January 19, 2016

**TECHNOLOGY**

* Tools – apparatus
* Method
* Technique (ability to be developed)
* Organization – organize tools & techniques (schools, factories, churches)

**NETWORK**

* Connections (people and/or things)
* Sharing of resources

Chimpanzees did not develop comprehensive system with their tools

* Rudimentary
* Not a technological species

Superfluous technology

* Not needed

Technology changes society and us

* Have social meanings
* Embody values and choices

Cargo cults – magical thinking to technology

* Copying science but not really knowing what they’re doing

If you don’t have insight into technology, you don’t really know what it is for

* You must learn how to use even the most basic form of tools, until it becomes second nature

Christian stones: fall from Eden, town of Babel, Greek mythology: Prometheus

* Skeptics of the power of technology
* Technology disrupts social order – HIEARCHY

**Attitudes of technology:**

1. **SKEPTISISM (ancient):** From religion, myth, rigid societal perceptions of norm – science and technology are trying to force the knowledge that belongs to Gods, if you disturb it, you will be punished. Discouraged innovation.
2. **OPTIMISM (enlightenment):** technology was possible means by people. It should be developed but for the improvement of society, not personal gain = progress. Technology created under certain set of values for the betterment of society.
3. **UNEASINESS (technology, romanticism):** adversarial progressive instead of romantic. Technology was beginning to give a lot mre power to a set of people (industrialists). Technology stopped being a means for common good, and started being means for personal wealth and personal gain. Society was being driven and managed be these people who were greatly benefitted.
   1. each has outlook, has view on:
4. **Value scale**
5. **Politics**
6. **Society**
7. **Environment**
8. **Progress**

**Technological utopia vs. Dystopia 🡪** generally engineered human beings, unachievable hierarchy, strong, tall, and gorgeous man with ultimate steps

**Japan example:**

* Portuguese bring gun powder & weapons
* Japanese thinks that it is fantastic idea at frist
* Started to produce their own weapons that they perfected
* There was direct need for weapons: war in japan
* After war the ruling class: shogun banned weapons because of fear of masses using guns against them.
  + Warrior class: samurai are people who dedicate their lives to studying the art of weaponry
  + Samurai’s can move easily defeat a person with spear rather than a gun
* Therefore, they banned guns along with other western ideologies: trading with Dutch became less, banned Christianity.
* Exposed strict regulations on technologies
* This shows that even better, more efficient technologies can be regulated by societal convention

This is often done: (containing, supressing, regulating)

**TECHNOCROMANTICISM**

* First aspect of romanticism:
  + More technology = more progress
  + Romantics opposed this as they did not believe that technology alone were the basis of progress – need more regulation
* Second aspect of romanticism:
  + Respect to environment

Possible exam question; explain how Nye uses the example of narrative to define technology as more than just an artifact?

Set of intentions🡪 use of an artifact🡪 decided outcome

Combination of alone three components to be classified as technology

i.e., crashing car window with rock to get your keys; Rock not technology, but the moment you pick it up it becomes a technology.

Some artifacts can contain many technologies:

* Coat hanger🡪 used for hanging coats; can be used to open car door for keys.

January 26, 2016

Artifacts cannot be good or bad but intentions can be good or bad🡪 therefore can be used for good or bad.

Explain historical context; explain the progress/conceptually.

**HISTORICAL CONTEXT**

**Enlightenment:**

* Free themselves from 3 sources of oppression:
  + Monarchy
  + Church
  + Socioeconomics

**CONCEPTUALLY**

* People valued technology instrumentally
* Enlightenment: technology is only progressive if it is for the good of the people and liberated people from the three sources of oppression

Humans value things in two ways :

1. Instrumentally (i.e, money, car, etc…)
2. Inherently- value it for no reason/ cannot explain why (i.e, family, love, friendship, etc…)

We can value things bot instrumentally and inherently (i.e, I value my mom inherently because she is my mom, but I value her instrumentally because she buys me things)

**MANIFEST DESTINY**

**Technocratic:** technology being for inherent good

**Romantic:**  not all science and technology is good

**Counter enlightenment**

* Does improved technology mean progress?
* Progress toward what? We must evaluate the intention of the technology. We need to democratize science and technology

**TECHNOLOGICAL DETERMINISM**

Possible Question:

Explain how these same as a counter example of technological determinism:

* Japanese intro of gun (hard determinism)
* The Amish (strong counter example of soft + hard determinism)

If technological determinism is time then the Japanese would not have rejected arms, but eventually technology gains enough momentum that they had to adopt guns. (effective argument for Hard determinism not soft)

Technology determines structure of society:

1. Hard technological determinism (Karl Marx T🡪S):
   1. Society is nothing more than the technological infrastructure
   2. 100% of technology fully shaped society and society must abide
2. Soft technological determinism (T🡨🡪S):
   1. Technological momentum
   2. Technology has powerful role in society by shaping social forces (how you conceive yourself, how you communicate with others)
   3. Momentum says that in the beginning a technology is malleable. We can shape it as we want, but once it grows it starts to influence society

**NYE CHAPTER 5**

**SOCIAL CONSTRUVTIVISM:** two sides of same coin with technological determinism

**“All the way down”** – Flip of Hard Technological Determinism

* Technology is nothing more than the social values from which it is concerned
* Walmart:
  + Blame this technology for introducing this kind of unsustainable economy

Social order shaping technology

* + Walmart is not shaping the world according to its own creed, its born due to the social values of the communities
  + American capitalism: value the consumer over the worker
  + Rights of individual over collective

**Co-constructivism -** Flip of Soft Technological Determinism

* Most common
* Social choices that exist over some technologies, but some technologies
* We always have a choice

**All the way down 🡪 Co-constructivism🡪soft technological determinism🡪hard technological determinism**

Do artifacts have politics?

Discuss the three ways, with evidence, these artifacts may have politics

1. Shaping of social order:
   * Arguing against “all the way down”
   * Technology does shape our social order sometimes

Example: moses engineering of NYC- reduced height of the bridge to limit burses (black people) from whites; racism was integrated into the city.

Technological choices made long ago continue to shape NY and its boroughs today. Technology is exerting an influence. (even though Moses is dead)

Example: handicap services in public transportation and buildings

Technology shaping social order🡪 issue of equality. Not about an “evil person” like Moses.

1. High Compatibility

Example Solar power: it is decentralized

* Democratizes and individualizes
* In charge of own consumption and own production
* It can be centralized hence why it is necessary

Legitimate non-technical critiques of science and technology

HTD🡪 nuclear power? Hierarchical, non-democratic, highly centralized form of government (essentially it’s forecast therefore to use nuclear power is essentially engaging in forecast government), highly militarized (high level of security), etc.

1. Necessarily compatible with politics
   1. Nuclear power

Q: example of high compatible vs. necessarily compatible with politics:

A: difference is logical necessity

February 2, 2016

**NYE CHAPTER 7**

Loss of skills due to factories/mass production “deskilling”

* Lost with industrial revolution due to mechanization
* Shift from blue collar to white collar
* New managerial class

During 20th century, there is a reskilling of blue collar workers due to mechanization of white collar: “pencil pusher”

Cultural lag: society not knowing what to do with technology; not keeping up

* Society gets blamed for not keeping up with technology when disaster strikes. It is never the technology’s fault
* Cultureal lag assumes that if technology was at the helm , everything would be ok. (technocrats given power)

Question should not be whether a certain technology is good or bad, but rather should we bring this technology into our lives.

Technology does not do bad; it is the person behind it

* NAZI Germany: gas chambers, concentration camps, etc.
* Someone defined best most efficient technology to eradicate Jews
* Critique of efficiency of technology

**DO ARTIFACTS HAVE POLITICS?**

Certain technologies embody powers

A new machine is not neutral; it embodies an intention of its conception

Moses overpasses: low so that a bus may not fit

* Promotes racism
* Political statement about class and power

Nuclear power: must be kept in place by person of authority to protect it

* Centralized power structure
* Can be militarized: hierarchical structure
* Actively exclude individuals from decision process

**TECHNOLOGY AND GENDER**

**Intersection of Gender – Hopkins**

Sex🡪 biological (male or female)

Gender🡪 social construct

* Expectations of behavior towards men and women
* Semiotic square:

Masculine

Male

Feminine (Gender)

Female (sex)

Separations of Genders:

* Behaviour
* Expectations
* Work

Subversion of division of power in household

**Essentialism:**

* Gender is innate
* Nature cannot be changed
* Everything is predefined
* Culture cannot change gender
* Gender is purely biological

**Social constructivism:**

* Society shapes gender
* Representations change historically and culturally
* Attributes everything to nurture
* In its pure form, over states the role of culture

\*Establish a middle ground between above (essentialism, social constructivism)\*

February 9, 2016

Do artifacts have politics?

* Values get embedded into physical objects
* Technology played a role in emancipating women and other racial groups

**NYE CHAPTER 5**

Does technology diversify or universalise?

Although there exists a lot of diversity in product, the processes used are the same (i.e, food court)

Puts forth appearances of diversity under cover of marketing is shallow

Construction of our identity:

* + - * Gender
      * Individuality
* We are demonstrating how we are by showing what we think we are
* Our identity is created by making choices about our style, lifestyle, food, etc.

Massification and standardization of culture only asserted itself after industrialization

Cultural massification/homogeneity:

* Technology was the driver

People want to compete with each other, they want to be different

* They hate the idea of having the same thins and displaying them in the same way

Consumers require diversity and production systems allow for their change:

* More choice exists, but it is more or less established

**GLOCALIZATION:**

* Global + local
* Big globalized entities adapting to local tastes/traditions/designs etc.
* i.e, McDonalds:
  + spaghetti in Italy

**INIDIVIDUALISM**

* Production
* Consumption: 🡪 Conspicuous Consumption: Status
  + Buying clothes
  + Where you eat
  + Going to the opera

Being different comes with a price

Time Bank:

* Sharing resources and skills
* You provide four hours of work and you can have four hours of work back

**APPROPRIATION -** When users of technology make it their own

**Technological Missionaries –** People who believe that because a technology exists, they can simply bring it everywhere to make things better.

**Cultural Appropriation**

* We are integrating culture into our society by pillaging the cultural effects of other societies
* Assimilation of culture
* Example: banning headdresses from music festivals: degrading the meaning of culture.
* Cultural appropriation depends on the scenario: depends on the oppression of the culture one is appropriating

**Commodification:** appropriate something and then you try to package and sell it to make money

Selling a Native American headdress as a party favor = cultural appropriation and commodification

**Invention of tradition:**

* 18th, 19t century during modernization
* People tried to sell their own ancestral identity
* Industrialists in England and Scotland tried to sell the ideas of tartan (crisscross fabric pattern) representing family clans
* Tartans erected in 19th century

**Is technology predictable?** There is no way to predict whether a given technology will be successful

**Technological Prognostication:**

* The evolution of technology (not like a species)
* Predicting the future of technology
* Follows a certain path that is completely unpredictable
  + Too many variables

1. **INVENTION/PREDICTION** (**\*** any kind of change (economic, etc.) hinders the possibility of prediction\*)
   1. Something entirely new: a new technology
   2. Not related to anything else
   3. Possibilities of technologies: dreams and science fiction
   4. Example: AI (artificial intelligence) a true AI
   5. Deals with the implausible, but not always the impossible
   6. Trying to put an entirely new technology in the context where it might exist
   7. DREAMERS
2. **INNOVATION/FORECASTING** 
   1. Trying to adapt to already existing technologies
   2. Making changes to what already exists
   3. If social conditions are stale, forecasting becomes better and more reliable
   4. It is easier than prediction because one may look at prototypes etc.
   5. This is business of engineers and consultants (no need to be a dreamer)
   6. Based more in concrete evidence
   7. However, forecasting can go badly
      1. Example: IBM who completely dominated the market but did not envision the transition of a new technology to completely revolutionize their business
3. **DIFFUSION/PROJECTION**
   1. About trends
   2. About understanding/creating trend to see what the market will be
   3. Combination of economics/marketing and design
   4. “Cool Hunting”: youth culture, seeing what is cool based on the trends adolescents buy into

Any form of prognostication is a narrative for the future:

* What will come
* What will happen

Consumers hold the power

Markets are not necessarily driven by technology alone

* Driven by desire
* Driven by consumer priorities

Technologies become appropriated into technologies

Some technologies are used in ways that are completely different then its intended purpose.

Factors of technology rise:

* Does it give rise to new, unexpected economic factors
* Does it give rise to dynamic technologies that are based on it

Diffusion of innovation follows the following curve:

Adoption

**Time**

Early Adopters

2nd wave of adopters that really spread the technology

**Langdon Winner:** A technology becomes

embedded in the way a society lives

February 16, 2016

Technological prognostication is like astrology:

* Everyone reads their horoscope every once in a while, but not many truly believe in it 100%
* Similarly, prognostication is used, but it is not a sure science: one cannot predict future technologies

**TEXT: beyond engineering (choices)**

* Unpredictable events that shape a path that technology takes
* Modern economic theory states that there is rationality in choices:
  + Rational choice theory (RCT)
  + Individuals make their choices by weighing pros and cons and then deciding
  + In order to make a rational choice, one requires information (data)
* Unpredictable events alter the course of technology by shaping/changing our choices

**TEXT: Public Policy:**

* + laws are reformed in public policies
  + regulations
  + set of rules that pertain to a given subject they are put in place in order to solve a given problem
  + needs to be coherent with the rest of laws and regulations but you need a set of input from specialists related to a certain field
* Life is framed with a set of regulations which are put in place for a given purpose
* Regulating agencies and governmental structures are put in place to uphold regulation and public policies
* Public policy is made by the interaction of governing bodies:
  + Require input from corporations, think tanks, private individuals, professional organizations, etc. (experts)
* Bureaucracy and public-policy making systems are seen as inefficient due to the way they are run.
  + But people cease to realize that this mechanism requires time and information from specialized individuals

**DECIDERS:**

Public servants

Politicians

**STAKEHOLDERS:**

Opinion making

**COMPLAINTS:**

Policy proposals

Recommendations

**DECISIONS:**

Public policy

**AFFECTABLE FACTORS:**

Political priorities

Budget availability

Stakeholders are interested in decisions because it affects

their work.

Public mistrusts experts because: Authority (legitimacy)

|  |  |
| --- | --- |
| **EXPERT LEGITIMACY** | **POLITICAL LEGITIMACY** |
| Derived from professional expertise   * Independent * Conflict of interest * Bias * Risk | Derived from the public   * Appeal to emotion * Reference to “gut” feeling as opposed to logic |

Science communication is difficult because one cannot simply rely on facts and numbers. This opposes political communication

Science communication🡪 sticks to facts

Political communication🡪 can afford to stride into territory of emotion and manipulation

In order to effectively communicate science to a non-technical audience, one must become empathetic and understand the multiple models of policy-making.

**MIDTERM REVIEW**

Week 2:

* Defining technology
* Technology progression
* Technology optimism, skepticism, romantic uneasiness

Enlightenment (renaissance 16th century) 🡪 Optimistic (industrialization, beginning of 19th century)🡪 social/political progress:

* + - * + technology should be used to promote social good and political progress: REGULATIONS (socio-political control)
        + (mid-19th century)technocracy: notion that progress is simply acquiring more technological power and wealth

Week 3:

* Technological determinism: social/cultural lag
* Social constructivism (soft determinism - compatibility thesis/ hard determinism –nuclear power)
* Politics of objects-the artifacts we use influence our way of thinking; people should have a say in the technology they adopt

Week 4:

* Issues of gender and technology
* Essentialism vs social constructivism (everyone is affected by options embedded and refined) ideas of sex vs. gender
* Role technology has on social dynamics and how technology enforces the roles
* Technology can alter gender relations 🡪 shift of jobs

Week 5:

* Diversification vs. unification of technology
* Glocalization
* Individualism
* Appropriation
* Technological prognostication:

Invention/prediction

Innovation/forecasting

Diffusion/projection

Week 6:

* Policy making
* Define policy
* Interaction of engineers (purpose)

March 8, 2016

**TECHNOLOGY ASSESSMENT**

A set of techniques that allow us to look into the d4eecisions of effects of technology

Very useful tool to make sure that political deciders have best info needed to make decisions on technology

Ideal world: assessment would gather info from everyone involved in tech making decisions

**FUNCTIONS (1-8):**

1. Aid decision making, strengthen decision making capabilities of policy makers
   1. Providing better sources of information
2. Policy score: support short and medium terms of policy making
   1. What kind of regulations should be put in place
   2. What kind of tech models exist
   3. Strength policy-making with better info
3. Contribute to long-term policy
   1. Supply info on what’s in technological horizon
   2. Which technological are in development
4. Early warning: anticipating risk
   1. Providing some options on how to minimize risk/danger by having early warning
5. Provide knowledge, decision making capabilities, to stakeholders and citizens
   1. Creating bureau/departments that would provide info to other stakeholders (other than political system)
   2. Or also society at large (citizens)
6. Try to accomplish design tasks by accompanying useful design applications
7. Encouraging general public to accept technology
   1. Creating awareness generating information could educate the public in making informed decisions in technology-making
8. Promote social responsibility among stakeholder, developers and policy makers

Technology assessment was initially set up to assist political government

Design

**TA**

- Stakeholders

- Society

Parliament

A method to analyze and direct technological advances

More information = better decisions

WANT: advisors that are as neutral as possible (for policy making advisory committee)

**PARADIGMS (4)**

**Classical:**

* Embedded this notion that early warning system was needed to understand 2nd wave of technology
* 2nd sense of early warning: provide insight on social effects of technology
* Tried to address mostly functions 4+7

**Office of Technology (OTA)**- parliamentary model🡪 office of technology association model

* Office of technology assessment in America attached to house of representatives (1972-1993)
* First major technology assessment office in the world
* Relates to functions 1-2-3-4
* They were tested to evaluate the impact of large scale technological projects
  + What are best policies to make this happen?
  + What should we do/not do?
* Consisted of inner-team of specialists external advisors
  + Everything needed to be reviewed by scientists

Idea was to link political system with scientific system

**Public Technology Assessment (PTA)**

**Constructive Technology Assessment (CTA)**

Did not just rely on connections with parliament, but relied heavily on connections with society

**PTA**

* Tried to emphasize functions 5, 7, 8 while contributing strengthening policy-making
* Did not require direct funding from the government. They were contracted by government but not under its wing.
* More legislative independence
* Actually concerns everyone in society, so required more effort and contribution from everyone

**CTA**

* More participatory
* Constructing technology
  + Design, etc.
  + Other aspects other than policy making
* Creates system where institutional choices, societal concerns and political policies work in tandem
* It does not assume that info provided is neutral
  + It needs people to bring their own views and importability come into the conversation

Bridges gap between

PTA 🡪

Society

TA: Technology Assessment

PS: Political System

political body and society

(scientists, citizens,

stakeholders, etc.)

**COLLINGRIDGE DILEMMA**

1. Difficult to forecast future of technology (**prognostication)**
2. Only one thing more difficult than predicting technology’s changing it once it has been implemented. (technical momentum)
   1. **Classical +OTA** models broke down because could not ensure neutrally/all information
   2. **CTA + PTA** do not solve neutrality issue, just try to implement a democratic solution
   3. In Europe, CTA and PTA are still alive
   4. STOA like OTA for European parliament
      1. Not as committee focused as OTA

**Do we need Technology policy?**

**Technology Policy:** actions by government aimed at assisting or stimulating delivery of competitive goods and services

What’s wrong with DEP’N?

* Technology policy is not just about regulation
* Technology policy is government responsibility
* Government steps in to bridge gap between society’s inefficiencies
* Technology policy makes it seem like its only about technology when it’s not; it’s about how to set up entire policy making system to not fall behind
* Technology policy is not just about delivering of goods and services its about societal organizations

**RCT 🡪** when given true and complete info, people will make rational decisions

* Classical/Neo-classical economic theory encompasses RTC

**Schumpeter:** (economics)

* An economist: wrote a book about how innovation comes up in society
* Creative destination
  + Expression to explain how innovation occurs
  + Each innovation replaces something (i.e. creative destruction, e.g. UBER replaces taxi)
  + Makes labor market more useful: take out old skills, bring in new skills

**Von Hippel:** (economics)

* Innovation is about the ensemble of society
  + It does happen in a vacuum
  + It exists because some societies make it happen
* Need to introduce a more communitarian approach to innovation
  + The benefits of innovation should be recycled to the people

**4 FUNCTIONS OF TECHNOLOGICAL POLICY**

1. **Climate setting (climate for business):**
   1. Lower taxes corporations
      1. Canada tries to attract more investment
      2. Tax policy but also test policy
   2. setting business climate in countries
      1. Interplay between these policies (tax, labor, education, etc.)
      2. try to create a hospitable environment for these corporations
   3. innovation occurs in societies where work force is highly skilled
   4. climate setting🡪 trying to bring all these factors together

E.g. flex security: balance welfare state with neo-classical economic theories innovation

1. Flexibility: deciding who to hire and fire

2. Security: those fired are recycled in terms of skills and put back to work quickly

1. **Surveying:** 
   1. Trying to prognosticate
      1. Also seeing what the competitors are doing: assess global situations
2. **Coordination:**
   1. Try to make economic and technology agents come together to innovate together, instead of pursuing their own agendas.
3. **Gap Filling:**
   1. About the way government can step in and “fill the gaps” in the economic and technological system
   2. Instead of leaving everything to the market, the government steps in
   3. Stimulate economy
   4. 3 approaches:
      1. Direct🡪 takes charge of a situation
      2. Indirect🡪 does not take charge of a situation
      3. Long term🡪 cooperative gap filling

e.g. arc net predecessor to internet (gap filling)

**TRIPLE HELIX MODEL:**

* Government funds research in *universities*
* Universities create innovation: the intellectual property will be spun off into *private sector*
* Private sector also funds research

Intellectual property must be patented, licensed and manufactured

March 15, 2016

**GLOBALIZATION**:

The interconnection of global networks

**Global economy:** economy depending on global/international community

* Economic interlocking creates imbalance because more influential countries give to others in forms of goods and services

e.g. “Leap frogging”: skipping ever a given stage of technological development with the hopes of avoiding a detrimental social and technical impact.

e.g. of how newer technology can help avoid bigger negative impacts of technology innovation by avoiding intermediate steps that are inefficient

**DEMATERIALIZATION:**

1. Quantity of input economy needs requires less materials to produce same thing (more efficiency in material consumption)
2. Growing dependence of our economy of human capital (human knowledge) skills (in order to achieve that we need to invest more in human knowledge)

A lot of main companies deal in ideas: research, design, sophistication to technology/economic system) reduces dependency on material goods

March 15, 2016

**GLOBALIZATION:** the inter connection of global networks.

**GLOBAL ECONOMY:** Economy depending on global/international community.

* Economic interlocking creates imbalance because more influential countries give to others in forms of goods and services.

*Jose Goldenberg* → **LEAP-FROGGING**: Skipping over a given stage of technology development with the hopes of avoiding a detrimental social and technological impacts.

e.g.: of how newer technologies can helps avoid bigger negative impact of technological innovations y avoiding intermediate steps that are inefficient.

**DEMATERIALIZATION:**

1. DIRECT: Quantity of input economy needs less materials to produce same thing.
   1. More efficiency in material consumption
2. TRIPLE\_HELIX: Growing dependence of our economy or human capital (human knowledge) skills.
   1. In order to achieve that we need to invest more in human knowledge.

* A lot or main companies deal in ideas: research, design, sophistication to technology (economic system) reduces dependency on material goods.

**SOCIAL JUSTICE:** building capacity; what technology they need and require instead of giving them something they don’t need.

**APPROPRIATE TECHNOLOGY**: addresses (directly) need of uses and does not want development. Make use of available resources/use local trade skills.

**LOCALIZED vs GLOBALIZED** → trying to translate skills in contexts that have very little to do with context that are so different from what you’ve learned in.

e.g.: Nicaragua

March 22, 2016

**LEAPFROGGING:** Skipping over unsavoury aspects of technology.

* ADVANTAGE: presents a better choice of technology. Allows developing nations to avoid worst parts of technology.

As economies develop/grow → more energy input is required.

* Technology becomes more efficient
  + Need for resources is less
  + Application of energy becomes more efficient/less input needed
  + Footprint is reduced after reaching peak levels in developing nations
* Countries that develop later never quite reach the same footprint/peaks that already developed countries have already undergone.
* Leapfrogging should be put in place with policies that promote the right kind of its application.
* More profitable to use older technologies because they are cheaper, they are not the most ecologically or all-around efficient.
* Open trade/clear policies/commitment to current generations technologies help
* PROBLEM
  + Trying to extract more out of old technologies with cheap labour allows us to offset costs of using new technologies with properly paid wages.

**ESTABLISHED WISDOM:** Exchange expensive labour with cheap labour instead of investing in newer more efficient technologies. (i.e. making products in China instead of Canada)

Establishing correct environment for technology growth.

*Emmanuel Kant:* Humans should be treated as a means in and of itself, not a means to an end.

Engineer’s disease → Expert’s disease

March 29, 2016

**BIOMIMICRY:** Technology and industry mimics nature. In nature there is no waste.

* Technology Fix: Technology trying to solve a problem with changing things. Add to existing technologies to eliminate waste.
  + Appropriate technology
  + Easiest solution
    - They solve the problem now, they do not think long term
  + CRITICISM → Appropriate Technology Movement: Focus more on scaled-back technology applications that are a better fit with biophysical + psychosocial.
* Technology Ecology: Not to fix problem. To mimic nature and the sustainability. No waste.

Aim to reduce toxic output to the point where ecological system → Human + ecological system

e.g. Domesticating animals

As humans approach on ecological systems, we need to change them to echotechnological systems. *Thomas Hughes*

Metro Resources have Limits → Earth is not enough to sustain us if everyone on earth lives like an American.

**HOW TO ENSURE SUSTAINABLE DEVELOPMENT**

* Renewable energy reduces the amount of inputs and outputs
  + Better technology
* Reducing our energy/resource intensity 1/10k
* Reutilization → ensuring more efficiency

e.g. Nuclear technology:

* + Using 50 year old technologies
  + Update procedures
  + Reuse/recycle waste

**ABATEMENT TECHNOLOGY:** Try to minimize by reducing the amount of noxious gases → Clean up.

**POLLUTION PREVENTION TECHNOLOGIES:**

* Biodegradable materials
* Clean products (biomimicry)

Design process takes into account the desirable outcomes of not needing abatement

1. Sustainable
2. Pollution Prevention
3. Abatement
4. Remediation

These are the four horsemen of environment; order of “Perfectness”

e.g. Dupont synthetic materials for Teflon

**TECHNOLOGICAL PARADIGM:** Design challenge

**INDUSTRIEL ECOLOGY:** Exchange of materials where waste stock of one industry becomes feed stock of another.

**SCIENTIFIC PARADIGM** *Thomas Kuhn*

**APPROPRIATE TECHNOLOGY** *E.F. Schumacker*

April 5, 2016

**DEMOCRACY IN ENGINEERING**

Political system → Political legitimacy

People hold power in system set up as a democracy

* Cannot rule without consent
* Citizens vote plus participate

Political system → produce decisions

**THEOCRACY:** Legitimacy does not flow from the people, but god.

**TECHNOCRACY:** Legitimacy stems from technological expertise.

**CITIZENS:** Ancient Greece

* Private: Rome, your own property (economics)
* Public: occurred in courts, assemblies …
  + Politics: Everyone could participate

**Expert vs Lay person** (General public/citizens)

* Better science communication in order to bridge expertise and lay people.

In order to make an informed decision, one needs information:

* Media needed to relay information
* Ancient style (direct democracy) is not feasible due to great population in cities (millions)
* We have representative democracy because media acts as buffer to relay information.

**RATIONAL CHOICE THEORY** (economics): perfect citizens is one who takes initiative to make best decision.

A democracy makes a lot of decisions not from an informed state → They come from gut feeling or ideology.

**CRISIS OF LEGITIMACY:** Growing gap between lay people and experts

Ex. Panama releasing data of $36 Trillion in tax haven, culprits around the world, therefore consumption is ubiquitous. Unites us all

**CONSENT**

* Nuclear Waste: We act as proxy’s for the future generations. The future generations have no say; they cannot give their consent.

Our consent (even if we vote) is useless for future generations

* Future Generations: Why did past generations make these decisions and now we have to deal with them.

Future generations have no regrets because they are not born yet because they do not exist.

Certain problems

* Nuclear
* Climate change
* Genetic mutation
* And more

Cannot be avoided for future generations

Informed consent is not a thing for future generations. They cannot provide it and we have no model to accordingly project what 300000 years in the future would look like.

**ETHICAL FRAMEWORK:** more rigid, more concrete aspects to follow, more restrictions. Lays out basic ethical laws you are trying to preserve.

**SCIENCE COMMUNICATION:** Key to connecting lay people (public) with science and technology.

1. Deficit Model: Experts → Info →Public
   1. Only in one direction, there is no feedback
2. Dialogue Model: Experts ↔ Info ↔ Public
   1. Encourages scientists to listen to questions. Makes science “dump down”. Better communication but not better science.
3. Empowerment
   1. Giving people the tools to challenge certain technologies and science.

20-26 MARCH

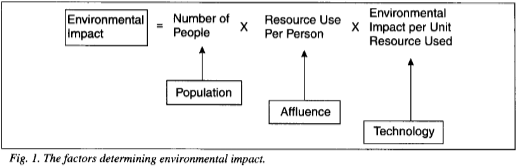
ROLE OF TECHNOLOGY IN SUSTAINABLE DEVELOPMENT

The achievement of sustainable development will depend on our ability to reduce the environmental impact of resource use through technological change. This will require the redesign of our technological systems and not merely the application of technological fixes that are seldom satisfactory in the long term.

Redesign neglected the dimension of social change in the past.

DEPENDENCE ON TECHNOLOGICAL CHANGE

The U.N. endorsement followed the completion of a report by the World Commission on Environment and Development published as “Our Common Future,” which defined sustainable development “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”



APPROPRIATE TECHNOLOGY vs. TECHNOLOGICAL FIX

Appropriate technology involves attempting to ensure that technologies are fitted to the context of their use-both the biophysical context, which takes account of health, climate, biodiversity, and ecology, and the psychosocial context, which includes social institutions, politics, culture, economics, ethics, and the persona spiritual needs of individuals. One of the best-known early proponents and popularizers of appropriate technology was the British economist E.F. Schumacher who talked about ‘intermediate technology’ in his book Small is Beautiful: A Study of Economics if People Mattered. He was principally concerned with development in low-income countries and aimed at developing technology that helped the poor in a more efficient way.

In 1970’s appropriate tech was concerned with more developed countries and impact of social as well as environmental problems.

Robin Clarke differentiated between the appropriate technology response and the “technological fix” responses to environmental problems. For example, he characterized the technological-fix response to pollution as “solve pollution with pollution control technology”; the appropriate technology response, instead, would be to invent non-polluting technologies.

PARADIGMS and examples of how it affects technology

A technological paradigm or “tradition,” Constant said, is subscribed to by engineers and technicians who share common educational and work experience backgrounds. Giovanni Dosi described a technological paradigm as an “outlook,” a set of procedures, a definition of the “relevant problems and of the specific knowledge related to their solution.” Such a paradigm, Dosi said, embodies strong prescriptions on which technological directions to follow and ensures that engineers and the organizations for which they work are blind to other technological possibilities.

Reluctance to research alternative technologies can be explained partly by technological paradigms.

A technological paradigm will determine what is feasible or at least worth attempting. As a result, technological development tends to follow a certain direction, trajectories, that are determined by an engineering profession.

An example is the development of sewerage engineering. The range of ways of treating sewage is limited by a sewage treatment paradigm that assumes that sewage will be delivered in pipes to centralized locations near waterways.

Generally, technological change is gradual and occurs within technological paradigms. Radical technological innovation is often opposed by firms because of the social changes that may need to accompany it-for example, changes to the work and skills of employees, to the way production is organized, and to the relationships between a firm and its clients and suppliers.

Radical technological change can occur, only if social context is changed\*

LANGDON WINNER APPROPRIATE TECHNOLOGY

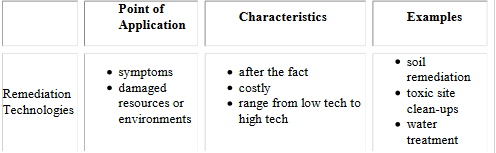
Sustainable development relies on technological change to achieve its aims, but will government take the steps required to force radical technological innovation rather than the technological fixes. Cannot ignore the necessity to redesign our technological systems rather than continue to apply technological fixes that are seldom satisfactory in the long term. Technological optimism does not escape the need for fundamental social change and a shift in priorities. That was the mistake many in the Appropriate Technology Movement made. It takes more than the existence of appropriate or clean technologies to ensure their widespread adoption.

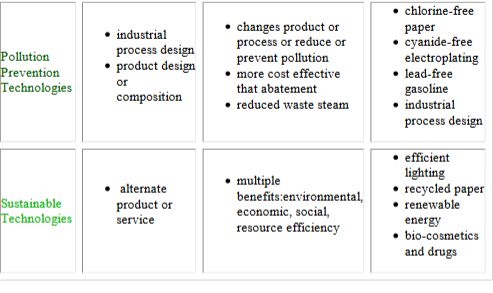
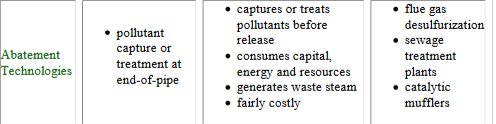
INDUSTRIAL ECOLOGY

One of the more radical approaches to achieving greater levels of material and energy resource use efficiency involves the concept of industrial ecology. 'Industrial ecology' refers to the exchange of materials between different industrial sectors where the 'waste' output of one industry becomes the 'feedstock' of another. For example, the excess steam from an electrical generating facility can be used as a heat source for a nearby chemical manufacturer. The fly ash from a coal fired generating station can be used as an input for the cement industry.

Represents a relatively new paradigm for business.

ENVIRONMENTAL TECHNOLOGIES





13-19 MARCH

FLAT WORLD AFTER ALL

How did the world get flattened, and how did it happen so fast?

It was a result of 10 events and forces that all came together during the 1990's and converged right around the year 2000. Let me go through them briefly. The first event was 11/9. That's right -- not 9/11, but 11/9. Nov. 9, 1989, is the day the Berlin Wall came down, which was critically important because it allowed us to think of the world as a single space. ''The Berlin Wall was not only a symbol of keeping people inside Germany; it was a way of preventing a kind of global view of our future,'' the Nobel Prize-winning economist Amartya Sen said. And the wall went down just as the windows went up -- the breakthrough Microsoft Windows 3.0 operating system, which helped to flatten the playing field even more by creating a global computer interface, shipped six months after the wall fell.

The second key date was 8/9. Aug. 9, 1995, is the day Netscape went public, which did two important things. First, it brought the Internet alive by giving us the browser to display images and data stored on Web sites. Second, the Netscape stock offering triggered the dot-com boom, which triggered the dot-com bubble, which triggered the massive overinvestment of billions of dollars in fiber-optic telecommunications cable. That overinvestment, by companies like Global Crossing, resulted in the willy-nilly creation of a global undersea-underground fiber network, which in turn drove down the cost of transmitting voices, data and images to practically zero, which in turn accidentally made Boston, Bangalore and Beijing next-door neighbors overnight. In sum, what the Netscape revolution did was bring people-to-people connectivity to a whole new level. Suddenly more people could connect with more other people from more different places in more different ways than ever before.

No country accidentally benefited more from the Netscape moment than India. ''India had no resources and no infrastructure,'' said Dinakar Singh, one of the most respected hedge-fund managers on Wall Street, whose parents earned doctoral degrees in biochemistry from the University of Delhi before emigrating to America. ''It produced people with quality and by quantity. But many of them rotted on the docks of India like vegetables. Only a relative few could get on ships and get out. Not anymore, because we built this ocean crosser, called fiber-optic cable. For decades you had to leave India to be a professional. Now you can plug into the world from India. You don't have to go to Yale and go to work for Goldman Sachs.''

India could never have afforded to pay for the bandwidth to connect brainy India with high-tech America, so American shareholders paid for it. Yes, crazy overinvestment can be good. The overinvestment in railroads turned out to be a great boon for the American economy. ''But the railroad overinvestment was confined to your own country and so, too, were the benefits,'' Singh said. In the case of the digital railroads, ''it was the foreigners who benefited.'' India got a free ride.

The first time this became apparent was when thousands of Indian engineers were enlisted to fix the Y2K -- the year 2000 -- computer bugs for companies from all over the world. (Y2K should be a national holiday in India. Call it ''Indian Interdependence Day,'' says Michael Mandelbaum, a foreign-policy analyst at Johns Hopkins.) The fact that the Y2K work could be outsourced to Indians was made possible by the first two flatteners, along with a third, which I call ''workflow.'' Workflow is shorthand for all the software applications, standards and electronic transmission pipes, like middleware, that connected all those computers and fiber-optic cable. To put it another way, if the Netscape moment connected people to people like never before, what the workflow revolution did was connect applications to applications so that people all over the world could work together in manipulating and shaping words, data and images on computers like never before.

In David Nye’s *Technology Matters Questions to Live With*, the questions are abundant but definitive answers are elusive. Each chapter Nye poses a new question such as what is the definition of technology or how do we understand it in a historical sense. The questions were thought provoking; however, many were frustrating as the writer seldom provided a complete answer to the questions posed. Instead, he left the reader more questions to think about.

1. In chapter one Nye poses the first of ten questions. Can we define technology? Nye goes on to explain several different definitions that have been used throughout history. Early on technology was thought as only objects that were made intentionally. He adds interesting antidotes and stories that challenge the early definitions. For example, he tells how Jane Goodall witnessed a chimpanzee using a twig as a means to get its lunch. Nye continues throughout this chapter giving many examples of how it is difficult to define. He ends the chapter by stating the term “ ‘Technology’ remains an unusually slippery term" (Nye, 2007, p.15). With this the reader is left with an undetermined answer to the definition of technology.
2. Chapter two begins with an intriguing question. Does technology control us? The answer, it depends who you are. Again Nye provides many stories to discuss the question. He talks about current advances that many people would have a difficult time imagining not having or using. To contrast this, he gives examples of societies that chose to reject advances in technology. He includes the examples of Japan’s rejection of guns, and religious groups such as the Amish or Mennonites, who carefully consider the effects of any technology on their society before adopting it. He points out that a common view is that mechanical systems are deterministic or inevitable. However, there are several beliefs that counter that including Werner Sombart was argued “that cultures often shaped events more than technologies did” (Nye, 2007,p.25). Sombart felt the failure in Rome was due to political institutions rather than technological change, which is often blamed for its failure. Nye continues to provide examples back and forth such as these and the intriguing question of whether technology controls us remains intriguing and unanswered.
3. The next question Nye poses is the predictability of technology. Is technology predictable? Sticking to his allusive ways, Nye goes on to describe that yes technology is predictable and no it is not. Nye describes inventions versus innovations. He contrasts between predicting new inventions and forecasting innovations. He gives examples of successful and unsuccessful forecasting and predicting. Nye concludes by saying that technology is unpredictable.
4. The next question Nye asks ponders the idea of how historians understand technology. Again Nye has interesting examples to share. One of the more interesting ones was his story of the bicycle in America. The bicycle helped women to have mobility during the suffrage movement. The technology of the bicycle was warned to be harmful to women because some doctors claimed it was harm their reproductive system and it promoted immodesty due women having to wear shorter skirts to ride. After telling about this Nye goes on to explain two different ways historians explore technological advances. “The Internalist reconstruct the history of machines and processes focusing on the role of the inventor, laboratory practices, and the state of scientific knowledge at the particular time” (Nye, 2007, p.56). The second approach Nye describes is the contextual approach in which, “every technology is deeply embedded in a continual (re)construction of the world (Nye, 2007, p. 61). Either strategy seems to have its positive and negatives with their understanding of technology historically.
5. Chapter five raises the question of cultural uniformity, or diversity? How does technology make a culture the same or different? Nye adds an interesting anecdote that sums up both sides of this question. “The social critics of the first half of the twentieth century overstated the degree to which mass production would be accompanied by conformity and standardization of the personality. Neo-Marxists were particularly likely to overstate the case. In fact, consumers relentlessly demanded variety, and over time, even the companies and products that seemed to epitomize mass society dissolved into difference. Ford had to abandon the Model T, the universal black telephone from AT&T evolved into a myriad of sizes, colors, and designs, and Levittown’s uniformity disappeared in a wave of home improvements and landscaping” (Nye, 2007, p.76). Does globalization create a homogenous or heterogeneous world? Nye addresses this debate by sharing views of George Ritzer and Roland Robertson who have the opposite views on the debate. Again the readers are left to decide for themselves which argument is more plausible.
6. Chapter six begins with a provoking question, “Does mastery of technology ensure abundance?” Nye points out that “Western technologies have been used to create abundance, but at a high environmental cost” (Nye, 2007, p.98). Nye referenced *Robinson Crusoe* in the beginning of the chapter. He relates how in the story Crusoe is able to create a comfortable life for himself with years of technological experience he brings to the deserted island. Nye goes on to describe many ways that technology has hurt the environment causing a shortage rather than abundance. He ends with asking the question again and stating same obscure way that the answer depends on choices made, therefore there is no definitive answer.
7. In chapter seven Nye asks if we work more or less. He relates ways that the progress in technology has caused some people to have very boring repetitive work. Much of the “progress” caused worry for people as their jobs are replaced with the new advancements. Nye shares interesting stories about how roles in corporations have changed as workers have sometimes become more knowledgeable than management in day-to-day operations. Another interesting story he shared was of the partnership between Harley-Davison management and unions. They have decided to work in a more civil manner than many companies, by having management and union heads share offices. Nye also shares that work load and pay depends who you are. He cites instances where women worked more for less pay or were not given the same consideration for jobs. The answer of the chapter‘s question, again depends on the situation.
8. In the next chapter Nye looks at the questions of how technology is selected and who should select it. He gives examples of technological regulations. If a person owns a home and wants to add on, they must have permission and past inspections. On the other hand he gives an example of a company who a person paid to clone their cat. The government has less involvement in the cloning case then in the house revamp. Nye asks why the cat cloning has a less watchful eye than the house remodel. He gives these examples to show that some areas have been tightly regulated while others are not. He then goes on to give many other examples of how the market does or does not steer technology.
9. In the chapter nine Nye poses the question of whether technology has made us safer or if it causes more danger. Throughout history new technologies have been promoted as the answer to the end of war. Communication technologies were predicted to improve communications breaking down cultural barriers and lessening the chance of war. Nye says, “Such claims were made for the telegraph, the telephone, radio, the motion picture, the television, and for the internet. In practice, however, each of these technologies also become a tool of warfare” (Nye, 2007, p.182). Throughout the chapter Nye provides examples of dangers and protections technology has provided us. He ends the chapter by saying, “Paradoxically, advanced technologies can make us safer, but to do so they unavoidably expose us to dangers” (Nye, 2007, p.184).
10. Nye’s final question is, “Expanding Consciousness, or Encapsulation?” Nye wonders if the advances we have experienced deter us from thinking in certain ways. Are our perceptions shaped in a particular way because of the world we have created? He goes through many examples of peoples’ concerns with various advancements. Of course the answer to his question depends on the example that he provides, therefore never nailing down a conclusive answer.