

Filling the Digital Divide with Offline Content

*Six ways to deliver a library anywhere for
under \$90*

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Humane Informatics

8 November 2010

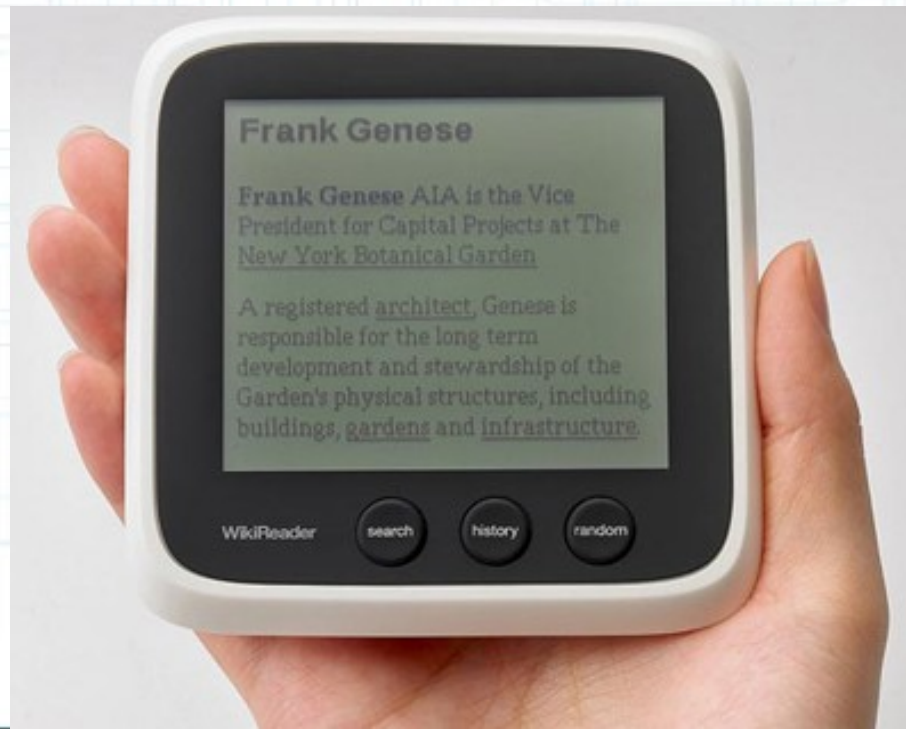
*G20 International Symposium
on Convergence Technologies*

Overview

- Internet access is still expensive and difficult in the developing world
- Inexpensive media now exists that can hold vast offline libraries of information
- Large sources of content are available
- Inexpensive reader devices now exist which can read libraries on media

Thesis

Delivering offline libraries of content with e-text readers is an effective way to provide a wealth of information for hundreds of millions (billions?) of people in the developing world.

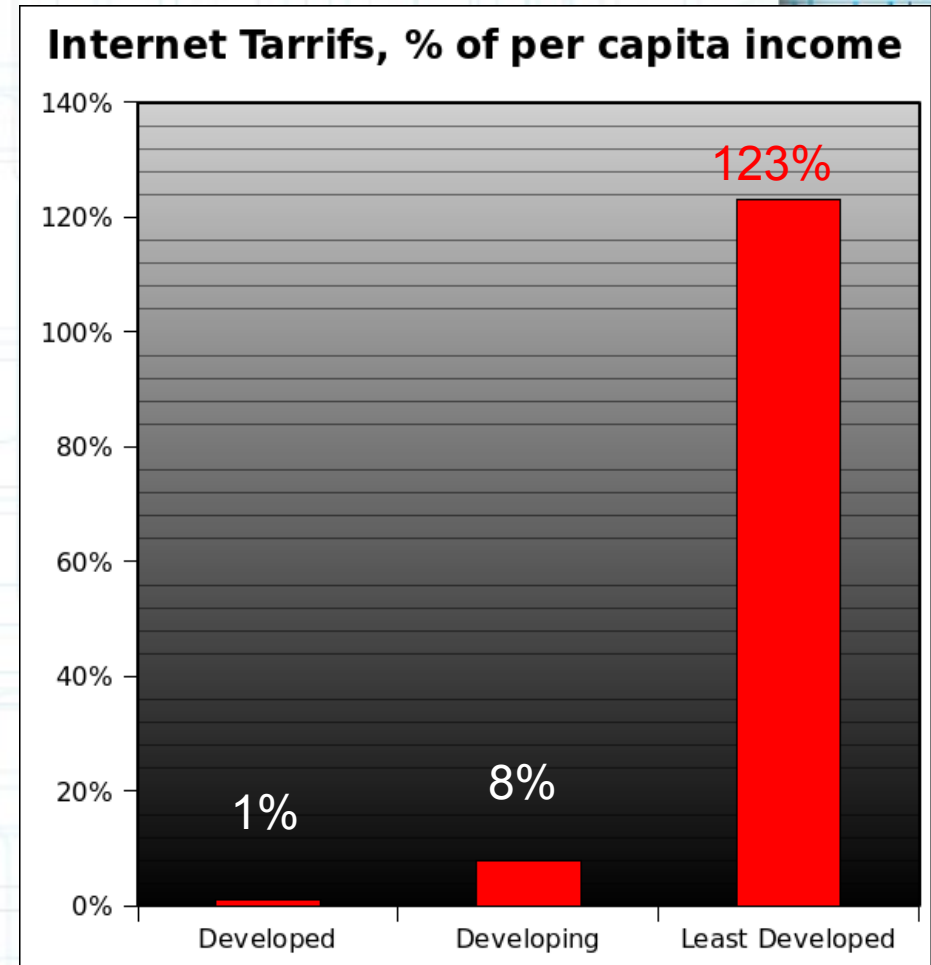
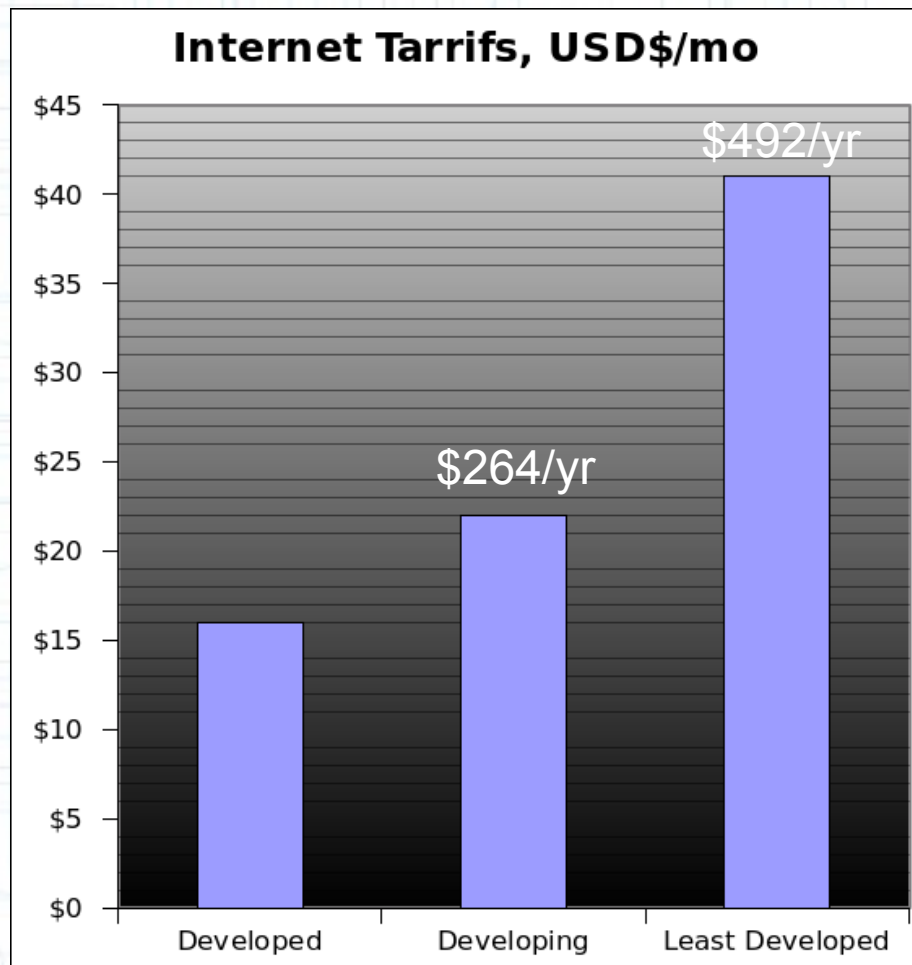


Global Internet Access

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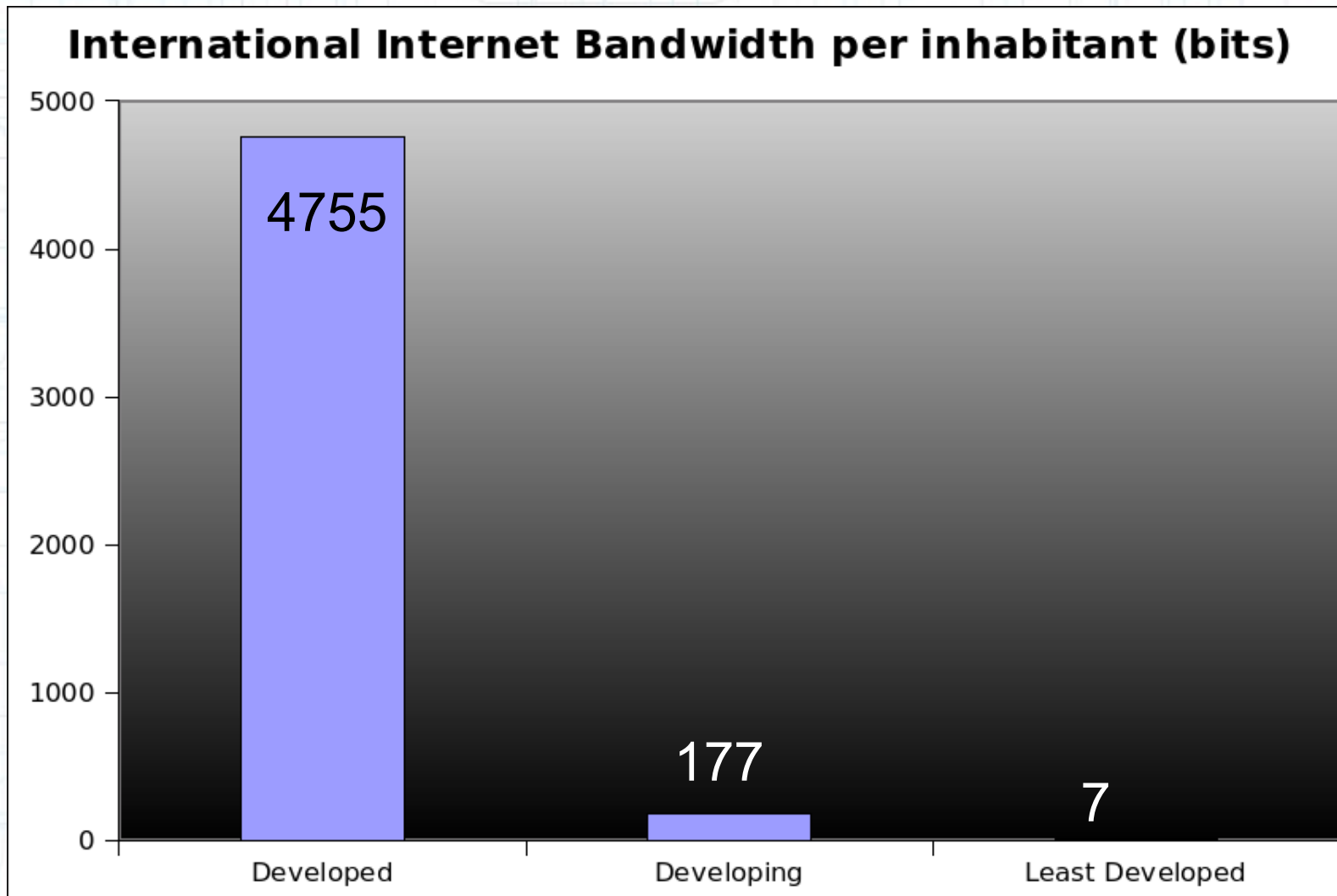
Internet Cost

- Cost for 20 hours of dialup per month



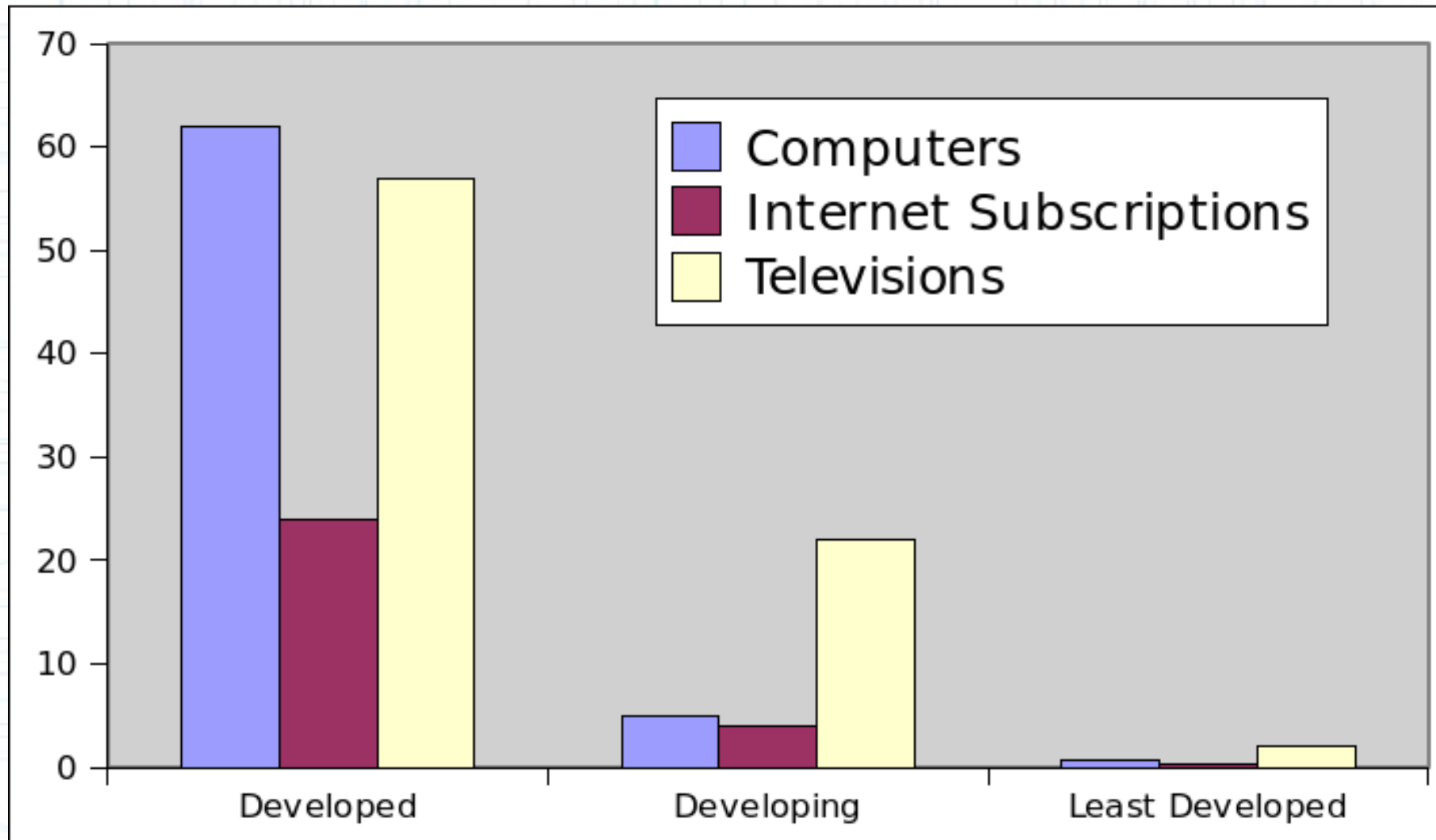
Internet Capacity

- Deficit of internet infrastructure



TV/Internet Gap

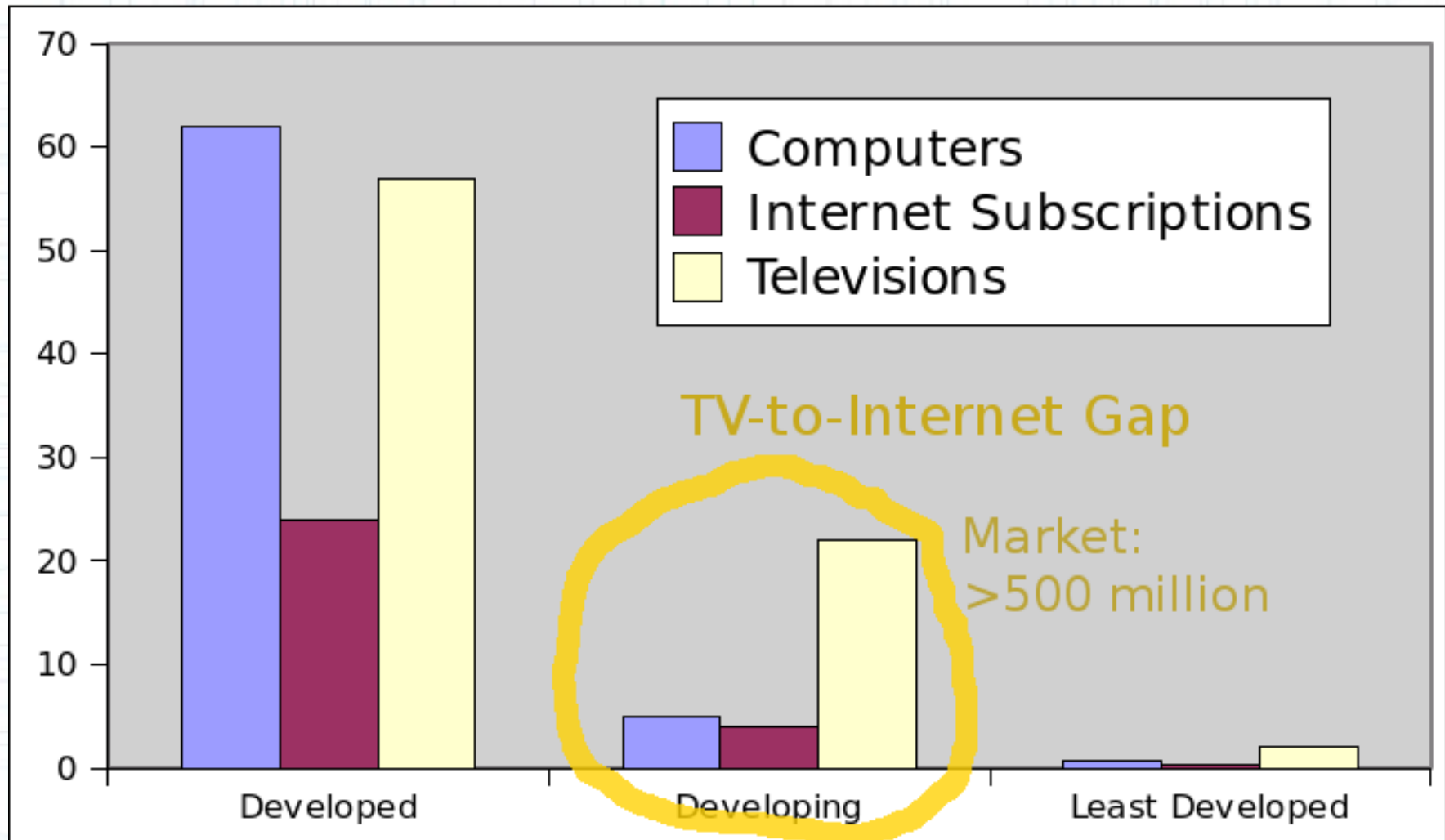
Global Information Access per 100 Inhabitants



"The Global Information Society: a Statistical View", 2008

TV/Internet Gap

Global Information Access per 100 Inhabitants



"The Global Information Society: a Statistical View", 2008

Access Conclusions

- Internet access is still rare and expensive
- Televisions are many times more common than computers or internet access
- **Question:** How can we deliver content without easy internet access?

Storage Media

- Internet access is still expensive and difficult in the developing world
- Inexpensive media now exists that can hold vast offline libraries of information
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SD Cards

- 2 GB \approx 5,000 Books (text only)
- \approx \$3



Cds

- 700 MB \approx 1,750 books
- <\$1



DVDs

- 8.5 GB \approx 20,000 Books
- $<$ \$1



Hard Drives

- 2,000 GB \approx 20% of US Library of Congress Printed Collection!
- ~\$110



Media Conclusions

- Massive quantities of text can be cheaply provided with today's hardware
- The question is not if we can deploy large media libraries, but what large libraries of content are available?

Content Sources

- Internet access is still expensive and difficult in the developing world
- Inexpensive media now exists that can hold vast offline libraries information
- **Large sources of content are available**
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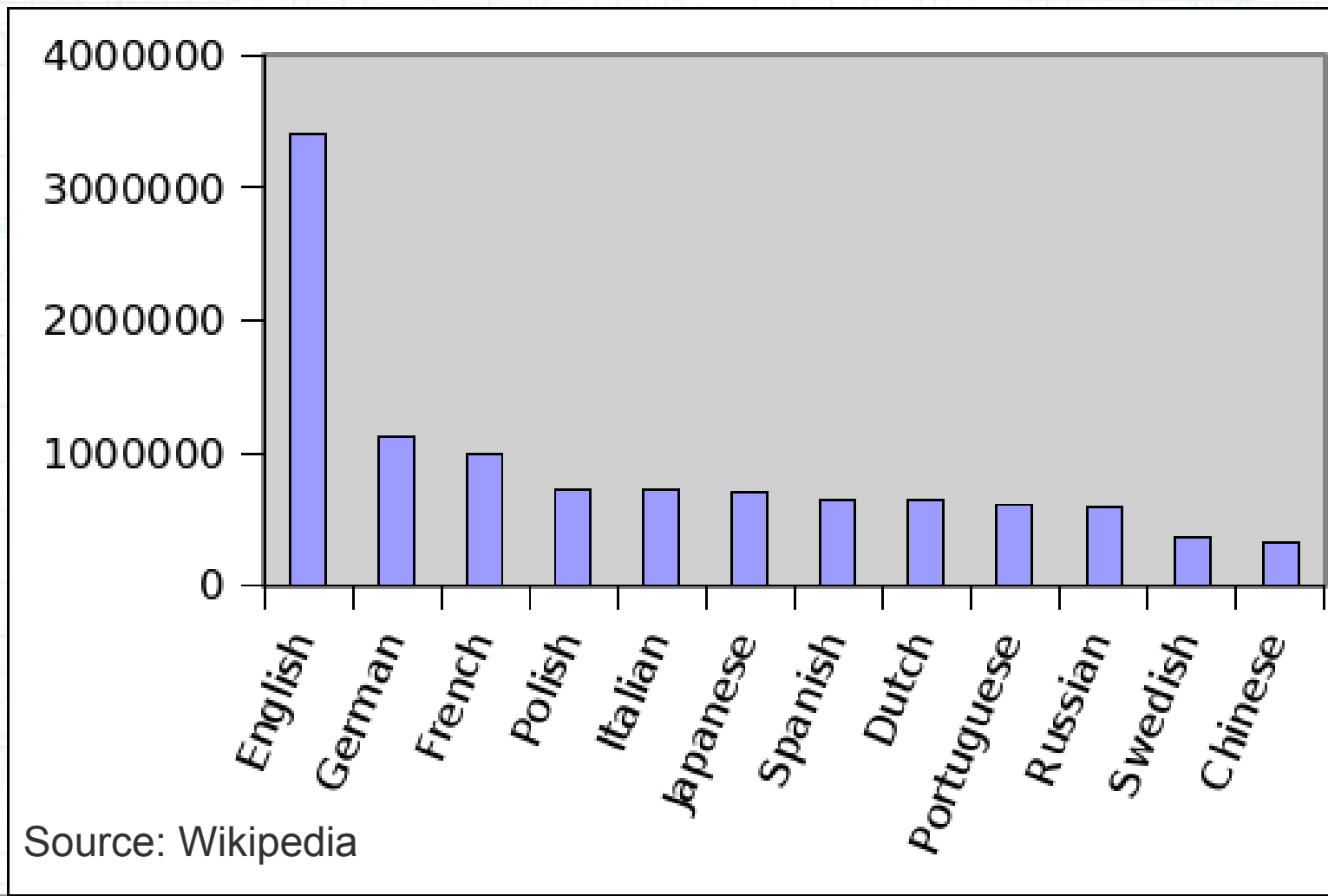
Wikipedia

- Seventh highest ranked web site in the world
- Fully Open Source content
- Can be downloaded and read offline
- Text-only English Wikipedia is about **5 GB** compressed

Wikipedia

- Not rich in all languages

Number of articles for top languages



Source: Wikipedia

Public Domain

- Content that is no longer protected by copyright
- Project Gutenberg – over **130 GB** of **ebooks in 21 languages, over 30,000 titles**
- Old – mostly pre-1923

Open Source Textbooks

- Aka "Open Educational Resources" (OER)
- Many models emerging
 - State-funded Model
 - California Open Source Textbook Project
 - State of California spends \$400 million per year on textbooks
 - Volunteer-driven Model
 - South Africa – Free High School Science Texts (FHSST)
 - Math and Science high school curriculum
 - WikiBooks Project
 - 2,000+ books "in progress", few finished

Open Source Textbooks

- Many models emerging
 - Publisher Model
 - Flat World Knowledge (Publisher)
 - 40+ Textbooks, all English
 - Publisher and author make money off print copies and formatted downloads
 - University-driven Model
 - MIT Open Courseware
 - College course material provided both for students and others

Commercial E-books

- Amazon Kindle Store offers over **670,000 digital titles**
- Barnes and Noble offers over 1,000,000 digital titles
- **DRM:** Digital Rights Management prevents reading books on unapproved hardware/software
- Cost is prohibitive for developing world

Content Conclusions

- Large bodies of freely available content exist, such as Wikipedia dumps, public domain books, and open source texts
- An enormous number of commercial digital e-books are now available.
- Quantity and quality of content varies greatly by language.

Reader Devices

- Internet access is still expensive and difficult in the developing world
- Inexpensive media now exists that can hold vast offline libraries of information
- Large sources of content are available
- **Inexpensive reader devices now exist which can read libraries on media**

Humane Reader



Humane Reader

- Displays to television set
- Reads Micro-SD Card (2GB)
- Optional PS/2 Keyboard
- Wikipedia reader
- \$20 in quantity



Humane Reader

- Minimalist design
 - Uses two 8-bit microcontrollers
 - Specs of a 1977 Apple II computer
- Cell phone standard micro-USB power
- Open Source Design
 - Effort to build community around platform
- Arduino expansion slots
- Can be used as simple 8-bit computer

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==[Title Search]==

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Sid Meier's Alpha Centauri
Steel-string acoustic guitar
Sacrifice fly
Stolen base
STS-51-F
School voucher
Son of Godzilla
Shock site
Second Polish Republic
Scilly Isles
Serie A
Society of Jesus

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SEO

Seoul National University

Seon

Seoul Metropolitan Subway

Seoul World Cup Stadium

Seol Ki-Hyeon

Seoul Subway Line 5

Seoul Station

Seongnam

Seogwipo

Seoul Subway Line 1

Seongnam Ilhwa Chunma

Seoul National Capital Area

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Seoul Metro
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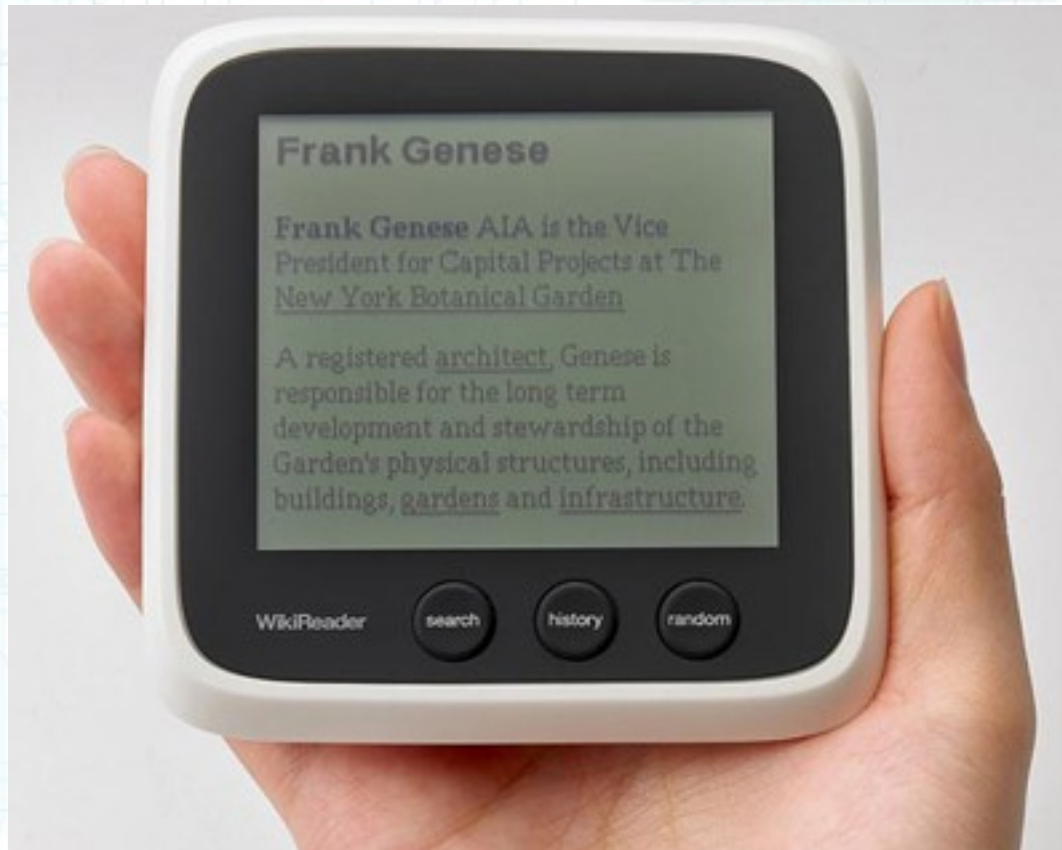
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-=[ Seoul National University Table of
>Seoul National University
+History
++Pre-establishment
++Establishment
++College of Medicine
++Relocation
+Academics
++Undergraduate colleges
++Graduate schools
+++General programs
+++Professional schools
++Admissions
++Reputation
++Rankings
+Campus
++Location
++Public transit access
```


-=[Seoul National University Art

>Seoul National University Hospital and the College of Medicine trace their history to Gwanhyewon, also known as Jejungwon, which has been claimed as the first western medical institution in Korea, founded by royal support in 1885. This assertion has however been disputed by medical historians, as lacking any tangible evidence. It is widely accepted that Gwanhyewon is instead a direct predecessor to Severance Hospital and Yonsei University's College of Medicine. It is suggested that Seoul National University Hospital and the College of Medicine are related,

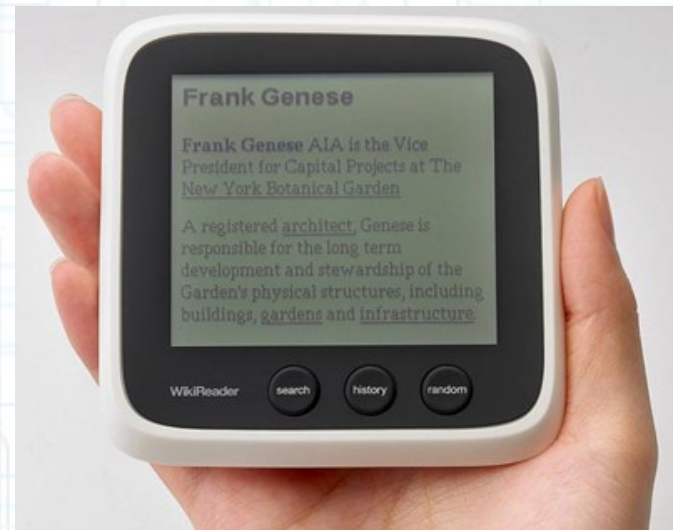
WikiReader

- Handheld Wikipedia reader



WikiReader

- Handheld Wikipedia reader
- SD Card contains entire English Wikipedia
- Wikipedia in 15 languages available
- Parental filter
- POWER: 2x AAA batteries for 12 months of operation
- **\$65**



WorldReader Project

- Deploys commercial e-book readers



WorldReader Project

- Deploys commercial e-book readers
- Combination of commercial and public domain content
- Looks for funding to subsidize e-book readers and books
- Field tested Kindle



Wikipedia on DVD

- Wikipedia Selection for Schools
- Hand-checked selection of 5,500 articles for education
- Includes images
- English only
- Requires PC
- <\$1 DVD



A screenshot of a web browser window displaying the '2008/9 Wikipedia Selection for schools' website. The browser's address bar shows 'http://schools-wikipedia.org/'. The page features the Wikipedia logo (a globe with letters) and the text 'WIKIPEDIA The Free Encyclopedia'. Below the logo is a list of subjects: Art, Business Studies, Citizenship, Countries, Design and Technology, Everyday life, Geography, History, Information Technology, Language and literature, Mathematics, Music, People, Portals, Religion, and Science. To the right of the subject list is a large text block titled '2008/9 Wikipedia Selection for schools' with a 'Welcome to this Wikipedia Selection' message. The message describes the DVD as a free, hand-checked selection of 5,500 articles, targeted around the UK National Curriculum. It mentions that the DVD contains about 5,500 articles, as many as can be fitted on a DVD with good size images, and is about the size of a twenty-volume encyclopaedia (34,000 images and 20 million words). Below the text is a small illustration of a medieval scene with knights on horseback. The browser's status bar at the bottom shows the page title and address.

One Laptop Per Child

- OLPC Project promises **\$100** tablets in next year
- Designed for use as both reader and PC



Cheap Netbooks/Tablets

- India's \$35 Tablet promised in next year
- Multiple sub-\$100 tablets announced
- \$100 netbook is a reality today
- Tablets easily used as Readers



Conclusions

- Internet connectivity is not necessary to provide rich libraries of content to end users
- Modern media make cheap distribution of large media collections possible
- A variety of inexpensive emerging devices allow for use of offline media
- In many languages, content is limited

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