Measuring Progress and the Ethical Dimensions in Engineering

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Electrical and Computer Engineering Department

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Sponsored by the:

GREAT-IDEA NSF Project

Social Ethical and Global Issues in Engineering (SEGI)

IEEE WPR Chapter of Society for Social Implications of Technology

College of Engineering, University of Puerto Rico in Mayagüez

Grupo de Filosofía Ingeniería y Tecnología

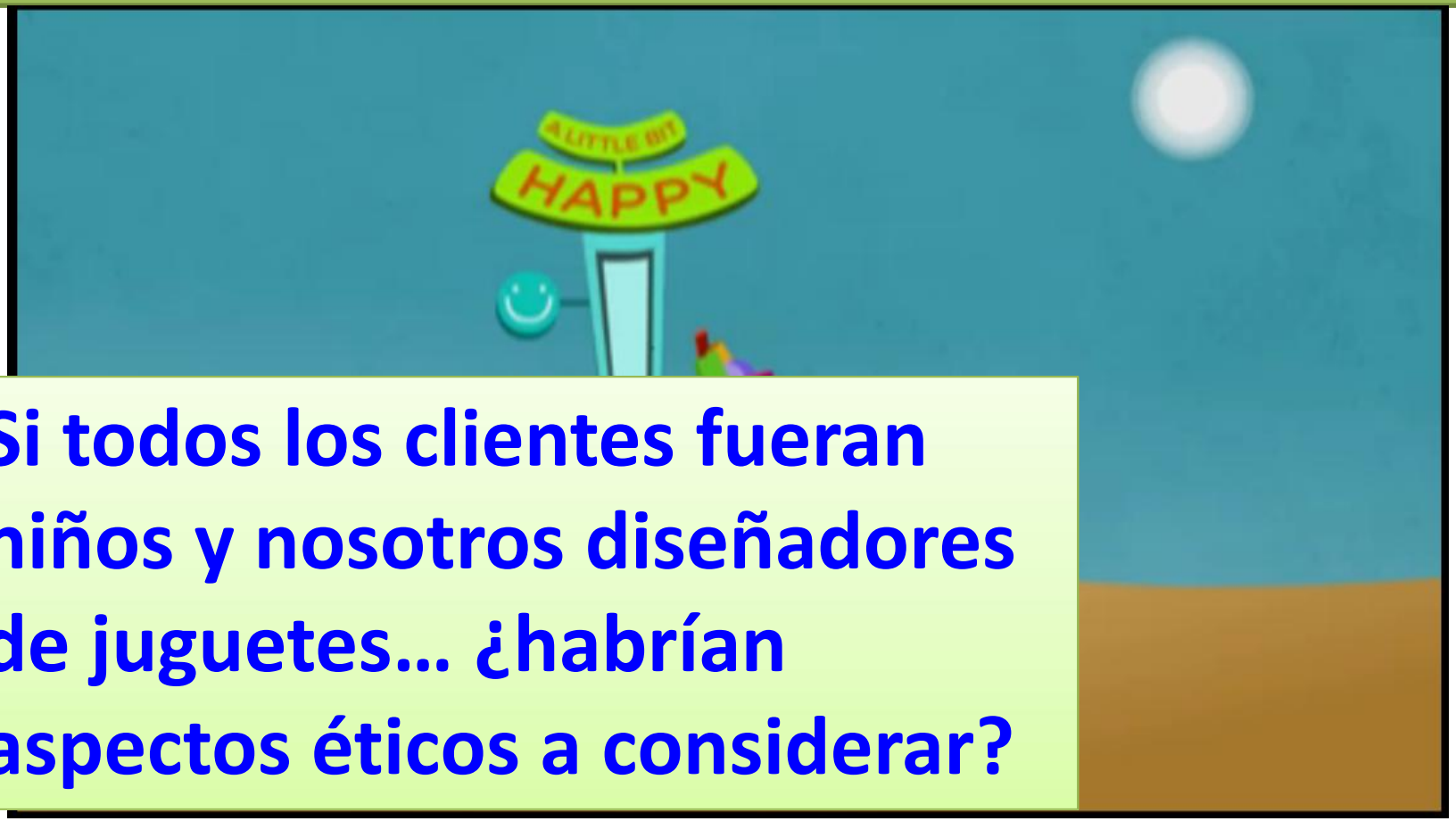
IEEE-Society for Social Implications of Technology

Reconocimiento

Este trabajo no se hubiera podido realizar sin la colaboración de los profesores

- Christopher Papadopoulos,
- Efraín O'Neill Carrillo,
- Luis Jiménez, William Frey
- Jorge Ferrer

HAPPY



Si todos los clientes fueran niños y nosotros diseñadores de juguetes… ¿habrían aspectos éticos a considerar?

Source - http://pbskids.org/loopscoops/happiness.html

Overview: Part One

- **Responsible Moral Agent and Technology**
  - **Social Implications of Technology**
  - **Progress and Well-being**
  - **Engineering and Social Responsibility**

IEEE Tagline:

Advancing Technology for Humanity

- “advancing technology and benefiting humanity”
- "to foster technological innovation and excellence for the benefit of humanity.“

Source: “What's in a Tagline?”, By Pedro Ray, IEEE President and CEO

http://www.ieee.org/portal/site/tionline/menuitem.130a3558587d56e8fb2275875bac26c8/index.jsp?&pName=institute_level1_article&TheCat=1009&article=tionline/legacy/inst2010/mar10/presidentscolumn.xml&;jsessionid=77z1LlSfsrbwLc6FDtBTzbhJhSCYLwmLqcktGgwyBJpYVy8Q2Z54!-1399741855!1904126598

IEEE Tagline:

Advancing Technology for Humanity

- “advancing technology **and** benefiting humanity”
- "to foster technological innovation and excellence **for** the benefit of humanity.“
- Ethical implications?

Source: “What's in a Tagline?”, By Pedro Ray, IEEE President and CEO

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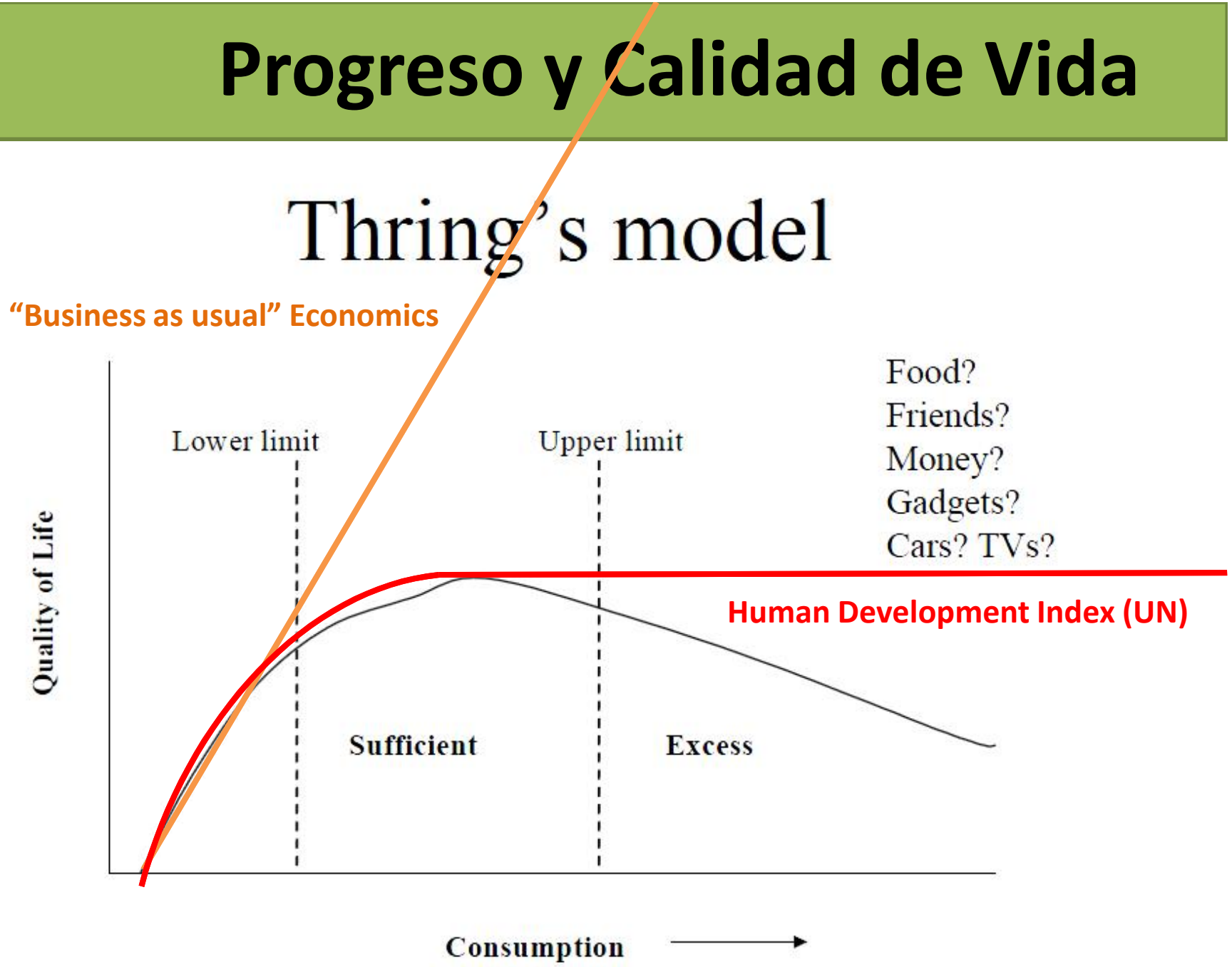
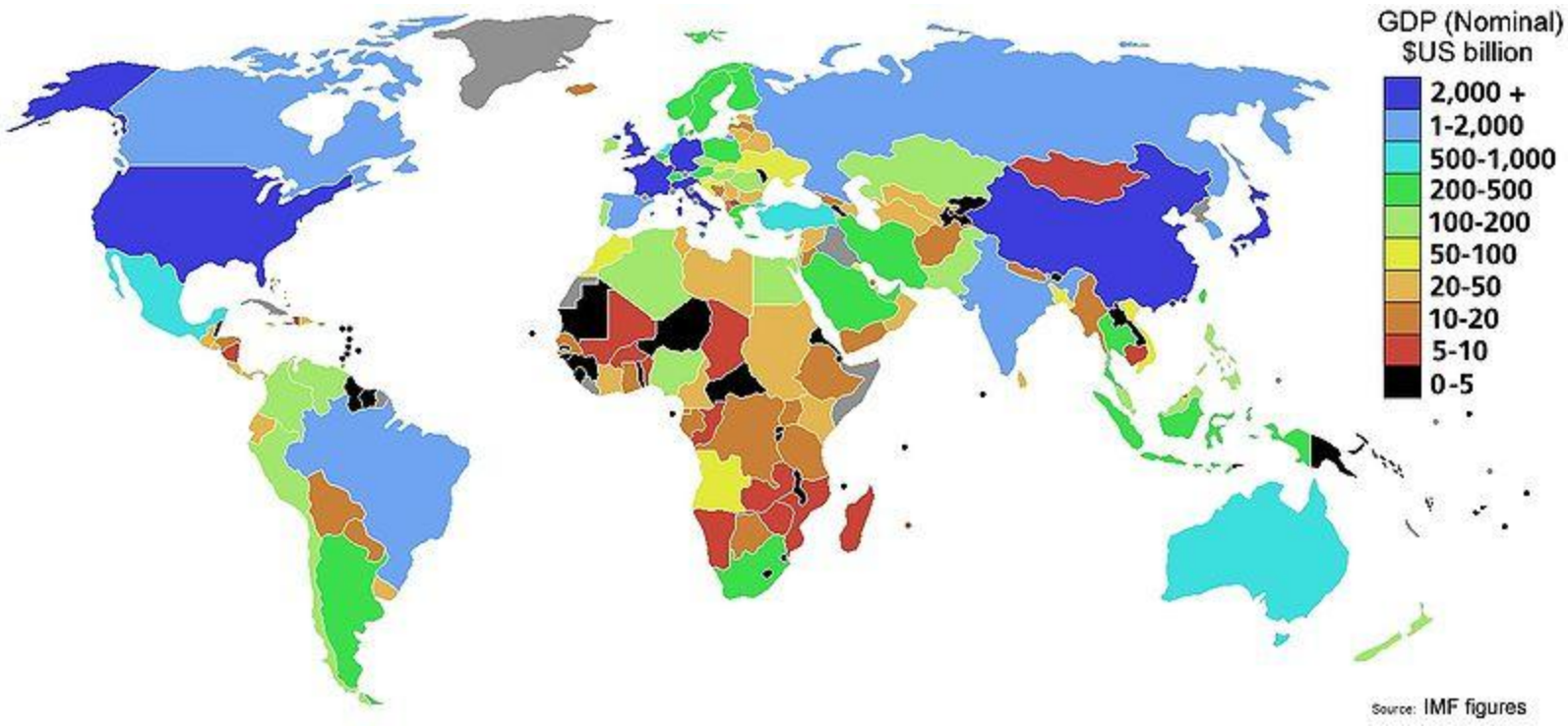
Progreso y Calidad de Vida



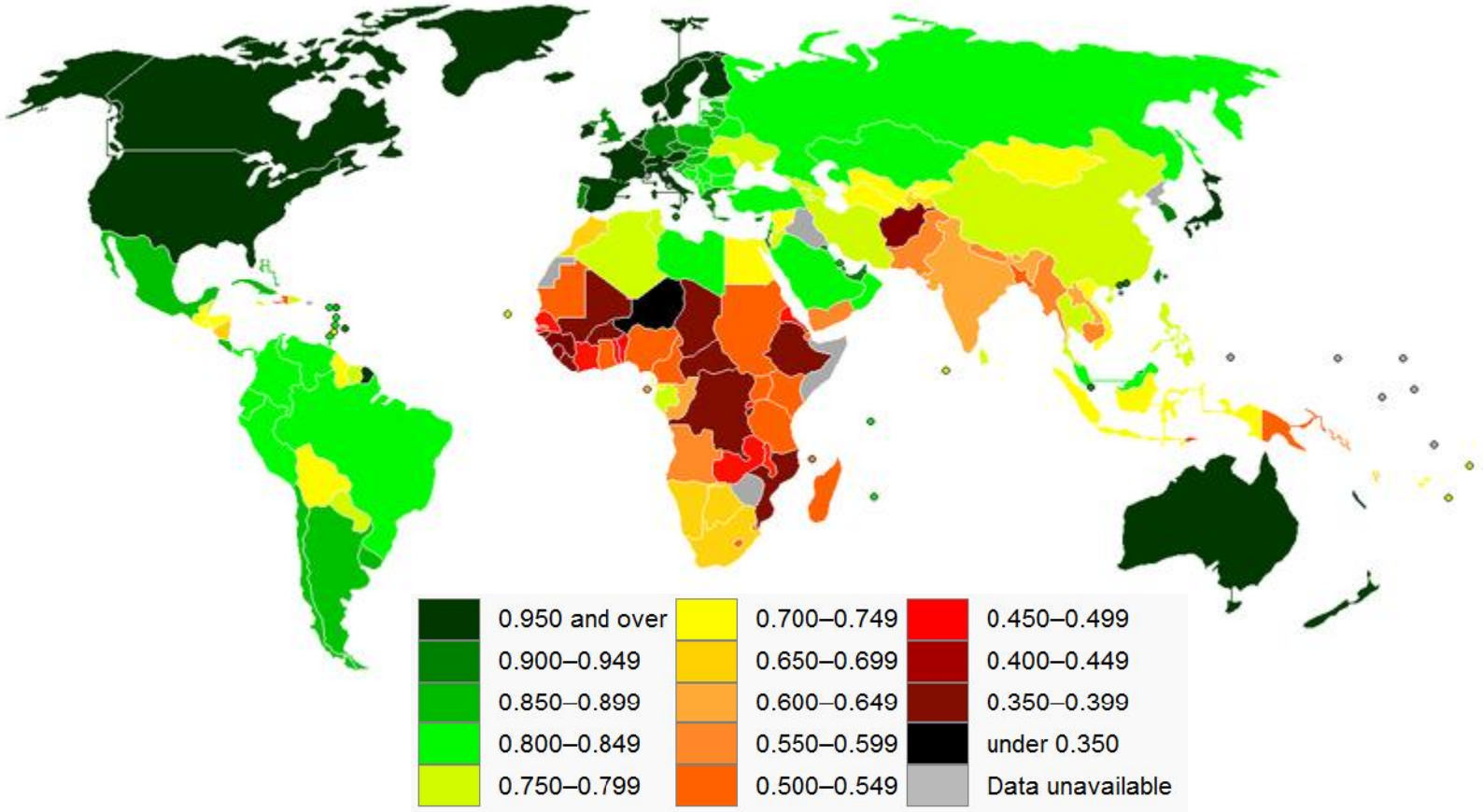
Medidas de Bienestar

Mapa GLobal del **Producto Interno Bruto** (Fondo Monetario Internacional) 2007



Medidas de Bienestar

Mapa GLobal del **Índice de Desarrollo Humano** (Naciones Unidas) 2009



Medidas de Bienestar

BIENESTAR MATERIAL: Limitaciones del PIB

- Ejemplos de eventos que aumentan el PIB:

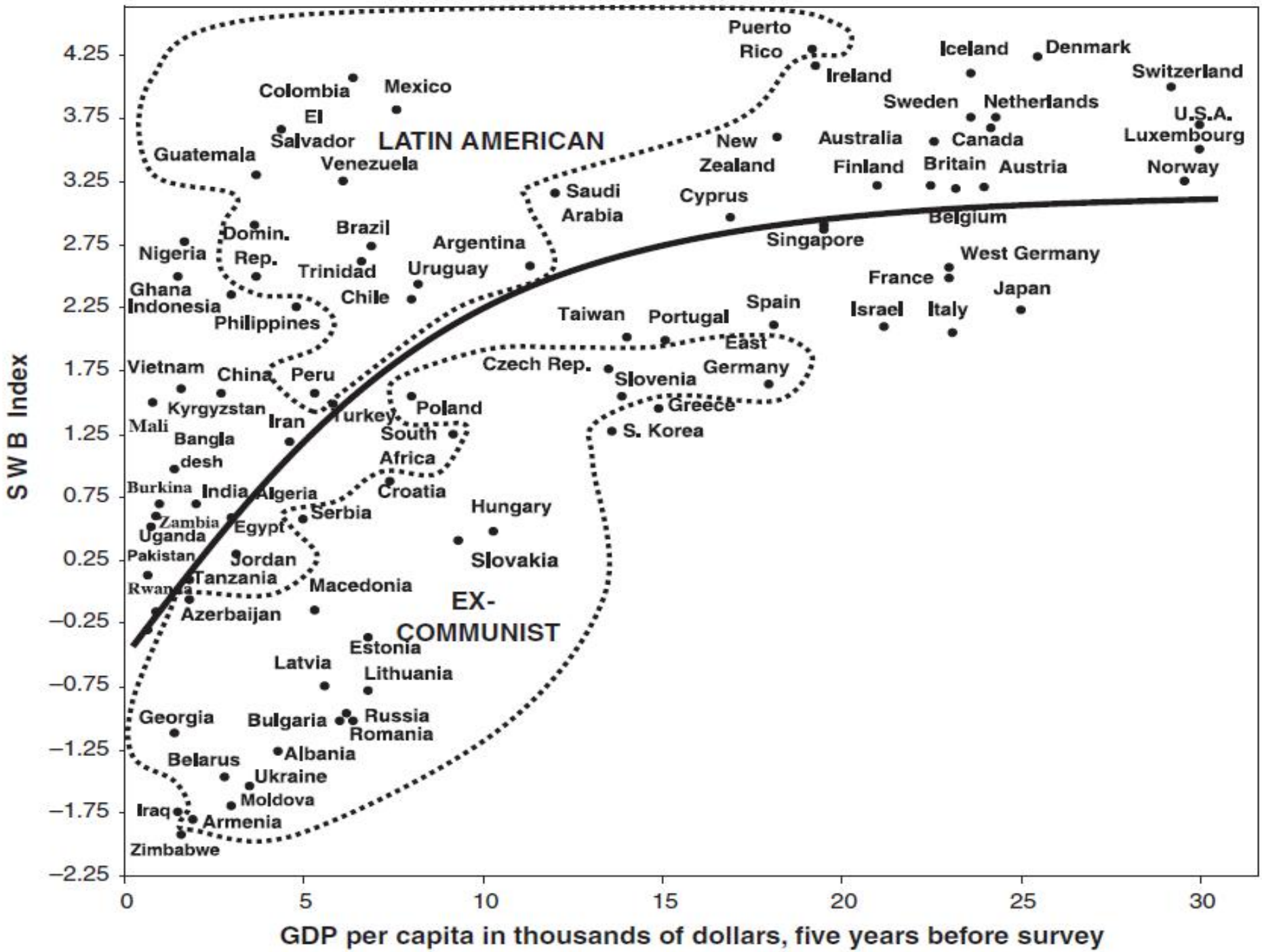
Estudio de Felicidad

University of Michigan's World Values Surveys (WVS)

World "Happiest" Countries vs. Countries with the Highest Levels of "Subjective Well-Being“

Happiest	Subjective Well-Being
1. Nigeria	1. Puerto Rico
2. Mexico	2. Mexico
3. Venezuela	3. Denmark
4. El Salvador	4. Colombia
5. Puerto Rico	5. Ireland

Source: http://www.worldvaluessurvey.org/


LATIN AMERICAN
EX-
COMMUNIST
Puerto Rico
Iceland
Denmark
Switzerland
Ireland
Colombia
Mexico
Sweden
Netherlands
U.S.A.
El Salvador
Luxembourg
Guatemala
Venezuela
New Zealand
Australia
Canada
Finland
Britain
Austria
Norway
Saudi Arabia
Cyprus
Belgium
Singapore
Domin. Rep.
Brazil
Argentina
Nigeria
West Germany
Trinidad
Uruguay
France
Ghana
Chile
Japan
Indonesia
Spain
Taiwan
Portugal
Israel
Italy
Philippines
East Germany
Vietnam
China
Peru
Czech Rep.
Slovenia
Kyrgyzstan
Poland
Greece
Turkey
Iran
Mali
South Africa
S. Korea
Bangladesh
Burkina
India
Algeria
Croatia
Hungary
Zambia
Serbia
Egypt
Uganda
Pakistan
Jordan
Slovakia
Tanzania
Rwanda
Macedonia
Azerbaijan
Estonia
Latvia
Lithuania
Georgia
Bulgaria
Russia
Romania
Albania
Belarus
Ukraine
Moldova
Iraq
Armenia
Zimbabwe
SWB Index
4.25
3.75
3.25
2.75
2.25
1.75
1.25
0.75
0.25
–0.25
–0.75
–1.25
–1.75
–2.25
0
5
10
15
20
25
30
GDP per capita in thousands of dollars, five years before survey

Subjective Wellbeing = Progress?

- Single overarching measure
- Self-evidently good
  - **Life satisfaction**

- 2 more items:
  - Life expectance (Quality of Adjusted Life Years)
  - Impact on future generations. (Any Suggestions?)

Source: Layard, R. (2009) "Why subjective well-being should be the measure of progress", OECD World Forum on "Statistics, Knowledge and Policy – Charting Progress, Building Visions, Improving Life", Busan, Korea – 27-30 October 2009, available at http://cep.lse.ac.uk/textonly/_new/staff/layard/pdf//OECDBusan12Oct09.pdf

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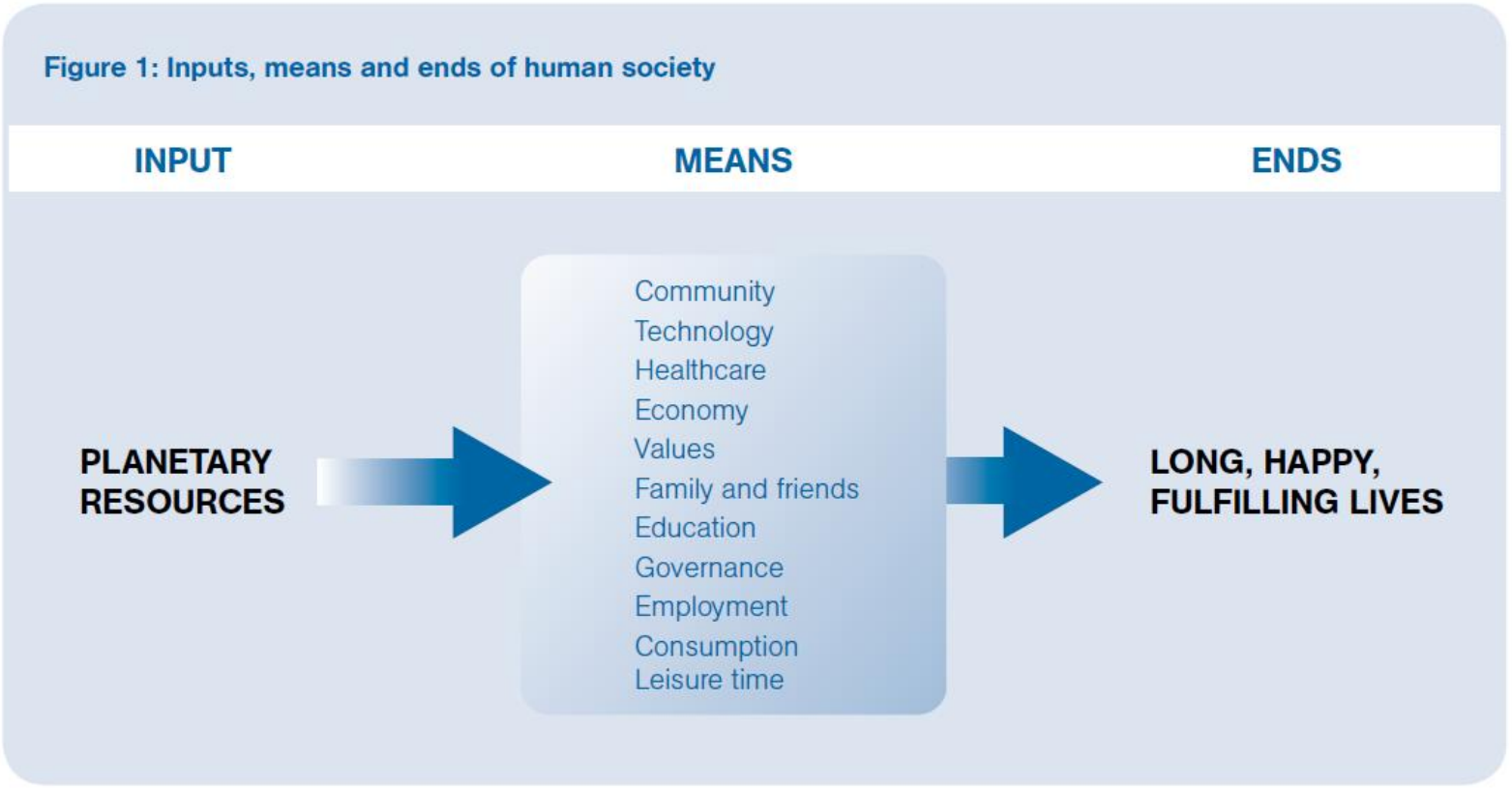
$$\text{Happy Planet Index} = \frac{\text{Happy Life Years}}{\text{Ecological Footprint} + \alpha} \times \beta$$

Figure 1: Inputs, means and ends of human society



Source: The unHappy Planet Index 2.0 Report, edited by Mary Murphy, the new economics foundation (nef), 2009. http://www.happyplanetindex.org

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1st place: Costa Rica	Life sat: 8.5	Life exp: 78.5 years	Footprint: 2.3	HPI: 76.1
2nd place: Dominican Republic	Life sat: 7.6	Life exp: 71.5 years	Footprint: 1.5	HPI: 71.5

Source: The unHappy Planet Index 2.0 Report, edited by Mary Murphy, the new economics foundation (nef), 2009. http://www.happyplanetindex.org

Calidad de Vida

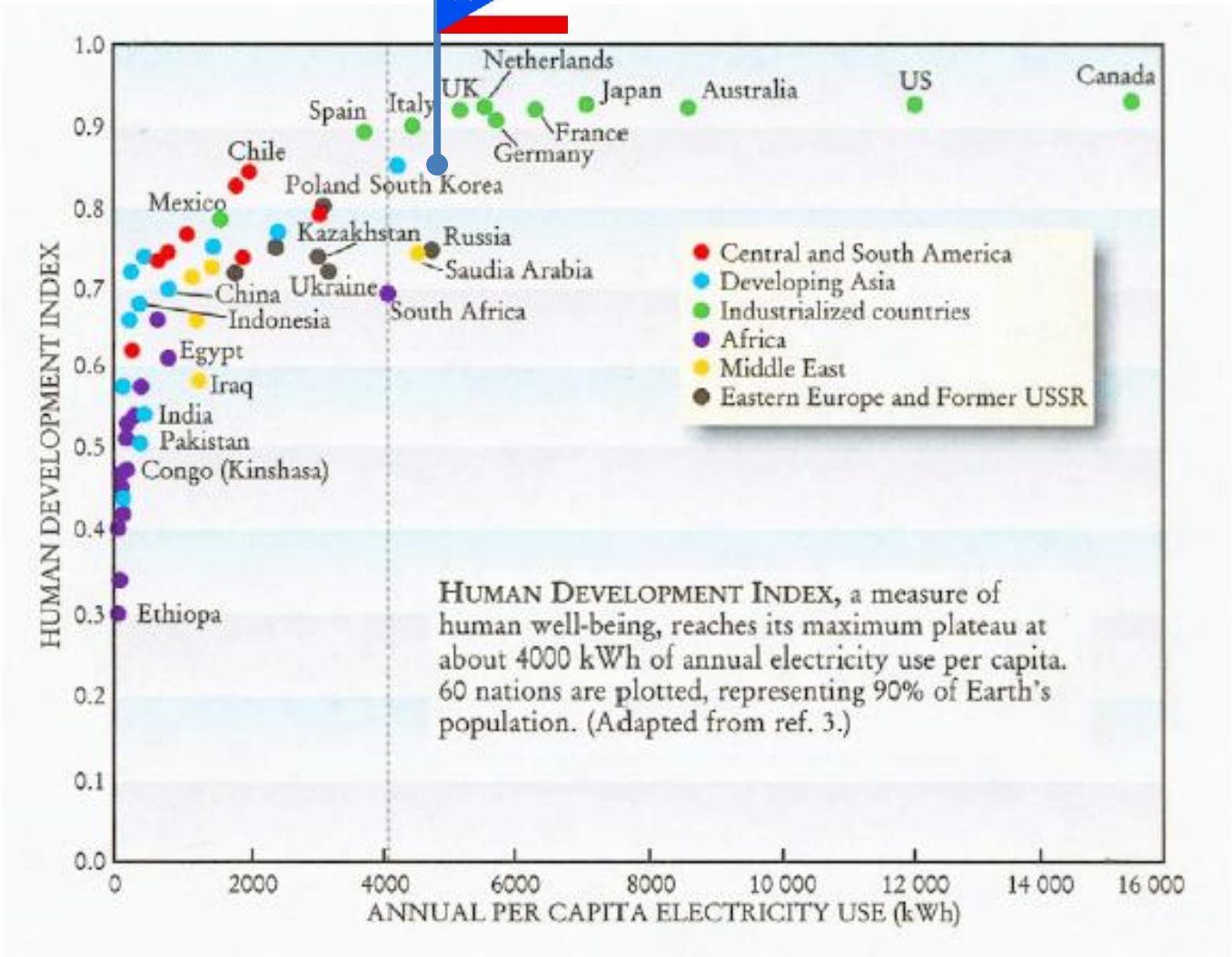

Figure 1.2. Human development index vs. per capita electricity use for selected countries. Taken from S. Benka, *Physics Today* (April 2002), pg 39, and adapted from A. Pasternak, Lawrence Livermore National Laboratory rep. no. UCRL-ID-140773.

Calidad de Vida

Thring's model

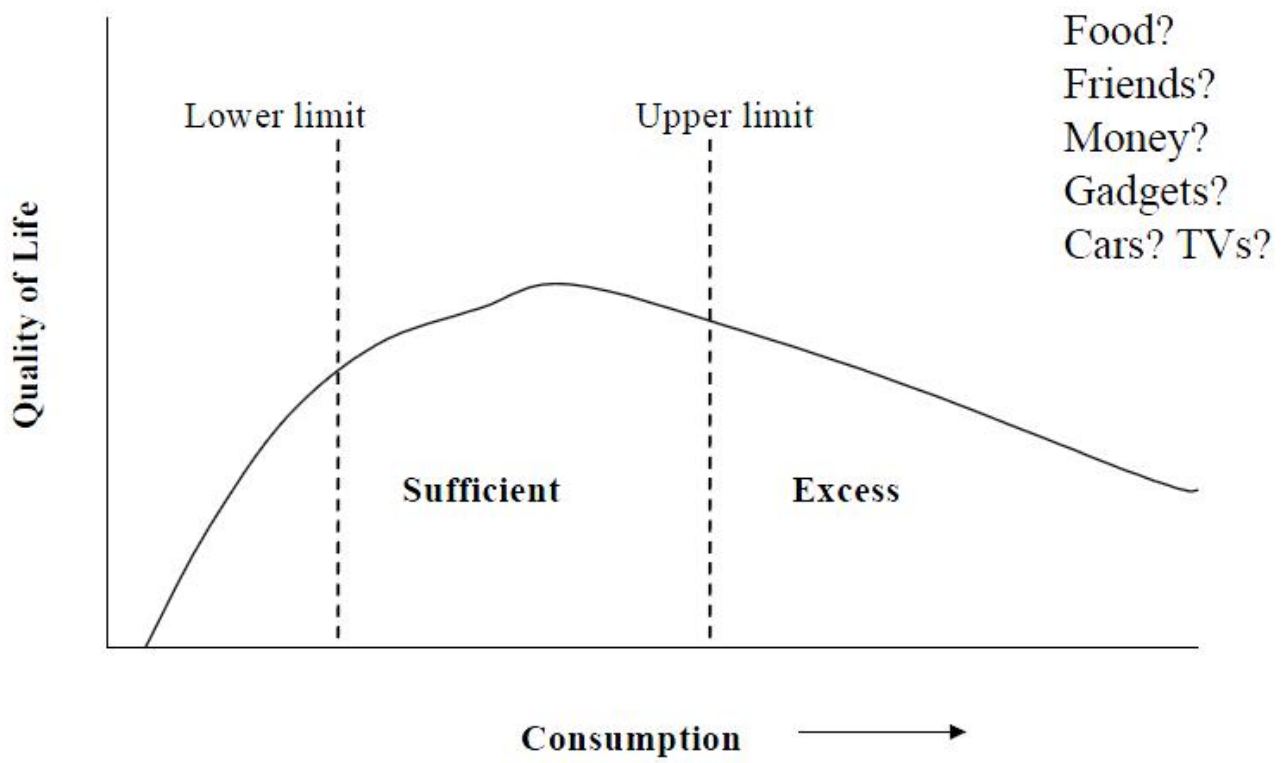

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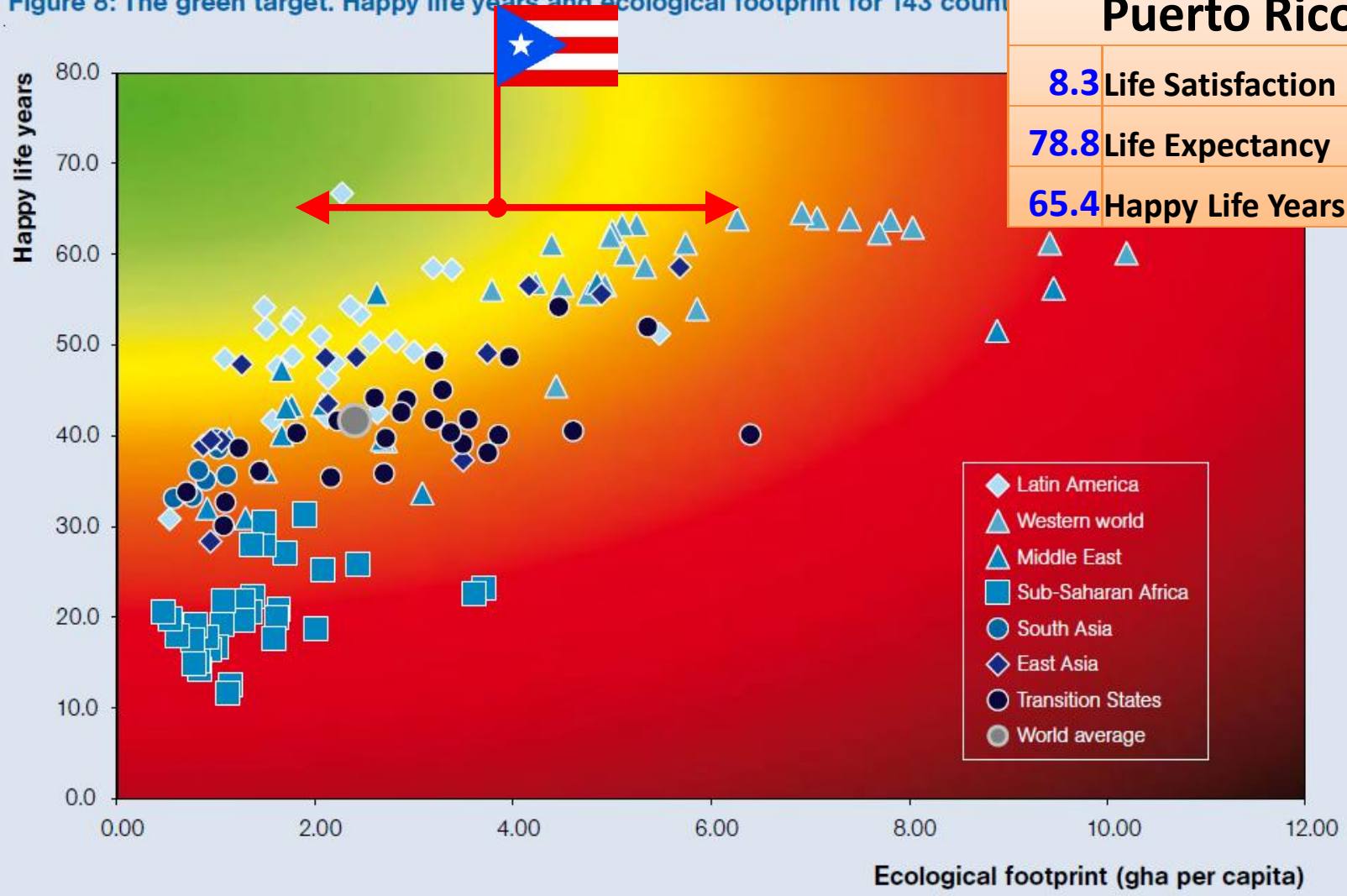
Figure 8: The green target. Happy life years and ecological footprint for 143 count



Puerto Rico	
8.3	Life Satisfaction
78.8	Life Expectancy
65.4	Happy Life Years

http://www.happyplanetindex.org

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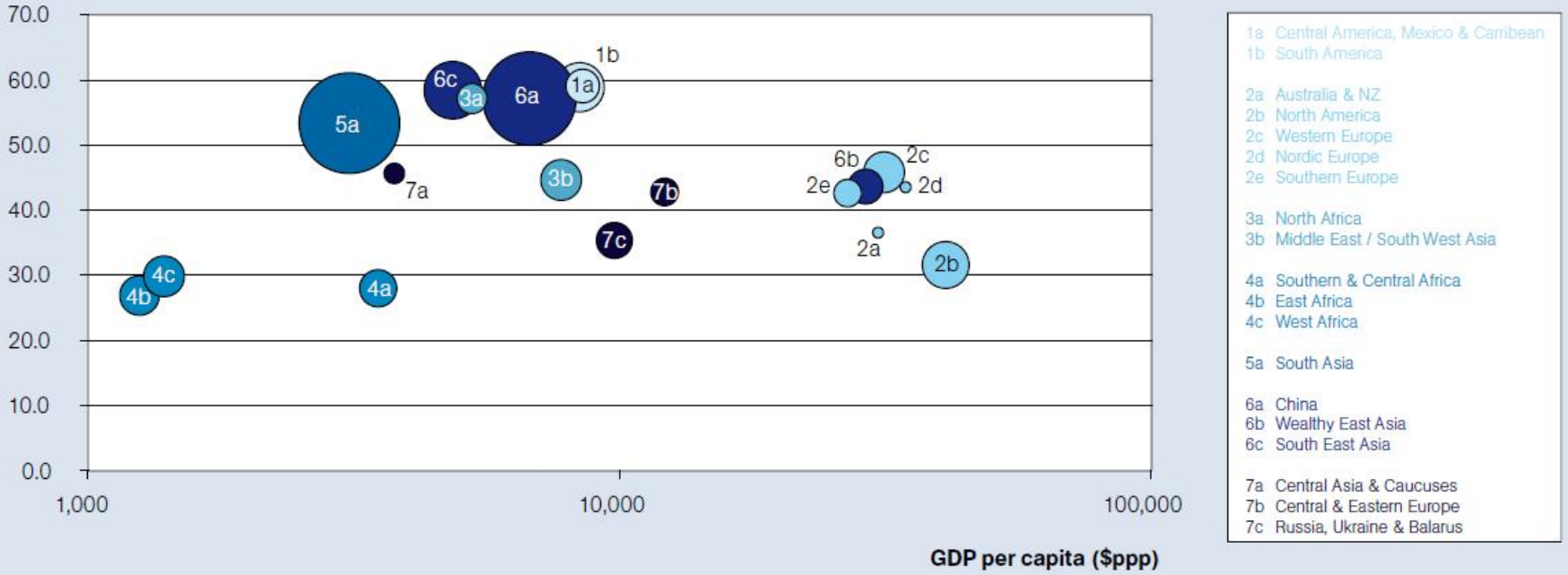
Figure 16: GDP per capita vs. HPI for sub-regions. Dot size represents the population of the sub-region. GDP per capita is plotted on a logarithmic axis which spreads out data points to the left and tightens the gaps between those to the right.



Source: The unHappy Planet Index 2.0 Report, edited by Mary Murphy, the new economics foundation (nef), 2009.

http://www.happyplanetindex.org

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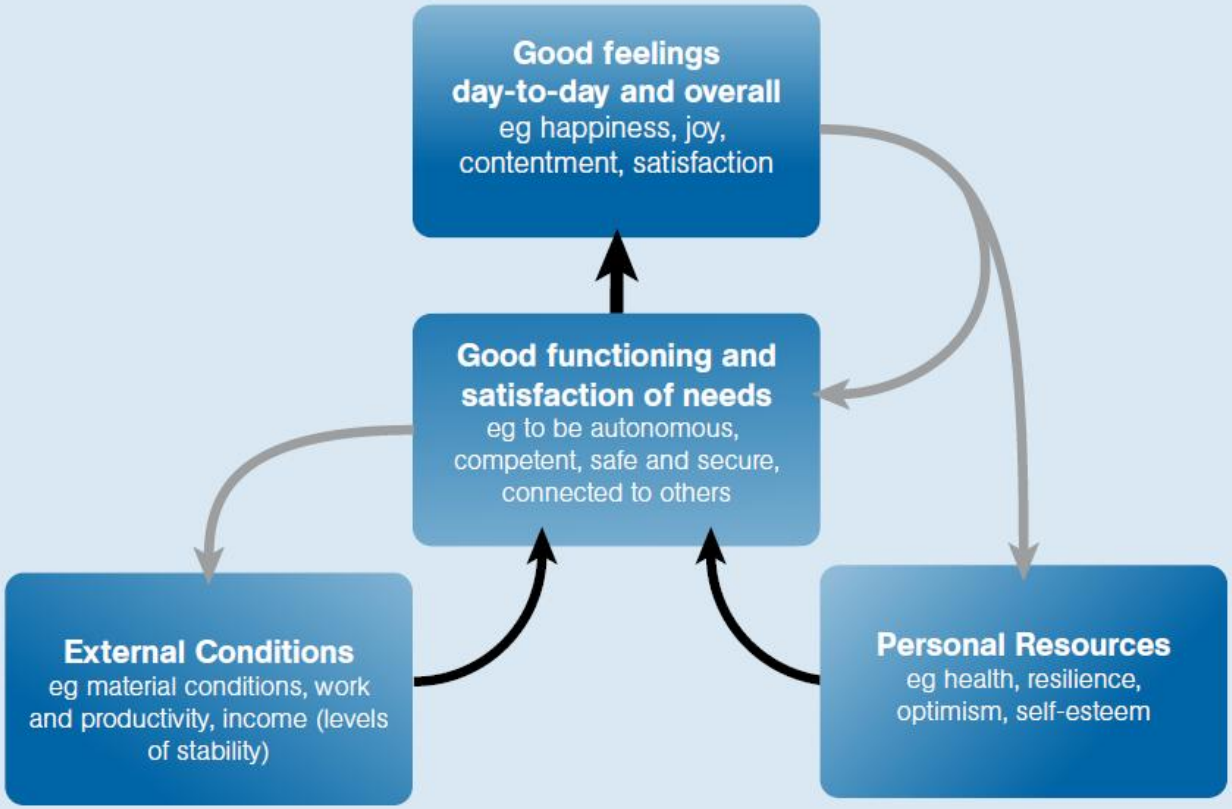
Figure 3: Dynamic model of well-being



Source: Measuring our progress: the power of wellbeing, Saamah Abdallah, Sorcha Mahony, Nic Marks, Juliet Michaelson, Charles Seaford, Laura Stoll and Sam Thompson, February 2011. http://www.neweconomics.org/publications/measuring-our-progress

- ***Satisfaction*** *question: "All things considered, how satisfied are you with your life as a whole these days?" (on a scale where 0 means completely dissatisfied and 10 means completely satisfied).*
- ***Positive emotion*** *question: "How much of the time yesterday did you feel happy?" (scale includes 'none of the time', 'some of the time', 'most of the time' or 'all of the time').*
- ***Relationships/negative emotion*** *question: "How much of the time yesterday did you feel lonely?" (same scale).*
- ***Meaning*** *question: "I generally feel that what I do in my life is valuable and worthwhile" (on a 5-point scale from strongly agree to strongly disagree).*
- ***Autonomy*** *question: "I feel I have little control over important things in my life" (same scale).*

Source: Measuring our progress: the power of wellbeing, Saamah Abdallah, Sorcha Mahony, Nic Marks, Juliet Michaelson, Charles Seaford, Laura Stoll and Sam Thompson, February 2011. http://www.neweconomics.org/publications/measuring-our-progress

¿Por qué enseñar ética?

1- Crear conciencia en el futuro profesional sobre como:

- **las ideas que proponga**
- **las acciones que realice**
- **las decisiones que tome**

tendrán consecuencias tanto directas como indirectas, a corto y a largo plazo, y que parte de su rol como profesional incluirá: asumir responsabilidad por esas consecuencias.

Slide by: Dr. Efraín O'Neill

¿Por qué enseñar ética?

2- Adiestrar profesionales de manera que, las ideas que propongan, las acciones que realicen y las decisiones que tomen puedan contribuir a:

- Prevenir desastres
- Prevenir corrupción
- Propiciar un balance adecuado entre el desarrollo de la profesión, el desarrollo tecnológico y la calidad de vida

Slide by: Dr. Efraín O'Neill

Agente Moral Responsable

•“ … se preocupa **imparcialmente** por los intereses de cada uno de quienes se verán afectados por lo que hace;
•alguien que distingue cuidadosamente los **hechos** y examina sus implicaciones;
• alguien que acepta principios de conducta sólo después de **analizarlos** con cuidado para estar seguro de que son firmes; ”

Source: *Introducción a la filosofía moral*, , 2006, http://www.librosintinta.in/biblioteca/ver-pdf/philosophica.us/eticatec/lecturas/rachels_filosofia_moral.pdf.htx

Agente Moral Responsable

•“alguien que está dispuesto a **“escuchar la razón”**, incluso cuando esto significa que tendrá que revisar sus convicciones previas, y finalmente,

• alguien que está dispuesto a **actuar** siguiendo los resultados de su deliberación.”

Source: *Introducción a la filosofía moral*, , 2006, http://www.librosintinta.in/biblioteca/ver-pdf/philosophica.us/eticatec/lecturas/rachels_filosofia_moral.pdf.htx

Tres Pecados Capitales contra la Integridad Profesional en la Ingeniería

- **Fabricación**, invención de información o resultados de pruebas, estudios o datos de diseños que no se efectuaron.
- **Falsificación de datos**, alteración de resultados de pruebas, estudios o diseños.
- **Plagio**, apropiación de métodos, datos, cuerpo de un texto, trabajos sin citar o reconocer la fuente.

Slide by: Dr. Efraín O'Neill

Overview: Part Two

- **Ethics Introduction:**
- Engineering Ethics Codes
- Three Ethics Tests
- Case Studies

moodle

- All ethical standards are relative to the culture in which they exist.
- Obeying the law always guarantees ethical behavior.
- A professional code of ethics (Engineering, Medicine, Law, etc.) will always determine the answer to an ethical problem encountered by a professional.

moodle

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moodle

Ethics Cases

- Challenger
- “Vía Verde”
- Ford Pinto
- SOPA, PIPA
- BP Spill

Local Issues

- Economy
- Energy/Renewable
- Transportation
- Crime/Security
- Housing
- GASODUCTO
- Education
- Politics

Global Issues

- Food
- Water
- Climate Change
- Energy/Renewable
- Piracy
- Pollution
- Security
- Recycling
- Peace/War
- Family
- Progress

moodle: **Ford-GM**

- The philosophy and ethics behind Henry Ford and Alfred Sloan (General Motors) leading efforts in automakers mass production was always very similar and that's why both were very successful.

moodle: **Ford-GM**

- **Ford Philosophy –** "The integrity of the product was always the first consideration… He represented an absolute **ethic of quality and durability…** "

- **General Motors Philosophy –** "Brave New World: progress toward a technological utopia was accepted almost without question. The rapid succession of inventions that had already improved the quality of life was ll the proof they needed… the dynamism of capitalist economies makes technological obsolescence nearly inevitable."

Source – Giles Slade, *Made to Break*, page 33, 2006.

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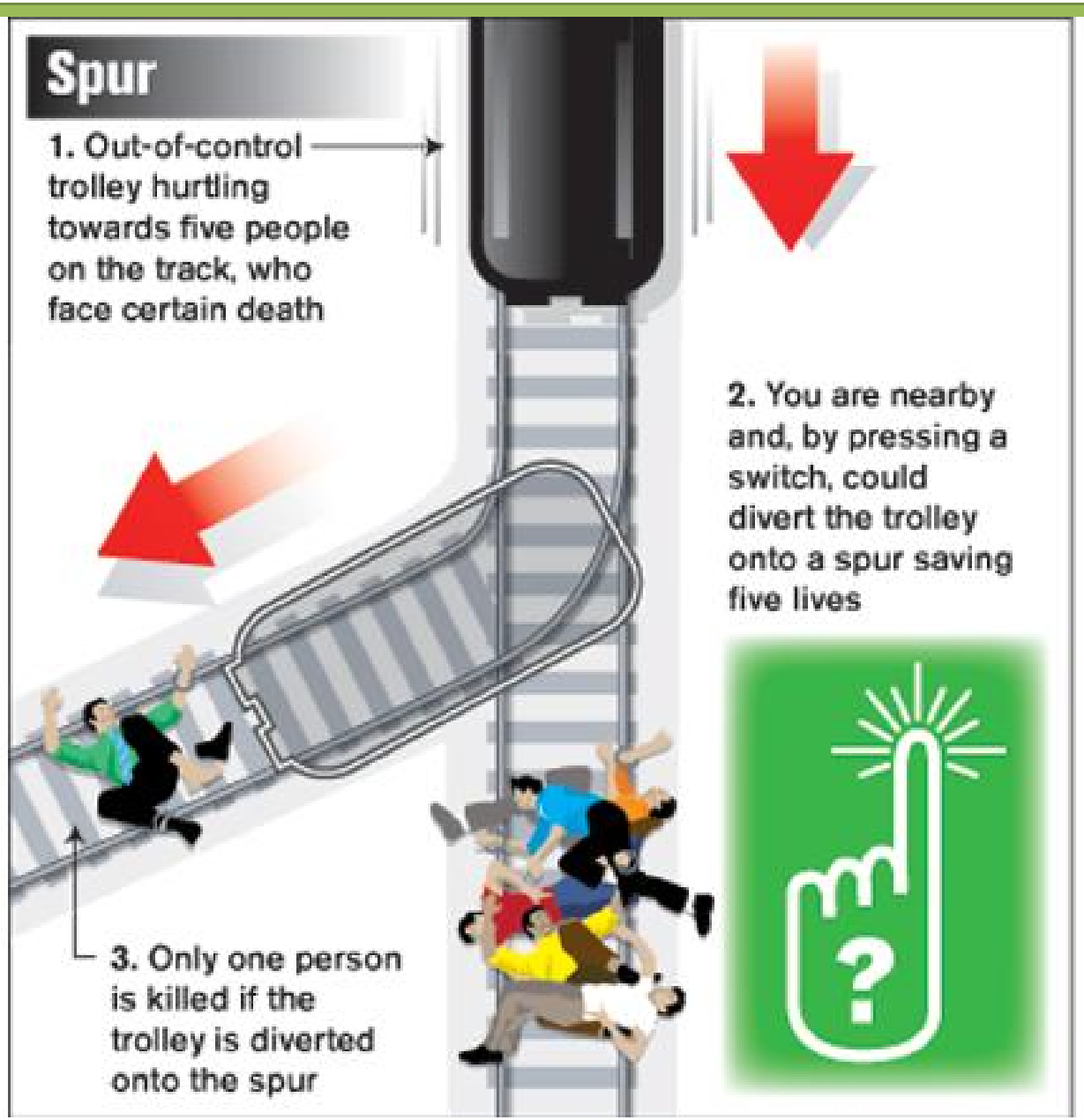
Ethics: Definition?



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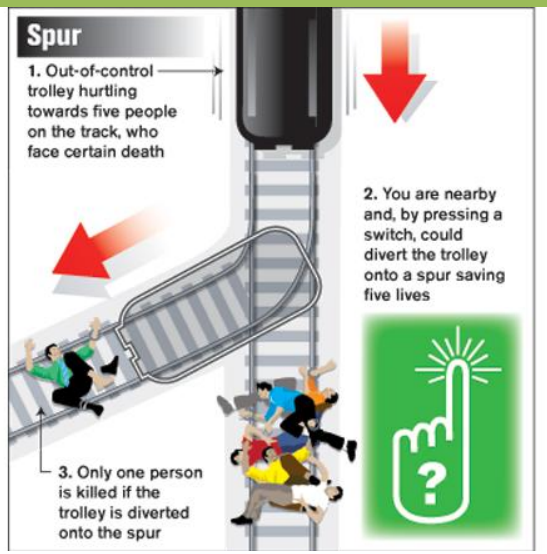
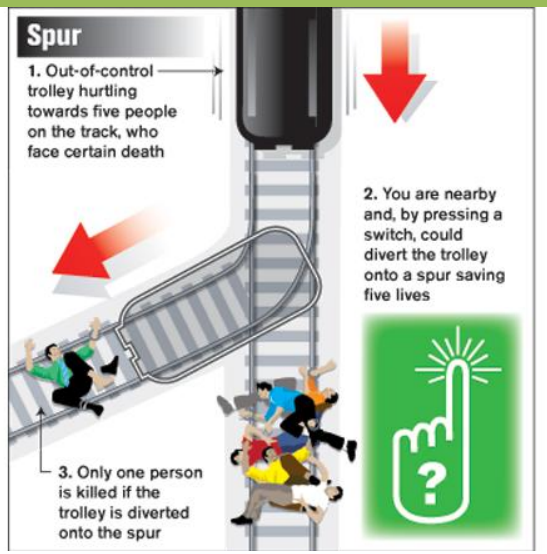
Ethic Dilemma



- TRAIN PROBLEM
  - **Basic Case: 5 workers in rails vs. 1**

What would you do and why?

Ethic Dilemma

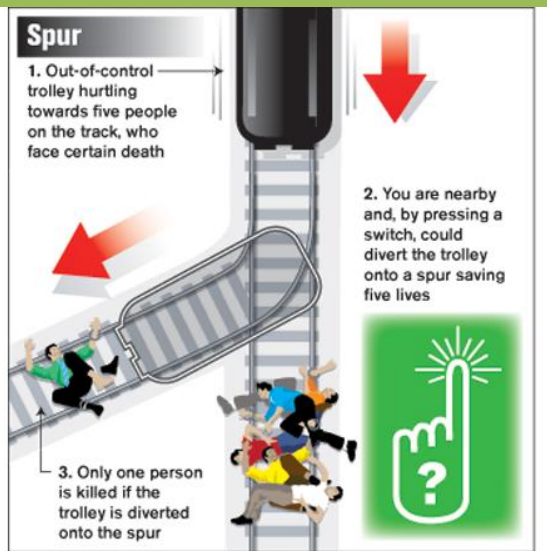


- TRAIN PROBLEM
  - Basic Case: 5 workers in rails vs. 1
  - Other Cases:
    - **5 with terminal disease, 1 healthy**

What would you do and why?

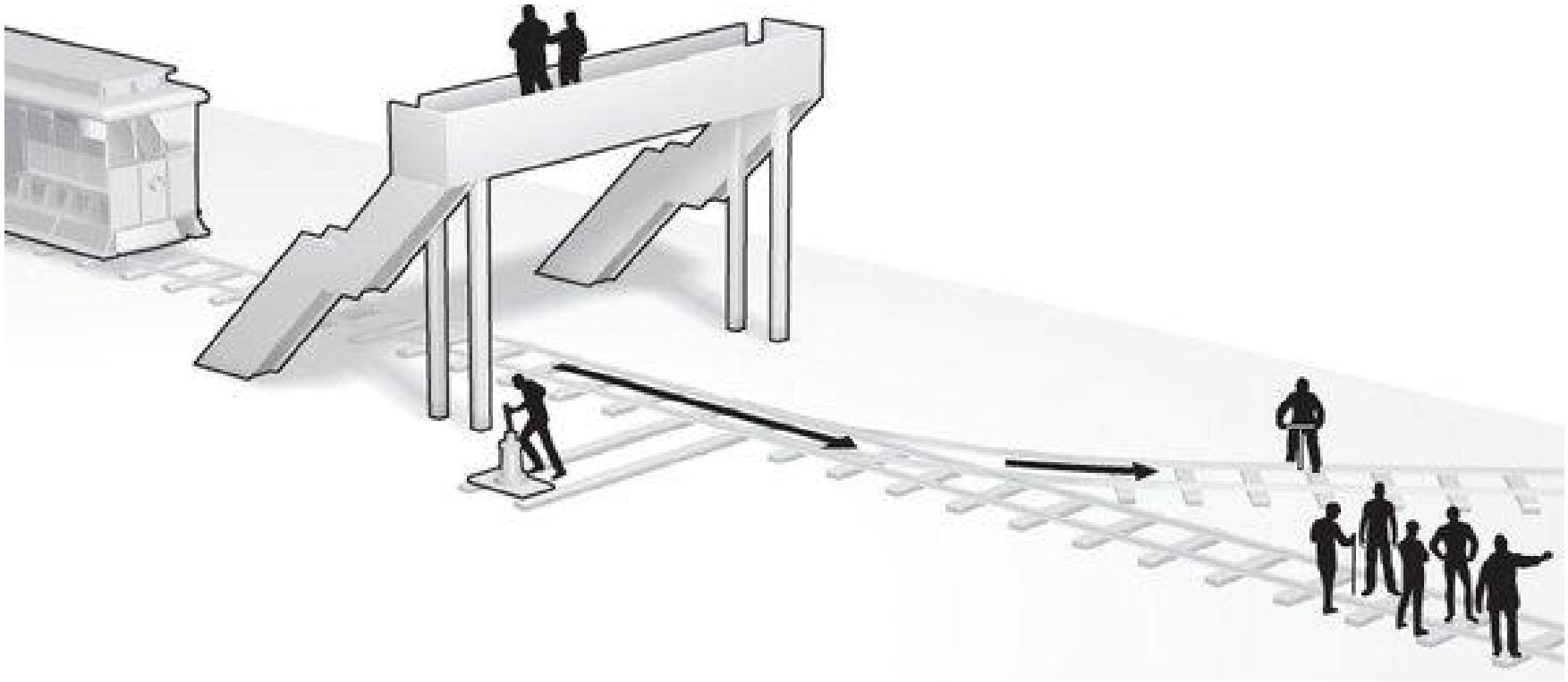
Source - https://picasaweb.google.com/109139092475651784258/LeDilemmeDuTrolleyEtSesVariantes

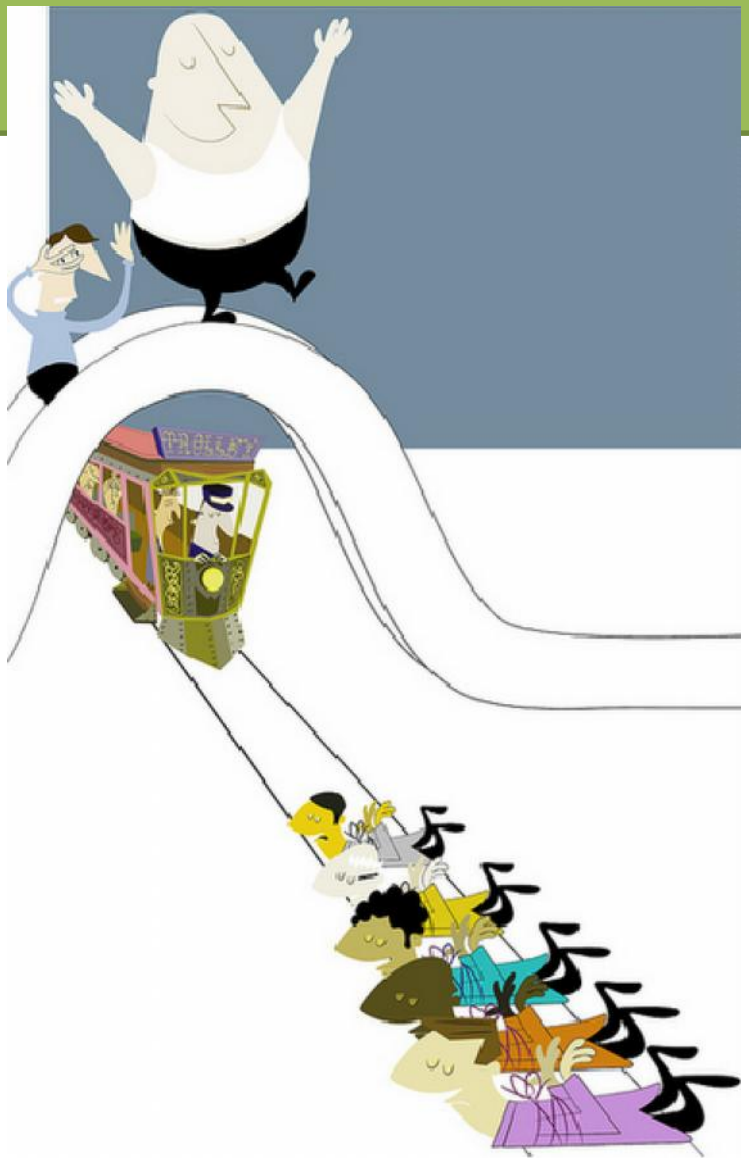
Ethic Dilemma

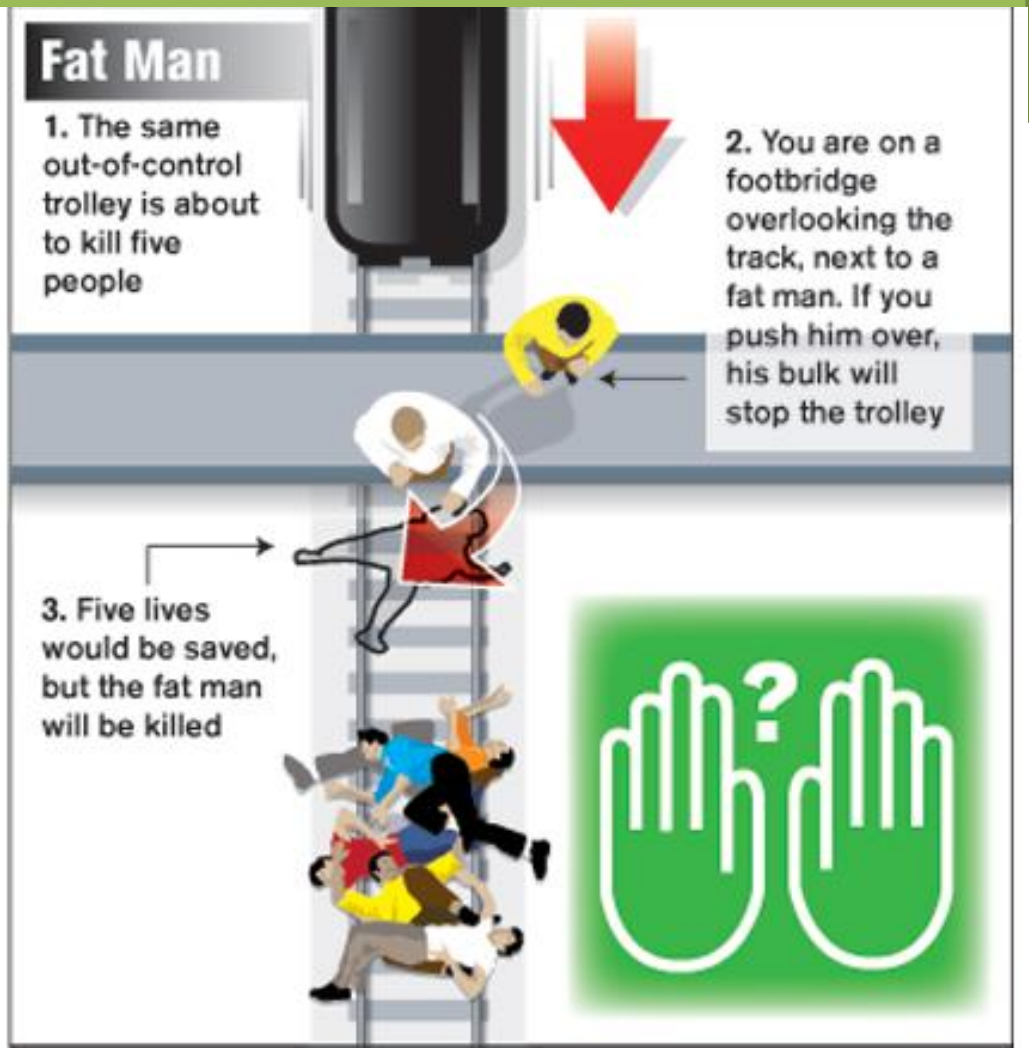


- TRAIN PROBLEM
  - Basic Case: 5 workers in rails vs. 1
  - Other Cases:
    - 5 with terminal disease, 1 healthy
      - **5 vs. 1 that is mom**

Ethic Dilemma







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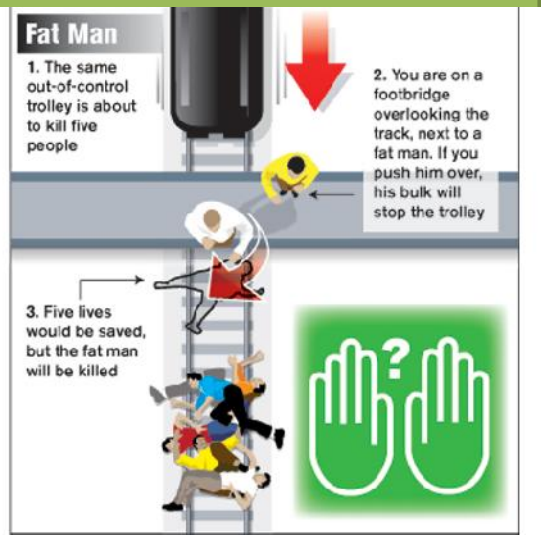
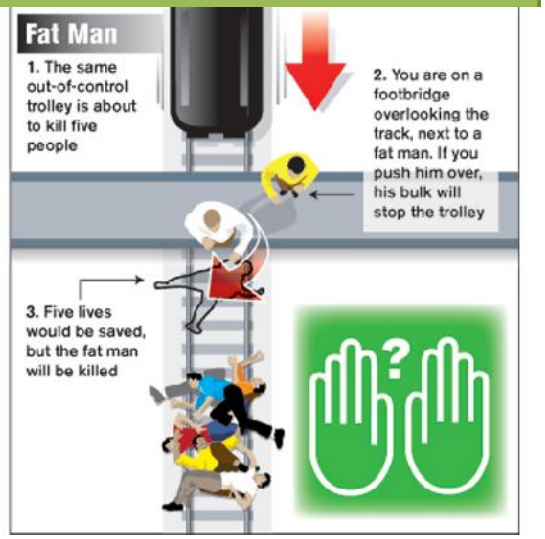
Ethic Dilemma



- TRAIN PROBLEM
  - Basic Case: 5 workers in rails vs. 1
  - Other Cases:
    - 5 with terminal disease, 1 healthy
      - 5 vs. 1 that is mom
    - **5 workers in rails vs. one in the bridge (push or not)**

Ethic Dilemma



- TRAIN PROBLEM
  - Basic Case: 5 workers in rails vs. 1
  - Other Cases:
    - 5 with terminal disease, 1 healthy
      - 5 vs. 1 that is mom
    - 5 workers in rails vs. one in the bridge (push or not)
      - **5 Nobel peace winners vs. 1 Native from Amazon**

¿Qué es un problema ético?

- "Un problema ético puede ser definido como un conflicto que la persona experimenta entre dos o más obligaciones morales en una circunstancia particular".

Joseph R. Herkert, Social, Ethical, and Policy Implications of Engineering, IEEE Press, 2000.

Slide by: Dr. Efraín O'Neill

Plagiarism

- **What is Plagiarism (Merriam-Webster Online Dictionary)**
  - Steal and pass off the ideas or words of another as one's own.
  - Use another's production without crediting the source; literary theft.
  - Present as new and original an idea or product derived from an existing source.
- **Cases of Plagiarism (www.plagiarism.org)**
  - Turning in someone else's work as your own.
  - Copying words or ideas from someone else without giving credit.
  - Failing to put a quotation in quotation marks.
  - Giving incorrect information about the source of a quotation.
  - Changing words but copying the sentence structure of a source without giving credit.
  - Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not (see our section on "fair use" rules).
- **Avoiding Plagiarism (www.plagiarism.org)**
  - Citing sources.
  - Acknowledging that certain material has been borrowed.
  - Providing your audience with the information necessary to find that source.
  - *Reading and synthesizing many sources*

Plagiarism exercise

"A class of maize mutants, collectively known as disease lesion mimics, display discrete disease-like symptoms in the absence of pathogens. It is intriguing that a majority of these lesion mimics behave as dominant gain-of-function mutations. The production of lesions is strongly influenced by light, temperature, developmental state and genetic background. Presently, the biological significance of this lesion mimicry is not clear, although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens. ... In this paper we argue that this might be the case ..." [G.S. Johal, S.H. Hulbert, and S.P. Briggs. 1995. 'Disease lesion mimics of maize: a model for cell death in plants." BioEssays 17:685-692]

http://faculty.chass.ncsu.edu/comstock/langure/ethics/php816/modules/plagiarism/biology_new_open.php
https://mywebspace.wisc.edu/rstreiffer/web/CourseFolders/MHB999S10/03_Exercise%20-%20Life%20Sciences%20Plagiarism%20Key.pdf

Plagiarism exercise

"A class of maize mutants, collectively known as disease lesion mimics, display discrete disease-like symptoms in the absence of pathogens. It is intriguing that a majority of these lesion mimics behave as dominant gain-of-function mutations. The production of lesions is strongly influenced by light, temperature, developmental state and genetic background. **Presently, the biological significance of this lesion mimicry is not clear, although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens. ... In this paper we argue that this might be the case ..."** [G.S. Johal, S.H. Hulbert, and S.P. Briggs. 1995. 'Disease lesion mimics of maize: a model for cell death in plants.” BioEssays 17:685-692]

Plagiarism exercise 1

Original Text …

Presently, **the biological significance of this lesion mimicry is not clear**, **although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens.** … In this paper we argue that this might be the case …

You write …

Currently, **the biological significance of lesion mimicry in plants is not known**, **although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens.**

Plagiarism exercise 2

Original Text …

Presently, **the biological significance** of **this lesion mimicry** is not clear, **although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens**. … In this paper we argue that this might be the case …

You write …

Currently, **"the biological significance" of lesion mimicry** in plants is not known, **"although suggestions have been made that they may represent defects in the plants' recognition of, or response to, pathogens" (Johal et al., 1995).**

Plagiarism exercise 3

Original Text …

Presently, the biological significance of this lesion mimicry is not clear, although suggestions have been made **that they may represent defects in the plants' recognition of, or response to, pathogens**. … In this paper we argue that this might be the case …

You write …

Several researchers are investigating the significance of lesion mimicry. Johal et al. (1995) argue that they may represent defects in the plants' recognition of, or response to, pathogens. However, other researchers (e.g., XYZ), have disputed this.

Plagiarism exercise 4

Original Text …

Presently, the biological significance of this lesion mimicry is not clear, although suggestions have been made **that they may represent defects in the plants' recognition of, or response to, pathogens**. … In this paper we argue that this might be the case …

You write …

Several researchers are investigating the significance of lesion mimicry. Johal et al. (1995) argue **that they may indicate mutations that inhibit the plants' ability to recognize and respond to pathogens**. **However, other researchers (e.g., XYZ, 2004), have disputed this.**

Related to plagiarism

- Fabrication (see case of John Darsee)
- Falsification
- Fair Use of Copyrighted Material

Overview: Second Part

- Ethics Introduction
- **Engineering Ethics Codes**
  - **NSPE**
  - **CIAPR**
  - **IEEE/ACM**
- Three Ethics Tests
- Case Studies

NSPE Code of Ethics

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

- Hold paramount the safety, health, and welfare of the public.
- Perform services only in areas of their competence.
- Issue public statements only in an objective and truthful manner.
- Act for each employer or client as faithful agents or trustees.
- Avoid deceptive acts.
- Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

NSPE Code of Ethics

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Institutionalizing Engineering Practice in Puerto Rico

- Law 319 (1938): Established the College of Engineers and Architects and Surveyors of Puerto Rico (1938)
  - **Colegio de Ingenieros, Architecturas, y Agrimensores de Puerto Rico**
- Law 173 (1988): Established the **Puerto Rico State Society of Professional Engineers and Land Surveyors**
  - **Colegio de Ingenieros y Agrimensores de Puerto Rico (CIAPR)**

Slide by: Dr. William Frey

Cánones de Ética Profesional

- **Canon I**
  - Velar por sobre toda otra consideración por la seguridad, el ambiente, la salud y el **bienestar de la comunidad** en la ejecución de sus responsabilidades profesionales.
- **Canon II**
  - Proveer servicios únicamente en áreas de sus competencias.
- **Canon III**
  - Emitir declaraciones públicas únicamente en una forma veraz y objetiva.
- **Canon IV**
  - Actuar en asuntos conflictos de intereses o la mera apariencia de éstos, manteniendo siempre la independencia de criterio como base del profesionalismo.
- **Canon V**
  - Edificar su reputación profesional en el mérito de sus servicios y no competir deslealmente con otros.

Slide by: Dr. William Frey

Cánones de Ética Profesional

- **Canon VI:**
  - No incurrir en actos engañosos en la solicitud de empleo y en el ofrecimiento de servicios profesionales.
- **Canon VII:**
  - Actuar con el decoro que sostenga y realce el honor, la integridad y la dignidad de sus profesiones.
- **Canon VIII:**
  - Asociarse únicamente con personas u organizaciones de buena reputación.
- **Canon IX:**
  - Continuar su desarrollo profesional a lo largo de sus carreras y promover oportunidades para el desarrollo profesional y ético de los ingenieros y agrimensores bajo su supervisión.
- **Canon X:**
  - Conducirse y aceptar realizar gestiones profesionales únicamente en conformidad con las leyes y los reglamentos aplicables y con estos Cánones.

Slide by: Dr. William Frey

Stakeholder Code developed in 1994

- Working document shows 15 issues condensed to 10. These 10 become CIAPR canons
- Table correlated CIAPR issues to issues in NSPE, ECPD, IEEE, ASCE, and ASME codes
- **Four Stakeholder Groups emerge from these codes:**
  - **Public, Client, Profession, and Engineer**

Slide by: Dr. William Frey

Stakeholders + Obligations

- **Public**
  - Public **Wellbeing** (health, safety, welfare)
  - Report those who do
- **Client**
  - Avoid Conflicts of Interests
  - Maintain confidentiality
- **Profession**
  - Uphold the Honor and Reputation of Profession
- **Engineer** (Peer)
  - Collegiality
  - Avoid disloyal competition, public criticism of other engineers, comparative advertising

Slide by: Dr. William Frey

Principios Fundamentales de Ética Profesional
CIAPR

A fin de mantener y enaltecer la integridad, el honor y la dignidad de sus profesiones, de acuerdo a las más altas normas de conducta moral y ética profesional, el **Ingeniero** y el **Agrimensor**:

1. Deberán considerar su principal función como profesionales la de servir a la humanidad. Su relación como profesional y cliente, y como profesional y patrono, deberá estar sujeta a su función fundamental de promover el **bienestar de la humanidad** y la de proteger el interés público.
2. Serán honestos e imparciales y servirán con fidelidad en el desempeño de sus funciones profesionales, **manteniendo siempre su independencia de criterio que constituye la base del profesionalismo**.
3. Se esforzarán en mejorar la competencia y el prestigio de la ingeniería y de la agrimensura.

Slide by: Dr. William Frey

Is Engineering a Profession?

- PROFESSION AUTONOMY: State of being independent in making decisions enabling professionals to exercise judgment as they see fit during the performance of their jobs.

- THE CHALLENGE: "… engineers were taught not to question the motives or incentives of others, but to accept them and proceed to calculate the means of achieving them. If so, engineering is not a profession."

Source: "Engineering, Social Justice, and Sustainable Community Development", Workshop Summary, National Academy of Engineering

Engineering: Definition

Source – student response

Engineering: Definition

- **Engineering** is the discipline, art, and profession of acquiring and applying scientific, mathematical, economic, social, and practical knowledge to design and build structures, machines, devices, systems, materials and processes that safely realize improvements to the lives of people.

Source - http://en.wikipedia.org/wiki/Engineering

IEEE Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making engineering decisions consistent with the safety, health and **welfare of the public**, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;

IEEE Code of Ethics

5. to improve the understanding of technology, its appropriate application, and potential consequences;

6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;

7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;

8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin;

9. to avoid injuring others, their property, reputation, or employment by false or malicious action;

10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Approved by the IEEE Board of Directors
August 1990

ACM's Code of Ethics

GENERAL MORAL IMPERATIVES.

As an ACM member I will ....

1.1 Contribute to society and human well-being.

1.2 Avoid harm to others.

1.3 Be honest and trustworthy.

1.4 Be fair and take action not to discriminate.

http://www.acm.org/about/code-of-ethics

ACM's Code of Ethics

GENERAL MORAL IMPERATIVES.

As an ACM member I will ....

1.5 Honor property rights including copyrights and patent.

1.6 Give proper credit for intellectual property.

1.7 Respect the privacy of others.

1.8 Honor confidentiality.

http://www.acm.org/about/code-of-ethics

Overview

- Introduction
- Engineering Ethics Codes
- **Three Ethics Tests**
  - **HARM**
  - **REVERSIBILITY**
  - **PUBLICITY**
- Case Studies

Pruebas Éticas

- Prueba (Publicity):
  - ¿Quisiera o me preocuparía que esta opción fuese dada a conocer en un periódico?
  - “Ojos que no ven, corazón que no siente”
- Prueba (Reversibility)
  - ¿Pensaría que es una buena opción si yo estuviera entre los afectados?
  - “Ponerse en los zapatos de los otros”
- Prueba (HARM)
  - ¿Hay algún daño? ¿Hace menor daño que las alternativas?
  - ¿Es el remedio peor que la enfermedad?

Solution Evaluation Matrix

Solution / Test	**Reversibility Test**	**Harm Test**	**Publicity Test**	**Code Test**	**Wellbeing Test**
Description	“would I still think choice of this option good if I were adversely affected by it?”	“does this option do less harm than alternatives?”	“would I want my choice of this option published in the newspaper?”	Does the solution present any major code violations?	Does the solution improve the wellbeing in the context of the case?
Solution 1					
Solution 2					

Analogy between design and ethics

Dr. William Frey

Analogy between design and ethics problems

Design Problem	**Ethics Problem**
Construct a prototype that optimizes (or satisfices) designated specifications	Construct a solution that realizes *ethical* values (justice, responsibility, reasonableness, respect, and safety)
Conflicts between specifications are resolved through integration of specs	Resolve conflicts between values (moral vs. moral or moral vs. non-moral) by integration
Prototype must be implemented over background constraints	Ethical solution must be implemented over resource, interest, and technical constraints

Problem-solving in engineering

- Stages:
  1. Problem Specification
  2. Solution Generation
  3. Solution Testing
  4. Solution Implementation

Proceso de Toma de Decisión Ética

- Exprese claramente el problema ético (¿existe un problema/conflicto ético-social?)
- Revise los hechos relevantes (¿cual es el problema real/técnico?).
- Identifique aquellos que son afectados.
- Identifique o desarrolle opciones.
- Evalué las opciones
  - ¿es práctica? - dimensión técnica.
  - ¿es ética?
- Seleccione e implemente la opción.

Overview

- Introduction:
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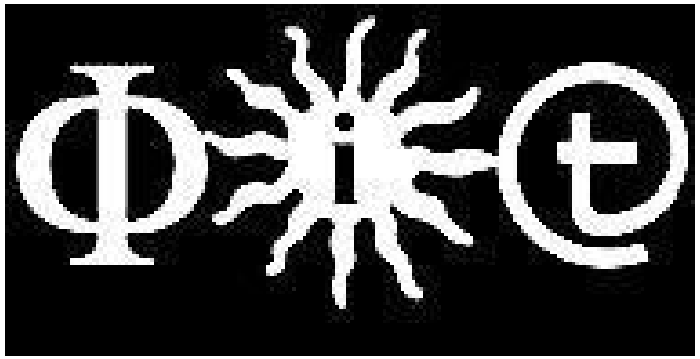
Tareas: para entregar en una página

- Identificar una lista de por lo menos tres conflictos éticos que pudieran estar presentes ó surgir en su proyecto
- Redactar en media página un caso hipotético de **un conflicto ético** que pudiera surgir en su proyecto de capstone.
- Proponer al menos dos posibles soluciones para el conflicto y analizarlas utilizando el "Solution Evaluation Matrix"

Responsible Engineer

- **Technical Competence**
- Cooperative
- Broad Awareness
- Integrity

GRUPO DE FILOSOFÍA, INGENIERÍA Y TECNOLOGÍA



TERTULIA DE FILOSOFÍA

Miércoles 15 de febrero, 2012, 8:00pm

Placita De Diego

http://blogs.uprm.edu/gift/tertulias/