ICTD education in traditional universities

Information and Communication Technology for Development (ICTD) research is inherently interdisciplinary in nature, therefore it is important to decide which department on campus is best suited to leverage the entire resources of the university to impart ICTD education. This decision may seem insignificant, but it also has important consequences in the broader context, for e.g. limiting ICTD research to a particular department may limit the amount of funding available for such research, it may limit the category of journals and conferences this research can be published in, and it may limit the number and discipline of researchers interested in conducting such research. But these problems are associated with any interdisciplinary field, and as the field grows and has its own tier 1 conferences and reputed journals, these problems become easier to resolve. In this paper, I highlight a few challenges of ICTD research in the academic world and then list a few current ICTD teaching practices in global universities. From there I analyze the strengths and issues associated with hosting ICTD programs in a few traditional departments, moving on to outlining the content that should be taught in undergraduate ICTD courses versus graduate ICTD courses.

Challenges of ICTD research in the Academic World:

The ICTD community brings together researchers from such varied fields as computer science, cognitive and social psychology, design, anthropology, development theory, economics and public policy.¹ However, this strength of ICTD research is its main weakness in the academic world, as interdisciplinarity is viewed suspiciously by academic disciplines that believe themselves to be pursuing “pure” research in a well-circumscribed field.² The problem faced by ICTD (and all other interdisciplinary fields) is that of

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trying to ensure sufficient depth in the presence of breadth. However, this is not an easy task, as unlike traditional subfields, the problems of developing regions are rarely obvious before at least a few iterations towards a solution. Thus, many high impact ICT projects tend to have simple solutions, once the problem is fully understood.

Alongside facing problems getting their work accepted in their respective fields, ICTD researchers also face problems communicating within the ICTD community at large, as engineering and social sciences have very different traditions. Two different metrics exist to measure the success of ICTD projects: from a technical perspective, it is the innovation on the technological front that has advanced research in the field, whereas from a practitioner’s perspective, it is the impact created by the deployment of such projects. Given that these two success metrics do not have a direct correlation (a highly innovative technical solution may not be able to solve the problem if it is not implemented properly), there is significant tension in the field as practitioners try to balance out two very different objectives. To resolve these issues, it is important that ICTD research is accepted on its own terms, and to gain further insight on this front it is worthwhile to look into how universities worldwide have incorporated ICTD programs amongst their offerings.

**ICTD Programs worldwide:**

This section lists a few of the degree awarding programs in ICTD and the departments these programs are hosted in. The University of Manchester awards a one year MSc. Degree in ICTs for development and the program is offered on a full-time and part-time basis and is also available for distance learning. The program is hosted in the School of Environment and Development. The University of Cape Town offers a one year Masters in Information and Communication Technology in Education and the program is

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5 [http://www.sed.manchester.ac.uk/postgraduate/taught/courses/06237/index.asp?code=06237&pg=1](http://www.sed.manchester.ac.uk/postgraduate/taught/courses/06237/index.asp?code=06237&pg=1) (last visited 12-12-11)
hosted in the Center for Educational Technology.⁶ The University of Salzburg offers a two year Masters of Arts in Communication Studies with a focus on ICT & Society. The program is hosted in Center for Advanced Studies and Research in Information and Communication Technologies & Society. The modules offered in the program are: HCI & Usability, Politics and ICTs, Technologies and humanities and eLaw.⁷ The Royal Holloway University of London recently started a one year MSc in Practicing Sustainable Development (ICT4D Specialism) that is available on a full time and part time basis.⁸ The program is based in the Department of Geography. Michigan State University has started offering a specialization in ICT4D for their undergraduate program in Media and Communication Technology.⁹ The program is hosted in the interdisciplinary Department of Telecommunications, Information Studies and Media. The University of Colorado Boulder offers a two year Masters in Information and Communication Technology for Development (MS-ICTD) that is hosted at the interdisciplinary ATLAS Institute. Towards the end of the program, candidates are required to undertake a semester long practicum with a company engaged in ICTD.¹⁰

It is interesting to see that even though these programs aim to impart similar knowledge, they are hosted in a range of different departments. Also, none of these programs are hosted in a traditional engineering department, which demonstrates the hesitancy of departments like Computer Science to accept ICTD work as relevant technical research. However, there are a few ICTD research groups at major universities that are affiliated with traditional engineering departments, such as the Technology and Infrastructure for Emerging Regions (TIER) group in Berkeley, the Change group at the University of Washington and the Computing for Good (C4G) group at Georgia Tech. The section below highlights the

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⁶ [http://www.cet.uct.ac.za/masters](http://www.cet.uct.ac.za/masters) (last visited 12-12-11)
⁷ [http://www.icts.sbg.ac.at/content.php?id=1028&m_id=1010](http://www.icts.sbg.ac.at/content.php?id=1028&m_id=1010) (last visited 12-12-11)
⁹ [http://tc.msu.edu/ict4d](http://tc.msu.edu/ict4d) (last visited 12-13-11)
¹⁰ [http://www.colorado.edu/atlas/newatlas/masters/](http://www.colorado.edu/atlas/newatlas/masters/) (last visited 12-12-11)
advantages and problems associated with hosting an ICTD program at a traditional Computer Science department.

**ICTD Programs as part of Computer Science Departments:**

A big portion of the technical side of ICTD projects involve Computer Science (CS) knowledge such as computer networks, programming for mobile apps etc. However, traditional CS hasn’t explored this side of computing by limiting itself to problems faced in the developed world. As Boriello suggests, the design space of computing is huge and we (Computer Scientist) only explore a small piece of it when we constrain ourselves to conditions present in highly industrialized societies.\(^{11}\) There are a number of advantages associated with making ICTD as a branch of CS. Saman Amarasinghe of MIT highlights a couple: First, it’ll make it possible to make students who are choosing ICTD as a career be better trained and prepared. Second, having dedicated university researchers will bring about research breakthroughs to ICTD.\(^{12}\)

However, it can be argued that making ICTD a branch of CS will make it prohibitive or discouraging for students from other backgrounds such as psychology or development theory. This arrangement would also limit the amount of funding available, as a lot of the funding for departments like CS comes from the high tech private industry or organizations such as the National Science Foundation (NSF), which until recently was not on board towards funding projects with a purely international focus. Also, to make ICTD a part of CS, the expected goals of ICTD research would need to change from global impact to advancement in computing, as hardcore CS centric ICTD professionals like James Davis suggest: Our goal should be to more systematically channel CS research towards development, even targeting our research in this direction. But make no mistake, to be effective, we should be working on computer


science, not on development.\textsuperscript{13} I believe that this could be disastrous for the field of ICTD, as most development projects (ICT based or otherwise) fail because of a lack of proper development oversight, not because the technology wasn’t appropriately designed. As Bennet and Sterling suggest, Information and Communication Technology is a critical component in global change strategies, but it needs to be considered as a component of development rather than as a stand-alone development sector.\textsuperscript{14}

**ICTD Programs as part of the School of Humanities:**

A significant portion of ICTD deals with the monetary constraints of the developing world (economics), the mindset of the population being served (psychology and ethnography) and the corruption marred relationship between third world governments and development (policy). Most ICTD projects that create significant impact take these considerations into account during the design and dissemination of the project. It is therefore essential to impart such training to future ICTD practitioners to ensure successful ICTD deployments in the field in the long run. Therefore it can be argued that ICTD programs should be hosted in the school of humanities, and social scientists are taught technology design, as is the case with University of Cape Town’s program for ICT in Education. Such an arrangement would invite a wide range of funding options from development sector organizations such as the USAID and DFID, and would also bring in interest from large philanthropic organizations such as the Gates Foundation.

However, given how reluctant traditional engineering programs have been to accept ICTD research, this arrangement would make it a lot more difficult for engineering candidates to opt for such a program while staying connected to their home department. Changing the mindset of CS professionals to allow their students to conduct research outside of their department that is not completely tech-centric is going to be a lot more difficult than proposing an argument for making ICTD a part of CS. And


marginalizing such a huge segment of ICTD professionals (engineers) and expecting humanity majors trained in technology to keep abreast with technological developments, and simultaneously push towards innovative technologies designed for the developing world is an irrational assumption. Richard Heeks argues that you only have to hang around with ICT4D techies for a short while to see that their techno-centrism and focus on innovation generates excitement, motivation and hope that are lost if technology becomes hidden beneath other development goals.15

**ICTD Programs as part of existing Interdisciplinary Institutes such as iSchools:**

Most universities have an interdisciplinary institute, whether it is a School for Public Policy, a School of Public Health or as was the case in the University of Manchester, a School of Environment and Development. Also, there are a growing number of Schools of Information Science (iSchools) in the US and around the world.16 Institutions with reputed CS programs like UC Berkeley, Carnegie Mellon, Georgia Technology, University of Michigan and University of Washington have all inaugurated their own iSchools, and 33 iSchools have affiliated with iSchools.org (the iSchool alliance).17 This is greater than the number of Schools of Public Health in the US in 1999.18 The number of iSchools is only expected to grow, and if the field of public health could continue to grow and award Master Degrees in Public Health (MPH), then it is a reasonable assumption that the field of ICTD should be able to continue down this path. I identify the advantages associated with hosting ICTD programs in iSchools below.

According to the iSchool alliance, iSchools are interested in the relationship between information, people and technology.19 This objective is remarkably similar to the objectives of ICTD: relationship between information, people and technology for development. Some iSchools like Carnegie Mellon’s

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15 Richard Heeks, “The Case Against Mainstreaming ICTs in Development,” October 30, 2010
17 Ibid.
19 [http://www.ischools.org/site/](http://www.ischools.org/site/) (last visited 12-12-11)
Heinz College and University of Pittsburgh’s School of Information Sciences have also started offering graduate degrees in IT (MS in IT at CMU, MS in Telecommunications at Pittsburgh). Given that iSchools are already interdisciplinary in nature, and they already have the expertise to impart a portion of the ICTD curriculum, a graduate program in ICTD seems like a natural fit. All that iSchools need to do in order to set up a comprehensive ICTD program is to tap into resources available in development theory and economics concentrations within the university, while attracting engineering professors with interest in emerging regions. Some iSchools like the one at University of Washington already have research work being conducted in ICTD as part of a dedicated research group called Technology and Social Change Group (Tascha).  

Other iSchools are sure to follow suit in the near future.

Schools like MIT that don’t have dedicated iSchools, have other interdisciplinary departments like MIT’s Engineering Systems Division (ESD) that host interdisciplinary programs like Technology and Policy. Other schools that don’t have dedicated interdisciplinary programs that link the technical and the humanities track have broad engineering programs such as Engineering Sciences at Harvard’s School of Engineering and Applied Science (SEAS). These schools conduct interdisciplinary research within engineering like Bioengineering and could be possible host departments for an ICTD program.

The reason why I place such a strong emphasis on conducting an ICTD program at an interdisciplinary institute is because I feel it is important not to exclude the T (technology) and the D (Development) in ICTD. Similar to an MPH program, where non-doctors can train towards public health, I feel that non-engineers should be able to undergo training towards ICTD. However, I also realize that the field of ICTD is very young (compared to public health) and so there is a strong need to have engineers help develop it further, similar to how medical doctors advanced research in epidemiology and chronic disease control in the early twentieth century.

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20 http://tascha.uw.edu/ (last visited 12-18-2011)
21 http://esd.mit.edu/ (last visited 12-12-11)
Difference in Curriculum of Undergraduate and Graduate ICTD Programs:

There are a number of courses being offered at universities around the globe that are directed towards ICTD. Most of the undergraduate courses have a broad focus and give a brief overview of the field of ICTD. Normally, such courses are titled Technology and Global Development (CMU)\(^{22}\) or Computing for Good (GA Tech),\(^{23}\) and they briefly introduce different branches of ICTD like M-Health, e-government and ICT4Ag, while requiring students to complete a semester long project on appropriate ICTechnology in one of these branches. To further this development, it would be interesting to initiate certificate programs in ICTD for undergraduates that comprise of two core courses (for e.g. Global Development and ICTD) alongside an elective course in a particular area of choice – ICT4Health, ICT4Agriculture, ICT4Governance etc.

On the other hand, graduate courses in ICTD are more detailed and require candidates to study the history of development in greater detail and be familiar with work done in all the different branches of ICTD. Furthermore, graduate students are required to select one of these ICTD branches and contribute towards advancement in that branch. Graduate students undergo more focused courses in ICTD such as Human-Computer Interaction in the Developing World (CMU)\(^{24}\) and User Interface Design and Development (UC Berkeley)\(^{25}\). Given that it is possible for graduate students to undergo such detailed training in ICTD, universities now have the opportunity to award these graduate students with advanced degrees in ICTD. This has not been possible thus far because of the aforementioned conflict amongst academicians regarding ICTD placement.

\(^{22}\) http://www.cs.cmu.edu/sfs/cs/Web/People/techbridgeworld/courses/TGD_F07/assignments.html (last visited 12-12-11)
\(^{23}\) http://www.cc.gatech.edu/about/advancing/c4g (last visited 12-12-11)
\(^{25}\) http://www.ischool.berkeley.edu/courses/213 (last visited 12-12-11).
Conclusion:

Information and Communication Technology for Development (ICTD) is an exciting field that has the potential to impact the lives of roughly 4 Billion people living on less than $2 a day. Given how technology has impacted the lives of people in the developed world, the world of ICTD is predicted to grow. Dedicated ICTD programs in universities have not kept abreast these developments because academicians haven’t been able to decide where exactly to place ICTD in the world of academia. As Bennet and Sterling point out, universities tend to be conservative when it comes to organizational structure. Even as they argue against academic silos, they fight to preserve the purity and primacy of their historic intellectual turf.  

However, with the inception of iSchools in universities around the world, the cause of dedicated ICTD programs has received a significant boost, as in iSchools academicians can find an interdisciplinary abode for ICTD and move on towards making the world a better place.

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