

Learner's Guide

***ICT in developing world with focus
on technology
7.5 ECTS***

Autumn 2013

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1. Aim

The aim of the course is to provide students with broad knowledge on how information and communication technologies function and the challenges faced when implemented in developing countries. It is assumed that students have knowledge in using information and communication technologies (ICT), hence the focus will be on the operation of different technologies. Students will extend their understanding of Internet and other networks, regulations which affect development and implementation of different technologies, affordable devices and connectivity used in developing regions and ongoing research in this direction. The importance of open hardware and software for developing regions will be emphasized and applications and services that can be deployed in emerging markets suggested. The role of the older ICTs (TV, telephone, radio), as well as other important issues to be considered when implementing ICT will be also explored.

2. Facilitator

The facilitator of the course is Iskra Popova. She was born and spent most of her life in a developing country where she was engaged in establishing the first Internet connection at the university "St Kiril and Metodij". Her PhD thesis is in the area of routing algorithms and flow control in packet-switched networks. Currently, she is a senior lecturer and researcher at the Interaction Design and Learning Lab (IDEAL) at DSV, Stockholm University.

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3. Intended learning outcomes

After finishing the course the learners are expected to:

1. Understand how Internet works and the reasons behind the digital divide (uneven spread of the Internet);
2. Recognise ICT devices that are low-power, robust, and affordable;
3. Categorise different types of network connectivity and their characteristics;
4. Differentiate between free and open access software and hardware and understand its importance for developing world;
5. Identify the significance of cloud computing and Web 2.0 for developing world;
6. Analyse whether particular problems can be addressed by using ICT with respect to the available resources (financial, human, technological);
7. Explore ICT alternatives to find suitable solution for integrating technology to support certain strategy;
8. Select appropriate ICT and create concept map for its implementation and evaluation in situations where this is feasible, desirable and brings positive change.

4. Logistics

The course is offered via e-learning platform iLearn 2 and no physical meetings are scheduled. Students will gain knowledge through using multimedia material available either via the e-learning platform or on the Internet and through performing various learning activities. Communication will be conducted through iLearn discussion forums, and via Skype meetings. The facilitator is available via Skype or in her office each Thursday afternoon (13:00-17:00) during the time the course is running. To connect via Skype send a request with your full name (as registered on the course) at least 24 hours before the meeting is scheduled.

5. Content

The topics studied are divided into four sections.

1. Introduction
 - Definition of ICT, terminology and acronyms
 - Advantages of digital technology
 - Digital divide and e-readiness
 - Challenges with ICT in developing regions
2. The Internet
 - Computer networks
 - Packet versus circuit switching
 - Internet protocol
 - Other protocols
 - Peering and Internet Exchange Points
3. Affordable connectivity and devices
 - Other networks and connectivity
 - Wireless technologies
 - Affordable devices and sharing
4. Software, content, interfaces and other issues
 - Free and open source software
 - Local content
 - User interface
 - Cloud computing
 - Other issues related to technology (power supply, security, mobile phones for development, green ICT)

The very last subtopics (security, M4D, and green ICT) will be studied in more details in the course "Special topics in technology for development". Within this course they will be only introduced.

6. Structure of iLearn page

The iLearn page of the course starts with the text about the course, its aim and objectives followed by short introduction of the teacher and text and pictures explaining the

structure of the course and examination. This guide and two discussion forums are placed immediately after the course introduction together with the video clip about the course. The news forum is used mainly by the teacher to announce unanticipated issues, and the discussion forum is place for posting questions, comments and opinions related to the course.

There are four sections in the course and they are placed in continuation on the iLearn page. The following learning activities are common for each section: slides, literature, self-assessment test, assignment and quiz. The slides present the summary of the topics for the section. The literature consists of links to texts, videos or animations. It is divided in the literature that is compulsory (obligatory) and additional (for extending the understanding on certain topics). The self-assessment test contains questions through which you can test your understanding of the topics studied during the week. The assignment and the quiz are used for assessment.

Besides the ordinary learning activities section 1 and 3 contain some additional ones.

Section 1 contains the glossary for new terms and acronyms, and the project assignment.

The work on the project extends throughout the whole course. The report is submitted at the end of the course.

Section 3 contains a the project discussion forum where issues with respect to the project are discussed.

The picture on the right side illustrates the structure of the course.

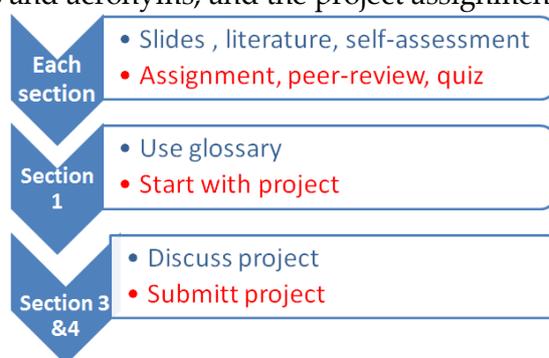


Figure 1 Structure of the course

7. Literature

The literature is provided as a list of texts, video clips or animations for each section separately. All of them are open access and you will be able to reach them once you have the URLs. Only, the video clips made by the facilitator might not be available unless you are identified as a registered student. The list consists of compulsory and additional literature presented in a form of links to articles or multimedia material. Each link opens in a separate window on the browser. The list of the links is given as an appendix to this guide.

8. Learning activities and pedagogical approach

Learning activities consist of the following.

- Acquiring knowledge using literature (read the articles, watch the videos and animations)
- Entering new terms and acronyms into the glossary
- Reviewing the acquired knowledge and comprehension using the slides and self-assessment tests
- Asking questions and sharing opinions via Discussion forum on iLearn2 for various issues related to the course, the content studied
- Taking quizzes

- Working on the tasks given in the assignments
- Submitting the assignments and doing the peer assessment
- Discussing different parts of the projects with other participants in the course
- Searching for literature necessary for the project
- Writing and submitting project report
- Defending the project report

The intention of the course is for students to learn the basic terminology in ICT, to understand how technology operates, how and when it can be implemented so that a positive impact is achieved. Students will use their own experience, literature available through the course and elsewhere, as well as the discussions with the colleagues and facilitator to acquire knowledge and comprehension, as well as to write and defend their simulated project. The picture on the right side graphically presents the pedagogical approach in the course.

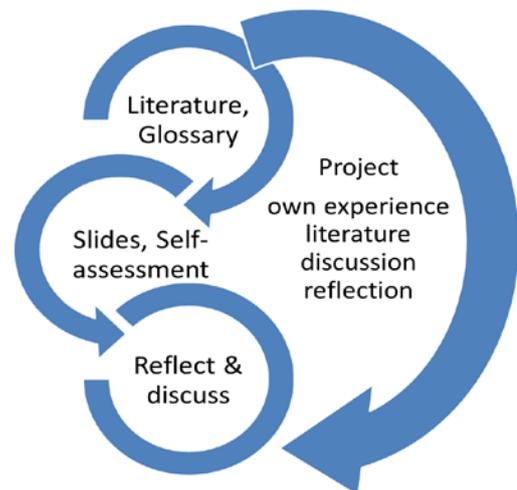


Figure 2 Pedagogical approaches for the course

9. Examination

Four assignments together with peer-assessment, four quizzes and a project are to be successfully accomplished in order the full course to be completed (7.5 hp). Assignments and quizzes assess learning outcomes 1 to 5, and the project those from 6 to 8. Assignments together with peer-assessment, as well as the quizzes, contribute 1.5 hp each to the total points. They are graded Pass/Fail. For passing grade at least 60% correct answers are required. The project contributes with 4.5 hp to the course and is graded with A to F. The figure on the right side presents the points and grades.

Assignments are submitted every Thursday by 23:55. They are graded through peer assessment. The peer assessment is performed based on the given criteria and is due the next Sunday at 23:55. Assessment is done by answering Yes/No to specific assertions for each assignment. Two peers assess each assignment. Each student performs assessment of two assignments.

Quizzes contain closed questions, there is limited time of 30 minutes and they are automatically graded. You can take them multiple times if necessary and any time during the course.

Whole course		
7.5 hp		
Assignments 1.5 hp Pass/Fail	Quizzes 1.5 hp Pass/Fail	Project 4.5 hp A-F
Assignments+Quizzes		Project

Figure 3: Points and grades in the course

When quizzes and assignments are completed before submitting the project, the score obtained on quizzes and assignments contributes with 10% to the final grade.

The project consists of a written essay and oral defence. The written report is submitted via iLearn2, and the oral defence is conducted via Skype following the schedule published on iLearn.

Grades A, B, C, D, E, Fx or F are used for assessment. The grading criteria associated with each grade for the project are described below.

10 Grading criteria

The grading criteria associated with each grade for the simulated project are presented in the following table. Note that the grade can be changed based on the points obtained from assignments and quizzes when they are completed before submitting the project report.

Grade	Abilities presented through the written report and oral defence
A	<ul style="list-style-type: none"> • Ability to thoroughly and critically analyse a problem in developing world • Knowledge and comprehension for making informed conclusion on whether and how ICT could contribute to mitigating the problem • Deep understanding of more than two technologies to be considered in mitigating the problem • Ability to coherently and logically present the problem chosen and the technologies suggested • Ability to estimate and justify necessary pre-conditions and available resources for each of the considered ICTs • Ability to select the most appropriate ICT and justify the selection • Comprehensive knowledge on anticipating how the project implementing the selected ICT in mitigating the suggested problem will be conducted, monitored and evaluated
B	<ul style="list-style-type: none"> • Ability to thoroughly analyse a problem in developing world • Knowledge and comprehension for making informed conclusion on whether and how ICT could contribute to mitigating the problem • Deep understanding of at least two technologies to be considered in mitigating the problem • Ability to coherently and logically present the problem chosen and the technologies suggested • Ability to estimate and justify necessary pre-conditions and available resources for each of the considered ICTs • Ability to select the most appropriate ICT and justify the selection • Comprehensive knowledge on anticipating how the project implementing the selected ICT in mitigating the suggested problem will be conducted and evaluated
C	<ul style="list-style-type: none"> • Ability to analyse a problem in developing world and present it • Knowledge and comprehension to make informed conclusion on whether and how a particular problem can be mitigated using a particular ICT • Ability to coherently and logically present the problem chosen and justify the technology selected • Ability to estimate and justify necessary pre-conditions and available resources for the selected technology

	<ul style="list-style-type: none"> • Ability to justify the selected technology as appropriate ICT under the circumstances • Comprehensive knowledge on anticipating how the project implementing the selected ICT in mitigating the suggested problem will be conducted and evaluated
D	<ul style="list-style-type: none"> • Ability to analyse a problem in developing world and present it • Knowledge to make informed conclusion on whether and how a particular problem can be mitigated using a particular ICT • Ability to present the problem chosen and justify the technology selected • Ability to estimate and justify necessary pre-conditions and available resources for the technology selected • Ability to justify the selected technology as appropriate ICT under the circumstances • Knowledge on anticipating how the project implementing the selected ICT in mitigating the suggested problem will be conducted and evaluated
E	<ul style="list-style-type: none"> • Ability to analyse a problem in developing world and present it • Knowledge to make conclusion on whether and how a particular problem can be mitigated using a particular ICT • Ability to present the problem chosen and justify the technology selected • Ability to identify necessary pre-conditions and available resources for each of the considered ICTs • Ability to justify the selected technology as appropriate ICT under the circumstances • Knowledge on anticipating how the project implementing the selected ICT in mitigating the suggested problem will be conducted
F	Any of the abilities or knowledge described in the list of bullets for grade E is not shown at all.
Fx	One or two of the abilities or knowledge described in the list of bullets for grade E are not presented well enough and need to be corrected.

The grades are based on the written report for the project and the defence via Skype.

11. Ethical Issues

The honour code in accordance to the policies defined by DSV, Stockholm University, will be followed. For detailed explanation of the policies visit the following web page: <http://www.dsv.su.se/en/education/regulations> .

Plagiarism refers to copying parts of texts written by others without explicitly giving the source. Do not plagiarize when writing the report for the project or the text as an answer to the questions in the assignments. This might result in grade F. You can find more information about plagiarism at SU on the blog entry by SU's student ombudsman on plagiarism at SU at <http://www.sus.su.se/en/blog/2013/05/22/did-you-write-that-in-your-own-words>.

12. Calendar for the course

The calendar suggests the schedule and includes the deadlines for the activities in the course. You can work at your own pace as long as you have in mind the hard deadlines marked with bold letters in the schedule. They cannot be changed.

October 2013

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			3. Start of the course	4. Familiarize with course page	5.	6.
7. Use the glossary	8. Complete quiz 1	9. Define the problem and the constraints for the project	10. Submit Ass. 1	11. Hard deadline for Ass. 1	12. Peer assessment of Ass.1	13. Hard deadline for peer assessment of Ass. 1
14. Write sections 1 and 2 of the project	15. Complete quiz 2	16. Analyse possible ICT to mitigate the problem in the project	17. Submit Ass. 2	18. Hard deadline for Ass. 2	19. Peer assessment of Ass.2	20. Hard deadline for peer assessment of Ass. 2
21. Discuss the project	22. Complete quiz 3	23. Choose appropriate technology for the project	24. Submit Ass. 3	25. Hard deadline for Ass. 3	26. Discuss the project Peer assessment of Ass.3	27. Hard deadline for peer assessment of Ass. 3
28. Write the project report	29. Complete quiz 4	30. Discuss the project	31. Submit Ass. 4	1. Hard deadline for Ass. 4	2. Peer assessment of Ass.4 Submit the project	3. End of the course Hard deadline for all activities

Annex – Links to the literature for the course

Literature for section 1

- Compulsory

ICT, Definition and terminology

- Video: *Introductory lecture on what ICT is at* at <https://play.dsv.su.se/hypercaster/8635/width=640/height=360/link.js>
- Text: *Vision on ICT and media industry (from a telecom perspective)* at <http://www.caneval.com/vision/ictmediaindustry.html>

Advantages of digital technology

- Video: *Lecture on analogue and digital data and signals* at <http://www.youtube.com/watch?v=ubEijRkLweo>
- Text: *Digital vs. Analogue Transmission* at <http://www.cs.purdue.edu/homes/park/cs422-datatrans-2-06s.pdf>

Digital divide, e-readiness

- Video: *Digital divide* at <https://play.dsv.su.se/hypercaster/8629/width=640/height=360/link.js>
- Text: *Chapter 1: Introduction* from the book “Accelerating development using the Web” at <http://public.webfoundation.org/publications/accelerating-development/Accelerating%20Development%20Using%20the%20Web.pdf>
- Text: *Exploring the Aspects of Digital Divide in a Developing Country* at <http://iisit.org/Vol8/IISITv8p231-244Acilar248.pdf>
- Text: *Comparison of E-readiness assessment models* by Vaezi and Bimar, at <http://www.academicjournals.org/sre/pdf/pdf2009/May/Vaezi%20and%20Bimar.pdf>

Challenges with ICT in developing regions

- Text: *The case for technology in developing regions* by Brewer and others at <http://tier.cs.berkeley.edu/docs/CFT-ieee.pdf>
- Video: Talk by prof Brewer at <https://www.usenix.org/conference/fast-10/technology-developing-regions>

- Video: *Seven top reasons for ICT4D failing projects* at <http://www.ictworks.org/news/2011/01/05/top-7-reasons-why-most-ict4d-projects-fail/>
- Additional
 - Text: *Information and Communication Technology*, Chapter 2 from the report based on two workshops at http://www.cs.cmu.edu/~rtongia/ICT4SD_Ch_2--ICT.pdf
 - Text: *The Information Age/The Digital and ICT Revolutions*, wiki book at: http://en.wikibooks.org/wiki/The_Information_Age/The_Digital_and_ICT_Revolutions
 - Miscellaneous: *Analogue and digital FAQs* at <http://www.m2m.ecs.soton.ac.uk/Wca4671a691bb4.htm>
 - Text: *A rural/urban digital divide? Regional aspects of Internet use in Tanzania* at <http://www.ejisd.org/ojs2/index.php/ejisd/article/view/417>
 - Text: *The Internet in developing countries: a medium of economic, cultural and political domination* at <http://ijedict.dec.uwi.edu/include/getdoc.php?id=4513&article=360...pdf%E2%80%8E>
 - UNGIS joint statement on post development agenda at the WSIS forum 2013 at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/wsis/ungis_joint_statement_wsis_2013.pdf
- ICT terminology and acronyms
 - Free online computing dictionary at <http://foldoc.org/>
 - ICT Glossary Guide at <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:21035032~menuPK:282850~pagePK:210058~piPK:210062~theSitePK:282823~isCURL:Y,00.html>
 - Teach-ICT glossary at <http://www.teach-ict.com/glossary/A.htm>
 - Glossary of ICT terminology at http://www.ict4lt.org/en/en_glossary.htm
 - Glossary on Internet applications at <http://whatis.techtarget.com/glossary/Internet-applications>
 - Understanding basic ICT terms at <http://www.igcseict.info/theory/topics/index.html>

Literature for section 2

- Compulsory

Computer Networks, packet vs. circuit switching

- Video: *Networking, basic concepts and terminology* at <https://play.dsv.su.se/hypercaster/8631/width=640/height=360/link.js>
- Text: *Networks and the Internet*, Sections 1 to 8 (pp. 1-4) at https://ilearn2.dsv.su.se/pluginfile.php/8260/mod_resource/content/2/1_ComputerNetworkInternet.pdf
- Video: *Ethernet, basic concepts and terminology* at <https://play.dsv.su.se/hypercaster/8633/width=640/height=360/link.js>
- Video: *How to setup a small LAN* at <http://www.youtube.com/watch?v=u3hNRZWMcc>
- Video: *Ethernet, part I* at http://www.youtube.com/watch?v=X-yb5zr_WTc
- *Circuit and packet switching, basic concepts* at <https://play.dsv.su.se/hypercaster/8738/width=640/height=360/link.js>

The Internet, TCP/IP protocol suite

- Video: *Internet protocol, basic concepts and terminology* at <https://play.dsv.su.se/hypercaster/8736/width=640/height=360/link.js>
- Text: *Networks and the Internet*, Sections 9 to (pp. 1-4) at https://ilearn2.dsv.su.se/pluginfile.php/8260/mod_resource/content/2/1_ComputerNetworkInternet.pdf
- Animation: *History of the Internet* at <http://www.youtube.com/watch?v=9hIQjrMHTv4> (short video with the inventors of the Internet being the main actors) or <http://www.youtube.com/watch?v=MdMo5k-f1aw> (long video)
- Text: *The past and the future history of the Internet* at <http://ccrg.soe.ucsc.edu/CMPE252A/FALL2012/PAPERS/history1.pdf>
- Text: *A concise guide to the major Internet bodies* at <http://ubiquity.acm.org/article.cfm?id=1071915>
- Video: *What does ICANN do?* at http://dougvitale.wordpress.com/2013/06/03/important-tech-organizations-it-pros-should-be-familiar-with/?goback=.gde_1430_member_250243732

- Video: Ericsson's movie *The Dawn of the Net* at <http://www.youtube.com/watch?v=R2kzspvRb5o>
- Text: *Primer on latency and bandwidth*, Chapter 1 from O'Reilly book at <http://chimera.labs.oreilly.com/books/1230000000545/ch02.html>
- Video: *Traceroute* at <http://www.caida.org/publications/animations/>
- Video: *Domain Name System* at <http://www.youtube.com/watch?v=oN7ripK5uGM>

Access, Peering and IXP

- Text: *Internet exchange points* at www.isoc.org/educpillar/resources/docs/promote-ixp-guide.pdf
- Video: *Benefits of Internet Exchange Points* at <http://www.youtube.com/watch?v=TKNQ1lggUM8>
- Additional
 - Short introduction to computer networks at <http://heather.cs.ucdavis.edu/~matloff/Networks/Intro/NetIntro.pdf>
 - Lecture on network media http://www.youtube.com/watch?v=D_e_dj02HoI
 - Video on the operation of plain telephone system at <http://www.youtube.com/watch?v=Tahfluke6cU>
 - Video on protocol stacks at <http://www.youtube.com/watch?v=zyL1Fud1Z1c>
 - Video on routing and routing protocols, autonomous systems at <http://www.youtube.com/watch?v=RbY8Hb6abbg>
 - Video on how DNS operates at <http://www.youtube.com/watch?v=2ZUxoi7YNgs>
 - Paper on the Internet Exchange Points at http://intgovforum.org/Substantive_1st_IGF/IXP%20Paper.pdf
 - Overview of the problems related to the Internet at <http://www.ijric.org/volumes/Vol5/6Vol5.pdf>
 - Network visualization at <http://www.caida.org/publications/animations/#netviz>

Reading list, week 3

- Compulsory

Connectivity and other networks

- Video: *Connecting to the Internet* at <https://play.dsv.su.se/hypercaster/8728/width=640/height=360/link.js>
- Video: *Andrew Blum's TED talk on how physical Internet is* at http://archive.org/details/AndrewBlum_2012G
- Map: *Interactive submarine cables map* at <http://www.submarinecablemap.com/>
- Video: *Other networks and wireless access* at <https://play.dsv.su.se/hypercaster/8734/width=640/height=360/link.js>
- Text: *Teracom tutorial on PSTN* at <http://www.telecommunications-tutorials.com/tutorial-PSTN.htm>
- Video: *The difference between local loop Internet access with DSL and with modem* at <http://www.youtube.com/watch?v=mI6Uh6D3NvA>
- Video: *Ultrafast broadband in New Zealand and differences between copper and fibre* at <http://www.youtube.com/watch?v=CbtJZT8FYCM>
- Text: *Aaron Balshunas, Cable and DSL technologies* at http://www.routeralley.com/ra/docs/cable_dsl.pdf
- Text: *ICT policy, a beginners handbook* (pp. 23-36) at http://www.apc.org/en/system/files/policy_handbook_EN.pdf (pages 9-73)
- Text: *Cellular communications* at <http://www.eng.iastate.edu/ee423/EE421/Lecture/cellcommtutorial.pdf>
- Video: *Growth of different mobile communications generations* at <http://www.mydroid.apnafundaz.com/2010/07/5growth-of-mobile-communications-different-generations/>
- Video: *Khoun Community Radio* at <http://www.youtube.com/watch?v=al44OkX0u70>
- Text. *Community radio handbook* at <http://www.unesco.org/new/en/communication-and->

[information/resources/publications-and-communication-materials/publications/full-list/community-radio-handbook/](http://www.apc.org/en/information/resources/publications-and-communication-materials/publications/full-list/community-radio-handbook/), pp. 25-44

Wireless technologies

- Text: *Spectrum for development* at <http://www.apc.org/en/spectrum/pubs/issue/openaccess/spectrum-development>
- Video: APC series of videos on *A new proposed open spectrum*, parts 2-5 at <http://www.apc.org/en/spectrum/news/have-you-watched-our-videos-spectrum-development-v>
- Text: *Comparative Analysis of Last Mile Broadband Access Technologies (Wi-Fi and WiMax)* at http://www.akamaiuniversity.us/PJST10_1_280.pdf
- Text: Sensor networks for development at <http://www.tik.ee.ethz.ch/~marcoz/pubs/witfor07.pdf>
- Video: VSAT connectivity concept at <http://www.youtube.com/watch?v=s4e-iD5maXU>
- Text: Eric Brewer, *Technology insight for rural connectivity* at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.114.2034&rep=rep1&type=pdf>

Affordable devices and sharing

- Video: Talk on OLPC, by Nicholas Negroponte from 2007 at http://www.ted.com/talks/nicholas_negroponte_on_one_laptop_per_child_two_years_on.html
- Video: Review on OLPC XO-1 laptop at <http://www.youtube.com/watch?v=nhPQ49Pwplc>
- Video: About wiki reader at http://www.youtube.com/watch?v=okkhi_GnI8k
- Video: TED talk on bridging digital divide with RIA at http://www.ted.com/talks/aleph_molinari_let_s_bridge_the_digital_divide.html
- Text: *Critical view of the OLPC project* at <http://www.ime.usp.br/~vwsetzer/OLPC-WMSCI.pdf>
- Text: *Sharing mechanisms for information technology in developing countries, social capital and quality of life* at <http://link.springer.com/content/pdf/10.1007%2Fs11205-008-9335-3.pdf>

- Text: *Optimizing Internet Bandwidth in Higher Learning Institutions: A case of Sokoine University of Agriculture* at <http://www.ijcir.org/volume4-number2/article3.pdf>
- Additional
 - Text: *VSAT case studies* at <http://link.wits.ac.za/papers/vsatngaltz.pdf>
 - Text: *Chapter 2* from the book edited by George Sadowsky at <http://public.webfoundation.org/publications/accelerating-development/>
 - Video: *Mobile community radio* at <http://tedxtalks.ted.com/video/TEDxCapeTown-Martin-Tai-Lyhne-2;search%3Atag%3A%22technology%22>
 - Text: *Can Internet overcome the natural geographical barriers of Bhutan in developing countries?* at <http://ijedict.dec.uwi.edu/viewarticle.php?id=577&layout=html>
 - Text: *Framework for designing telecentres* at <http://www.unapcict.org/ecohub/resources/a-framework-for-designing-telecentres>
 - Text: *Village cell: Cost effective cellular connectivity in rural areas* at <http://www.cs.ucsb.edu/~veljko/docs/VillageCellICTDposter>
 - Text: *Updated guide to low-cost educational ICT devices* at <http://www.infodev.org/en/Publication.891.html>
 - Text: *Broadband strategies handbook* at <http://broadbandtoolkit.org/Custom/Core/Documents/Broadband%20Strategies%20Handbook.pdf>
 - Text: *Open access: Lowering the cost of international bandwidth in Africa* at <http://www.apc.org/en/pubs/issue/openaccess/africa/open-access-lowering-costs-international-bandwidth>
 - Text: *Grameen phone project* at <http://www.t-forum.org/mausklick/background/Grameenfinalreport.pdf>
 - Text: *Simputer as a Platform for ICT Education in Tanzania* at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1357741>
 - Text: *Meet the Raspberry Pi* at <http://www.google.se/books?hl=en&lr=&id=C0bZSmKnRK4C&oi=fnd&pg>

[=PT8&dq=Raspberry+Pi+computer&ots=LkxRP4W6ym&sig=OHptDD-YS8S-xUCh06NMGHVmeHQ&redir_esc=y](#)

- Text: *Optimizing Internet Bandwidth in Developing Country Higher Education* at http://www.inasp.info/uploads/filer_public/2013/03/11/optimising_internet_bandwidth_report.pdf
- Text: *Bandwidth management in universities in Zimbabwe: Towards a responsible user base through effective policy implementation* at <http://ijedict.dec.uwi.edu/include/getdoc.php?id=5207&article=1432&mode=pdf>

Reading list, week 4

- Compulsory

Free and open source software

- Text: *Categories of free and non-free software* at <http://www.gnu.org/philosophy/categories.html>
- Video: *The history of open source software* at <http://www.youtube.com/watch?v=lrcdhzr2qnk>
- Video: *About the licenses* at <http://creativecommons.org/licenses/>
- Text: *Information policies and open source software in developing countries* at http://flosshub.org/system/files/camara_fonseca_OSS_developing_countries.pdf
- Text: *Open source software in business-critical environments* at http://www.opensource.ch/fileadmin/user_upload/opensource.ch/knowhow/2011_OpenSourceSoftwareInBusiness-criticalEnvironments.pdf
- Video: *Open hardware explained* at <http://www.youtube.com/watch?v=I0HOgcbtmws>
- Video: *How Arduino is open-sourcing imagination* at http://www.ted.com/talks/massimo_banzi_how_arduino_is_open_sourcing_imagination.html
- Text: *Democratizing production through open source knowledge: From open software to open hardware* at http://www.alisonpowell.ca/wp-content/2008/11/Powell-Open-Source-Knowledge_revision1.pdf

Local Content

[2F%2Fwww.ineer.org%2Fevents%2Fficee2011%2Fpapers%2Fficee2011_submission_49.doc&ei=i0EfUpW3Elfvswa4kYDYDw&usg=AFQjCNGirjbSRqrefEX6syWDQ-Sta7EEfg&cad=rja](http://www.ineer.org/Events/Ficee2011/Papers/Ficee2011_submission_49.doc&ei=i0EfUpW3Elfvswa4kYDYDw&usg=AFQjCNGirjbSRqrefEX6syWDQ-Sta7EEfg&cad=rja)

- Text: *Computing security in developing world: A case for multidisciplinary research* at <https://cs.nyu.edu/~jchen/publications/nsdr06-ben-david.pdf>
- Text: *M4D - Mobile Communication for Development* at <http://www.diva-portal.org/smash/get/diva2:549742/FULLTEXT01.pdf>
- Text: *ICT and the environment in developing countries: opportunities and developments* at <http://www.oecd.org/ict/4d/43631894.pdf>
- **Additional**
 - Text: *Open source in developing countries* at <http://www.eldis.org/fulltext/opensource.pdf>
 - Text: *The effect of open source software licenses on business software* at <http://www.wpi.edu/Pubs/E-project/Available/E-project-030609-190349/unrestricted/iqp.pdf>
 - Text: *Understanding free software developers: Findings from the FLOSS study* at <http://www.flossproject.org/papers/ghosh-2005.pdf>
 - Text: *Opportunities and challenges of open source software integration in developing countries: Case of Zanzibar health sector* at <http://www.jhidc.org/index.php/jhidc/article/view/84/121>
 - Video: *Software solutions for cashew farmers in Ghana* at <http://www.sap-tv.com/video/#/7313/>
 - Text: *Free and open source software approaches in Brazil and Argentina* at http://www.sis.uta.fi/infim/infim_2011/julkaisut/hyper/b/mannila-2005.pdf
 - Text: *Open source software in development context: A case study with a university in Uganda* at http://www.iicd.org/articles/Article_OSS-UMU.pdf
 - Text: *Building VoIP in developing regions* at <http://www.it46.se/voip4d/voip4d.php>
 - Text: *ICT for local radio* at <https://en.unesco.org/radioict/icts>
 - Text: *Digital publishing in developing countries* at <http://alliance-lab.org/etude/?lang=en>
 - Text: *The relationship between local content, Internet development and access prices* at <http://www.oecd->

ilibrary.org/docserver/download/5k4c1rq2bqvk.pdf?expires=1371046931&id=id&accname=guest&checksum=BF84AA876D95E75447BA995B8E77992
[D](#)

- Video: *Video 2.0 for development, stories of people from developing countries* at <https://vimeo.com/channels/web2fordev>
- Text: *Circling the point: from ICT4D to Web 2.0 and back again* at <http://pubs.iied.org/pdfs/G02844.pdf>
- Video: *Users videos on different assistive technologies* at <http://www.assistiveware.com/user-videos>
- Video: *GPII (Global Public Inclusive Infrastructure) and cloud computing* at <http://www.youtube.com/watch?v=YHXSQvV39k>