



O impacto das TICs na educação

El impacto de las TICs en la educación

The impact of ICT in education

BRASILIA Abril April April 27-28, 2010



The Past, Present and Future of Open Educational Resources

Richard Baraniuk
Rice University



vibrant
interactive
community
connected
innovative
up-to-date
efficient
effective

create

share

**use
freely**

**re-use
openly**

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create

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**use
freely**

**re-use
openly**

why?

**today's textbooks/courses
lock up educational ideas**

- closed copyrights
- closed formats



open education

create

share

**use
freely**

**re-use
openly**

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today's textbook *pipeline*

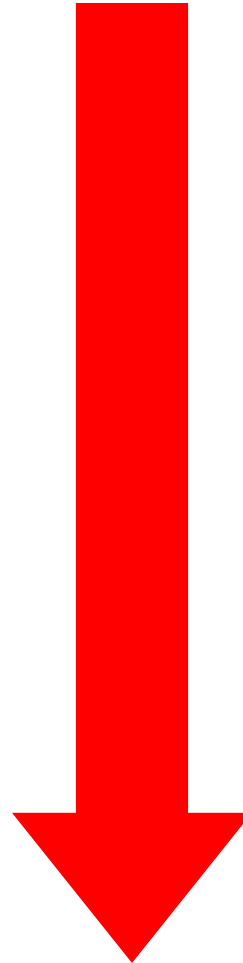
authoring

editing

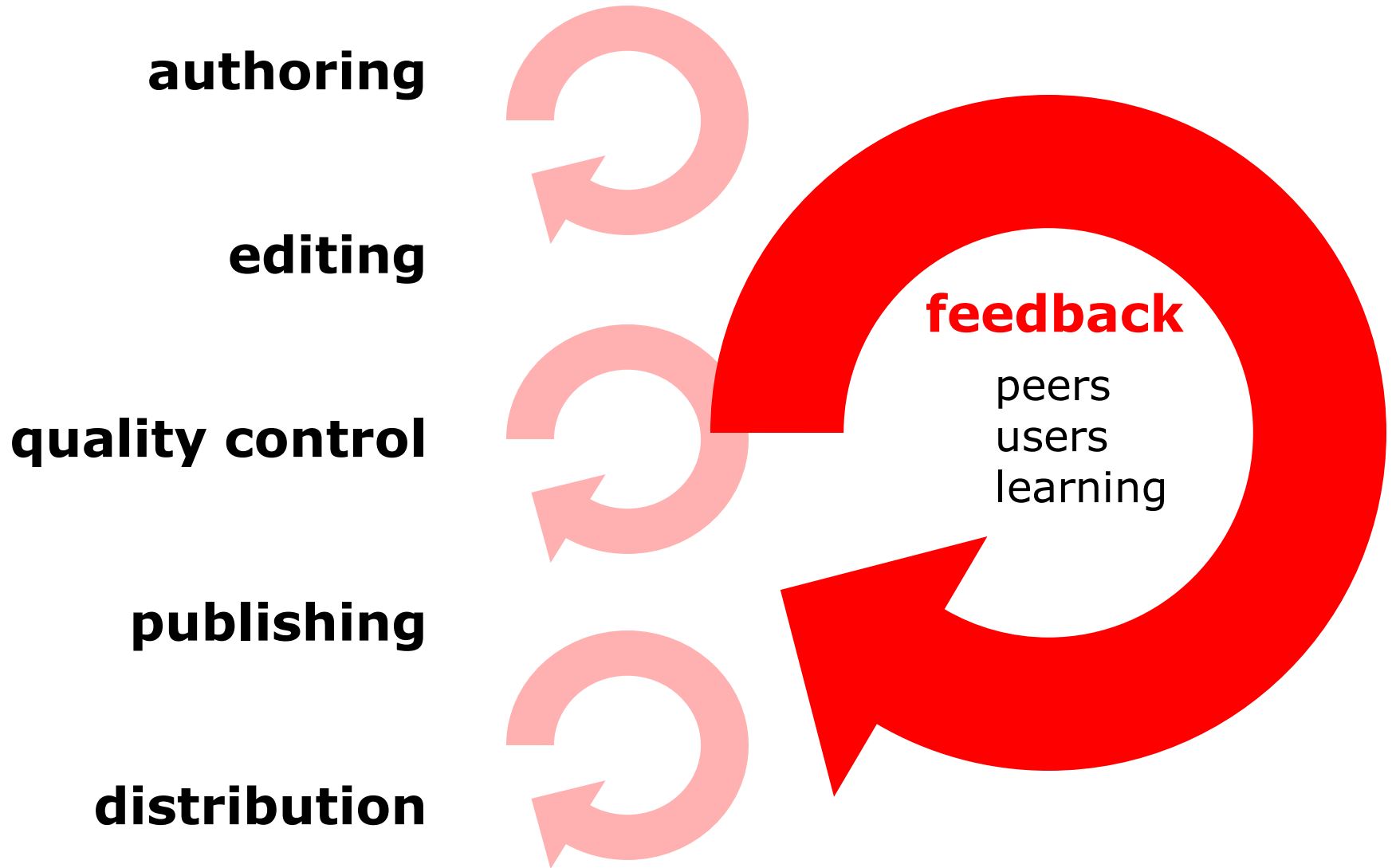
quality control

publishing

distribution



open education *ecosystem*

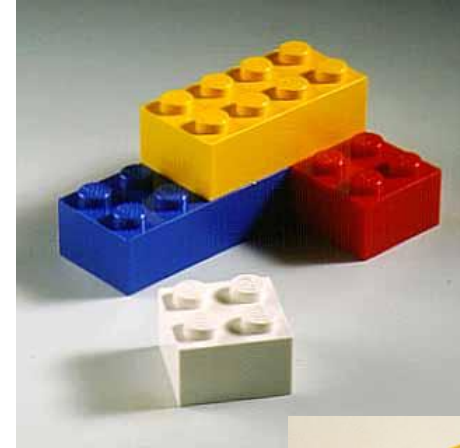


OE
enablers

enabler 1: technology

Web/XML

**common framework
for sharing**



Internet

virtually free distribution

virtually infinite, permanent storage



ecosystem – *primordial state*



textbook / course

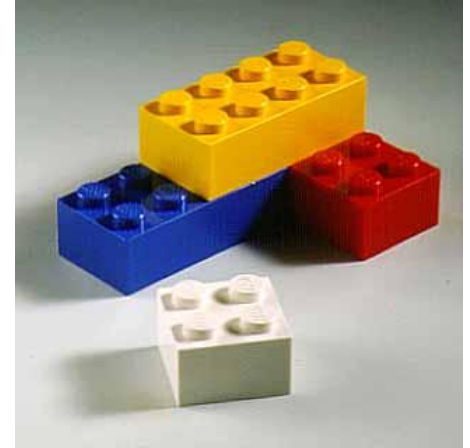


personalized textbooks



enabler 2: new IP

**intellectual property
and copyright**



make content *safe to share*

common legal vocabulary

inspiration: open-source software
(Linux)



OE

examples

MIT**OPEN**COURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

O E R
OPEN EDUCATIONAL RESOURCES


flat**world**
KNOWLEDGE

OpenLearn


KOALICJA
OTWARTEJ
EDUKACJI

OCW
CONSORTIUM

siyavula 
evolving education

ck-12
The next generation textbooks

 **GLOBAL TEXT PROJECT**
ENGAGING MANY FOR THE BENEFIT OF MANY MORE

 **WIKIVERSITY**


Curriki
Global Education & Learning Community

C O N N E  I O N S
CNX.ORG

Connexions (cnx.org)

non-profit open education platform
founded 11 years ago

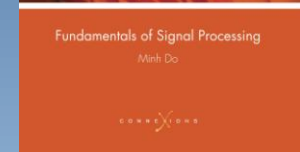
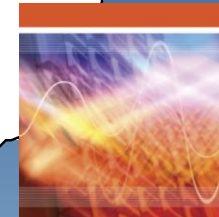
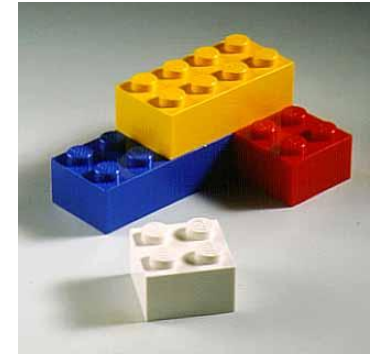
1000 open textbooks/courses

16000 Lego modules

from contributors *worldwide*
in many languages

free on-line

low-cost in print

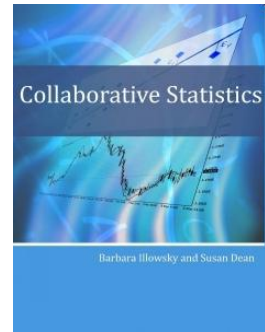


usage per month:
1.7 million unique users
77 million hits
from 190 countries

some Connexions partners

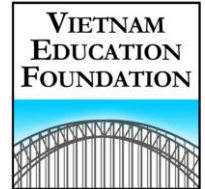
Community College Open Textbook Project

100+ CC's in USA and Canada
developing a suite of free open textbooks



Government of Vietnam

developing new curriculum at 40 universities



Siyavula / Shuttleworth Foundation

complete K-12 curriculum for South Africa



IEEE

quality review of open materials



efficient

RELATED MATERIAL

Similar content

- [Complex Fourier Series and Their Properties](#)
- [Fourier Series: Eigenfunction Approach](#)
- [Orthonormal Basis Expansions](#)

[MORE »](#)

Courses using this content

- [Signals and Systems](#)

Fourier Analysis in Complex Spaces

[Print \(PDF\)](#)

By: [MICHAEL HAAG](#), [JUSTIN ROMBERG](#)

Summary: This module derives the Discrete-Time Fourier Series (DTFS), which is a fourier series type expansion for discrete-time, periodic functions. The module also takes some time to review complex sinusoids which will be used as our basis.

Introduction

By now you should be familiar with the derivation of the [FOURIER SERIES](#) for continuous time functions. This derivation leads us to the following equations that you should be quite familiar with:

$$f(t) = \sum_n (c_n e^{j\omega_0 n t})$$

$$c_n = \frac{1}{T} \int f(t) e^{-j\omega_0 n t} dt$$

$$= \frac{1}{T} \langle f, e^{j\omega_0 n t} \rangle$$



frequency $\omega_0 n$ in $f(t)$.



IEEE

stanford
illinois
michigan
wisconsin
berkeley
ohio state
ga tech
utep
rice
cambridge
norway
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(login required)

In this module, we will derive a similar expansion for discrete-time functions. We will derive the **Discrete Time Fourier Series** (DTFS), or the

accessible

PERSONALIZE

Choose a style

- [Summer Sky](#)
- [Desert Scape](#)
- [Charcoal](#)
- [Playland](#)

Análisis de Fourier en Espacios Complejos

[Print \(PDF\)](#)

By: [MICHAEL HAAG](#), [JUSTIN ROMBERG](#), [ERIKA JACKSON](#), [FARA MEZA](#)

Based on: [FOURIER ANALYSIS IN COMPLEX SPACES](#) by [MICHAEL HAAG](#), [JUSTIN ROMBERG](#)

Summary: Este modulo deriva la series de Fourier discreto en el tiempo (DTFS), la cual es un tipo de expansión de fourier para funciones periodicas y discretas en el tiempo. El modulo tambien da un repaso a los senosoidales complejos que sirven como bases.



estar familiarizado con la derivación de la [SERIES DE FOURIER](#) par alas . Esta derivación nos lleva a las siguientes ecuaciones las cuales usted

$$\begin{aligned} f(t) &= \sum_n (c_n e^{j \omega_0 n t}) \\ c_n &= \frac{1}{T} \int_n f(t) e^{-(j \omega_0 n t)} dt \\ &= \frac{1}{T} \langle f, e^{j \omega_0 n t} \rangle \end{aligned}$$



donde c_n nos dice la cantidad de frecuencia en $\omega_0 n$ in $f(t)$.

RELATED MATERIAL

Similar content

• [Fundamentals of Digital Signal Processing Lab](#)

• [Introduction to Digital Signal Processing](#)

• [Control Systems Laboratory](#)

MORE »

Courses using this content

• [DSP Laboratory with TI TMS320C54x \(International Demo\)](#)

Preface for U of I DSP Laboratory (Thai Version)

[Print \(PDF\)](#)

By: [DOUGLAS L. JONES](#), [PATRICK FRANTZ](#), [KAMOLCHANOK KRIENGCHAIPRUCK](#)
Based on: [PREFACE FOR U OF I DSP LABORATORY](#) by [DOUGLAS L. JONES](#)

Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.

เอกสารฉบับนี้สร้าง (Digital Signal Processing) ทั่วปีของการร่วมมือ เนื้อหาของเอกสารนี้ การปฏิบัติการณ์ประกอบ ซึ่งเป็นวิชาเลือก สำหรับ Urbana-Champaign และเป็นส่วนที่แสดง เอกสารฉบับนี้ยังเห็น อย่างน้อยอย่างนั้นเห็น ซึ่งได้เป็นที่ยอมรับ อย่างเช่น มหาวิทยาลัย

RELATED MATERIAL

Similar content

• [DSP Development Environment: Introductory Exercise for TI TMS320C54x](#)

• [DSP Development Environment: Introductory Exercise for TI TMS320C54x \(ECE 320 Specific\)](#)

• [Introduction to Digital Signal Processing](#)

MORE »

Courses using this content

• [DSP](#)

Preface for U of I DSP Laboratory (Japanese Version)

[Print \(PDF\)](#)

By: [PATRICK FRANTZ](#), [EMIKO YAMAI](#)
Based on: [PREFACE FOR U OF I DSP LABORATORY](#) by [DOUGLAS L. JONES](#)

Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.

このテキストは、資料の共同開発、サンベン校の修科目、2単位が、他の様々な期バージョンは、います。

このテキストは、ることができま

- 1学期単位で精
- 1学期単位で精
- 信号処理理論

RELATED MATERIAL

Similar content

• [DSP Development Environment: Introductory Exercise for TI TMS320C54x](#)

• [DSP Development Environment: Introductory Exercise for TI TMS320C54x \(ECE 320 Specific\)](#)

• [Introduction to Digital Signal Processing](#)

MORE »

Courses using this content

• [DSP](#)

Preface for U of I DSP Laboratory (Chinese Version)

[Print \(PDF\)](#)

By: [PATRICK FRANTZ](#), [KANGLIN WANG](#)
Based on: [PREFACE FOR U OF I DSP LABORATORY](#) by [DOUGLAS L. JONES](#)

Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.

摘要：该DSP(数字信号处理)教程适合多种相关课程使用，而Connexions则为该教程提供了一个理想的演示平台。

该教程是建立在使用了14年以上的实验指导和历时10年经合作开发的实验讲义基础上的。内容主要来自ELEC320----伊利诺伊大学厄本那 - 香槟分校(the University of Illinois Urbana-Champaign)一门本科四年级两学分的实验选修课。本教程编排结构和教学目的都与其大致相同。本教程适合多种相关课程使用，其早期版本被华盛顿大学(the University of Washington)等成功地用于教学。

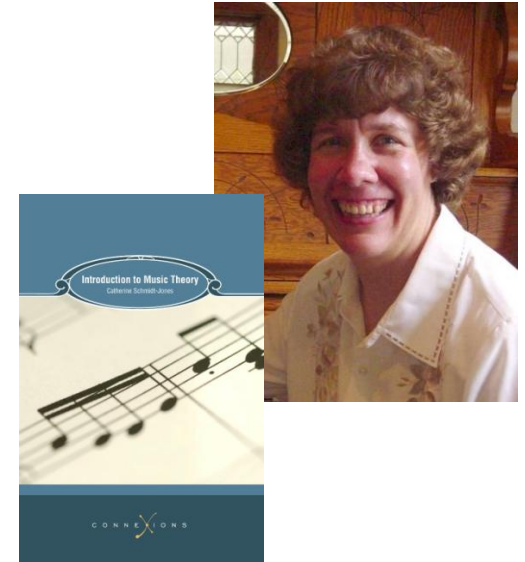
该教程可用于多种不同的教学安排，包括：

- 一学期制的以课程设计为主(project-oriented)的DSP实验课，
- 半学期制或一学期制的并在每周有实验安排的DSP实验课，

~~unexpected~~ consequences

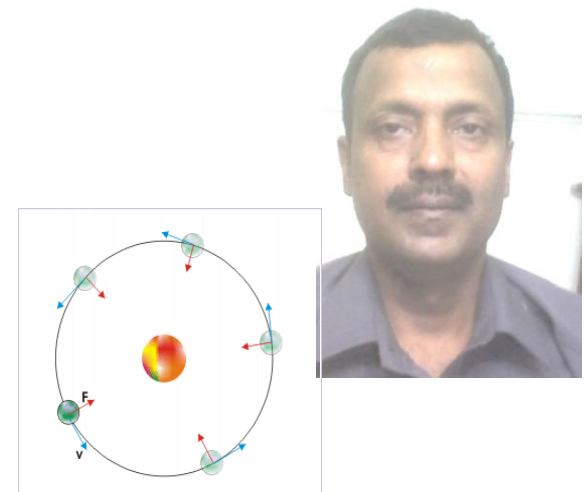
Catherine Schmidt-Jones

private music teacher, USA
music theory textbooks



Sunil Kumar Singh

engineer and parent, India
physics textbook

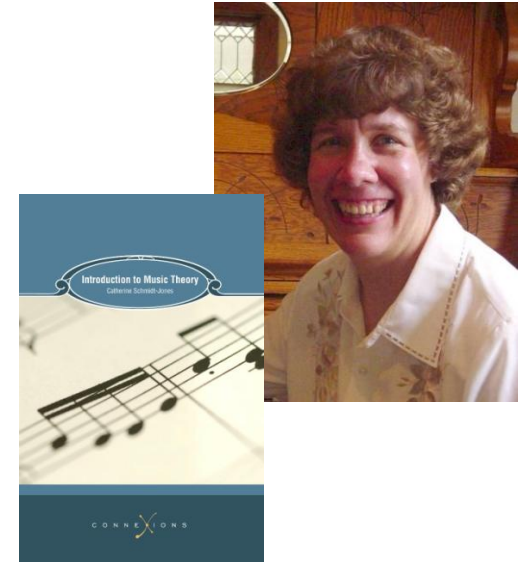


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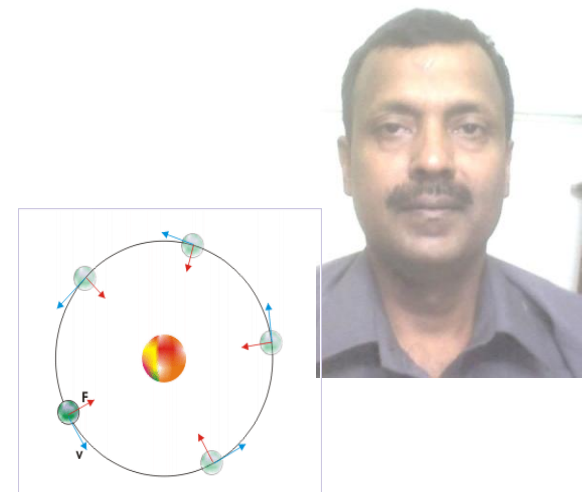
15 million uses to date



Sunil Kumar Singh

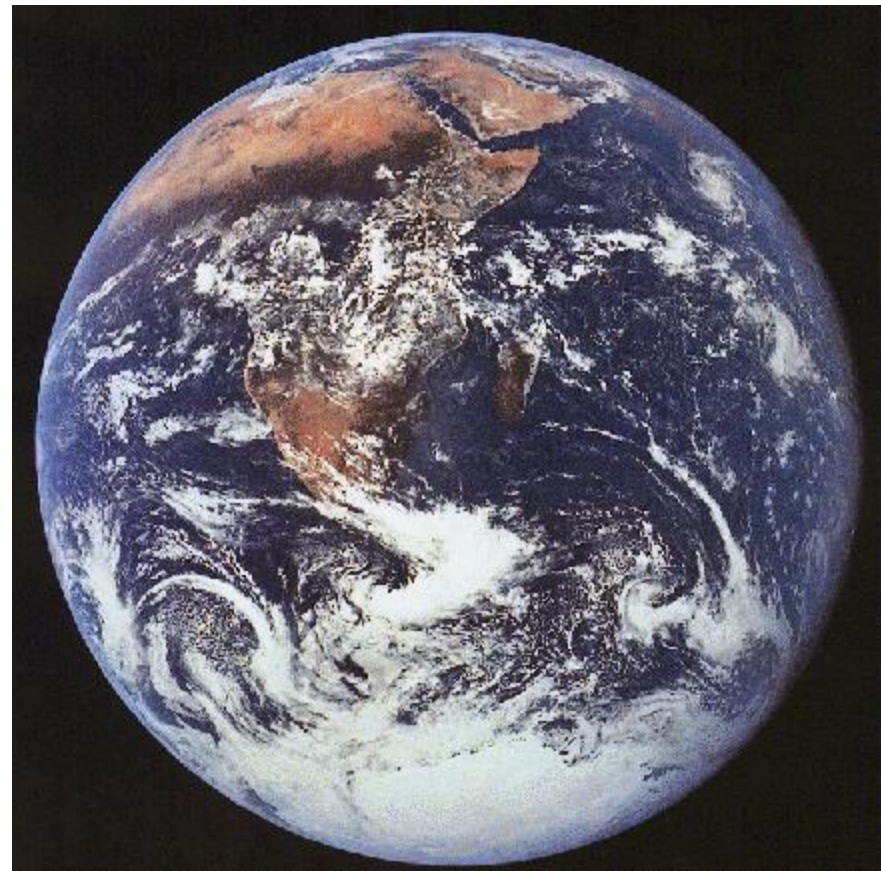
engineer and parent, India
physics textbook

4 million uses to date





outreach





inreach

outreach



open education opportunities



open access

free on-line

low-cost in print

never out-of-print

high-quality

continuously updated

translated

democratic

OE

sustainability

sustainability

Q: is OE financially sustainable?

sustainability

Q: is OE financially sustainable?

Q: is the status quo sustainable?

textbook prices have risen

4x faster than inflation

for well over a decade

**publishers are pricing themselves
out of the market**



textbooks



**computer hardware
and software**



music



newspapers

sustainability

Q: is OE financially sustainable?

A: OE (can be) compatible with for-profit publishing

enables commercial entities to add value to OERs and sustain the community



sustainability

Q: is OE financially sustainable?

A: OE (can be) compatible with for-profit publishing

enables commercial entities to add value to OERs and sustain the community



OE

legislation

OE legislation

education is a *public good*

USA state e-textbook initiatives
in CA, VA, WA, ...

USA President Obama DOE initiatives
\$50m for community college open textbooks

USA Open College Textbook Act, US Senate

Netherlands Wikiwijs project



OE

recommendations



THE CAPE TOWN OPEN EDUCATION DECLARATION

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Read the Declaration

Cape Town Open Education Declaration: Unlocking the promise of open educational resources

We are on the cusp of a global revolution in teaching and learning. Educators worldwide are developing a vast pool of educational resources on the Internet, open and free for all to use. These educators are creating a world where each and every person on earth can access and contribute to the sum of all human knowledge. They are also planting the seeds of a new pedagogy where educators and learners create, shape and evolve knowledge together, deepening their skills and understanding as they go.

This emerging open education movement combines the established tradition of sharing good ideas with fellow educators and the collaborative, interactive culture of the Internet. It is built on the belief that everyone should have the freedom to use, customize, improve and redistribute educational resources without constraint. Educators.

SHUTTLEWORTH
FOUNDATION



OPEN SOCIETY INSTITUTE

recommendations

invest in prototype projects

- open up current and future government-sponsored educational materials

adopt truly open intellectual property

- not all open licenses are “open”
- ex: prefer CC-By

build on existing technology

- do not reinvent the wheel; adopt emerging standards

support quality control

- engage existing institutions in review of OERs

learn from others' successes and failures

- several other countries are engaging in OE



Richard Baraniuk

richb@cnx.org