

NOTES FROM IPIDAT 2004

ONGOING...

- Donna will revise the IPIDAT Bibliography
 - Everyone should email Donna any books or videos that you think should be on it

EXPECTATIONS

- Teaching methods
- Sharing curricula
- Learning about technologies
- Networking
- Collaboration
- Lessons learned
- Sharing experiences
- Community building
- Best practices
- Good time
- Learning from others' international experiences
- Find a GREAT research project combining mechanical engineering and assistive technology
- Useful resources
- How to develop truly appropriate, respectful technologies; how to discuss that issue in the classroom
- Good food, good toys
- Expand skill set (bop-it)
- Explore opportunities for career development
- How do sustainability and appropriate technology interact and fit into viable business models / economic development
- Reinvigoration (things are stale after 20 years)
- New ideas
- Learn who's doing what and how
- Intellectual property issues
- Tangible results

PRESENTATION OF EXISTING MATERIALS & WORK

IPIDAT Documents distributed

- Bibliography
- Guest Speakers

IPIDAT Library: Books Amy Smith recommends and brought

- World development indicators (also on CD)
- Hazeltine & Bull books
- The AT Reader (out of print but findable online)
- Mastering the Machine Revisited (what to read after Small is Beautiful) about AT
- Practical Innovations for a Sustainable World
- Gaviotas
- Ripples from the Zambezi
- Participatory Development Toolkit – handbook & activities

Other recommendations

- Books by Victor Papanek
- Books by Buckminster Fuller (ask Ben, Spaceship Earth and ...)
- Video: Peanut Sheller (ask Donna)
- Video: Life & Debt, tourism vs. reality (ask Claire)
- Video: A Closer Walk – about people with AIDS worldwide; very difficult to watch, requires a facilitator (ask Claire or see acloserwalk.org)
- Video: NOVA special – world in balance, focused on Japan, China, India, Africa, US; looks at sustainability, birth rates, cultural issues (ask Christine)
- Video: T shirt travels – what happens to clothes from Goodwill to sold in Africa (ask Donna)
- Video: Road to the end of the River – amazon basin environmental issues (ask Amy S)
- Bullfrogfilms.com has the peanut sheller, biomimicry, road to the end of the river, and many others

Highly not recommended, but the visuals are helpful (ask Ben)

- David Suzuki – videos from book by Benyus on Biomimicry

Claire's work

Harvard Medical School recently created a division of service learning, first course is "Physician in the Community." The course presents the humanitarian aspects of being a physician for first-year med students, including providing services and research to improve the health of a community. The class starts in spring, students go to community in the summer, fundraise and assess in the fall, and then hopefully hand off sites/projects to next students in spring.

It's a very interactive course, lecture and two tutorials (4 students w/ faculty & 10 students w/ 2 faculty), and also get a faculty advisor for project. Students learn the basics of engaging in community, how to define project, write it, implement it, evaluate it, develop sustainability plan, develop & revise grant proposal.

Good parts of the class: Co-teaching has been wonderful, learning a lot from co-teacher, shows students multiple perspectives (and inspires their sharing). Excellent faculty-to-student ratio. Encourage students to find non-physician mentors, so students start to respect more types of skills, people, experiences, etc.

Examples of projects:

- In South Africa, student wanted to determine how to encourage women with HIV-AIDS to express needs and get support; based on community

needs, instead developed program to help women gain access to new methods of health protection

- Student wants to develop clinic, but needs help with architectural/site planning issues; student can just help define what clinic staff and services has
- Adolescent HIV work, and orphan issues due to AIDS, looking at art therapy; but community wanted teaching in English, and student lacked experience

Students mostly assess need, have difficulty if need is technical; interested in pairing with engineers (and other skill sets – teaching, architecture, planning), potentially, to address other needs. Also major challenges with needs assessment.

Collaboration opportunity/idea: having students from different schools all going to the same place, so that the different skills can be shared, and maximize community benefit & knowledge.

Amy Smith's work (handout of syllabus)

D-Lab is a yearlong series of courses and fieldtrips. 1st class in fall – international development, appropriate technology, specific cases in agriculture, health, building tech, etc, through guest lectures, hands-on exercises, etc. Simultaneously, work with partners in countries that they'll go to in January, determining people to work with and projects to work on; in January, they go to the field site and work on projects and talk to community members to find new projects; spring term is a design class when they develop the projects they've identified, and then implement them in country in the summer. Students aren't required to do all steps.

There seems to be a surprising level of camaraderie, and students are willing to take on projects started in previous years. All years of students (freshmen to grad students), all majors.

Try to balance readings and lectures with hearing from people who have done field work. As much hands on experience as possible. Estimated energy usage for a day, designed a PV clinic, actually make charcoal from waste, test water for contamination, so have a skill set when they enter the field.

Use a bunch of good questions to drive discussion ... ex: leading cause of death for kids under 5 in developing countries (answer: respiratory failure from cookstoves in the home). Live on \$2/day for a week ... they start to realize what it really means to be poor. Trying to develop other similar experiential projects (effort to get from an ear of corn to porridge).

During January, 2-3 weeks of travel. Communication challenges have come up. Students should go in with the intention of learning about the community and the projects, not necessarily to do any projects.

3 Collaboration Models for community partnerships: working with universities, Peace Corps Volunteers, Small technical consulting organizations, and domestic university development programs.

Class requirements yield documentation about everything.

Will's work (handout of syllabus)

Design that Matters ... the design studio portion of D-Lab. When students start, they are presented with a large number (possibly too many) of design challenges. Still trying to determine what makes an excellent design challenge that should yield a good project. The class involved a lot of guest lectures on a really wide range of topics. There were also lab sessions with issues particular to the projects ... example, stakeholder analysis learned with a case study and an in-class exercise.

Also arranged a set of lab modules (popular) (students took 3 of the 8 offered): injection molding, machine shops, economics, market research, CADLAB and rapid prototyping, GIS mapping.

Students enjoyed working in a group on a project during the entire term (3-6 students per group, with a mentor for each group). Students learned the most from the practitioners who are currently doing this sort of work. Tried to get guest lecturers from developing countries doing the work, not just Americans doing the work.

Student engineers really enjoy problem-solving, so getting to brainstorm on guest speaker's challenges is a great experience for all.

Struggling with how to focus as class grows and instructors change; maintaining & developing good community partnerships; the projects are in their nature interdisciplinary, and it's hard to develop the right teams; hard to make sure there's a useful service deliverable at the end with limited student skills when they enter; hard to give students enough choice in projects but still make sure they work on good ones. Students get excited by wide-reaching projects that get them in over their heads.

Lab classes 2 hours each week; lectures 1 hour each week, and each group met 1 hour per week out of class.

Collaboration opportunity/idea: maximizing guest speakers, chipping in resources, and having them visit many local schools.

Mandana's work (brought single copies of: draft of a booklet, course reader)

Natural Step is a thinktank and advisory organization. Developing frameworks and models for sustainable design. Very high level; intended to help get designers comfortable with the idea, and understand the importance and steps for immediate action.

In her class, Beyond Green Theory, analyzed existing products to understand how they were (not) sustainable. The class is online ... ask Mandana to get URL. Mostly Mech. Eng. product design grad students.

Bringing in practitioners was very effective. Also had students develop an information tool, individualized for themselves, to help them manage the information they were getting in the class. Ask Mandana for the assignment.

Also has a business, recycles inner tube rubber to make products like handbags: <http://usedrubberusa.com> . Similar international business - aid to artisans.org .

Donna's work (brought syllabus; website too)

Works at LATDC (Lemelson Assistive Technology Development Center), focus on assistive technology, and art. Lots of technicians available to help students learn skills. Focus on experiential learning. Developed course out of IPIDAT 2003. In January, Ralf Hotchkiss did a Whirlwind Wheelchair Workshop, including background in welding. Very varied levels of skills. Class evolved from topics students were interested in. Students were struggling with role of Americans in development work. Researched community request for bicycle ambulance, and found existing ones in country of need. Some students built project ... other students built wheelchair cart ... others finished whirlwind wheelchairs. 12 students. Used few guest lectures; students selected readings/films and led discussions. Class met 2x/week, 1 hour 20 minutes/class. Students very concerned about ethics.

Led to conversation about ApproTech - developing water irrigation pumps, ideally built in Kenya for use in Kenya, but implementation/profitability challenges

Ben's work

Currently teaches MIT Humanitarian Demining course; also teaches at Olin College of Engineering. Originally wanted students to apply design skills and work on a REALLY hard problem. Goals: provide design experience on humanitarian topic; give alternative careers awareness; develop bona fide humanitarian demining ambassadors, talk intelligently about issues, and dispel

myths; to really help someone in this area of need. Focus on humanitarian deminers.

Offered every spring, unfinished projects carry over to next year. Focusing on one set of users for entire class – thin slice to try to get depth and develop sustainable networking, projects, etc. Look for very focus projects/problems. Work often on hand tools. Lots of ergonomic challenges. Pair projects with companies that build and/or sell demining tools (or similar things like wheelchairs) in developing countries. Ideally, sell designs to these shops at a low enough price that they can be built and sold profitably.

Christine & Bill's work (brought course overviews)

Engineering for Community @ University of Michigan. Two professors and 6-7 grad students w/ community/international experience taking class for credit, but acted as team leaders that developed course materials rather than doing assignments. Huge teaching staff ... undergrads loved it. Online discussion threads that students were expected to contribute to. Used two taps activity. Class very grad-student driven, 1/3 non-engineers. Challenges with getting appropriate credit for everyone. Staff met weekly.

Christine's advisor created course called Global Product Design ... students at Michigan, in Germany, and in Korea all take class together. Review case studies and teams (2 people from each site) develop global product together. 2 meetings each semester, everyone meets at one site. Many designs have been "appropriate:" bike whose parts can be reconfigured as a wheelchair.

University of Dayton ... ETHOS started summer internship, 12 students go each summer work side by side with technicians and live with host families. Course teaches them about AT, foreign languages, and cultural immersion. Projects get incorporated into project labs.

Derek's work (brought presentation handouts about course)

Trying to get sustainability and appropriate technology ideas into CalTech ... very rare at the school currently. Formed Engineering w/out Frontiers (now Engineers for a Sustainable World) last year. Trying to gather projects for a fall semester class. Ideally, students develop a tangible device over class, and couple that with a trip to countries to better understand problem.

Led to word of mouth tutorial on EW_. Engineers Without Frontiers (EWF) now Engineers for a Sustainable World (ESW): Started at Ithaca, seem to be focused on projects, inspired by Engineers Without Borders (EWB) in Canada, which I believe was inspired by EWB in the UK.... Engineers Without Borders

(EWB): US version started by Bernard Amadei at UC Boulder about 20 years ago.... Proposed new groups for IPIDAT participants: Engineers without Acronyms (EWA).

Led to conversation about the fact that engineers seem to be starting to be interested in more ethical/social issues. ABET criteria may be influencing this, maybe not.

Chris's work

Appropriate Technology Class. Developed to increase technical literacy of liberal arts students. Course hits people over the head with lots of technologies: electricity, wind, water solar, health care, agriculture, aquaculture, as much technical stuff in 1st half of semester as possible, with ideas that they're going to need to build something. 2nd half, policy, obstacles, cultural, political, where, etc. Also develop projects.

Class with RISD, 6 industrial designers and 6 engineers studio course. Different things every year. One year, design something where the product's production is meaningful for whoever is building it. Next semester, topic on human powered vehicles.

Chatted about studio method vs. traditional engineering design. Best if there's dedicated space for students to work in.

BRAINSTORMING SESSION – IDEAS FOR COLLABORATION

- Develop curriculum materials: case studies, classroom exercises, assignment examples that exemplify engineering problems through appropriate technology.
- Creating a curriculum for a master's program in the Caribbean, including training for faculty. Maybe state department \$ offered in Fall (\$200Kish). Engineering & Environmental Science topics.
- Collaborative (regional?) speaker series
- Documentation of what materials & manufacturing methods likely to be available in certain countries. Metric vs. Imperial issues, and other similar ones. Methods for finding out this information, rather than lists, perhaps. Maybe a consulting network, group, and also what can we answer ourselves. Consulting server (message board) that starts with an internal network, then expands, as needed. Maybe we need details about each person on the list in terms of their expertise areas: name, contact info, regional knowledge, skill set. But need to avoid damaging contacts

through random passing along of contact info. There is friendster-like technology for this sort of thing. This could be very helpful for people in the developing countries, too. [people can be much more useful than documents]

- Downloadable reading lists and other resources (but legal issues)
- Using videoconferencing/webcases to share speakers & optimize resources
- Could create tactile/visual libraries (physical samples) of materials and tools available to help people understand what's available in countries. Libraries could request people traveling bring back samples.
- Collaborative projects between universities, in parallel or serial
- Getting to the implementation phase of the projects – how to do this
- Speaker series / storybooks / case studies on great failures in development; also great successes
- Competing goals – learning goals, service goals
- Helping students understand when a project is ready for deployment – case studies
- FAQ for students about AT
- How to do interdisciplinary work more effectively – health, business; bringing in other disciplines
- Follow-up longer term with communities
- How we can empower the communities we're working with and help them own the process
- Identifying ways to find the entrepreneurs in the community, since it's a low % of people ... maybe a pH test. Meredith Minkler writes about this and has a good method for mapping and finding the right players. But it is a slow process.
 - Gnvc.org (or .com, I forget) might be an example, sorta, but maybe too business-focused
- Creating explicit workshops on teaching AT, so that we all teach better (perhaps IPIDAT 2006)
- Collaborating with other universities in developing countries – what are good methods, how do we use them as a resource
- Is another way for us to be helpful (in parallel) for all of us teachers with strong skills to teach in universities in developing countries (but we need to find the right universities interested in this, not too cutting edge). Our universities can also inspire the cutting edge ones to work on development issues too. Students can teach too, as appropriate. Could be an interesting collaboration between US universities to send a team.
- Creating opportunities for students to do field work; how to manage being effective with limited amounts of time, or how do we expand the time available.
- Funding – joint proposals, sharing sources and opportunities

- Bringing in the historical context and how that defines what we're doing
- Long, long term partnerships and support
- Assessment

PRESENTATION OF WORKING SESSIONS

What makes for a successful AT class

- Start with a definition, and make sure the framework is set with a consensus
- Be clear with goals of the class
- Make sure skills needed are there, either by restricting class or incorporating skills development into the class
- Have good community connections
- Put the projects in context
- Have project awareness early on
- Provide closure and follow-up

Other worthwhile topics

- Model-making
- Sketching, solidworks/cad
- Liability & IP
- Skills for building
 - Sheet metal forming
 - Welding/brazing/sweating pipe
 - Shop tools
- Presentation-making skills
- Mix of policy and projects
- Cultural immersion

Take advantage of the many resources at universities that might be able to help you teach skills: legal, IP, HR, WorldBank (perhaps someone used to work there and now works at your university)

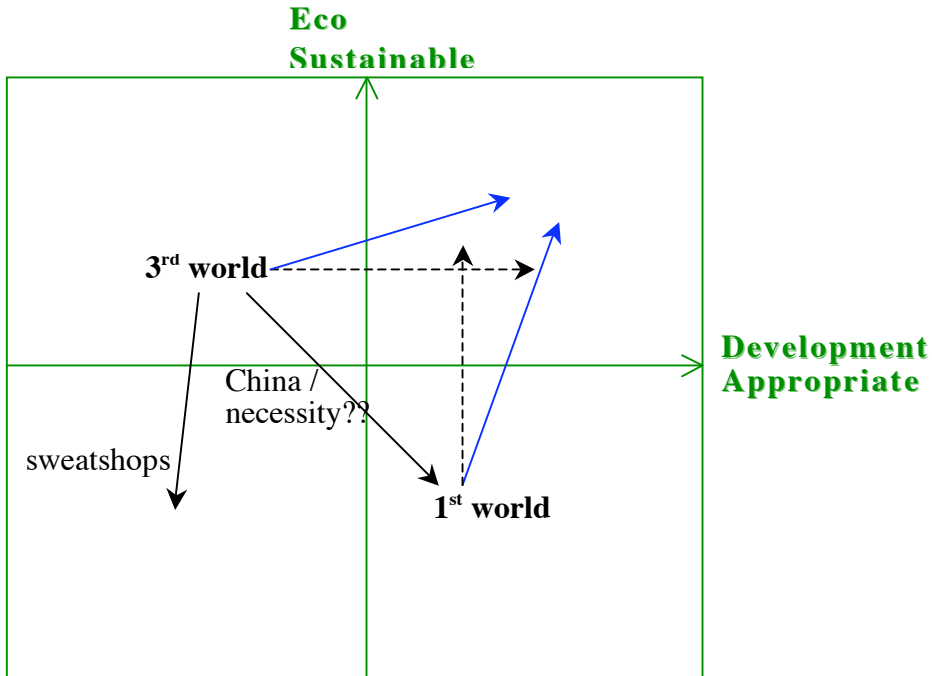
Intersection of International Development and Assistive Technology with Environmental and Sustainable Design

Development needs (from survival to health, education, and human rights)

Eco Sustainability (from polluting/consuming/depleting to closed loop cycles, no accumulation of manmade substances, no concentration of extracted resources, no degradation of the natural environment, and meeting of human needs [last one moved to development needs])

Positive slope is good. 1st world pretty good in development needs but lower on eco/sustainable. 3rd world reasonably high on ecosustainability, low on development.

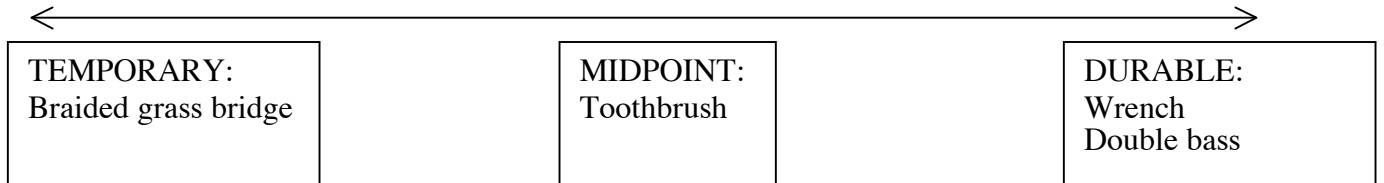
Ideally, all worlds will increase with positive slope on both. But minimally, best to improve on one and stay same on the other.



Blue is ideal, and it's nice that maybe they're about the same difference
Dotted is how just Eco or just Devel tends to think
Positive slope is good.

We probably need a third dimension for happiness

The Durability of Goods (based on some thoughts from John Ochsendorf)



Bridge provides community building, local, low impact, "easy" maintenance, IDATESD-like

Toothbrush is beautifully designed, washes up on beach

Double bass is beautiful, long-lasting, improves with age.

Wrench - even though an expensive one might last much longer, limited income limits purchasability. Hard to think far ahead, different people can go different levels, but short term paybacks are more controllable. People could steal the wrench.

ESD seems to look long term, not so much short term. IDAT looks short term, not so much longer term. Is there a good middle?

U2U (university to university): Developing collaborative projects

Currently collaboration between UC Davis, MIT, Harvard Med, UMich

Goals, Outcomes

- Sustainable development
- Capacity building
- Student education
- Long term sustained relationship w/ communities
- Papers based on field work
- Mechanism for continuing communication

Timeline

- Jan/Feb - student selection
- Feb - Winter retreat (3 days)
- April - Video Conference
- Jun 8 - Workshop
- Jun 15-Aug 15 - field trip of interdisciplinary group with mucho skills
- Oct - Post trip event

Student Selection Criteria

- Medical, engineering, business, social science, education

Site Criteria

- University partner
- Community interest
- Language
- Connections to the community (likelihood of success)
- Safety/political stability
- Community need
- Infrastructure/resources
- Ease/cost of getting there, time zone issues

Sites

- U Zambia (thru Kurt)
- Many others listed

Workshop

First week where all students meet together, team-build, share experiences

- In-country
- Presentations of work to date
- Team building exercises
- Language classes
- Cultural training
- Logistics/project planning
- Basic skills workshops
- Field trips
- Goals & expectations

Proposal

- Budget
- Timeline
- Mission statement
- Description
- Background/needs/motivation
- Objectives
- Assessment/eval
- Administrative plan
- Continuity

Funding

- Student travel
- Program admin
- Workshops
- Program materials

Assessment

- Develop tools; work with social science folks to do impact assessment

Motivation – Kurt believes that a big part of development has to come from other places than just grassroots. Developing universities can do a lot – people, structure, etc. Going with cross-curricular group means cross-pollination of knowledge.

CLOSING

- Each group should at least write up notes, if not write a more formal paper/proposal that could be shared amongst us and beyond
- Donna will create a listserv to collect relevant competitions and grant opportunities
- Sean will create an IPIDAT website documenting who everyone is

- Ideal size is hard to say – being inclusive but similar feel ... we could limit to one per institution ... adding more disciplines is good but makes it a lot bigger ... is there anyone with an even bigger house with more beds ...
- Next year ... hands on things (technologies, project samples, briquettes, Stirling engines, biodiesel, solar cookstove cook-off) when (now is pretty good because we're no longer stressed about term, but interferes with Zambia plans ... end of August afterwards could work well?, could even bring students to report back)