



African Health
OER Network

Growing an Institutional Health OER Initiative:

A Case Study of the Kwame Nkrumah University of Science and Technology



Background

The Kwame Nkrumah University of Science and Technology (KNUST), located in Kumasi, Ghana, is the second largest university in Ghana, with over 23,000 students.

Guided by its slogan 'Nyansapo wosane no badwenma', translated as 'the knot of wisdom is untied only by the wise child', KNUST's vision is 'to produce high calibre graduates with knowledge and expertise to support the industrial and socio-economic development of Ghana in particular and Africa more generally'.



The College of Health Sciences (CHS) is the first of KNUST's six colleges to launch an OER initiative, supporting the production and use of Open Educational Resources.

CHS is made up of over 2,000 students, and comprises: the Faculties of Allied Health Sciences, Pharmacy and Pharmaceutical Sciences; the School of Medical Sciences; the School of Dentistry; the School of Veterinary Medicine; and the Kumasi Centre for Collaborative Research in Tropical Medicine.

What are Open Educational Resources?

Open Educational Resources (OER) are educational materials and resources offered freely and openly for anyone to use and under some licences to adapt, copy, and redistribute. OER can include course syllabi, presentation slides, image collections, animations, videos, textbooks, research papers, and self-assessments.

In November 2008, the William and Flora Hewlett Foundation sponsored a project to develop health OER through collaboration between African institutions.

The 2009 health OER project was a joint effort between OER Africa (which is an initiative of the South African Institute for Distance Education, 'Saide'), and the Colleges of Health Sciences at KNUST, the University of Ghana, the University of Cape Town, the University of the Western Cape and the University of Michigan.

In late 2009, the partner institutions submitted a successful two-year follow-on grant proposal to the Hewlett Foundation and launched an African Health OER Network, to foster a continent-wide network to share knowledge, address curriculum gaps and use OER to advance health education.



Over the past two years, CHS Provost Peter Donkor and Professor of Internal Medicine Ohene Opere-Sem have assembled a skilled team of staff and faculty from within CHS and across other colleges for OER production and advocacy. They have drawn in individuals who could speak to the multiple dimensions involved in developing openly licensed learning materials, including policy, content development, media production, content review, and web support.

This case study is the result of semi-structured interviews conducted in 2010 with teaching faculty, other staff, and students involved in OER activities at KNUST.

Interviewees (listed on the last page) gave their consent for the author to use their names and direct quotations, and their words are included here verbatim.

The study explores KNUST's experience with OER, highlighting the university's strategic priorities, achievements, challenges, production processes, and future plans, as well as participants' advice for others interested in creating their own institutional OER initiatives.



Strategic priorities

CHS identified three strategic priorities for health education, which are the basis for its OER activities.

Develop contextually appropriate teaching resources

Many medical textbooks and publications originate in Western countries, and therefore use photographs and examples that are not always suitable for the Ghanaian context. In addition to differences in local equipment or common practices, the manifestation of a disease may vary with skin tone.

When you look in textbooks it's difficult to find African cases. The cases may be pretty similar, but sometimes it can be confusing when you see something that you see on a white skin so nicely and very easy to pick up, but on the dark skin it has a different manifestation that may be difficult to see. Sometimes it is difficult for the students to appreciate when they see a clinical case that involves an African. I think that [locally developed] OER will go a long way in helping the students appreciate the cases that we see in our part of the world.

Richard Phillips, lecturer, Department of Internal Medicine

Increase student engagement with the local curriculum

Growing class sizes limit the in-person interaction between lecturers and their students. In order to supplement the limited time they have with students for classroom and clinical training, several CHS faculty are interested in creating interactive, self-guided learning materials that students can work through on their own and in their own time. The goal is to go beyond the standard PowerPoint lectures and to design dynamic, media-rich, stand-alone instructional materials. For this reason, KNUST distributes OER electronically, either online or via CD-ROM, which enables the students to access the materials on a computer at their convenience. Due to infrastructure challenges (e.g. bandwidth, power outages, and other challenges that are explored in more detail further on in the case study), offline and local area network access are essential to ensure student access to educational materials. CHS's primary goal has been to make these educational materials more readily accessible to its own students, but the open licensing allows it to reach students in other classes and faculty across departments within CHS, as well as health science students and educators around the world.

Classes used to be 35 students when we started [teaching 10–15 years ago]. Now it's gone all the way to 200 per class. It's a shock for the lecturer. OER gives the student the chance to flip through all of the materials and then prepare well ahead of time before the lecture. For the medical school and the clinical years, that interaction is a key priority. It will help the students to have one-on-one contact with some of these cases even before they come to the wards.

Richard Phillips, lecturer, Department of Internal Medicine

Strengthen the core curriculum

Given the limited in-person instruction time and faculty availability, it is difficult to cover all the necessary topics within the confines of the classroom and with locally developed resources. The provost and CHS faculty involved in the initiative view OER as an alternative method for delivering difficult topics to students, such as how to use an automated blood cell counter. In addition, the open licensing of OER allows CHS faculty to borrow and adapt health science resources developed by other institutions, and fosters both South-North and North-South flow of information. An OER module developed by a KNUST lecturer on the Buruli ulcer has already been used by the World Health Organization and by a professor at the University of Michigan.



Perceived benefits of OER

Instructional faculty and other staff at KNUST who create OER are driven by various perceived short-term and long-term benefits. While KNUST's health OER initiative is still in its infancy and limited evaluation has been done to date, the perceived benefits serve as the motivating factors for faculty and other staff.

Global visibility for faculty and the university

Creating OER means making materials publicly available at a global level, so CHS faculty and administration view OER as a way to enhance their personal and institutional reputations. Publishing OER presents an opportunity for faculty to showcase their expertise and for CHS to share its curriculum.

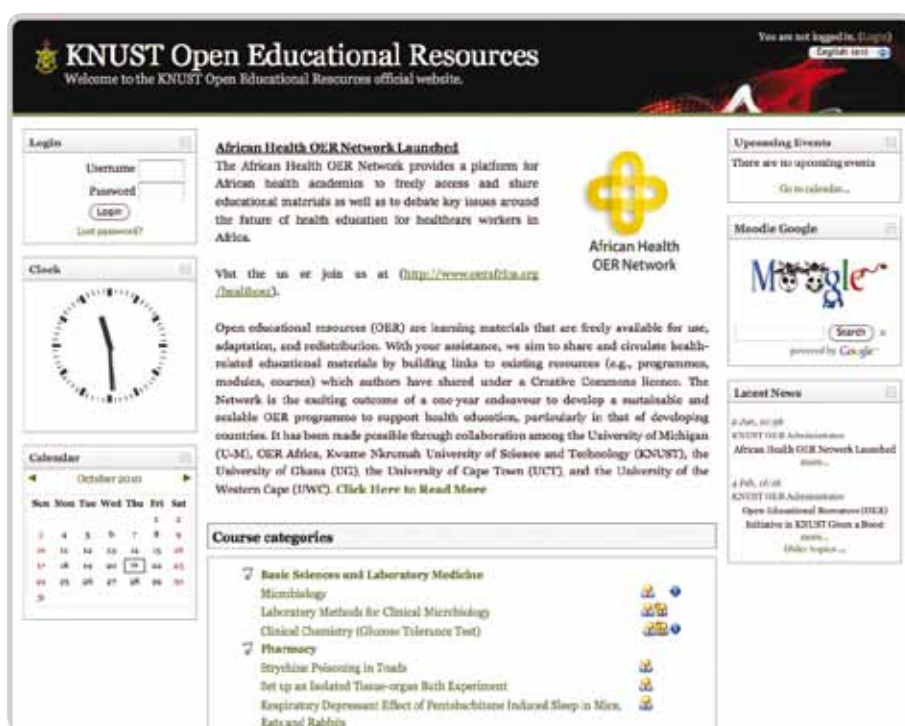
In late 2009, KNUST added a Creative Commons Attribution licence to the university's website footer as part of a broader strategy to use Wikipedia and Google to help increase the institution's web traffic. The KNUST webmaster believes that the licence is responsible, in part, for increasing the university's ranking in the Webometrics Ranking of World Universities.

It has made the university more visible because our OER are out there Lately KNUST is priding itself on being the best university in Ghana and this is partially based on the Webometrics ranking of the university's visibility. And OER have contributed, I think in a small way, towards making the university more visible.

Peter Donkor, provost, CHS

Increased student and educator access to educational materials

When OER are distributed electronically, they are easy to access via a computer, to copy, and to share. This is true of any electronic learning resources, whether openly licensed or not. The open licences associated with OER, though, make it easier to share materials with wider audiences. Rather than restricting access to enrolled students, OER are available to students and educators in a variety of settings. Students can, therefore, access materials developed by their own faculty, as well as from faculty at other universities. Students already share notes, study guides, and other learning materials with their peers. The goal of OER is widespread distribution, so sharing OER with classmates is not only legal but actively encouraged.



Expanded alumni access to KNUST content

The CHS provost views OER as a method for creating and sustaining the university's alumni networks. Alumni can use OER as a means of sharpening their skills, whether informally or formally (e.g. through continuing medical education), or simply to stay connected to their alma mater.

Lower cost for student access to educational materials

Unlike traditional textbooks and journals, OER do not require licensing fees. Although OER are not free to produce, they are free to access. There may still be a marginal cost for distributing OER (e.g. for printing or for removable media such as CDs), but it is a fraction of the standard licensing fees.

Decreased faculty time on materials development

Harnessing open content can reduce faculty time required to produce content. OER makes it easier for educators to preview how others in their field teach a given topic. Faculty can even use OER created by others – in whole or in part – to develop their own lecture slides or other teaching aids.



It has potential for sharing with other African institutions. I think if we were to decide to base the whole of the medical curriculum, for example, on OER, then what we could do is that we could identify a number of institutions around Africa who we have confidence in and say, 'Look, why don't you develop a programme in ob/gyn?' for instance. We would look at surgery, and another would do paediatrics and ... then we can meet and look at everything and see whether they meet our needs at our local institution. Just by working together, we could develop the curriculum, which we share, and it would make our lives much, much easier.

Peter Donkor, provost, CHS

Re-examination of local curriculum and teaching styles

At CHS, the OER initiative is viewed as a catalyst for pedagogical change. Instructors may use OER from elsewhere to inform their own teaching. Likewise, creating OER for a global audience may encourage faculty to re-examine their own teaching practices before codifying them as OER.

I think it's getting people here – faculty and even staff who are working on OER – to think at a certain level, because you know it's not only within your university now. Going through this process is making faculty think about things that they had done over and over again and had taken for granted. Now they are thinking about standards and about how to improve.

Nadia Tagoe, programme manager, CHS

Eased development of new programmes

OER may be particularly useful when a university is looking to expand its curriculum by offering new courses and degree programmes. OER allows faculty to preview how a topic is taught at other institutions. Open licensing allows faculty to contextualize and translate OER to suit local needs.

It will help newer institutions to also develop such programmes. If they want to set up a new medical school, they can just go to the website and look at all that needs to go into that and they don't have to reinvent the wheel. Even [for] the ones who reinvent the wheel, [it's] just with minimal effort. Many African institutions can actually work together on this. It has unlimited scope.

Peter Donkor, provost, CHS

Accomplishments

Over the past two years, CHS has adapted its academic practices and official policies to promote OER at KNUST.

CHS has also developed faculty and other staff expertise in content production and open licensing and fostered the creation of 15 comprehensive, interactive OER modules.

Proposed and passed institutional OER policy

One of the greatest accomplishments of the KNUST OER team is that it has successfully passed a new policy in support of OER. As is the tradition in many universities, faculty performance evaluation at KNUST was originally based largely on publication in peer-reviewed journals. The CHS OER team knew the reward structure needed to be revised in order to provide an incentive to faculty to devote time to creating teaching materials as OER modules. In early 2009, CHS established an interdisciplinary committee of faculty, other staff, and librarians across the university to examine existing faculty development and intellectual property policies. The committee drafted a new policy and began the process of moving the policy through three committees at different levels of the university administration. Both OER Africa and the University of Michigan provided input on the draft policy. The policy was approved in August 2010. As the policy states:

The purpose of the OER Policy is to:

- identify human resource[s] to support faculty in turning teaching and learning material into OER.
- clarify publication rights and policies regarding the use of required infrastructure (information technology, library, etc.) and other support services.
- define collaborations within and [beyond] the university and the intent to allow access.
- develop and review OER materials prior to sharing them on a worldwide scale.



The new policy formalized the role of the OER coordinator, as well as the technical support role of the Department of Communication Design (DCD). The university maintains copyright ownership for OER and other instructional materials developed. Instructors may, however, select the Creative Commons licence they prefer. Most notably, the policy established a reward structure for OER production: it proposed that faculty receive the same credit for OER modules as for peer-reviewed publications and that the university allocate time for faculty to devote to creating OER. Although the policy has been approved, the policy committee questioned whether there were adequate internal funds to support the part-time staff members who assist in media production. The committee recommended that the university continue to seek external funding for this, and also encouraged departments within CHS to earmark some funds for OER in their budgets.

Trained faculty and other staff in OER policy and production

CHS has organized several OER workshops since the launch of the health OER activities in late 2008. Through these workshops, faculty and other staff learned the basic principles of OER advocacy, open licensing, content production, and content distribution.

- In February 2009, KNUST convened representatives across CHS to propose topics for OER that would address curriculum gaps and/or showcase the expertise of its faculty.
- The same month, OER Africa and the University of Michigan conducted policy review and OER production workshops with KNUST library, technology, and health science faculty and other staff.
- In May 2009, the faculty from the February workshop reconvened to review the OER produced since February.
- In July 2009, two University of Michigan staff members conducted a small, hands-on multimedia and OER production workshop with faculty and other staff.
- In September 2009, KNUST brought together representatives from all 24 departments of CHS to propose additional topics for OER modules.
- In July 2010, KNUST brought together CHS and DCD staff and faculty to conduct a qualitative and technical review of the resources developed.
- In October 2010, the OER coordinator and a University of Michigan professor conducted an OER production workshop for faculty from CHS and the Colleges of Engineering and Science.



Completed and published OER modules

To date, CHS has completed 15 OER modules. Cary Engleberg, University of Michigan professor of Internal Medicine, spent a year-long sabbatical at KNUST (2008–09) assisting faculty with content development. Professor Engleberg is the co-author of seven of the completed modules.

Faculty have developed resources for microbiology, laboratory methods for clinical microbiology, a glucose tolerance test, the mental state examination, automated blood counts, Buruli ulcer, examination of pregnant patients, and eight pharmacy lab demonstrations.

The modules include learning objectives, animations, lab demonstrations, surgery videos, case studies, and self-assessment quizzes. All of these resources have been posted on the KNUST OER site (<http://web.knust.edu.gh/oer>) and on the African Health OER Network space on the OER Africa website (<http://www.oerafrica.org/healthoer>). An additional 18 modules are currently in development, and another 17 have been proposed for 2011.

Established infrastructure for OER production

In early 2009, Professor Opore-Sem was introduced to lecturer Adam Rahman from the DCD. Mr Rahman and Professor Opore-Sem agreed that the photography, video editing, and web design expertise of DCD would be great assets for OER production. Professor Opore-Sem acknowledged that multimedia support from DCD would relieve the CHS faculty of having to do both content development and technical production.

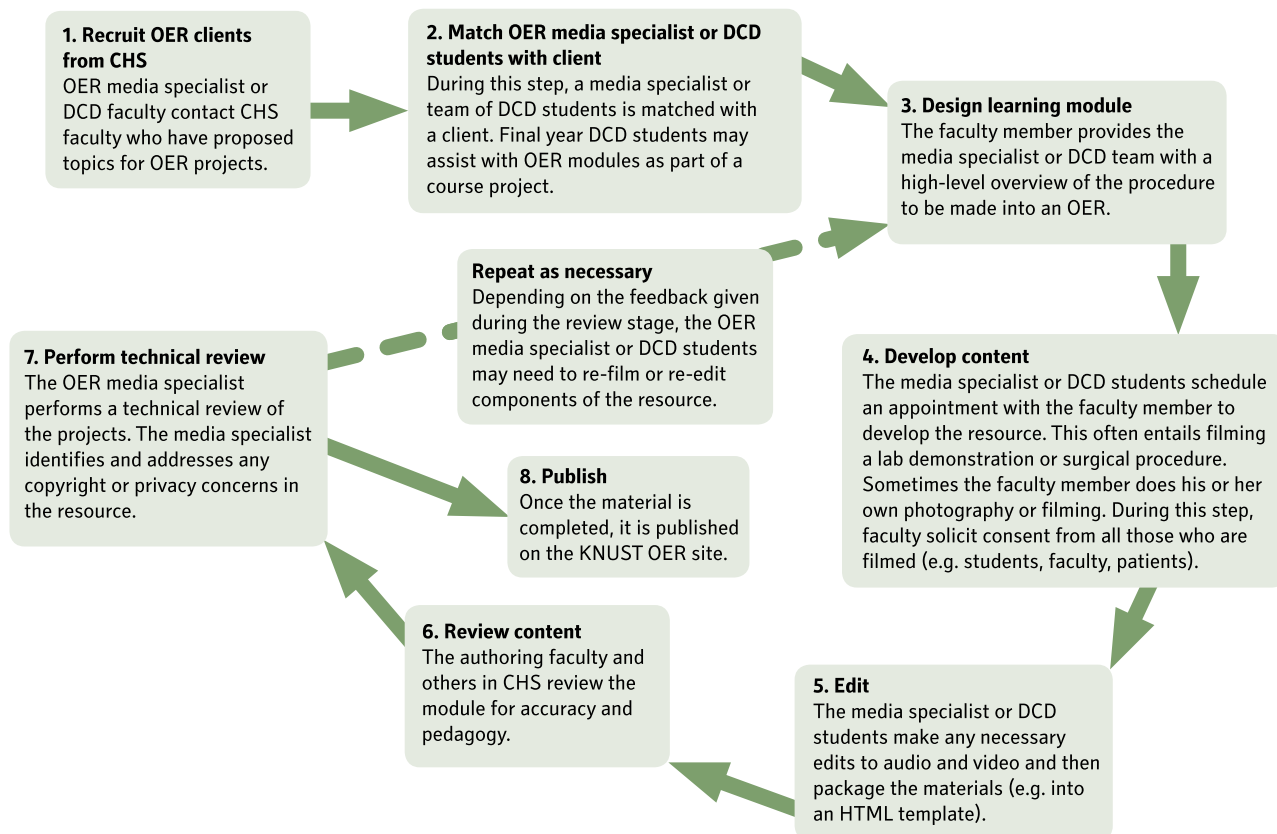
In late 2009, CHS hired two DCD graduates as part-time OER media specialists. These media specialists worked with the University Information Technology Services (ITS) office to create a KNUST OER website to host the completed resources. Now, two years after the project's initial launch, support for OER has spread across CHS, with participating faculty in obstetrics and gynaecology, medical laboratory, nursing, pharmacology, social pharmacy, physiology, chemical pathology, child health, and dentistry. The relationship with DCD continues to grow, with many fourth-year students and select faculty now involved in multimedia production for OER.



Developed OER production process

CHS purchased video cameras, drawing pads, laptops, and software licences to enable multimedia production for OER. With some basic equipment now available, CHS and DCD explored having student teams work with faculty to co-develop OER. In the OER production process that emerged, CHS faculty still develop the educational content, but an OER media specialist or team of DCD students assists with photos, videos, sound, and packaging for the learning modules.

KNUST OER production process



Offered DCD students practical experience in multimedia production

During the 2009–10 academic year, CHS experimented with enlisting final-year DCD students in the multimedia aspects of OER production. This proved to be a mutually beneficial partnership, as DCD students also gained valuable practical experience:

Previously they [DCD students] did not have practical, real-life projects to work with. Right now, with the OER programme, it's like they are actually working in a professional environment. It's given them experience, which will be helpful after they graduate.

Samuel Agyeman-Duah, OER media specialist, CHS

Increased awareness of and support for OER on campus

Many of the early participants in OER at CHS have now become advocates for OER. Those who have created OER are keen to produce additional modules. Awareness of OER has been stronger among faculty than among students, but some students have also come to see OER as a way to supplement their classroom learning. In early 2010, KNUST added a link to the OER website from the institution's main website navigation. In mid-2010, the vice-chancellor mentioned the OER activities during his commencement addresses at both CHS and DCD.

It has got faculty talking. It's got them saying, 'Oh, there are resources out there'. It's actually opening quite a lot of doors in their minds and it's also got them feeling less hesitant to put their materials out there.

Nadia Tagoe, programme manager, CHS

Shared experiences and completed OER with other institutions

KNUST faculty have shared their experiences with OER through various conferences and publications:

- Provost Donkor presented on the KNUST Health OER programme to the Commonwealth of Learning.
- Professor Danso, dean of the School of Medical Sciences, presented his OER module, *Examination of the Pregnant Patient*, to the West African College of Surgeons.
- In early 2010, Professor Phillips presented his *Buruli ulcer* OER module to the World Health Organization.
- Mr John Marfo and Mr Robert Kabutey Okine presented on *Implementation of e-Learning in Ghanaian Tertiary Institutions (A Case Study of KNUST)* at the Learning International Networks Consortium (LINC) May 2010 conference.
- In November 2010, Tagoe, Donkor, Opare-Sem, Rahman, Engleberg and several members of the University of Ghana Health OER team published a paper for the 2010 Open Education Conference in Barcelona, titled *Beyond the First Steps: Sustaining Health OER Initiatives in Ghana*.
- Later that month, Donkor and Opare-Sem presented on OER at the West African Health Organization Regional Meeting on Utilization and Sharing of e-Learning Tools for Medical Education.
- Donkor, Opare-Sem, Adu-Sarkodie (a professor of microbiology), and Engleberg authored a paper with two members of the University of Ghana Health OER team, for publication in the December 2010 *Ghana Medical Journal*. (<http://www.ghanamedj.org/pastjournal.php?IID=25>).

Challenges

There are currently several obstacles that limit the understanding and use of OER at KNUST. These are explored below.

Selling 'open'

OER and e-learning activities at KNUST emerged around the same time. It is therefore difficult at times to separate the two concepts in the minds of faculty and other staff. Although many now realize that OER have a Creative Commons licence and non-OER do not, it is still a challenge for many to qualify and quantify the benefits of content released under a Creative Commons licence. There are also some faculty who see 'open licences' as a threat to their intellectual property and traditional methods of teaching.

Opening up whatever you have out to the world in itself is a barrier to many faculty. So we've still got a long way to go [in order] to get everybody to accept that.

Nadia Tagoe, programme manager, CHS

Inconsistent network access

KNUST has Ethernet available in all academic buildings, as well as wireless in some classrooms. The network is often slow though. In addition, the campus often experiences power outages, and only a few buildings have generators. Since the KNUST OER website is the primary mode of distribution of OER to CHS students, when the network is down, students are unable to access OER available from KNUST or other institutions.



There are several network infrastructure improvement projects in place. For example, in late 2010, Vodafone installed a 45 Megabit-per-second network on campus, and is offering bandwidth at a 50% discounted rate for the next six years. Currently, KNUST's primary mode of distributing OER is via the campus local area network. This allows students on campus to watch streaming video contained in the OER modules. It is still difficult, however, to access the KNUST OER website from outside campus and likewise slow to access OER created and hosted elsewhere from within the KNUST campus. For this reason, KNUST is partnering with OER Africa and the University of Michigan to duplicate KNUST's completed OER on servers in South Africa and the United States.

Limited student and faculty availability

CHS faculty are extremely busy individuals. Most lecturers have to balance teaching obligations, clinical service requirements, and research expectations. There are only 0.15 doctors and 0.92 nurses per 1,000 Ghanaians, which is well below the World Health Organization's recommendation of 2.0 doctors and 2.5 nurses. The OER media specialists and DCD students have found it difficult to get CHS faculty to make time for content development among their other activities. Similarly, it has been difficult for faculty to work around student schedules. Since the DCD students were working on OER as part of a class project, there were definite start and end dates for their participation, which at times conflicted with the CHS examination schedules. Furthermore, CHS's pioneering role in developing OER materials suitable for the African context and suitable for adaptation by others means that, at this stage of the project, there are few time-saving benefits to be had for CHS faculty.

Multimedia production and packaging by non-health professionals

DCD students are trained in multimedia design, but they are not trained in health sciences or pedagogical principles. Limited subject knowledge makes it difficult for them to understand the context of the surgical and lab procedures they are filming. For example, it was found that the students did not necessarily focus the camera on what the lecturer wanted to highlight. Although faculty are involved during the initial content development and final review phases, Mr Rahman has identified the need for involvement of a health expert to assist students with questions that may arise during other stages of the content production process.



OER available do not always match methods as taught locally

One of the reasons why KNUST was motivated to create OER was to develop more contextually appropriate teaching resources for its students than those provided by Western textbooks. Since KNUST is among the early adopters of OER, specifically health OER, in Africa, there are currently few existing OER modules that it could use or adapt for its own students. One recent medical graduate remarked that the methods covered in an online OER module developed at another (overseas) university were quite different from the methods taught by CHS lecturers. While he found it interesting to learn about how different countries approach the same medical problems, he warned that students had to be aware of these variations and limit their exam answers to Ghanaian practices.

Lessons learned

The past two years of experimentation with OER have caused KNUST to revisit its expectations of OER, specifically the level of effort involved in producing media-rich materials that are both educational and openly licensed.

Need to teach elements of instructional design and copyright in communication design

The OER review workshop with CHS and DCD revealed some degree of mismatch between the objectives of creating sophisticated multimedia and the goals of creating materials intended to foster learning. DCD students have advanced media design skills, but the OER projects were their first endeavour in creating resources intended for educational rather than entertainment purposes.

At the July 2010 review workshop, Mr Rahman proposed that the OER team adopt the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model of instructional design when creating OER modules. He also reminded faculty and students to be mindful of copyright when building upon music, images, or other media from elsewhere.

Cost and speed of producing OER

OER are free to access, but not free to produce. Since OER are publicly available worldwide, CHS faculty view OER as a marketing opportunity, and therefore strive to create professional quality, media-enriched learning materials. This approach yields stimulating, interactive resources with rich media (in contrast to basic syllabi or lecture slides), but these resources are time-consuming to create. Provost Donkor estimates that it takes a total of 30 hours from start to finish to produce an open, comprehensive, interactive educational resource. He estimates that it takes three times longer to create an interactive OER module for a given topic than it takes to cover the topic in class, and has suggested that departmental budgets allocate appropriate funds for staff time necessary for creating OER.

[Producing] OER is quite expensive. It's not just filming and then finishing it. We think that in terms of faculty time, it's quite expensive. And so it has to be properly budgeted for and funded.

Peter Donkor, provost, CHS

During the first two years of its health OER initiative, CHS has focused on building its collection of locally developed OER rather than using or adapting OER from elsewhere. KNUST does, however, host health OER from the College of Health Sciences of the University of Ghana along with its KNUST-produced OER on its OER site for faculty, staff, and students to access. Awareness of the health OER initiative on campus is low but growing steadily, and very few CHS faculty have accessed or adapted OER from KNUST or elsewhere. This means that, while CHS faculty have a sense of how much time it takes to produce OER, they do not yet have a sense of the time that can be saved every year by using existing OER developed by colleagues at KNUST, the University of Ghana, or other institutions. The emphasis on producing OER over adapting or using existing OER has meant that some faculty have, in fact, devoted more time to developing media-rich OER than they had previously spent on materials development. Several CHS faculty and staff intend to address this dilemma in the year ahead by adapting more OER from elsewhere.

Next steps

CHS and DCD have ambitious plans for the next two years to advance the use and creation of OER across the university.

Adapt OER from elsewhere

So far, KNUST has focused on creating educational content from scratch rather than building upon OER available from elsewhere. Some of this is due in part to the lack of awareness of open content sites and some to lack of availability of relevant OER. This approach has prevented KNUST from taking advantage of the time-saving potential offered by OER. In response, KNUST is planning additional OER awareness activities for 2011.

The Basics of *M. ulcerans* Infection

Questions and Link to Content	Content type
What is Buruli ulcer disease?	Text or diagrams
Where does Buruli ulcer disease occur?	Text or diagrams
How does <i>M. ulcerans</i> cause the disease?	Animation
What is the usual presentation and course of Buruli ulcer disease?	Interactive multimedia programme

Icons

- Video
- Text or diagrams
- Animation
- Interactive multimedia programme

Map of Potential Buruli Ulcer Disease Distribution in Africa



Currently 13 African countries regularly report Buruli ulcer: Benin, Cameroon, Congo, Cote d'Ivoire, DRC, Equatorial Guinea, Gabon, Ghana, Guinea, Nigeria, Sudan, Togo, Uganda

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Incorporate OER into classroom teaching

During the 2009–10 academic year, most students learned of OER through the link on the KNUST website. Only one lecturer, Dr Opere-Addo, assigned a course activity that required students to use an OER module. Professor Engleberg also used the *Buruli ulcer* module created by several KNUST faculty in a course at the University of Michigan. Several KNUST educators plan to integrate OER developed at KNUST and at the University of Ghana into their lectures and class assignments in the course of 2011.

OER are going to simplify teaching methods tremendously and we need to send more reminders around so that people will know that these sets of OER have been produced and they are there on the website for them to use when needed.

Richard Phillips, lecturer, Department of Internal Medicine

Continue to refine the OER production process

The OER July 2010 review workshop revealed the potential of the partnership between CHS and DCD, as well as a need for further refining of the content development process and the roles and expectations of participants. One OER media specialist suggested that DCD and CHS compile a manual that would guide faculty, staff, and DCD students through all of the steps of the OER production process. This would help to standardize the content production process and clarify roles and responsibilities for OER production.



Our experience has taught us that we need to work out a system where we will be able to quantify the period needed to produce each OER module. Each person needs to know who is responsible for what. We need to know the processes involved and make sure that all of the stakeholders, content providers, those who upload, those who will produce – whatever – know that this is how the system works.

Adam Rahman, lecturer, DCD

Currently, those who are doing the content review are the same people who have created the OER themselves. The OER coordinator plans to bring in additional people to review the materials at the department level within CHS, including creators and non-creators of OER. Due to the scheduling difficulties with media specialists and DCD students, the OER team is also investigating teaching basic photography and filmography to faculty for capturing rare clinical scenarios on film for OER modules.

After the OER review workshop, several lecturers identified the need to teach final-year DCD students some elementary design principles and copyright basics to guide their multimedia activities for OER. In August 2010, Adam Rahman received the University of Michigan African Presidential Scholarship (UMAPS) award for his research proposal titled *Enhancing Medical Science Education in Ghana: Development of Interactive Design Template Models for Open Educational Resources (OER)*. As part of his six-month research fellowship, he studied instructional design, interactive design, and the dScribe process for clearing OER for copyright and privacy concerns prior to publication. He plans to use his knowledge to enrich the DCD curriculum and to create user-friendly, customizable, modular, interactive templates for building OER.

Establish dedicated studios for OER production on campus and at the hospital

DCD has set aside a dedicated space in its Media Centre for an OER production studio. The studio will house the cameras, microphones, and laptops for content development and serve as a workspace for DCD students and educational media specialists. Several in DCD hope ultimately to outfit the studio with professional film equipment, such as lights and umbrellas, but for now they are working with the existing basic multimedia equipment.

KNUST campus is a significant drive (20–60 minutes depending on traffic) from Komfo Anokye Teaching Hospital (KATH), which is where most KNUST physicians and nurses have their clinics. Several faculty have requested that an OER specialist be posted at KATH as well.

Continue to recruit OER creators across campus

Re-energized by the approval of the OER policy and the vice-chancellor's remarks at the CHS and DCD commencement ceremonies, the OER team hopes to expand OER activities to other colleges within the university. Due to the partnership with CHS, DCD faculty are now interested in creating OER modules to teach their own students, and plan to extend the OER projects to the second- and third-year students as well.



Expand OER into distance learning activities

In 2005, KNUST launched the Institute of Distance Learning, which offers paper-based distance education. Two years later, the Indian government established the Pan African e-Network for Tele-education and Telemedicine and donated equipment for a high-end multimedia studio. In mid-2010, KNUST began recruiting students for e-learning-enabled distance learning programmes using the multimedia studio from the Indian government. There are currently 3,032 students enrolled under the Institute of Distance Learning programmes and 475 students under the Indian–KNUST e-Learning Programme. In October 2010, Vice-Chancellor Otoo Ellis announced his plan to grow the distance education and e-learning programmes at the university. UITS is currently converting some of the paper-based distance education classes to its e-learning platform for online enrolment for the next academic year (which commences in September 2011). Some faculty members at CHS and DCD view distance education as an opportunity to offer services complementary to OER that could result in revenue generation to support future OER production.

For us, what it would mean is that our students don't even have to be located in one place. You see, currently, they come, we pack them into classrooms and teach them and then we ship them to [field research and fellowships]. If we had access to OER, they could be scattered all over Ghana and they would have access to the same material and lecture notes.

Peter Donkor, provost, CHS

Increase evaluation efforts

KNUST plans to evaluate the OER programme on multiple dimensions, including examining the impact of the new OER policy on participation in OER, usage statistics from the KNUST OER website, and the effect of OER modules on student learning outcomes.

Offer regional OER consulting services

With the expertise they have gained and the unique skills available from DCD, CHS and DCD would like to showcase and share their knowledge gained. Since DCD has laptops, audiovisual equipment, and an array of multimedia skills relevant to content production, Mr Rahman envisages using the DCD OER production studio as a testing lab for multimedia support for other OER-producing institutions.

Once we are able to get the [OER production] process, the policy and even the rewards and all of that, in place, then we could actually replicate that at other colleges and universities.

Nadia Tagoe, programme manager, CHS



Advice for other institutions

KNUST OER participants were asked to provide advice to other institutions interested in developing their own OER initiatives. The participants interviewed spoke about the potential benefits of OER and offered practical advice regarding building capacity for OER production and adaptation.

Open is worthwhile

Those interviewed reaffirmed that the perceived benefits of OER are worth the time and effort that go into producing them. The concept of OER is not only about producing teaching materials for one's own students; it is also about contributing to a pool of teaching resources that could be exchanged with other institutions locally, as well as globally.

Something produced in Zimbabwe may be useful to some of us in Ghana, and vice versa, and it will cut down significantly on cost. Linking up will be crucial in making this OER programme a success. We shouldn't feel isolated at our universities by trying to do everything and cover all topics on our own. We should fight a unified battle in producing things.

Richard Phillips, lecturer, Department of Internal Medicine



Collaborate with other OER-producing institutions

Production, evaluation, and sustainability are concerns of many institutions with OER initiatives. The KNUST OER team recommends that institutions collaborate in order to share practices that have proved successful, as well as to brainstorm on how to address common obstacles.

Examples or lessons learned by other institutions who are doing well in OER production could be valuable to these institutions that are beginning to grow their own OER programmes.

Adam Rahman, lecturer, DCD

Start small

The practice of opening up one's teaching materials to the world is a new paradigm to many. It is important to take incremental steps in growing an OER programme. Interviewees recommended that faculty begin by creating only a few OER modules, evaluating the quality, refining the process, and then repeating with additional modules.

First do a trial. Produce a few materials and then try going through the [OER production] process with a few people to see how things turn out: the factors that influence the process, the challenges that come out, and the strengths that you realize you have.

Nadia Tagoe, programme manager, CHS



Separate content design from multimedia production

Many of those interviewed recommended that other institutions follow KNUST's model of separating content design from multimedia production. Mr Rahman advised that institutions recruit subject matter experts for content development, and multimedia experts for enhancement and distribution. This specialization, he proposed, will be more efficient than relying on faculty to carry out all the steps of the OER production process. Mr Rahman also encouraged institutions to look within their university and local communities for the skills required for the different phases of OER production.

It's simple to produce. It's easy for the materials to be uploaded and it comes at no cost, and they [faculty] should not be afraid of copyright issues because of the environment within which OER operates, especially the Creative Commons Licensing. And it doesn't cost so much ... if anything, it is probably realigning certain factors or maybe resources in their institutions.

Adam Rahman, lecturer, DCD

Enabling institutional policy is necessary for faculty buy-in

Faculty must have an incentive to dedicate their time to creating OER. Academic credit, such as performance evaluation criteria, is a strong incentive.



I think that, if a university adopts a policy specifically for the development of OER in that institution, it will be a giant starting point. That way they won't depend on the willingness and desire of faculty because the faculty would know from the beginning that their inputs will be recognized by the statutes of the university and they would get the appropriate credit for that activity.

Ohene Opare-Sem, OER coordinator and professor of Internal Medicine

Appoint an official OER coordinator(s)

Several interviewees suggested that institutions should have a designated OER coordinator who can organize advocacy, training, policy, and evaluation efforts, as well as persistently remind faculty of targets and objectives related to OER.

Internal funding is necessary for sustainability

There are competitive grants available for OER, but they do not represent a viable source of long-term funding. Institutions pursuing OER must be willing to budget for OER using internal resources.

Institutions must be prepared to invest. If they don't have it now, they must be prepared to put in the necessary infrastructure to support it.

Peter Donkor, provost, CHS



Network facilitators



OER Africa is an innovative initiative established by the South African Institute for Distance Education (Saide) to play a leading role in driving the development and use of Open Educational Resources (OER) across all education sectors on the African continent. Established in 1992, Saide's mission is to increase equitable and meaningful access to knowledge, skills, and learning across the African continent, through the adoption of open learning principles and distance education strategies. Saide's recently launched OER Africa initiative brings together all of its OER-related activities under a common conceptual framework. Saide is – through its OER Africa initiative – providing a unique opportunity to deploy African expertise to harness the concept of OER to the benefit of education systems on the continent and around the world.



The University of Michigan (U-M) has a strong tradition of leadership in health science education. The University of Michigan established the first school of scientific medicine on the western frontier in 1850, and quickly became a leading producer of both practitioners and faculty members for other medical schools. Other health sciences programmes were established in the late 19th Century and early 20th Century, leading to the university's current complement of programmes in Medicine, Public Health, Nursing, Dentistry, Pharmacy, Kinesiology, and Social Work. U-M's health professions schools are deeply involved in issues of global health. Building on that legacy and investment, in 2008 U-M launched the university-wide Center for Global Health, which includes open educational resources activities. Across the university, there is strong investment in partnerships with African institutions. U-M has one of the strongest collections of health sciences education programmes, deep engagement in cutting-edge informational and educational technologies, and a vision for global service.

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This case study is one in a series that aims to showcase the Open Educational Resources (OER) programmes at African health science institutions. It is intended for higher education instructional staff and decision-makers on the African continent and overseas. To date, case studies in this series include the University of Malawi, the Kwame Nkrumah University of Science and Technology (KNUST), the University of Ghana, the University of Cape Town, and the University of the Western Cape.

Each institution in the series was a founding member of the African Health OER Network and has taken steps to open its teaching expertise to the world and develop sustainable institutional health OER initiatives.

This series is produced by the University of Michigan and OER Africa, which is an initiative of the South African Institute for Distance Education (Saide), with funding provided by the William and Flora Hewlett Foundation.

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We would like to acknowledge all at KNUST who provided support in developing this case study, particularly:

Peter Donkor, Ohene Opere-Sem, Adam Rahman, Nadia Tagoe, John Serbe Marfo, Richard Phillips, Jellili Akinwande, HS Opere-Addo, Samuel Agyeman-Duah, Afua Quantson Kunadu, Agnes Arthur, Yvonne Woyome, Joseph Bonney, and Senam Amedo

