
PLAITing the Developing World

Charles Snow

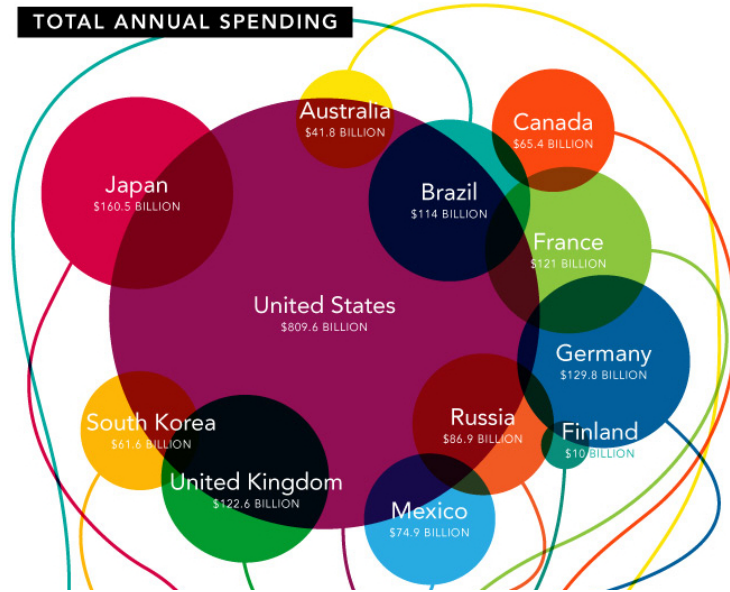
Department of Applied IT
Volgenau School of Engineering
George Mason University

Education

- generally seen as a good thing
 - perhaps not always by the students...

Expenditures on Education

TOTAL ANNUAL SPENDING



<http://mat.usc.edu/u-s-education-versus-the-world-infographic>

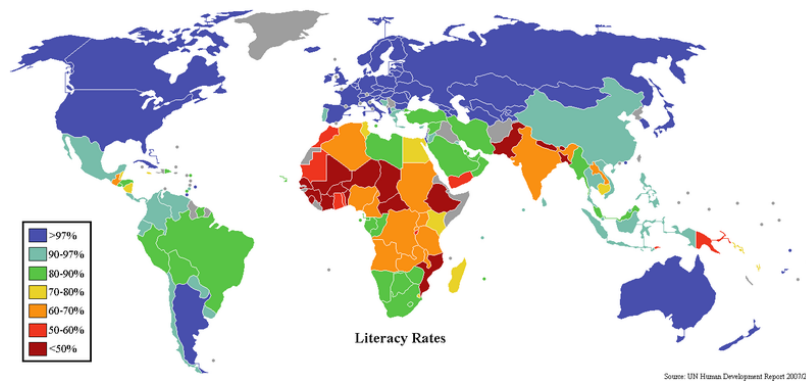
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Education: Keeping Score

- literacy rate



<http://depthofprocessing.blogspot.ca/2010/07/is-there-population-crisis-are-schools.html>

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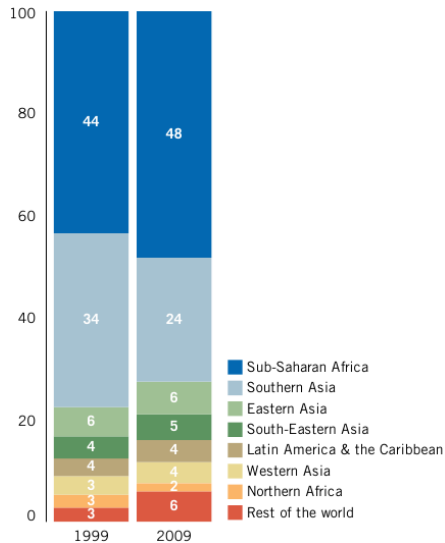
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Johnny Can't Read...

- not if he's one of **61 million** children worldwide with no access to primary education
- not if he's living in a region short of teachers: **2 million** needed worldwide

Distribution of out-of-school children by region, 1999 and 2009 (Percentage)



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...but can soon?

Millennium Development Goal 2:

Ensure all children, particularly girls, those in difficult circumstances and those belonging to ethnic minorities, have access to and complete, free and compulsory primary education of good quality.

- this goal is to be met by the end of **2015**

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There's An App For That

- will need distance education to solve
- as IT professionals, we think of using IT to mitigate, if not solve, this problem

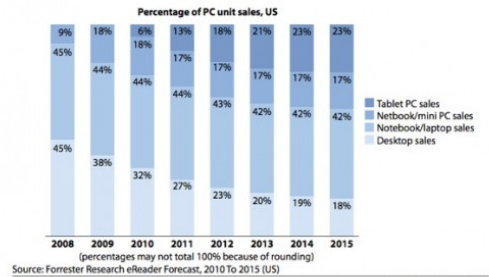
Our IT for DE Arsenal

- the tools we rely on:
 - synchronous delivery
 - e.g., MIST/C, Blackboard Collaborate
 - asynchronous delivery
 - text, audio, video on servers accessed by web or dedicated app
 - LMS
 - for discussions, assessment, reporting
 - interaction (student:instructor, student:student)

Underlying Technologies

- Internet
 - high performance connections between servers and users
- delivery to high performance devices
 - mostly laptop computers
- server infrastructure
 - content capture, storage, delivery

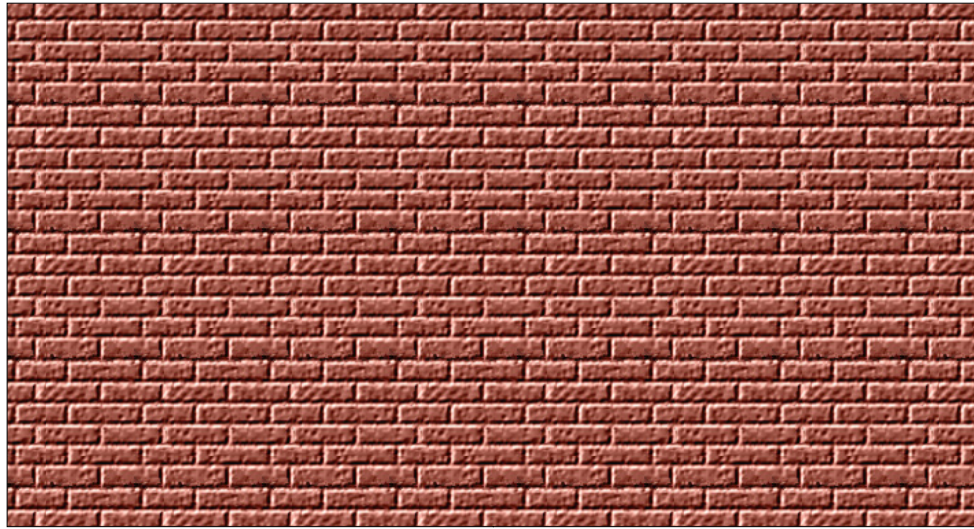
Figure 1 Forecast: Share Of US Consumer PC Sales By Form Factor, 2008 To 2015



How Good Does it Get?

- IT tools appear to scale up well
 - Coursera runs MOOCs with > 100K students
 - expand to reach other underserved students?

Apply 'Aresenal' to MDG2?



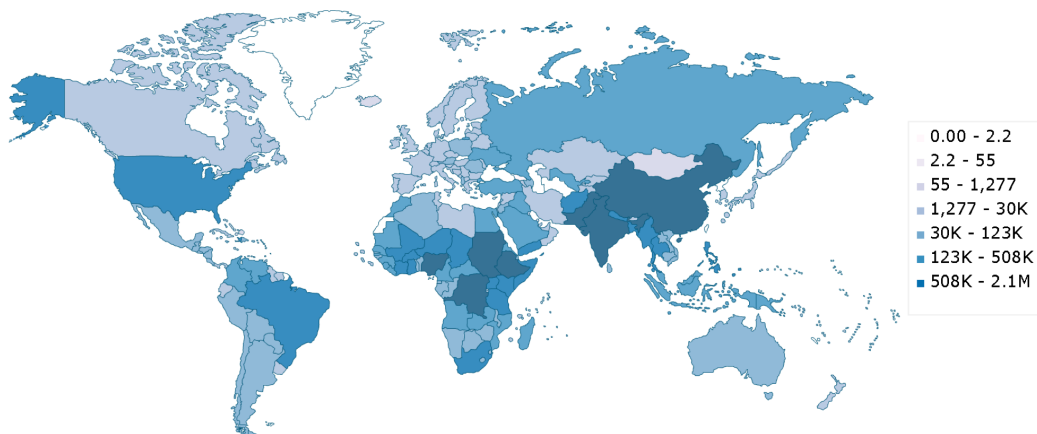
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Scope of the Problem

- where the students are not in school:



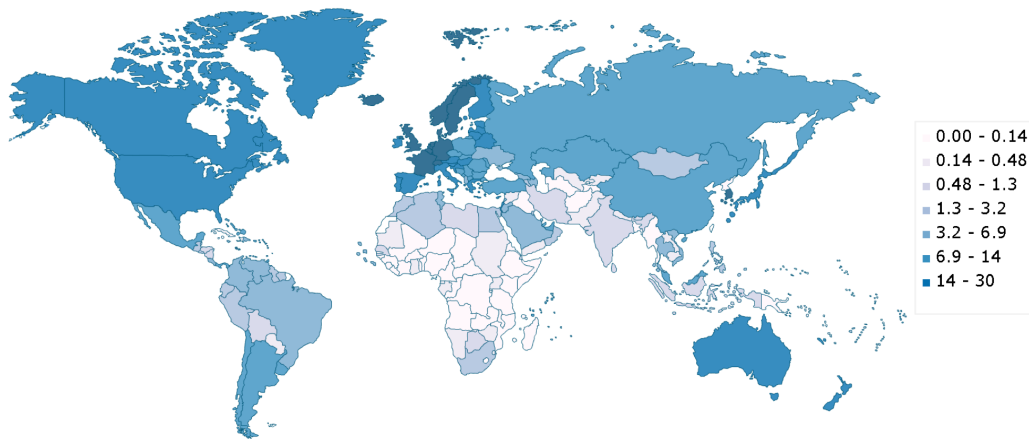
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Scope of the Problem

- where there is little/no Internet:



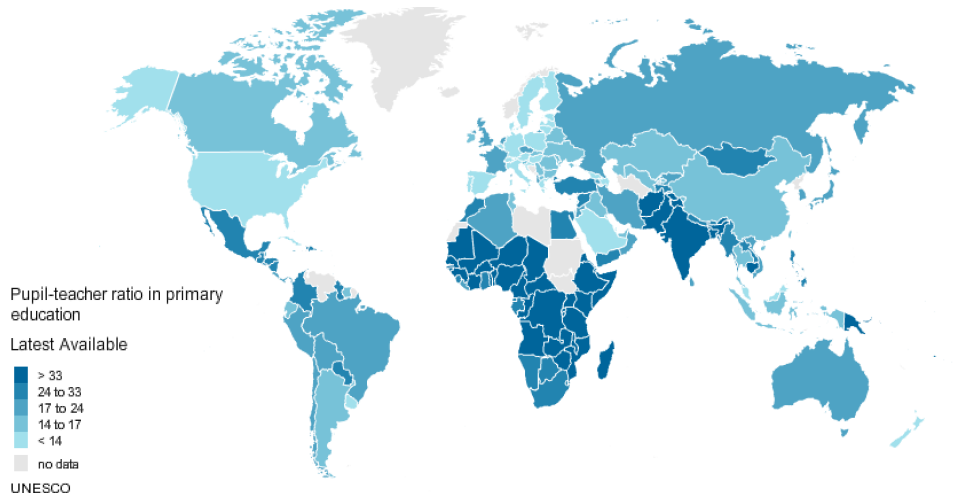
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Scope of the Problem

- where there are few/no teachers:



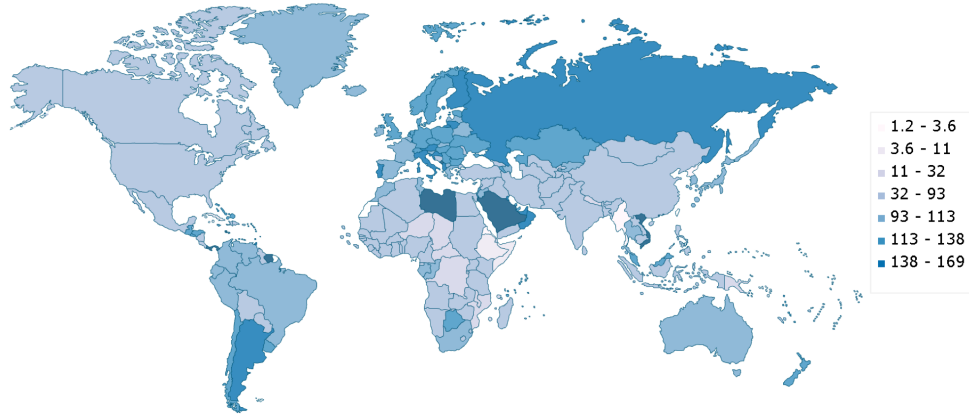
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What To Do?

- what *do* children have in those regions?
 - if anything, cell phones



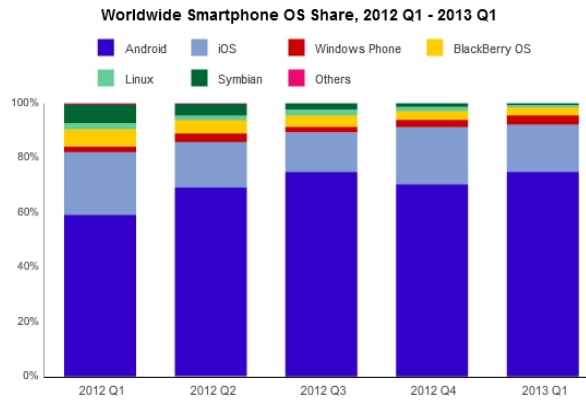
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What To Do?

- what *do* children have in those regions?
 - if anything, cell phones; slowly growing percentage of smart phones
 - Android rules!



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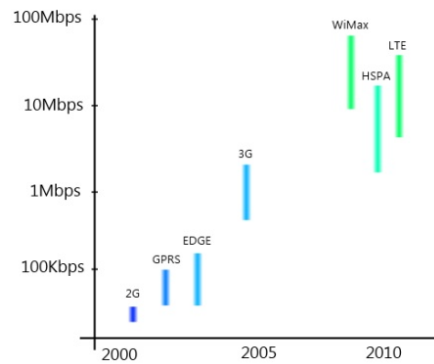
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<http://blog.geoactivegroup.com/2013/05/why-android-and-ios-are-still-leading.html>

What To Do?

- what *do* children have in those regions?
 - if anything, cell phones; slowly growing percentage of smart phones
 - data service?
 - wireless only
 - mobile broadband %:
 - developed: 56.5%
 - developing: 8.5%



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<http://openmind.posterous.com/wireless-data-speed-comparison>

Architecture: Content Delivery

- content replication, over distributed set of nodes
- aggressive use of P2P
 - handle highly transient population of nodes
 - fast search for content, content fragments
 - use BitTorrent protocol
 - architecture developed in Islam 2013

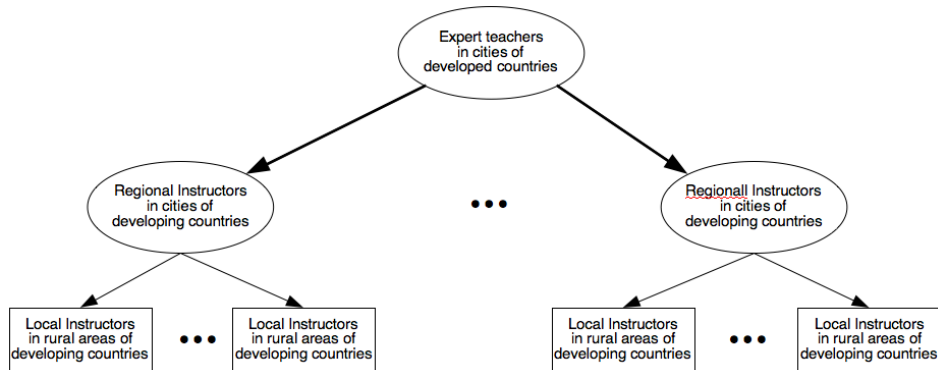
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Teaching Teachers

- using multi-layer hierarchy:



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Meanwhile, in Fairfax...



<http://newsdesk.gmu.edu>

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Another Tool in IT Arsenal

- Personalized Learning of Applied Information Technology (PLAIT)
 - allows directed, self-paced instruction
 - more immediacy via feedback promotes learning and retention
 - modules + competency-assessment-conditioned advancement

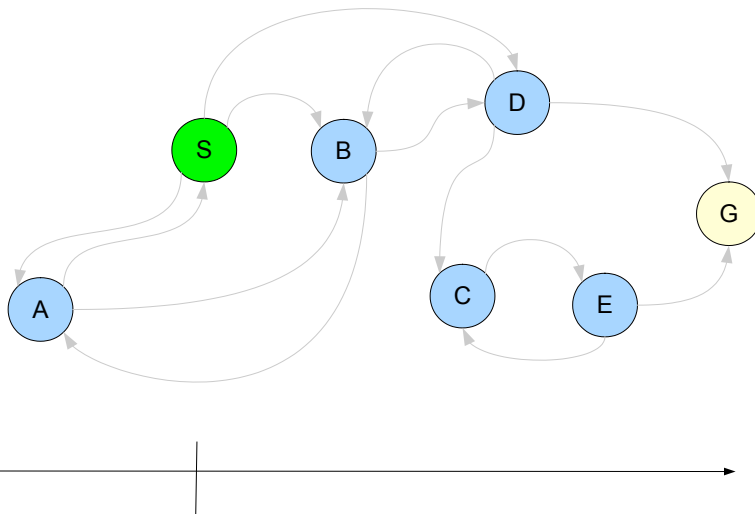
PLAIT 101

- consists of modules containing:
 - **content**: material a student is being taught
 - may be any mix of formats
 - **assessment**: some mechanism to determine how well the student has mastered content
- transitions from one module to another
 - guided by student performance on assessment
 - different students have different trajectories

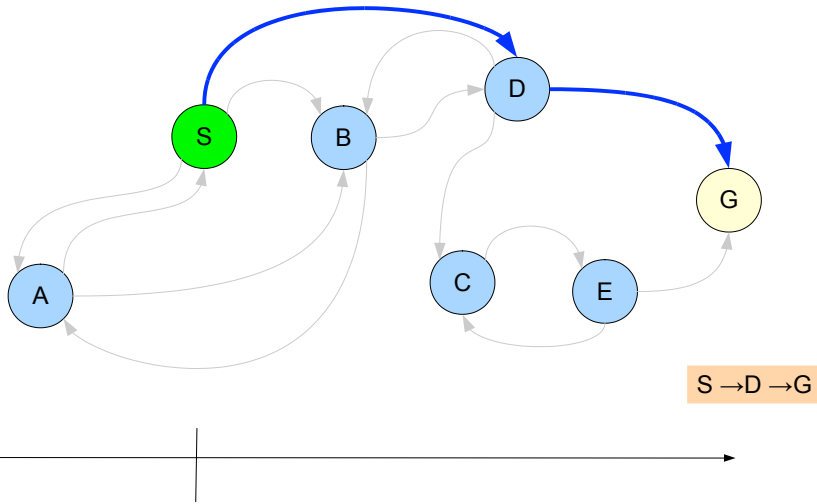
PLAIT

- like other IT tools in DE arsenal,
 - works with blends of DE delivery,
 - integrates into LMS
 - scales up well
- works well with ‘small’ snippet sizes
 - compared to hour(s)-long lecture recording
 - test student’s mastery on smaller bits to ensure solid foundation for subsequent bits

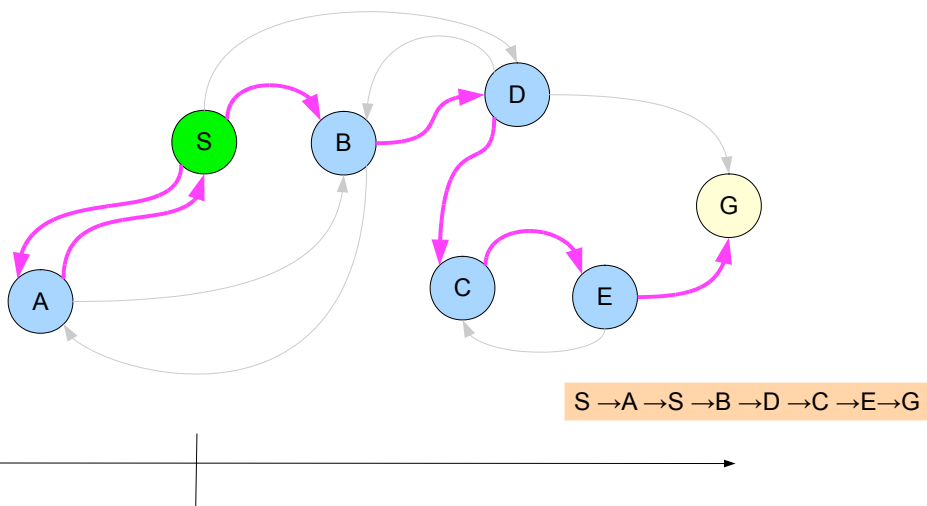
PLAIT space



PLAIT space



PLAIT space



PLAIT Here

- students in developed world tend to consume on laptop/notebook format computers
- growing use of tablets
- rely on:
 - high-capacity networks
 - simple client-server model
- may influence module content format...
 - but doesn't need to

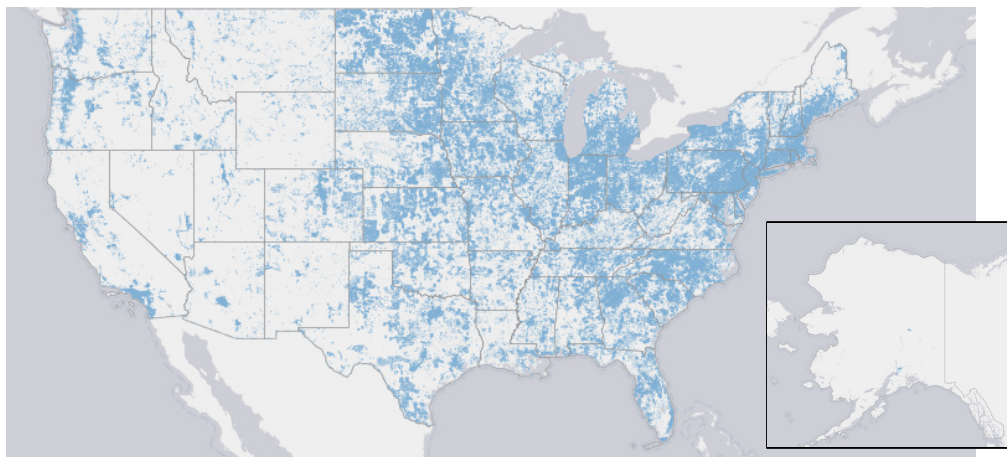
PLAIT There

- would work well on:
 - low(er) capacity networks
 - smartphones
 - P2P-based distribution model
- i.e., conditions that prevail in developing world

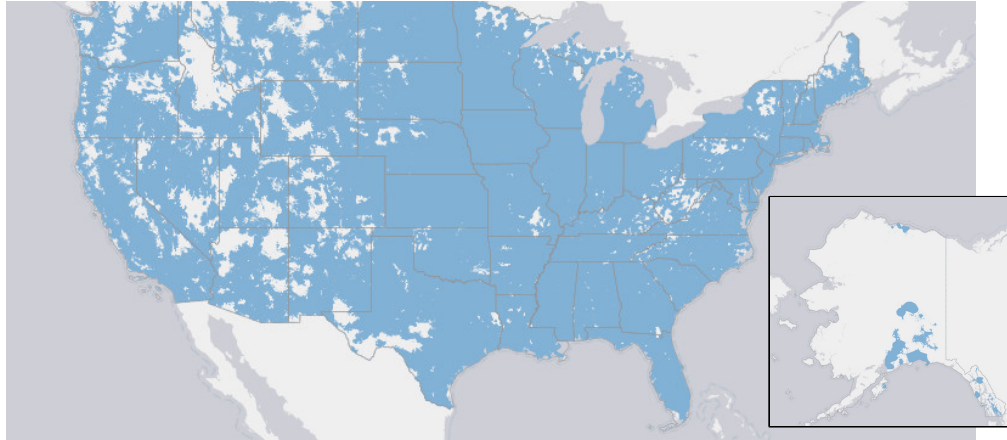
Good There is Good Here

- developing world conditions...
 - intermittently prevail in developed world normally having high quality services
 - prevail in broad parts of the developed world *still*

Wired Network Coverage



Mobile Wireless Network Coverage



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Summary

- distance learning is the future of education in both developed, developing worlds
- delivery platform of choice will be Android-running mobile device

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Possible Next Steps

- integration of PLAIT with MIST/C
 - Moodle-based system, all open source
 - developed, in part, at Mason
- development of MIST/C Android client
 - to run on Android smartphones (and tablets)
- deployment of Islam's P2P-based architecture for content distribution

