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KEY POINTS

- Educators worldwide are developing a vast pool of educational resources on the internet, open and free for all to use; however, they are currently not fully leveraged to improve provision of global education.
- Governments and institutions should adopt an inclusive approach and register as Creative Commons affiliates to encourage educators to experiment with OERs at all levels of education systems as illustrated in the cases.
- The capacity of educators to effectively use OERs requires significant professional development with regards to both the use of ICT and multimedia applications and new pedagogy of effective online instructional design.
- Successful investment and adoption of OERs requires strong leadership and long-term commitment, as the return on investment can be low in the short term.
- OERs can be developed through partnerships, working with private sector partners with necessary experience and expertise, as illustrated in the case studies.
- High quality ICT infrastructure, reliable connectivity, and affordable internet connection can significantly help the adoption and use of OERs.
- Validating OERs for education quality is not easy, but peer and student ratings can be adopted to show benefits for teacher professional development and student learning.

OPEN EDUCATIONAL RESOURCES: ENHANCING EDUCATION PROVISION AND PRACTICE

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INTRODUCTION

Open educational resources (OERs), a disruptive technology, made their appearance in early 2002 as a promising tool for enhancing the quality of and access to education generally and higher education in particular. OERs were also perceived to have the potential to reduce costs by reusing learning materials. This brief draws on a study that reviewed the uptake of OERs and related activities in six institutions in Hong Kong, China; India; Malaysia; Pakistan; and Thailand.[1]

WHAT ARE OPEN EDUCATIONAL RESOURCES?

OERs have been variously defined by many, but perhaps the best description is a series of attributes put together by Educause[2] as follows:

- An OER typically is not a course that carries a credit or credits, although an OER may be used as whole or part of a course.

- OERs may include textbooks, course readings, and other learning content; simulations or games; quizzes and assessment tools; and other educational materials.

- An OER typically refers to electronic resources, including those in multimedia formats, and such materials are generally released under a Creative Commons or similar license that supports open or nearly open use of the content.

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Governments could boost quality of education and get a better return on their human capital investment by providing finance for the development of OERs and making them widely available.

- OERs can originate from colleges and universities, libraries, archival organizations, government agencies, commercial organizations such as publishers, academics, or other individuals who develop educational resources and are willing to share them.

- Content labelled as an OER often carries a license, usually a Creative Commons license that permits reuse under certain conditions and normally at little or no cost.

Creative Commons licensing is a new intellectual property recognition and attribution system that gives users certain freedom of use. The various permutations of Creative Commons licenses are described in Table 1.

The five most commonly exploited freedoms by OER adopters under Creative Commons licenses are:

- Reuse: Use the original or a new version of the OER in a wide range of contexts
- Remix: Combine or "mash-up" the OER with other OERs to produce new materials
- Revise: Adapt and improve the OER so it better meets the needs of the user
- Redistribute: Make copies and share the original OER or a new version with others
- Retain: Retain the right to make, own, and control copies of the content

Table 1: Creative Commons Licenses

The Creative Commons (CC) licenses attempt to achieve a balance with the "all rights reserved" regimes of intellectual property rights (IPR) regulations and conventions. The CC tools give everyone standardized ways of granting permission for use of their creative works without losing their rights of ownership. Licensees must credit the licensor and keep copyright notices intact on all copies of the work.	
CC BY	**Attribution** Allows others to reuse, remix, revise, and/or redistribute (4R) material, even commercially; most liberal and generous of licenses
CC BY - ND	**Attribution—Nonderivative** Allows redistribution for both commercial and noncommercial use, but original content must remain unchanged
CC NC - SA	**Attribution—Noncommercial – Share Alike** Allows 4R; revisions must credit originator of content and relicense under identical terms and may be shared for noncommercial purposes only.
CC BY - SA	**Attribution—Share Alike** Permits 4R; revised works must credit originator of content and relicense under identical terms and may be shared for commercial purposes.
CC BY - NC	**Attribution—Noncommercial** Permits 4R; derived works must acknowledge originator; redistribution for noncommercial purposes only
CC BY - NC - ND	**Attribution—Noncommercial—No Derivatives** Most restrictive license; permits only download of works, without change, and sharing with others; originator acknowledged

Source: https:// creativecommons.org/licenses/

OER ADOPTION CASE STUDIES

Adoption of OERs at the national and institutional levels in Asia and the Pacific region has not been extensive, but there are pockets of OER use emerging at the institutional, state, and national levels. A few of them have been successful in meeting the purposes of adoption, whereas others have had mixed results to date. Projects such as these provide lessons for and evidence to other institutions in the region; thus a summary of OER adoption in six cases drawn from Asia and the Pacific region is presented in Table 2.

Despite the hype of ICT and online learning, most developing countries are still grappling with the seminal construct of OER practices including awareness of Creative Commons rules associated with access and use, and policy development and implementation.

Table 2: Summary of OER Adoption in Six Case Studies

Hong Kong, China: The Open Textbooks Project of Open University Hong Kong (OUHK)	
Background	• The Hong Kong Special Administrative Region (Hong Kong SAR) of the People's Republic of China is committed to maximizing the potential of information and communication technology (ICT) to enhance its already world class educational system. As a society, its e-readiness ranks among the top ten in the world.
	• Textbooks play a crucial role in the teaching and learning in schools in Hong Kong, China. Unlike many other parts of Asia, consumers pay for their textbooks, and commercial publishers are the main suppliers of textbooks endorsed by the Education Bureau of Hong Kong, China.
	• Despite intense competition, the cost of textbooks has been increasing significantly above the consumer price index over the past decade.
	• An alternative to commercial suppliers is the development of digitized content created by the community and made available at no cost to users.
	• Through a generous grant from a philanthropist, OUHK was commissioned to produce a series of open textbooks for teaching English (grades 1–12), to make them available through the web at no cost to the user, and to allow flexibility to the teacher to revise and remix the content to fit the needs of the class.
Key Findings	• Teachers and students like the open textbooks, which are free.
	• Open textbooks are perceived as not any worse than commercial versions, but it is still too early to report if better learning outcomes are achieved.
	• Teachers, particularly those handling students with special needs, welcome the freedom to "massage" content to suit learner context.
	• Qualitatively, teachers find open textbooks as good as commercial ones in design, content, and pedagogy.
Policy Considerations	• The Hong Kong SAR is not averse to the use of e-learning provisions.
	• Hong Kong, China has its Creative Commons affiliate, which enables authors to use these licensing provisions for their works.
	• Neither the Hong Kong SAR nor OUHK has an explicit policy on OERs, notwithstanding that there is a Hong Kong, China affiliate of Creative Commons that creators of learning content may use.

Table 2 *continued*

India: The Karnataka Open Educational Resources (KOER) Project	
Background	• The Government of India and the provincial government of Karnataka are committed to using ICT to enhance access to education as well as to improve educational quality.
	• The Karnataka Department of Education recognizes that a requirement for successful enhancement of educational quality is more and better trained teachers.
	• The state, with support from the Central Government, has embarked on a major effort to improve the quality of teachers, with the Subject Teacher Forums being one such initiative.
	• The Subject Teacher Forums and the KOER Project bring teachers into a collaborative learning community, engaging them in accessing, creating, curating, and publishing OERs in the sciences and mathematics in support of their curricula.
	• The Wiki-based OER platform serves as a shared repository of teachers' creations, searches, and findings.
	• Teachers contribute their time to participate in and enrich the Forums by discovering relevant and current resources and sharing them with peers.
	• Within 3 years, the Forum for science, technology, engineering, and mathematics (STEM) teachers had some 3,500 participants, who exchanged some 35,000 e-mails, 84% of which had resources attached; some 549,541 page reviews have been added to the repository.
	• The Karantaka Department of Education leverages these engagements into a professional development exercise that is both dynamic and driven by the teacher community.
Key Findings	• Participating teachers are beginning to have a greater understanding of how resources can be meaningfully utilized in teaching sciences and mathematics.
	• There is a growing self-awareness among teachers of their own levels of knowledge.
	• Collaboration among teachers and sharing of resources are on the increase, albeit at a much slower pace than anticipated.
	• The KOER Project encourages a more open process of helping each other, critiquing, and commenting, and has helped each other's revisions of remixed content.
	• Shared resources among participants are actually being used in the classrooms.
	• Inadequate ICT infrastructure and provisions are serious inhibitors to a more active Forum.
Policy Considerations	• India has well-structured strategies to use ICT in education.
	• The Central Government is supportive of OER development and has recently announced its policy support.
	• States such as Karnataka are also expressing their willingness to support OERs and ICT for education.
	• The nation's ICT and associated utility infrastructure still leave much to be desired, especially in the rural communities.
	• India has its national Creative Commons affiliates.

Table 2 *continued*

India: The National Programme for Technology Enhanced Learning (NPTEL)	
Background	• The NPTEL is a national effort to produce and make available high-quality open STEM courseware for reuse in academically weak colleges of engineering and technology, especially in rural areas. • Full courses in STEM subjects are produced and licensed as OERs by the Indian Institutes of Technology and the Indian Institute of Sciences. • About 1.5 million students studying in the nation's 3,500 colleges of engineering and science located in semiurban and rural districts are beneficiaries of this effort. • While exact numbers regarding reuse of NPTEL courses have not been established, there is anecdotal evidence that many rural and small science and engineering colleges (currently about 980) are registered as clients of the NPTEL.
Key Findings	• Reusable NPTEL materials improve the quality of curriculum in poorly resourced colleges. • Teaching standards improve in colleges with poorly qualified or new and young academic staff; additionally, younger academics also feel empowered with the availability of content that they can reuse and revise. • Learners find the availability of NPTEL materials of added value in their own knowledge development. • NPTEL materials have opened the opportunity for greater self-learning efforts. • There is some indication that over a longer term cost benefits accrue; in the short term, such benefits are somewhat marginal. • NPTEL courses taught in the English language are seen as an impediment where the medium of instruction is not English, especially among those with poor English language abilities.
Policy Considerations	• The NPTEL's open licensing policies are good enablers for promoting greater use of OERs. • Those institutions wishing to adopt OERs as part of their program development must put in place clear policies on OERs to guide them. • India has its national Creative Commons affiliates.

Malaysia: Reusing OERs in Undergraduate Courses at Wawasan Open University (WOU)	
Background	• Malaysia has excellent ICT policies and infrastructure to support education at all levels. Its private higher education sector is active and aggressive in the use of ICT for teaching and learning. • WOU is a not-for-profit private university that is deeply engaged in open educational practice. • Annually WOU delivers up to 323 courses in up to 43 programs leading to degrees. • WOU has received national, regional, and international recognition for the quality of its programs and services to students. For two cycles running it has been included among the 35 highest rated universities in the country. • One of its biggest expenditure items, besides staff salary, is the cost of designing and creating self-instructional materials, which are mostly wrapped around standard textbooks supplied to students at no additional cost. • To reduce the development costs of its learning materials, WOU is dedicating itself to producing self-instructional materials using OERs as standard textbooks, without compromising the quality of the course content. • To date WOU has created five courses incorporating OERs. It expects all of its courses to be mostly wrapped around open textbooks and other OERs within the next 3–4 years.

Table 2 *continued*

Key Findings	• There has been considerable improvement in the quality of content with enriching mixed media materials. • Substantial cost and time efficiencies have been achieved in materials development. • There has been a noticeable improvement in pedagogy, as academics spend more time and show greater focus on the selection and design of appropriate content. • Liberation from an overdependence on textbooks is leading to reflective practice. • Learners are enriched by the content and the opportunity to explore beyond a rigid syllabus. • Learning outcomes seem better in some cases but certainly no worse than with courses not using OERs. • Significant long-term cost savings of course development are anticipated.
Policy Considerations	• Malaysia does not have a formal OER policy; many of the public universities and some private ones like WOU have formulated their own using Creative Commons licenses. • WOU has an institutional policy on OER that is strongly committed to embedding OERs in all of its teaching, learning, curriculum, and course development activities. • Policy statements also include a commitment to staff training and incentivization. • Malaysia has a Creative Commons affiliate.
Pakistan: Open Courseware at Virtual University Pakistan (VUP)	
Background	• Pakistan has ambitious ICT policies to support its educational systems. It uses broadcast radio and television to reach across the country in its literacy and livelihood education programs. • VUP is a relatively recent effort to further enhance access to higher education to meet the ever-increasing demand. • VUP was established in 2002 to produce and deliver courses using video as the main medium, delivered through four dedicated free-to-air satellite television channels. Since 2008, the University has also started making available its courses through YouTube on the internet. • In 2011, VUP launched its open courseware (OCW) site, giving unrestricted access for anyone anywhere in the world to its hundreds of individual courses. • Currently the University has about 100,000 individuals enrolled as formal learners in one of its 40 associate, undergraduate, and postgraduate degree programs. • The OCW content is attracting visitors from many parts of the world, including neighboring India. Courses from all 40 programs are available, and download statistics show figures as high as 435,000 (computer science) to as low as 1,500 (Urdu). • VUP has met all of the quality assurance requirements of the Higher Education Commission of Pakistan.
Key Findings	• VUP courses serve both formal and nonformal learners equally well. • Well-designed video lectures by knowledgeable academics, either broadcast through satellite-linked television channels or transmitted through YouTube, attract learners in large numbers. • The OCW from VUP in the sciences and technologies is highly popular among the Urdu-speaking diaspora. • VUP OCW is also accessed by learners from conventional universities. • Inexperienced and recent employees in academia are also beneficiaries of the free-to-access-and-use policy of VUP.
Policy Considerations	• Neither Pakistan nor VUP has a formal OER policy, which creates a high level of legal uncertainty among potential reusers of VUP courses. • In Pakistan there is an understanding that courseware from public institutions can be reused for noncommercial purposes without any legal restriction. • Pakistan does not have a national Creative Commons affiliate.

Table 2 *continued*

Thailand: Training e-Learning Professionals Using OERs at Thailand Cyber University (TCU)	
Background	• The Royal Government of Thailand uses ICT extensively in its efforts to promote education widely; it is also committed to providing lifelong learning for its people. Radio, television, and the internet are becoming important vehicles in this effort. • TCU is the nation's response to increasing access to lifelong learning through its e-learning portal. • TCU has some 194,000 registered students and provides them with access to 811 course items annually. The courses originate from all of Thailand's state-funded institutions of higher education and can be openly accessed. • Specifically to meet the need for highly qualified e-learning trainers, TCU launched its e-learning Professionals Training Program. The University developed and delivered a suite of 12 courses leading to three specializations. • Three of the 12 courses in the program are derived from OERs culled from the web and reused with modification to suit Thai students. A number of the other courses also accessed other web materials that were available as "open access" but not labelled as OERs.
Key Findings	• Using OERs has enabled TCU to expedite course development. • There is evidence of marginal cost savings in using OERs in the e-learning training program. Skilled users of ICT find the experience of adopting OERs enriching and empowering. • On the other hand, many also find that incorporating OERs into the curriculum is time consuming, as they have to search for appropriate OERs to fit into their lectures. Besides, many teaching staff also lack appropriate skills.
Policy Considerations	• Thailand has an open access policy but not specifically as a policy on OERs; this limits the extent to which academic staff and their institutions are willing to participate actively in OER efforts. • TCU does not have an OER policy; it may require one if it wishes to be serious in the adoption of OERs as a principal driver of lifelong learning. • Thailand has its Creative Commons affiliate.

EXPAND AND ACCELERATE ADOPTION OF OERS IN ASIA AND THE PACIFIC REGION

The six case studies highlight the range of options that become available to institutions and individuals when OER learning materials, freed from the restrictions of intellectual property rights regimes, are readily available. The freedoms to use, reuse, revise, and remix, along with creative ways in which practitioners can also repurpose content, open new horizons for practice. The emergence of the family of Creative Commons licenses has also meant that producers of content can be generous in freeing the content for global use without losing their ownership of it. To further promote and increase universal adoption of OERs by national/institutional education systems, interventions will be required from governments, education institutions, as well as international development agencies. Such interventions include the following:

• Develop legal or regulatory instruments to encourage and support the adoption of OERs including requiring open access to all educational material developed and published with public funding.

• Develop well-articulated policies supporting the adoption of innovations such as OERs into the system.

• Review copyright regimes and make provisions for licenses such the Creative Commons that accommodate the five freedoms of Reuse, Remix, Revise, Redistribute, and Retain encapsulated in OERs.

• Invest in developing higher level ICT skills in educational professionals; develop knowledge and instructional skills to search, locate, curate, and incorporate OERs into regular teaching and learning activities.

The OER regulatory framework should cover more than teaching and learning resources that reside in the public domain for free use and repurposing by others; it can also include knowledge products for innovation and research.

- Support ministries of education in the development of national and/or regional OER repositories with easy dissemination processes; this can start as institutional repositories and be gradually aggregated.

- Provide seed funding to encourage OER development as well to facilitate collaboration among educators to produce and share OERs.

- Build awareness of OERs in the educational community; organize policy forums for senior policy makers in education and legal services responsible for intellectual property rights issues both to raise awareness as well as to build knowledge of commons licenses.

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