has specific metadata elements consolidated under 'pedagogic details' viz. Pedagogic type, Completion time, Task purpose, Skill areas and Learning level to define Teaching/Learning Resources. In addition to these, 6 metadata elements were added to capture information regarding Program, Learning outcomes, Syllabus, Effort needed, Access and Certificate. Also, metadata elements to define Curriculum level and year were also included. A generic subject tree was built to classify OER uploaded in the collection. This tree can be easily modified to include different subjects taught in the schools of PICs.

EPrints has the flexibility to create browse views (access points) based on the metadata elements which are captured during the submission of OER to the collection. One can discover OER of interest by year of publication, author of the OER, subjects under which the OER are classified, Curriculum Level and OER type. EPrints indexes both the metadata and the full-texts of OER (in case of text based OER) and it facilitates powerful simple and advanced search interfaces. One can further filter the search/browse results by the different facets.

EPrints has a Bazzar where plugins developed by the user community are displayed < https://bazaar.eprints.org/>. Two plugins available in the Bazzar were configured: APW theme plugin which is gadget-friendly for collection branding; and the statistics plugin which will help us get data about users of the collection.

Also the list of Creative Commons (CC) licenses available in EPrints by default were updated (Fig 1) so that one can assign suitable CC licenses to OERs.
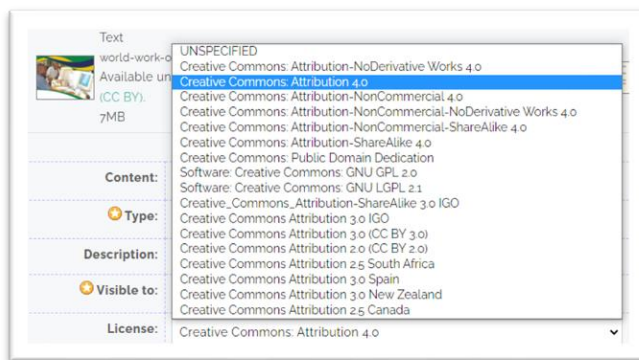

Fig. 1 List of CC licenses available in the customised EPrints

More than 250 sample OER were collated – which were published with open licenses, and produced by different individuals and institutions across the world. These were used to build a sample collection on the customised EPrints platform.

An expert was then commissioned to review the technical and organisational features of the platform. The technical team then incorporated all the suggestions given by the expert, such as changes in captions, changes in theme, and improvement in search interfaces and access points. Also, the platform was demonstrated to teachers in different countries in the region to get feedback from the intended end-users.

After testing, the platform was made available < https://staging.oer4pacific.org/ > to the ministries of education across the region to share with their teachers (See Fig 2).
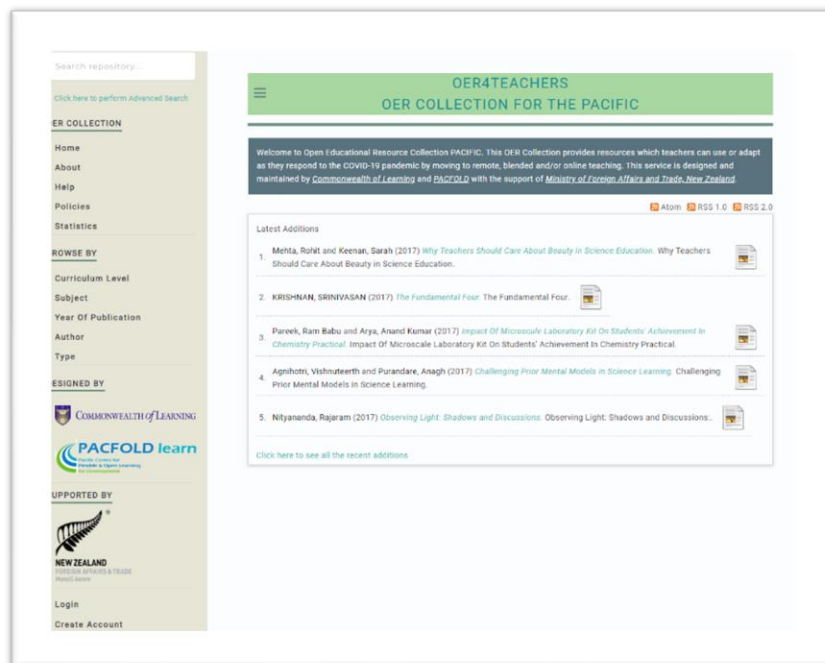
Fig. 2 Regional OER collection for teachers in the Pacific https://staging.oer4pacific.org/

Interoperable nationally-defined OER collections

A survey conducted by COL and the OER Foundation in 2020 highlighted the need for curated OER aligned to national and institutional curricula (Commonwealth of Learning, 2022). Though structured access to OER is essential, it may not increase the use and re-use by teachers and learners. OER platforms need to be contextualised for the local needs if they are to be used by the community. OER by nature are open to be adapted for different teaching needs and contexts.

Given the diversity in the national curriculums of PICs, it is inevitable that each country will need a structured OER platform which is tailored to align with the national curriculum. Hence, the partnership sought to develop an interoperable and curriculum-aligned OER collection 'grid' for the 9 PICs, and get it endorsed by the education ministries. This is to build trust among teachers in the PICs and make it more likely for them use the OER in the national collection.

The technical team exploited the features of EPrints, and created 9 instances of OER collections on the same regional platform for 9 PICs viz. Fiji, Papua New Guinea, Solomon Islands, Kiribati, Tonga, Vanuatu, Samoa, Tuvalu and Nauru. Each national instance was mapped with a unique URL. About 250 sample OER were uploaded in each of the national instances.

Table 1. URLs of regional and country level OER collections, No. of records and the No. of downloads

Country	URL	No. of records*	No. of downloads*
Regional Model OER collection	https://staging.oer4pacific.org/	253	823
Fiji	https://fji.oer4pacific.org/	200	724
Papua New Guinea	https://fji.oer4pacific.org/	255	322
Kiribati	https://kir.oer4pacific.org/	255	310
Nauru	https://nru.oer4pacific.org/	255	902
Solomon Islands	https://slb.oer4pacific.org/	254	104

Tonga	https://ton.oer4pacific.org/	255	286
Tuvalu	https://tuv.oer4pacific.org/	255	1221
Vanuatu	https://vut.oer4pacific.org/	255	340
Samoa	https://wsm.oer4pacific.org/	255	104

*as on 11 Apr. 2022

Each collection has workflows for administrative and editorial functions. The collections have dashboards for download statistics. An analysis of the download statistics reveals that OER in the national collections have been used often (see Table 1).

Interoperability among national OER collections

Since the nationally-defined collections comply with an interoperability protocol called Open Archives Protocol for Metadata Harvesting (OAI-PMH) <https://www.openarchives.org/pmh/ >, the individual collections can seamlessly interoperate with each other and form part of the regional and international OER network of collections that comply with the same protocol. National collections are not left in silos.

Individual instances act as a 'data provider' and they expose metadata to service providers in a structured way. The 'service providers' (metadata harvesters or search engines) can harvest metadata from the individual instances and index them to provide a single interface for users. The partnership will build a search engine layer soon and harvest metadata from the instances periodically to build an index.

The underpinning OAI-PMH structure model is depicted Figure 3. The benefit of interoperability among OER collections is that it will increase the visibility of OER uploaded in the national collection to all possible users in the region, as well as to users in other parts of the world, as metadata of OER in the collections are exposed to search engines like BASE < https://www.base-search.net/ >and other popular search engines. A teacher in a PIC can search across the national collections and discover relevant OER developed by teachers in other PICs.
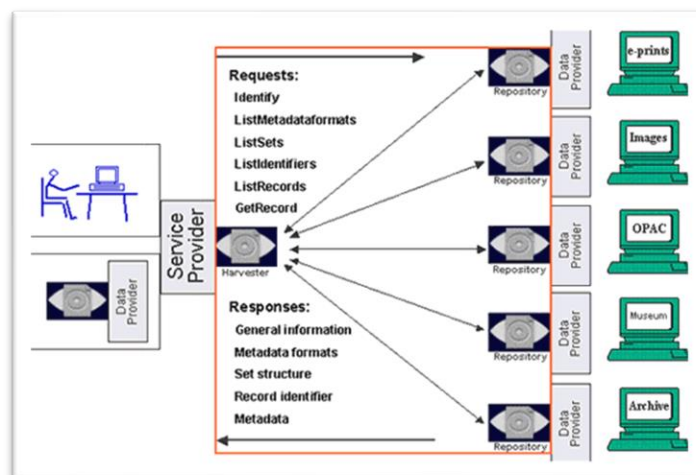

Figure 3. OAI-PMH structure model < http://www.ukoln.ac.uk/metadata/oa-forum/tutorial/page3.htm>

Contextualising OER collections – the case of Fiji

Though the national instances share a common metadata communication framework and a few other features among themselves, individual instances can be further customized to suit the national needs. The partnership reached out to a few national education ministries including Fiji, and demonstrated the features of OER collections and their effectiveness in OER delivery. The education ministry in the Government of Fiji came forward to use the collection

designed for it < https://fji.oer4pacific.org/>. The Ministry delegated two IT professionals within the Ministry to work with the technical team to reconfigure the Fiji collection to reflect the national curriculum.

The Fiji team wanted three important changes in the collection design:

(1) distribute OER records based on 7 curriculum levels and change the names of curriculum levels according to the national framework (see table 2) < https://fji.oer4pacific.org/view/curriculum_level/curriculum=5Flevel.html>;

(2) develop an access point by curriculum year (or class) <https://fji.oer4pacific.org/view/class/>;

(3) and have a comprehensive subject classification schema based on the national curriculum of Fiji to classify OERs by subject < https://fji.oer4pacific.org/view/subjects/subjects.html >. The technical team therefore customised the repository again, and incorporated these requirements.

After several rounds of online workshops on technical management of the platform and collection management in the same, the Fiji team has become well-versed in managing the platform and the collection. The Ministry team members are now capable of managing the system on their own. Fiji team members are re-distributing the OER records according to their national school curriculum framework and they are going to launch the collection soon.

Table 2 – Curriculum levels in the generic OER repository and the Fiji repository after reorientation

Curriculum level – Generic collection	Curriculum level – Fiji collection
- Junior Secondary - Lower Primary - Post school transition - Post secondary - Senior Secondary - Teacher Training - Technical and Vocational Education and Training - Upper Primary	- Early Chidhood Education - Primary Level - Secondary Level - Post secondary - Post school transition - Teacher Training - Technical and Vocational Education and Training

Recently, the Flexible Open Distance Learning unit of Department of Education, Papua New Guinea (PNG) has expressed interest in using the collection designed for it < https://png.oer4pacific.org/ >.

Discussion

Technically the development of an OER collection grid for the Pacific is a very successful experiment. It demonstrated that it was possible to build a repository grid with minimum technology deployment. The initiative hosted 10 instances on one EPrints platform, with freedom to enable country-level administrators to customise their collections for their needs. Collections can be easily migrated to different servers. Since these collections follow a structured metadata schema, they ensure interoperability at the metadata level. This feature makes the individual collections form part of a regional/global network. It is hoped that as teachers become more familiar with using OER, and more confident about adapting OER, they will begin to see the potential in adapting OER created by teachers in other countries in the region rather than always creating something new.

The technical team has developed a prototype for a seamless metadata harvester which will systematically, and periodically, harvest metadata from these repositories and index them. This harvester will provide a single interface for users (in this case students, teachers, and other possible users) enabling access to OER in all the national collections. OER collections and a harvester as a pack can be replicated wherever needed at a relatively small cost for technical maintenance.

It is encouraging to see Education Ministries in the PICs coming forward to use the national collections which the partnership has built. Fiji has successfully repurposed the generic collection to suit its curriculum framework and the new collection is soon going to be launched. The Papua New Guinea Department of Education has also

expressed interest in reconfiguring their own nationally-defined OER collection. As suggested by Hylén (2021), national OER collections are likely to be sustained when they are used and maintained by a community of practitioners – a concept well-suited to the diverse cultures of the Pacific Island Countries as indicated by the growing engagement with the Wisdom Community of Pasifika Teachers https://www.pasifikateachers.org/.

Conclusion

It is believed that open, distance and flexible learning (ODFL) approaches can help the PICs to build more resilient education systems and Open Educational Resources (OER) are increasingly seen as a central component of ODFL provision. The work completed to date on developing a regional OER collection and nine interoperable national OER collections, which can be reconfigured to map to the national curriculum, show what is possible with a little innovation. Over the coming months, the partnership will assist other Ministries to take ownership of their national OER collections as and when they are ready to do so.

References

Arahan, R et. al. (2020), Pacific Island Countries in the era of Covid-19: Macroeconomic Impacts and job prospects https://documents1.worldbank.org/curated/en/835131608739709618/pdf/Pacific-Island-Countries-in-the-Era-of-COVID-19-Macroeconomic-Impacts-and-Job-Prospects.pdf

Bossu, C. (2017). Pacific Leaders in Open, Online and Distance Learning, Journal of Learning for Development, Vol 4, No. 1 https://jl4d.org/index.php/ejl4d/article/view/207

Colvard, N. B., Watson, C. E., & Park, H. (2018). The Impact of Open Educational Resources on Various Student Success Metrics. International Journal of Teaching and Learning in Higher Education, 30(2), 262-276. https://eric.ed.gov/?id=EJ1184998

Commonwealth of Learning, (2022), Open Educational Resources in the Commonwealth 2021, http://hdl.handle.net/11599/4009

Hylén, J. (2021). Open Educational Resources: Opportunities and Challenges. OECD. https://docs.intersearch.com.au/prosentientjspui/bitstream/10137/17756/1/interpublish41675.pdf

Hilton, J. (2020).Open educational resources, student efficacy, and user perceptions: a synthesis of research published between 2015 and 2018. Education Tech Research Dev 68, 853–876. https://doi.org/10.1007/s11423-019-09700-4

Hollings, M., & Naidu, S. (2020). Chapter 13: Developing Practice in the Pacific in T. Mays & R. K. Singh (Eds). Addressing the Learning Needs of Out of School Children and Youths through Expansion of Open Schooling (pp. 235- 256). Commonwealth of Learning (COL).

Johnson, J.B., Reddy, P., Chand, R. et al. Attitudes and awareness of regional Pacific Island students towards e-learning. Int J Educ Technol High Educ 18, 13 (2021). https://doi.org/10.1186/s41239-021-00248-z

Kala, S. S. (2013). ICT education in Fiji, issues and challenges faced by tertiary education sector: an empirical survey. Education Journal, 2(3), 91-97. doi:10.11648/j.edu.20130203.16

Kidu, C. (2018). Informal Lifelong Learning for Development in Papua New Guinea: A case study from the margins into the mainstream. Journal of Learning for Development, 5(1). Retrieved from https://jl4d.org/index.php/ejl4d/article/view/275

Mays T. (2022) Challenges and Opportunities for Open, Distance, and Digital Education in the Global South. In: Zawacki-Richter O., Jung I. (eds) Handbook of Open, Distance and Digital Education. Springer, Singapore. https://doi.org/10.1007/978-981-19-0351-9_20-1

The World Bank Press Release, (2021), New World Bank report: Remote Learning during the pandemic: Lessons from today, principles for tomorrow. https://www.worldbank.org/en/news/press-release/2021/11/18/new-world-bank-report-remote-learning-during-the-pandemic-lessons-from-today-principles-for-tomorrow

Vaa, L. R. (2015). A baseline study on technology-enabled learning in the Commonwealth Pacific countries: report. Vancouver: COL.

Wilson, C (2021), Pacific Community Warns of Threat to Education Retention in the Wake of COVID-19, Interpress Service, https://www.ipsnews.net/2021/08/pacific-community-warns-threat-education-retention-wake-covid-19/