White Paper:

OPEN EDUCATIONAL RESOURCES

MAINSTREAM ADOPTION AND EDUCATIONAL EFFECTIVENESS

April 2011

THE WILLIAM AND FLORA HEWLETT FOUNDATION

DRAFT FOR PUBLIC COMMENT

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PREFACE

The Hewlett Foundation's Education Program is committed to openness and transparency in its grantmaking. Over the past year, the Program revisited its Open Educational Resources (OER) strategy in an effort to better understand how its philanthropic investments—within the context of the larger funding landscape—can help integrate OER into mainstream education. We conducted dozens of expert interviews and commissioned new research and analysis. The result of our research is this draft white paper, which presents a roadmap for transforming teaching and learning by shifting OER from a movement to the educational mainstream.

We recognize that there are many challenges on the road ahead, and this white paper seeks to tackle some of the most pressing barriers head-on. However, we also recognize that there may be roadblocks as well as opportunities of which we are not aware. The OER movement has always been a community-driven venture. Our hope in releasing this white paper for public comment is to harness the expertise and energy of the OER community in a conversation about the future of OER, the role of OER in transforming teaching and learning, and the Hewlett Foundation's role within the OER ecosystem.

Your feedback

We invite your feedback and welcome your active participation in an ongoing dialogue about the vision set forth in this paper. The Program is particularly interested in the OER community's thoughts on what metrics can be used to define whether, and when, OER has moved into the mainstream. Simply go to http://www.hfoer.org and share your thoughts in the public forum.

The forum is a space for our grantees and others in the OER community to react and respond to our vision, and as such, it's mostly a listening exercise on our part. The Program does not intend to respond to feedback in the forum, but please know that we will carefully consider any and all feedback provided, and that it will inform our OER efforts in the future.

The forum will be open for comments until May 27, 2011. At that time the forum will close and the Program will review and consider all feedback. We hope to summarize the feedback and post an updated white paper by Fall 2011, and we'll be sure to notify those who participated in the forum.

We look forward to hearing from you and appreciate your comments.

SUMMARY

The idea behind OER is simple but powerful—educational materials made freely available on the Internet for anyone to use, distribute, and revise. These digital materials have the potential to give people everywhere equal access to humanity's greatest achievements and to transform teaching and learning through rapid feedback loops and personalized learning. Anyone can tap educational experiences once reserved for students at elite universities and schools. Anyone can translate these resources, enhance their cultural relevance, improve them pedagogically, and integrate them into innovative new approaches to education. Knowledge once locked behind the gates of tuition and tradition can be made available to all. To realize that promise, however, OER must bridge the chasm between enthusiastic early adopters and an education community wary of new technology. Over the next several years the Foundation plans to help pave the way for the OER movement to reach millions of people worldwide and play a central role in improving the way we teach and learn.

This draft white paper presents the Education Program's theory of change for helping OER move into mainstream education and describes how the Program proposes to structure and time its investments to achieve its goal. It answers four key questions:

1. **Why is Hewlett committed to continued investment in OER?** Since the Hewlett Foundation began investing in OER in 2002, the field has blossomed from the seed of an idea into a global movement. Now, for the first time, OER is poised to alter the course of mainstream education, changing the nature of schooling for students, self-taught learners, educators, and institutions around the world.

2. **What will success look like?** By 2017 OER will be increasingly integrated into the educational mainstream, improving the effectiveness of education at all levels throughout the U.S. and around the globe. OER producers will supply high quality, personalized instructional materials for the most basic subjects and most popular credit-bearing courses in K-12 schools and colleges within the United States. At the same time, key OER providers around the globe will be on a path to sustainability, with funding from governments, other philanthropies, institutions, and private sources.

3. **What investments are needed to achieve this goal?** The Program envisions investing in the infrastructure required for mainstream adoption of OER and the transformation of teaching and learning. Once in place, the OER infrastructure will deliver a high quality supply of educational content, promote supportive policies, and develop practical standards for OER materials. The Program also aims to underwrite research and support opportunistic innovation.

4. **How will the plan be implemented?** The Program hopes to continue strategic investments in OER in close cooperation with other funders. Over time the Program might shift its spending priorities from an early focus on

supply to a strong push for policy change and standards adoption, accompanied by funding for innovation throughout the strategy. The Program will refine a set of outcome-focused metrics and targets to track its progress, and time shifts in priorities.

1. WHY IS HEWLETT COMMITTED TO CONTINUED INVESTMENT IN OER?

The rationale

Since the Hewlett Foundation began investing in open educational resources in 2002, the field has blossomed from the seed of an idea into a global movement. For the first time, OER is poised to alter the course of mainstream education, changing the nature of schooling for students, self-taught learners, educators, and institutions around the world.

Since 2002 the Hewlett Foundation has recognized what a profound revolution in education OER represents. Beginning with its early support of the Massachusetts Institute of Technology's online course project known as OpenCourseWare, the Education Program has invested in the infrastructure and early demonstrations that helped to make the movement possible. It has funded flagship projects, tools and guidelines, advocacy, and research. Its OER investments have helped:

- establish the meaning of "openness" and build the necessary legal infrastructure for OER;
- demonstrate the power of free access to educational resources and challenge the world's elite universities to fulfill their social missions;
- deliver more learning with fewer resources through free online courses and textbooks;
- deliver invaluable lessons and materials to thousands of teachers around the world; and
- support and grow a community of thousands of educators and learners committed to the belief that openly-licensed educational resources can deliver equal or better quality resources at a lower cost and can improve learning outcomes by allowing anyone anywhere to contribute to transformations in teaching and learning through rapid feedback loops and personalized learning.

Still, there is much work left to be done if OER is to fulfill the goal of becoming a self-sustaining movement. Only a fraction of its enormous potential has been realized and the enthusiasm of early adopters has not yet spread to the education community at large. OER is poised to move into the mainstream as nations across the globe are struggling to prepare more students for the global marketplace with fewer resources. In the meantime it is clear that OER will continue to require some combination of government support, private capital, and philanthropic funding until it matures.

Education today and the unique value of OER

OER offers a promising solution to the most pressing problem currently facing education systems in the United States and around the world—delivering better results with fewer resources.

State and local governments in the United States, grappling with the fallout from the worst recession since the Great Depression, already have made deep cuts in education and are planning more. Twenty-nine states cut K-12 education budgets in 2010, and many are expected to make permanent reductions in spending. [Johnson, Oliff, and Williams, 2010] In higher education, community colleges are struggling to increase their capacity to retrain unemployed workers while fielding growing enrollment demand from recent high school graduates, who are being turned away from cash-strapped state universities. [Chea, 2010] Around the world, limited access to educational resources and, in some cases, qualified teachers, remain significant obstacles to development.

These resource challenges present an opportunity for OER to enter the mainstream and improve educational outcomes. The movement can provide schools at all levels with tools to survive and even thrive in hard times. OER can:

- **Radically reduce costs**. Facing a budget gap of nearly $19 billion, California has initiated the Free Digital Textbook Initiative to cut costs by aligning free textbooks, including several open textbooks, with the state's curriculum standards. [McNichol and Johnson, 2010; Fensterwald, 2010; California Learning Resource Network, 2010] The Vietnam Foundation has produced over 20,000 teaching and research modules, available at no cost to students, professors, faculty members, and all other interested learners. And, though in its early stages, the OER university[1] is a partnership of like-minded institutions committed to creating pathways for OER learners to gain academic credit in the formal education system.

- **Deliver greater learning efficiency.** Rapid growth in web-based courses has allowed community colleges to expand enrollments at relatively little additional expense. [Instructional Technology Counsel, 2009] At the same time, Carnegie Mellon University's Cognitive Tutor program has helped students complete Open Learning Initiative courses in half the time with greater learning gains than those enrolled in traditional courses.

- **Promote continuous improvement of instruction.** In Nigeria, Rwanda, and Kenya, Teachers Without Borders is piloting a SMS-based evaluation system to provide feedback on, and improve, their certificate of teaching mastery program. At Utah's Open High School, where open resources are used throughout the curriculum, teachers continually customize coursework to match state standards and meet students' individual needs.

- **Encourage translation and localization of content.** Courses made available by MIT's OpenCourseWare have been translated into at least ten languages and free interactive science simulations produced by Physics Education in Technology are available in fifty-eight languages. Teacher Education in Sub Saharan Africa (TESSA) materials are available in four languages and contextualized for use in twelve countries.

[1] http://wikieducator.org/OER_university

- **Offer equal access to knowledge for all.** Open online courses have made it possible for anyone anywhere to master material anytime without being enrolled in an educational institution. WikiEducator, a global community of nearly 19,000 educators that focuses on creating and sharing classroom resources, lecture notes, textbooks, and planning and policy documents, is now being used in 110 countries and has been viewed more than nine million times. In 2010 Apple iTunesU reported more than 120 million downloads of Web-based lectures, the majority of them OER. And the Khan Academy, which offers 2,100 openly-licensed videos and 100 self-paced exercises, has over 45 million views on its YouTube channel.

Barriers to mainstream adoption

The use of OER has grown significantly over the last eight years, but the movement now faces a chasm between the early adopters, who have fueled it so far, and mainstream institutions, whose acceptance and use of the technology would transform education. This chasm is a common phenomenon faced by innovation [Moore, 1999].

Research shows that several barriers must be overcome before the majority of students, educators and schools adopt OER. The Program can help build an OER infrastructure capable of overcoming these barriers:

- **Limited supply**. Today some of the most successful demonstrations of OER exist at the margins of the educational system. They cover Advanced Placement (AP) and credit recovery courses in K-12, provide simulations as supplemental study materials to higher education students, or offer open courseware to lifelong learners. All of these functions are valuable, but OER do not yet include a full set of high quality materials for everyday use by educators in the most widely taught K-12 and post-secondary subjects.

- **Incompatible policies and lack of incentives.** Some states require that content producers pay for review by education officials—a hurdle for non-profits that produce OER. Many other states only use educational materials when they come bundled with assessment items and professional development services that OER producers do not always offer. Internationally, some education ministries will not adopt materials that are not available in all local languages, which many OER are not. Finally, within higher education institutions and especially at research universities, the production of OER is not considered in tenure decisions, and faculty often must make career sacrifices to contribute to the movement.

- **Lack of standards.** A great deal of OER remain hard to find and difficult to integrate into the learning management and student data systems used by schools and educators. Some are inaccessible to students with physical disabilities, which means they cannot be used in public schools.

- **Limited proof of effectiveness.** While there has been some progress in demonstrating the gains in productivity and educational effectiveness that

> OER can deliver, there is not yet a compelling body of evidence that can convince policymakers and educators to adopt OER. Because many OER platforms and producers have limited marketing machinery compared to the sales forces that support proprietary content, good research may be required to shift public opinion in favor of OER.

Over the next several years the OER movement will need effective and sustainable efforts to address each of these barriers. Building an OER infrastructure to support these efforts will be key to helping the movement achieve its promise.

2. WHAT WILL SUCCESS LOOK LIKE?

The future of OER and the goal and scope of investment

By 2017 the Education Program expects that OER will be increasingly integrated into the educational mainstream, improving the effectiveness of education at all levels throughout the U.S. and around the world. OER producers will supply high-quality, personalized instructional materials for the most basic subjects and most popular credit-bearing courses in K-12 schools and colleges nationwide. Key OER providers around the globe will be on a path to sustainability, with funding from governments, other philanthropies, institutions, and private sources. At the same time, OER will give millions of people opportunities to pursue their academic interests independently.

The future: OER sustainably integrated into education

Over the next several years the Program would like to see widespread adoption of OER that improve teaching and learning. The Program's long-term vision is for OER to become integrated into the education mainstream, delivering access to knowledge and improved teaching and learning within a financially sustainable model. The distinction of open resources is necessary because proprietary materials dominate education at every level of learning—primary, secondary, higher education, and professional. In the coming decades the Program hopes the distinction will lose its relevance as most educational materials become freely available, bearing open licenses so that anyone can reuse, remix, and revise them.

Of course, even when provided free of cost to teachers and students, open resources are not truly free to produce. They must be developed and regularly revised, formatted, and integrated with other systems. Some steps of the production process, like authorship, may one day rely on a committed community of educators. But others, such as quality control and distribution, may require financial resources to sustain. Some key elements, including research and advocacy, will likely also require funding.

In order to sustain the movement in the long run, the Program envisions businesses, both for- and not-for-profit, providing OER to an educational marketplace shaped by governments, schools, teachers, and self-taught learners. As the largest purchasers of educational materials and services, public schools and districts would provide the steady demand and revenue necessary to keep the OER market growing.

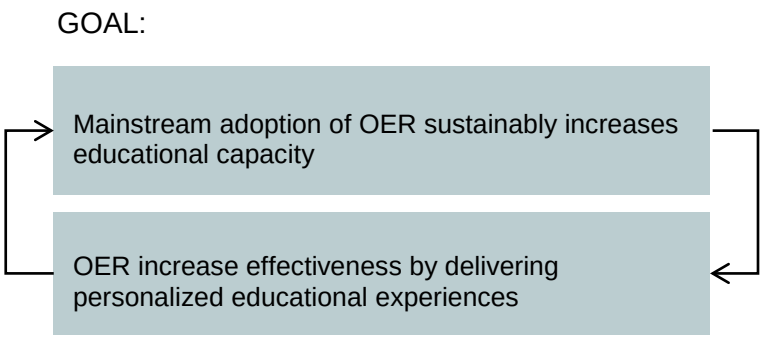
A number of possible business models could sustainably fund OER producers. Among them is a publishing model in which OER producers charge for print and electronic versions of their resources, or charge a sliding access fee for use of the site. There is a services model, which earns revenue by providing assessment and lesson planning services for OER. In addition, there is an accreditation model, in which online education provides a combination of OER and other courses for credit and degrees.

Each of these models relies in part on government and institutional policies creating a market for OER by opening the door to mainstream adoption by schools and students within formal education systems.

Goal: Mainstream adoption of OER that improve teaching and learning

The Program's goal for its OER infrastructure investments in the next few years has two components: 1) mainstream adoption of OER in a manner that promotes greater and sustainable educational capacity and 2) the effectiveness of OER is increased by delivering personalized educational experiences. These two goals are mutually supporting. The benefits of personalization will spur mainstream adoption, and mainstream adoption will increase the resources available for innovative tools to improve personalization.

Mainstream adoption will guarantee both widespread access and long-term sustainability, but it requires a steady supply of high quality resources along with supportive policies and standards. The Program is considering investments to encourage OER use by schools, students and lifelong learners. In addition it intends to invest in financially sustainable production and distribution by businesses, governments, and institutions.



Personalized education will ensure that the OER movement delivers on the promise of openness in education. For example, OER can be quickly translated into local languages without relicensing. OER can reduce the cost of textbooks and other educational materials to the point that they can be distributed to every student every year as consumables that can be freely annotated.

Measuring progress of these two elements will require the Program to increase the capacity of the OER field to track adoption and measure effectiveness. The movement will have crossed the chasm and moved into the mainstream once millions of teachers, educators, students, and self-taught learners are routinely using and producing OER, and usage is growing. Tracking that progress will require measurement of both the breadth and the depth of usage.

Breadth can be measured simply by tracking the number of unique users and downloads of OER. More refined metrics also can track the breadth of use within schools. The Program has enlisted the expertise of web analytics consultants to help its grantees begin to collect many of these statistics.

The next phase of tracking will involve metrics that can capture the depth of usage. These metrics would ideally capture the degree to which users revise OER, create their own open content, and interact in user communities. The Program will need to help the movement develop the capabilities to track these more complex metrics.

Meanwhile, understanding how OER can deliver improvements in productivity and effectiveness is critical to measuring its success. This will require a robust research effort to investigate various theories of how OER promotes educational gains.

These goals are ambitious, and will not be attainable by the Program's funding alone. As discussed in Chapter 4, the Program expects to work closely with co-funders, and engage public and private sources of capital in this undertaking.

Program scope: Build national leadership and pursue international partnerships to strengthen the OER movement worldwide

OER has become a worldwide movement focused on learning from kindergarten through adulthood. Its ultimate goal is to increase access to high quality educational resources for everyone. Many investments in OER infrastructure could possibly serve this global movement, but the Education Program's budget limitations require it to target investments selectively.

The Program would continue to support groups that are leading national policy advocacy[2] and development efforts to build an OER infrastructure for K-12 and community colleges in the United States. The Program's OER efforts would mesh with the Program's new deeper learning strategy, which is targeted at grades six through twelve and community colleges in the United States. The two areas of investment are expected to work in concert, with the deeper learning campaign developing partnerships with schools and districts that would be willing to serve as pilot sites for OER projects. In turn, any productivity gains realized by OER could partially offset the costs of deeper learning programs in schools.

Internationally, the Program plans to pursue a narrow scope of investment that leverages partnerships with other Hewlett programs, national and international bilateral and multilateral agencies, and philanthropies. By focusing on clear partnership opportunities with organizations that have significant reach and resources to support OER, the Program could make the most of its investments to grow OER as a worldwide movement.

As with its deeper learning strategy, the Program will make its OER investments with access to underserved students in mind. Not only will the Program support OER that are free to use, but its investments also will focus on encouraging reuse of existing resources, and reducing technological barriers to making the materials usable through new open software solutions with minimum hardware requirements.

[2] The Hewlett Foundation does not lobby or earmark its funds for prohibited lobbying activities, as defined in the federal tax laws. The Foundation's funding for policy and advocacy work is limited to permissible forms of support only, such as general operating support grants that grantees can allocate in their discretion, and project support grants for nonlobbying activities (e.g., nonpartisan research and public education).

Funding criteria: Free to use, revise, and remix

In order for OER to deliver on its potential, it must remain free to use, revise, and remix, as defined by the Creative Commons Attribution (CC-BY) license, or by availability in the public domain. The Program anticipates investing in projects that meet these criteria. We will also invest in projects that:

- are available in formats that are usable, sharable, revisable, and remixable with free and open source software, and with the minimum hardware requirements possible;
- are accessible as possible to users regardless of their physical capabilities;
- follow standards developed by the OER movement to enhance discoverability, interoperability, quality, and accessibility;
- align with the Common Core State Standards in the United States; [3]
- are able to be integrated at the system level, reaching thousands of teachers and hundreds of thousands of students
- augment research to understand the efficacy and outcomes of personalized education delivered by OER, as well as the impact of "open;"
- increase OER adoption and improve productivity; and
- create OER that deliver demonstrably improved teaching and learning outcomes

[3] These are a common set of English language arts and mathematics K-12 standards that represent the knowledge and skills that high school graduates need to master to succeed in college and careers. They were developed by The Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center) on behalf of 48 states, two territories, and the District of Columbia, and have been formally adopted in 42 states and the District of Columbia.

3. WHAT INVESTMENTS ARE NEEDED TO ACHIEVE THIS GOAL?

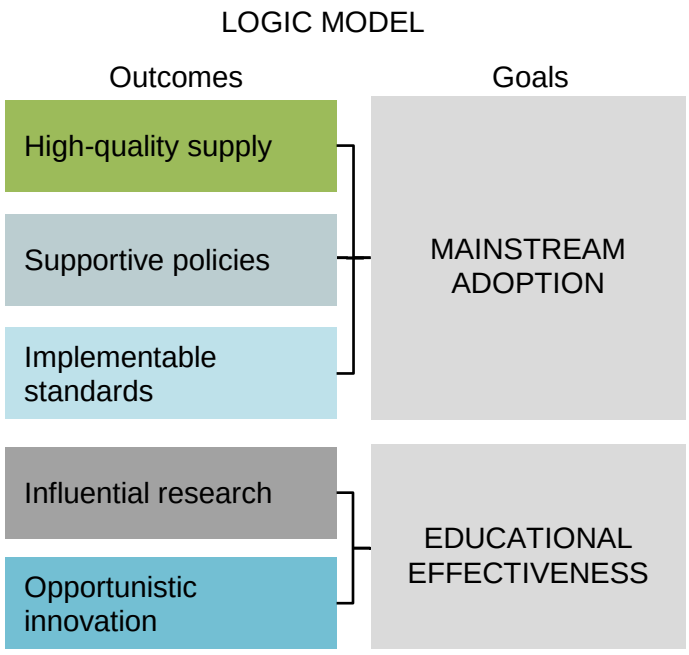
Logic model and theory of change

The Program envisions investing in the infrastructure essential for achieving mainstream adoption of OER and transforming teaching and learning. This infrastructure will deliver a high-quality supply of educational content, promote supportive policies, and develop practical standards for OER materials and practices. The Program would underwrite research to spur demand and guide production, in addition to supporting opportunistic innovation to build a pipeline of new OER.

Logic model: A theory of change for mainstream OER that improve educational effectiveness

The Program's logic model represents a theory of change to achieve mainstream adoption of OER that improve educational effectiveness. By focusing on the most critical barriers to adoption, the Program saves resources for the task of finding innovative ways to deliver personalized education.

The logic model also addresses the barriers, discussed in the first chapter, that stand in the way of OER moving into mainstream education and increasing educational capacity and effectiveness. A limited supply of high-quality, relevant OER relegates the movement to the margins of the education system. Incompatible policies limit the ability of schools to adopt OER, and make it difficult for educators to participate in the movement. A lack of standards creates high variability among OER, making them more difficult to find and use. And limited proof of effectiveness raises doubts among policymakers, administrators, and educators that OER are worth integrating into everyday use.



These barriers were identified through research, extensive interviews with experts, and the Program's own experience in the OER field. They are barriers that the OER movement has faced since its inception, and are closely related to some of the challenges identified by the authors of the 2007 review of the OER movement and the Foundation's OER initiative. [Atkins, Brown, and Hammond, 2007]

As shown in the basic logic model to the right, the Program's investments will directly tackle these barriers, while reserving funds to sustain an innovative pipeline of OER. The Program will pursue five outcomes:

- high quality supply of OER for the mainstream;
- supportive policies that remove restrictions on OER funding and implementation, and provide incentives to support OER;
- implementable standards that guide OER development and increase discoverability, interoperability, and accessibility;
- research to encourage demand and guide production; and
- opportunistic innovation to build an OER pipeline that will positively transform teaching and learning.

The Program has carefully considered the role of philanthropy, and how it can use its budget and leadership role in the movement to deliver the largest benefits to OER and education. The Foundation, and philanthropy generally, cannot sustain OER indefinitely. But philanthropic investments can help create the robust marketplace for OER, which is essential to the long-term sustainability of the enterprise.

The Program plans to push OER toward the mainstream by supporting the creation of high-quality supply for the most popular subjects and courses in K-12 and post-secondary education. In addition, the Program hopes to pull mainstream education toward OER, by encouraging the implementation of policies that support OER, while pursuing a research agenda that demonstrates improvements in teaching and learning and encourages OER adoption. Finally, the Program would help ensure that demand for OER is satisfied with quality materials by supporting the development of standards for usable and effective products.

The Program's theory of change simultaneously addresses supply, demand, and quality to achieve the Program's goals. Working together, the Program's investments would help create a market for OER. The sections below discuss investment activities to achieve the five outcomes from the chart on the previous page.

High-quality supply

To date, the movement has focused on content, which lies on the periphery of the education system, such as Advanced Placement (AP) and credit recovery. To reach the mainstream, however, OER producers must provide high-quality resources, including textbooks and assessment items, for the core academic subjects in K-12 and post-secondary education. Investments in this category would directly support OER production and complement the Program's efforts to encourage governments and institutions to build a high-quality supply.

- **GOAL: Supply OER aligned with the Common Core for schools, teachers, and students in K-12**. The adoption of the Common Core standards offers several unique opportunities for OER that align with the Common Core standards and deeper learning. First, the new standards will require the creation of new materials, and will allow new content producers into the supply pipeline. If OER can meet this demand, they may have a chance to bypass traditional state and district material adoption cycles that OER providers have not been able to participate in to date. Second, the Common Core standards are under consideration at the same time that states and schools face severe budget pressures, so OER may be preferable to proprietary content because they can substantially reduce costs. Finally, shared standards likely will encourage states to collaborate with one another on resource development, and open licenses would provide a ready legal framework for these efforts.

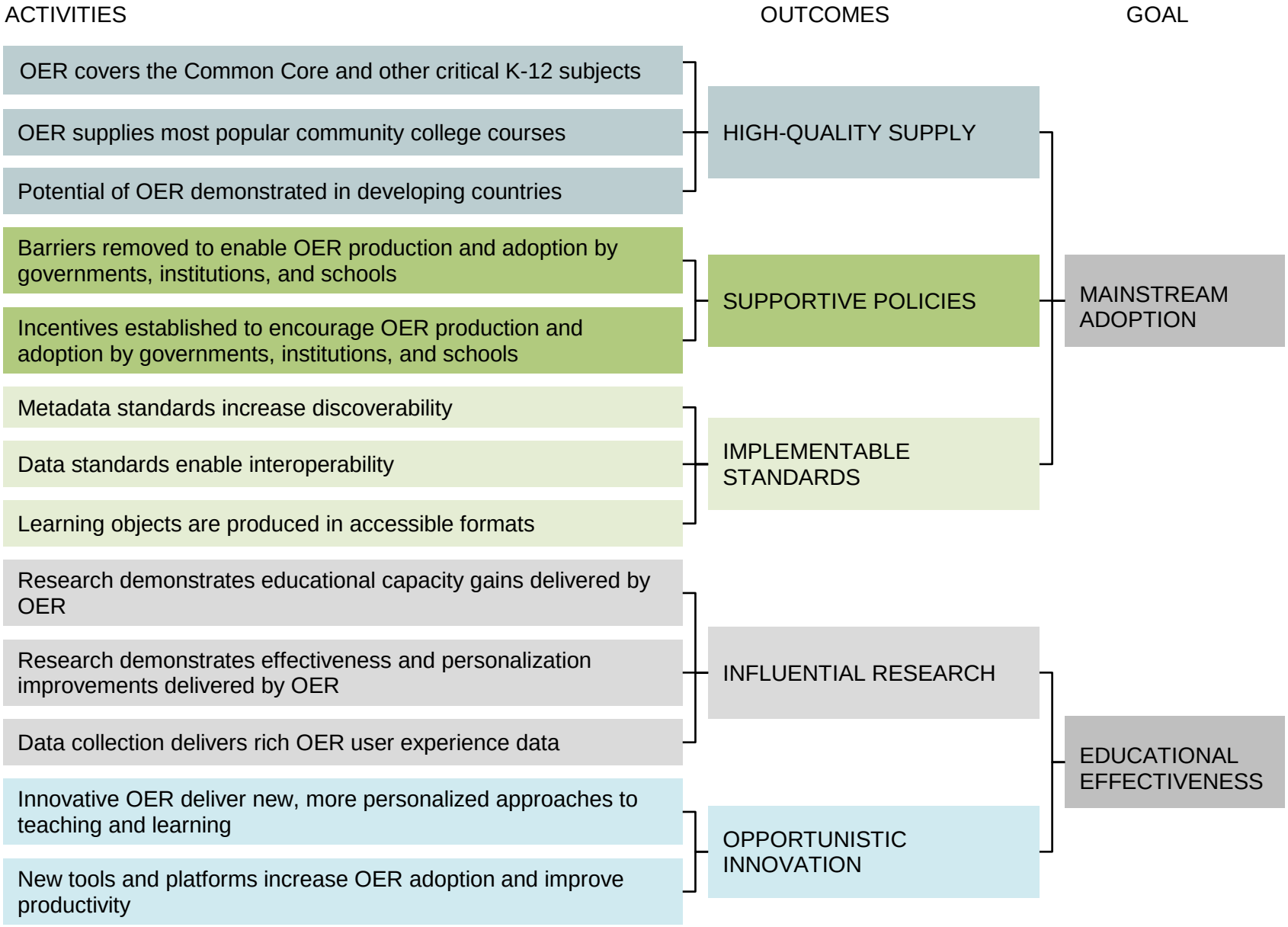
The above would mark a significant shift in OER content production for K-12. Ultimately the Program hopes to help support the production of content for English language arts and mathematics across all grades, and for middle- and high school science sequences, at least thirty-three courses in all. To achieve the necessary scale of content production, the Program needs to identify additional partners to take the lead in funding, producing, and assembling existing content. Potentially, those partners would include states and districts that adopt the Common Core standards, as well as for-profit producers.

- **GOAL: Support production of basic content for the twenty most popular community college courses**. The focus on community colleges reflects the Program's commitment to improve education for underserved students. In addition, because textbooks represent a significant percentage of the total cost of enrollment, community colleges and their students are especially sensitive to the price of textbooks, so demand for OER may be especially strong. Finally, textbooks produced for the community college market can be used both in advanced high school classes and in introductory courses at four-year universities.

- **GOAL: Pursue limited, high-impact international partnerships to produce and distribute OER in developing countries and demonstrate the movement's potential.** For example, the Program will look for opportunities like it found in Nigeria, where the government has invested in distributing print versions of open materials produced by Teacher Education in Sub-Saharan Africa. In this case government support of the work allowed it to reach large scale without significant philanthropic investment. The Program also may partner with other philanthropies or other Hewlett Foundation programs to produce high-impact OER and to revise existing resources for local contexts.

While limited, these investments are intended to prove that OER can satisfy the significant demand for educational content and materials in developing countries. In the long run, they are intended to encourage governments and international funding agencies to invest independently in OER as a means of increasing educational capacity around the world.

DETAILED LOGIC MODEL



Supportive policies

Supportive policies are crucial to achieving sustainable, mainstream adoption since they will spur the use of OER in traditional classrooms, in addition to OER production by governments, institutions, and educators. The Program expects to support advocacy efforts in two categories: reform of policy barriers to OER, and development of new policies to create incentives that encourage OER adoption and production. Broadening textbook adoption practices is an example of the former; OER production, re-use, and research as a factor in faculty tenure decisions is an example of the latter. Advocacy efforts may be targeted at institutions of higher learning as well as governments in the United States and abroad.

Policy barriers that impede OER adoption and production by governments and institutions include:

- **Material adoption policies**. Among these are state policies that require publishers to pay for review by public agencies, a barrier for non-profits that offer OER free of charge. In addition, many states have long adoption cycles that bar new materials for several years, slowing innovation and delaying OER implementation. Internationally, a variety of policies limit OER use, including requirements that materials be available in all local languages—OER rarely are—before they can be officially adopted anywhere.

- **Licensing of educator-generated content**. Many states and schools do not have clear policies about the legal licenses that apply to materials produced by teachers in their everyday work. In Utah OER supporters lobbied the state board of education to issue specific guidance for the application of Creative Commons licenses to the materials teachers produce for their classrooms. Similar efforts across the world could help educators graduate from informal sharing of content with colleagues to widespread digital distribution of OER.

Incentives to increase the adoption and production of OER include:

- **GOAL: Policies that favor applying open licenses to content developed with public funds**. Many governments fund the development of new content but allow the content to carry restrictive licenses that limit distribution and revision. Applying open license to some, if not all, of these publicly funded materials would create a strong incentive to publishers and curriculum developers to produce OER in order to receive government support.

- **GOAL: Policies that reward faculty for creating and revising OER.** In higher education, where OER has enjoyed the most significant growth in production, faculty members who have contributed to the movement have largely done so without recognition from their institutions. When faculty members produce, re-use, or research OER that improve teaching and

learning for students across the country, their contributions should be recognized in tenure decisions.

- **GOAL: Policies that include OER in professional development and teacher education programs**. In K-12 schools, teachers could be given professional development credit for participating in OER-related training or communities of practice. In addition, including OER in teacher education programs could result in higher rates of OER use by new teachers in their classrooms.

Implementable standards

Standards have the potential to make it easier to find and use OER, increasing the potential for mainstream adoption. Past standards investments, like the Program's support of Creative Commons licensing for OER, established openness as a legally viable concept and allowed the movement to grow to what it is today. Relatively easy implementation was crucial to their success. Similarly, investing in metadata, data, and learning object standards[4] that are as easy and inexpensive to implement as possible, will be crucial to the next phase of the movement's growth.

- **GOAL: Build on de facto metadata standards**. The focus should be on developing common vocabulary to tag and describe OER, and encouraging the collection of relatively low-cost, high-benefit metadata (like site maps) to improve discoverability. Metadata provide necessary context beyond what can be gathered from the full-text search provided by Google and Yahoo. For example, metadata can communicate which state standards a lesson meets, or appropriate age groups. While the technical challenge of metadata has largely been solved by de facto technical standards, the descriptive metadata that could most improve the discoverability of OER are not widely collected.

- **GOAL: Help establish and pilot new data standards**. To maximize production, research, and outcomes, OER-related data need to be accessible and readable across multiple platforms. So far, existing data standards have failed to reach the scale where the benefits of interoperability—such as access to technology that allows data to be shared—outweigh the costs. The Program would support a push to collaboratively establish a new framework for standards with lower costs and clearer benefits.

  The Program would partner with states and with other funders concerned with data interoperability, particularly those who were part of the consortium that won the Race to the Top assessment competition. Because the states participating in the consortium would share a common assessment, their data would be comparable and could be used to fuel education innovation. For these states the benefits of interoperability

[4] A learning object is "a collection of content items, practice items, and assessment items that are combined based on a single learning objective" Source: http://en.wikipedia.org/wiki/Learning_object, April 8, 2011.

become much clearer, and the costs may be considered more reasonable. Indeed, the Race to the Top assessment competition requires that consortia "develop assessment items and produce student data in a manner that is consistent with standards for interoperability". ["Overview," 2010]

- **GOAL: Support the adoption of accessible learning object formats[5] where the investment can significantly increase accessibility to high-quality OER**. Because materials used in public schools are legally mandated to be reasonably accessible to students regardless of their physical abilities, they must frequently be modified to suit different needs. OER has an advantage in this area over proprietary content because the open license allows anyone to modify the material for accessibility. If learning object standards can automate accessibility (for example, compatibility with screen-reading software for the visually impaired), OER may become accessible at much lower cost than proprietary materials.

Influential research

While the Program's research agenda is designed to encourage mainstream adoption first, it also should help measure OER's progress against the goal of delivering educational gains through personalization. The proposed agenda would include three components: measurement of the capacity gains delivered by OER to influence policy-makers and educators to adopt OER; research to influence the design of OER to improve effectiveness; and efforts to strengthen the data infrastructure.

- **GOAL: Evaluate the educational capacity gains delivered by OER**. As discussed in Chapter 1, the United States' education system must do more with less and OER can help increase its capacity. OER can help increase access to educational resources, personalize learning for individual learner needs, and help teachers assess and assist student learning. The Program intends to invest in research to evaluate the educational capacity gains OER can deliver and to link those findings with its policy advocacy efforts to encourage greater OER adoption and production. While measuring capacity gains is relatively straightforward in K-12, where states use standardized tests to compare effectiveness with cost, it is more difficult in higher education, where there are fewer accepted measures of learning.

- **GOAL: Measure the effectiveness and personalization gains delivered by OER**. Effectiveness gains attributable to openness of education are difficult to measure in both K-12 and higher education, since studies must isolate and evaluate how openness contributes to learning. Researchers within the OER movement argue that OER can deliver unique pedagogical benefits through personalization, such as with open textbooks

[5] This refers to learning objects that are designed "to enable inclusive access to personally relevant, engaging learning opportunities for the full diversity of learners and content producers." Source: http://floeproject.org/

that can be customized for a student's literacy level. However, the ways in which OER can personalize education must be better understood.

- **GOAL: Strengthen the data collection infrastructure**. The Program plans to continue to invest in the OER movement's data collection infrastructure, so that it can track and report its progress to the wider field of education. The Program already has helped many of its grantees collect detailed user data through Google Analytics. As research identifies capacity and personalization gains, the Program also proposes to help grantees and other OER organizations track their own successes. If the Program can help strengthen and automate data collection processes, the movement will have a wealth of efficacy results to guide the production of high-quality supply, and encourage supportive policies.

The Program will not generally support research into sustainability; business plans will prove sustainable by succeeding or failing in the marketplace. The Program believes it can best support the ultimate goal by encouraging its grantees to build sustainability plans into their grant applications and by pursuing a policy advocacy agenda that spurs OER demand.

Opportunistic innovation

Innovation is expected to create additional forms of OER that will be more attractive to formal and informal users alike, and can deliver larger productivity and effectiveness gains than less sophisticated materials. These new forms could include open online courses with integrated cognitive tutors, open participatory learning, open personalized learning environments, and other groundbreaking tools, platforms, and content.

- **GOAL: Invest in innovative forms of OER as opportunities arise**. As open textbooks and other basic OER mature, become sustainable, and are moved into the mainstream, the Program could help advance new forms of OER. These might include open participatory learning programs and open personalized learning platforms—new forms of OER that, while likely to be too risky and speculative for private capital to invest in, could provide significant benefits to the field.

- **GOAL: Explore new tools and platforms to increase the rate of OER adoption**. In addition to continuing to build the OER pipeline, the Program may explore innovative infrastructure approaches, such as learning outcome maps. These maps, while not directly related to OER, could provide a framework for metadata and data standards, creating an important infrastructure element for the movement. The Program is open to investing in innovative tools and platforms when they can increase the rate of OER adoption.

4. HOW WILL THE PLAN BE IMPLEMENTED?

Outcome-based budget, metrics and targets, and funding plan

In the future the Program hopes to be able to continue investments in OER in close cooperation with other funders. Over time the Program might shift its spending priorities from an early focus on supply to a strong push for policy change and new standards adoption, accompanied by funding for innovation throughout the strategy. The Program will refine a set of outcome-focused metrics and targets to track its progress and time shifts in priorities.

Outcome-based budget

Budget priorities will shift over the next several years as the Program pursues three phases of investment in the elements of the logic model.

- **Building supply (2011-2013).** In the next few years the Program expects its investments to focus on creating basic content for higher education and K-12, with an emphasis on open textbooks since that format is ready to be introduced on a significant scale into the education mainstream. Roughly less than half of the budget would support high quality supply over this three-year period, with the remaining investments split among supportive policies, standards, research, and innovation.

- **Encouraging adoption (2014-2016).** During this period the Program wishes to see widespread mainstream adoption of OER by public education systems and consumers. To support this goal, the Program plans to increase its allocation to advocacy of supportive policy, especially reforming adoption policies to increase support for OER. With a strong base of content in place, states should be more amenable to ramping up adoption. In addition the Program would increase its allocation to revision and adoption of standards, especially to improve data interoperability so that states can efficiently integrate OER into data systems. Funding for supply would decrease during this period.

- **Innovating (2011-2016).** Throughout 2011-2016 it would remain important for the Program to continue supporting new, innovative forms of OER that expand the frontiers of educational technology. By 2015 the Program expects that the field will have developed metrics of effectiveness and how to improve the quality of OER.

The Program has used expert input and additional research to set priorities for investment across outcomes over time. The Program plans to continuously analyze the expected return on investment in each outcome to ensure that investments are effectively allocated among the components of the logic model. For example, the expected return of additional investment in research would be compared with additional investment in supply to advance the linked goals of mainstream adoption and educational effectiveness. As the Program evaluates its grantmaking

each year, it intends to update allocations to maximize returns across the five outcomes.

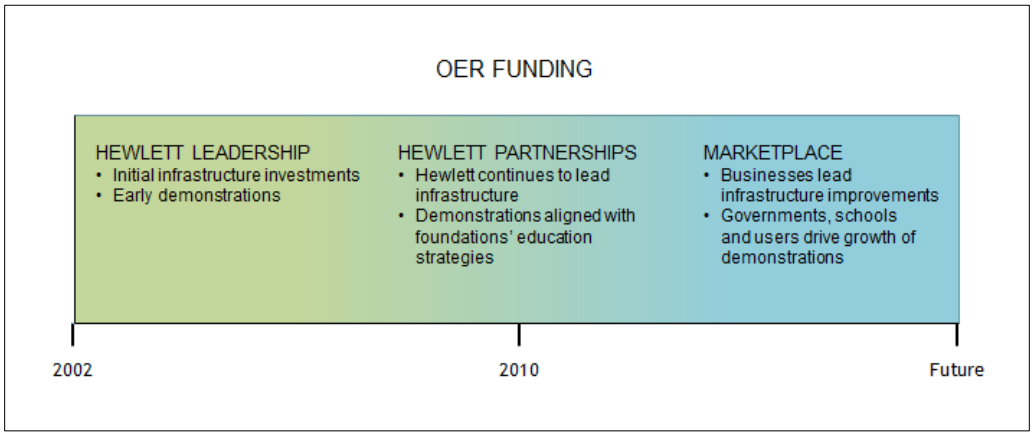
In addition, the Program plans to evaluate the social return of individual investments within each category of outcomes. This approach will ensure that comparable grants are evaluated together, and the Program advances each outcome as effectively as possible.

Metrics and targets: Measuring mainstream adoption and educational effectiveness

The Program intends to track its progress using a number of metrics and targets. These metrics and targets are intended to track both the breadth and depth of adoption—the degree to which users are actively engaged in the production and revision of OER, as well as the degree to which adoption is actually enriching teaching and learning. The Program is still in the process of evaluating what scale of impact it can achieve given the scope of its desired outcomes and the activities of co-funders. Therefore, the metrics, and especially the targets, are preliminary at best. Over the next several months, the Program will refine these targets.

Funding plan: Engaging philanthropic and public funding partners

When the Program began its OER initiative in 2002, the Foundation was the primary funder for building the OER infrastructure and demonstrating the movement's potential. Today, the Program often works with philanthropic partners and envisions a time when the marketplace will play a strong role in the field. If OER is to become sustainable, the funding landscape must shift to a broad, healthy ecosystem of funders, including governments, businesses, and communities of users.



While the Hewlett Foundation continues to lead investment in OER infrastructure, it plans to rely increasingly on philanthropic partnerships to fund high-quality supply and other demonstration projects. In addition the Program will look for opportunities to partner on infrastructure investments, though these may be limited.

As the OER movement crosses the chasm that separates early adoption from mainstream use, it is expected to move to a marketplace model, with governments and individuals as the customers for educational materials and service. Businesses, governments, and non-profit organizations would invest in the infrastructure and expansion of the market by underwriting the policy advocacy, research, and standards work necessary to increase the demand for, and quality of, OER.

In the long run the role for philanthropies should recede as openness becomes commonplace in education. Eventually, philanthropies would engage in OER development in the same way they support the development of other pedagogical and educational materials today. Just as the Hewlett Foundation is now supporting the development of educational materials—especially OER—that deliver deeper learning, other foundations will support OER that push the boundaries of educational practice in ways that are too risky or speculative for businesses.

The early adopters of OER believed that education is a public good, and that openness, embedded as an essential element of the teaching and learning process, can have a strong, positive effect in education. This white paper aspires to remain true to those founding beliefs, not for the sake of furthering OER as a movement itself, but for the sake of equalizing access to knowledge for all and demonstrating that the teaching and learning experience can be vastly improved. Bringing this aspiration to fruition in mainstream education will require focus, collaboration, and a community of supporters from multiple sectors.

EXAMPLE METRICS AND TARGETS

HIGH-QUALITY SUPPLY
- Freely available OER cover the Common Core and the 20 most popular community college courses

SUPPORTIVE POLICIES
- 3-5 countries, 5-10 states, and 10-15 large public school districts and institutions of higher education remove policy barriers
- 1-3 countries, 3-5 states, and 5-10 large public school districts and institutions of higher education incentivize OER production and implementation

IMPLEMENTABLE STANDARDS
- 3-5 flagship OER platforms and producers, like the OpenCourseWare Consortium, Connexions, Flat World Knowledge, and the Open Learning Initiative, adopt common metadata, data and learning object standards

INFLUENTIAL RESEARCH
- Research demonstrates the productivity gains delivered by OER
- Research demonstrates that unique pedagogical properties of OER deliver learning gains (e.g., student performance on state assessments improves due to teacher revision of OER)

OPPORTUNISTIC INNOVATION
- 3-5 innovative OER tools, platforms, and approaches deliver more effective teaching and learning or increase the rate of adoption

MAINSTREAM ADOPTION
- 10% of US K-12 and community college students take credit-bearing courses that integrate OER into the curriculum (either inside or outside of traditional classrooms)
- 2-4 OER platforms or producers scale up to reach at least 250,000 users (e.g., Teacher Share reaches 300,000 monthly users)
- 10% of OER users create and revise OER (e.g., 10% of Connexions users create or revise modules)

EDUCATIONAL EFFECTIVENESS
- Open textbooks and other open materials covering at least 3 major subjects measurably increase educational capacity or personalization in US K-12 schools (e.g., equivalent performance on state assessments at lower total cost)
- Innovative OER covering at least 2 major subjects (e.g., open participatory learning, cognitive tutors) deliver personalization gains in both formal and informal contexts

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