

0 Outline, 1 Answer Q: Define (Explain the nuances, affordances, values), Describe (Summarize and analyze), Compare (Sim./Diff. Against a Std., Significance of it), Explain (Justify by using knowledge), Demonstrate (Analyze), Prove (Evidence, Examining its relevance to a situation), Discuss (Take a position, describe it, present arguments for or against it), Analyze (Explain 5Ws/H, Breakdown), Evaluate (Assessing against a standard), Recommend (Define, Justify, consider altern.), What/Why (Answer directly as 1st sen. then expand) **2 Content** (ie. examples, handle counter claims, connections), **3 Organizing** (enumeration, keywords, headings), **3.5 Structure** Claim-evidence-justification, qualifier, counterclaims. **Economist: Data** "In 2000 the developing world, excluding China, accounted for less than 30% of annual carbon emissions. By 2030 it will account for the majority" (Economist 54). **1. Evidence for Convergence:** "Sustainable agriculture cuts emissions, climate-proofs the food supply and reduces the risk of famine" (Economist 54). "Mangrove preservation sequesters carbon, protects against storm surges and helps provide fishermen with a living" (Economist 54). **2. JST** "Just Energy Transition" packages... intended to shepherd middle income countries from fossil fuels to cleaner energy" (Economist 56). **3. WB:** "The 2,500 climate-finance projects the Bank has set up since 2000 have had almost no discernible impact on emissions" (Economist 56). **WENT TO POVERTY** **4. Greenwashing:** "International financiers are having this debate between themselves-rather than giving the main say about what to do with such cash to developing countries" (Economist 56).

W1 Postman's 5 Ideas of Technological Change 1. Every advantage has a disadvantage (Trade offs). 2. Always has winners and losers. 3. Has a powerful underlying idea 4. Is "ecological" in which consequences are vast, unpredictable, and irreversible, where it changes everything. 5. Technology tends to become "mythic", and just accepted as it is, and not easy to modify, controlling individuals' lives. **W1 Keynesian Economics (KE):** 1. Large, active government to regulate industry and market. 2. High taxes for the rich | 3. Extensive social welfare programmes for all to care for the disadvantaged.

W1 Three Dimensions of Neoliberalism 1. Ideology: 1. The principles of free-market capitalism & trade in a single global marketplace, 2, consumerism, 3. minimal government intervention | 2. Mode of governance: Neoliberalism, rooted in entrepreneurial values such as competitiveness, self-interest, and decentralization. Adopts the self-regulating free market, devolving the government to small local units. 3. Policy package: DLP Formula: (1) deregulate economy, 2) liberalization of trade and industry, and 3) privatization of state-owned enterprises.

L1/L2 WEIRD: Western, educated, industrialized, rich, & democratic. Beliefs of NL: 1 Progress is inevitable, 2 Value is defined in the marketplace, 3 Human potential rests with the individual, and 4 Capital freed of regulation will find its best way forward.

Consequences of NL: 1 Increased tax burden on the individual | 2 increased wealth gap (both nations and people) | 3 increased pace of extraction/production/waste | 4 unsustainable dependence on nonrenewable energy

Defn's of NL: 1 Progress - sustained by continuous economic growth | 2 Technology and innovation - serve to drive economic growth | 3 Growth - supported by minimal regulation of technology and tech firms.

W1 Sociotechnical Dualism: Engineering has a habit of separating the technical from the social and political. (C to depoliticization).

W2 Different Theories: 1. **Technological Determinism:** Technology develops in a fixed sequence; and shapes society (ie. imposes itself onto society) 2. **Social Construction of Technology:** Social systems direct technological change. (SCOT/TD divide human/tech. into 2 groups). 3. **Technological Momentum:** People direct the development of new technologies, but investment in large socio-technical systems makes them difficult to change (limit: doesn't acknowledge interactions b/w social/tech.).

W2 ANT: Focuses on relationships, not actors to create diverse network, and does not assume a fixed position (Treats human/tech. as relational).

1. **Generalized symmetry:** Non-human and human are on the same level (from a sociological perspective). Humans have some sense of agency; non-human have affordances.

2. **Resistances:** All actors have preferences which are overcome by relations. Resistances are overcome when actors have to work together to make a product.

3. **Intermediary:** Actors that transports force but are unimportant.

4. **Mediator:** Actor with power, whose outputs can't be predicted by inputs.

5. **Translation:** Process of creating relations to form a prod. which overcomes resist.

6. **Patterning/Ordering:** Offers durability to the network to overcome resistances as relationships solidify (Eg. TTC).

7. **Depunctualize:** (Expanded) usually after a disruption in the network.

8. **Punctualized:** (Hidden in one actor) to create organization and power.

9. **Technological Recess:** Quasi-independent subsystem that functions on its own, but can shape the broader system. Often results from a failure in the network.

10. **Power:** Can be used for good or evil | Relations hold power.

W2 Mechanisms of Affordances: Each non-human actor can afford. Request, Demand, Allow, Encourage, Discourage, Refuse, Provide, Enable, Permit, Control, Limit, Prevent, Require, Ignore, Influences, Reinforces, Marginalizes, Supports.

W2 Conditions of Affordances: 1. **Perception:** Actor is aware of the function of the artifact 2. **Dexterity:** Actor is capable of executing the function of the artifact 3. **Cultural/Institutional Legitimacy:** Support in executing the function.

L1/L2: 1. Leaky actor: Has competing ideas, initiatives, priorities, and features that disrupt the network.

2. **Real vs. Perceived Affordances:** Real are the functions attached to an object, while perceived are features that are clear to the user.

3. **Disaffordance:** Some technologies may inadvertently hinder specific actions or behaviors by not acknowledging and accommodating the diverse experiences associated with individual and group identities, such as race, gender, disability, and religion (ie. disapproval)

4. **Dysaffordance:** An object requires some users to misidentify themselves to access its functions (eg. Misidentifying age/gender to access).

W3 Different Theories: 1. **Duty Ethics:** Engineering codes of ethics with rules and law. 2. **Consequentialism:** Judged on the consequences of their work.

W3 Schmidt Virtue Ethics: Focuses on the person who acts, rather than the action itself. Looking at patterns of behavior instead of a single action.

1. **Social Aspect:** Cooperation between engineers 2. **Proper Purpose (Why):** Virtues should benefit the material well-being of all by achieving the internal goods.

3. **Societal Role (What):** Assess, manage, and communicate risk.

4. **Internal Goods (Why):** Safety (protect people and preserve property), sustainability (improve environments/conserves resources), and efficiency (perform function while minimizing costs).

5. **Moral Virtues (How):** Objectivity (impartial), care (concern for another), and honesty (cooperation and transparency).

6. **Intellectual Virtue (How):** Engineering judgment guiding moral vir.

Overall: Engineering judgment enhances the material well-being of all by achieving safety, sustainability and efficiency while having objectivity, care and honesty in assessing, managing and communicating risk.

W3 Reflexive Principlism: 1. **Beneficence:** Preventing harm and providing benefits

2. **Non-maleficence:** Avoiding the causation of harm

3. **Res. for autonomy:** Supporting and respecting autonomous decisions

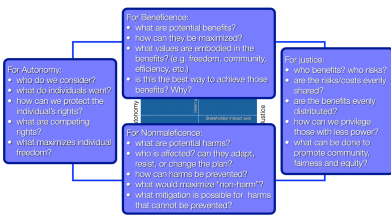
4. **Justice:** Fairly distributing benefits, risks, and costs.

W3: Specifying, Balancing, and Justification:

1 **Specification:** *Narrowing the scope of the principles to apply to a situation*

2 **Balancing:** *Adjudicating conflicts b/w the principles for the situation.*

3 **Justification:** *Evaluating coherence and completeness of an ethical-reasoning decision*



W4: Ethics of Care - Moral Distance

Moral Distance: The gap that can develop between individuals and the consequences of their actions.

1. **Proximity Distance:** Tend to behave ethically towards those physically or culturally close to them.

1.1 **Physical:** No face-to-face interactions. ↑ distance, quashes moral significance of the act.

1.2 **Temporal:** ↑ future, discounts the moral consequences of their act.

1.3 **Cultural:** Using same values in one culture to judge different cultures.

2. **Bureaucratic Distance:** A person's act is a small part of an extensive process

2.1 **Hierarchy:** Individuals tend to act against their principles when an authority demands.

2.2 **Complex Processes:** In collective settings, blurred responsibility, and many-hands making it difficult to identify moral responsibility.

2.3 **Principlism:** Reduction of morality to principles or a blind attachment to moral guidelines and principles.

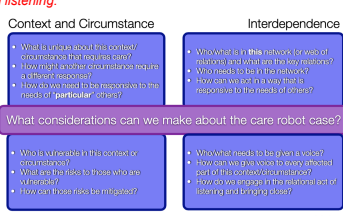
W4 Ethics of Care - 4 Concepts - Framework Useful when the interests of the least advantaged stakeholders are not being considered. (NOT PRINCIPLES)

1. **Interdependent Relationships:** Not only maintain relationships but also be responsive to the needs of others

2. **Context and Circumstances:** Contextualized responses rather than using rules or calculated outcomes.

3. **Vulnerability:** Understand the needs and suffering of others and to act according to those affected by our decisions.

4. **Voice:** Giving voice to every affected part of any situation by speaking and listening.



W4: Technical Rationality: Prioritizes verifiable knowledge, aimed at external success (ie. focuses on efficiency and the economy) **Empathy:** Ability to sense other people's emotions, and imagine what someone else might be thinking or feeling.

W5 Angela Carter - Petro-Capitalism and the Tar Sands.

0. Summary: 1 Capitalism depends on continuous growth by using fossil fuels. | 2 Resource curse in which there is a dependency on oil, but has allowed for growth. [3]

3 **Petroleum shapes policy,** where gov. weaken environmental policies to increase oil and gas development.

1. **Canada:** "The Harper government has weakened environmental policies...to facilitate oil and gas development... demonstrated a palty commitment to developing clean energy technologies" (Carter 5).

2. **Alberta:** "Downplayed or denied the... impacts of the industry while aggressively promoting its expansion... Alberta has become extremely dependent upon an environmentally disastrous industry" (Carter 9).

3. **Economic Logic:** "Petro-capitalism is grounded in the proposition that efforts to expand profit growth through mass production and mass consumption have hinged on the mass extraction of fossil fuels" (Carter 2).

4. **Transferring Away from Oil:** "A shift to a new political-economic system, away from one dependent upon incessant growth and accumulation and towards more... sustainable" (Carter 9).

5. **Quotes:** Key aspects of petro-capitalism: [3] 1 Resource curse, vulnerable to economic volatility [3] 2 Policy deterioration, policies seem to be only around oil. [3] 3 Environmental damage [4] Unstable balance of cheap oil and climatic limits at a Global level. [5] Empirical example of Canada's petro capitalism, aspiring to be a fossil energy superpower [7-9] Empirical example of Alberta's reliance on tar sands for oil, env. impacts.

W5 Todd - Fish, Kin and Hope: 1. **Summary:** Emphasizes the need to case for more than human beings, and not weaponize carbon-based organisms.

2. **Human's Use:** "These oily materials are not... dangerous. The ways that they are weaponised through petro-capitalist extraction and production turn them into... contaminants and pollutants" (Todd 107).

3. **Turning Oil into Threats** "The oil economy turns these fossil beings into threats to the 'narrow conditions of existence'" [Todd 104].

4. **Quotes:** [107] Taking care of more than human beings needed.

L1/L2: Sustainability is in conflict with neoliberalism *underlined.

1. **Weak Sus.: Human capital can substitute for nat. capital. (irreversible)**

2. **Strong Sus.: Human capital is not interchangeable with nat. capital (env. limits to ensure env. sustainability).**

3. **Sustainable Development 3 Pillars:** Intersection is where we want to be, but economic pillars have force over the other two pillars (social/environment), undermining sustainability.

4. **Planetary Bdd.:** Ocean acid., bio. integrity, and climate change have exceeded the bounds, at which production/consumption (C to NL) have become the driving forces of these pressures (ie. fossil fuels, waste).

5. **Possible Responses:** 1 Produce less | 2 Consume less | 3 Clean more.

W6 Socfenfianza - The Post Sustainability Trilemma:

1. **TBUA Bad:** "65% of anthropogenic emissions come from fossil fuels; 35% are the by-product of economic activities which are unrelated to the technology employed to produce energy" (Scon 774)

2. **DG:** "In the long run there is no such thing as economic growth strictly speaking. All growth is, in the long run, uneconomic" (Scon 775) | 3. **AG:** "Growth can be good - economic growth strictly speaking - if it increases social welfare" (Scon 775) |

4. **EA:** "China approved the implementation of targets which would reduce CO2 emissions per unit of GDP by 40-45% by 2020, compared to 2005" |

5. **Sus. Nar.:** "Sustainability narrative, according to which environmental governance should be neoliberal, growth-oriented, and optimistic about institutional capacity" (Scon 769).

6. **Quotes:** [770] Neoliberal indoctrination hard for sustainability [773] TBUA Tastes for environmental change diff. [773] TBAU technological fixes. [774] PG [774] De-growth explanation [774] A-growth explanation. [775] EA, participation curtailed** [775-776] Two reasons for EA [776] Empirical example of China [777-778] Problems with TBUA, EA, & PG

L1/L2: 1.1 TBUA (Eco. growth+Political participation): Care more about short-term (economic growth) than long-term (environment). -Technological fixes are ineffective right now, where we need 9.2x the current renewable energy output by 2050 (101% increase), impossible.

2.1 **PG (Env. protection+Political Participation):** Explore how humans can flourish without economic growth. De-growth: Extraction of materials is scaled down. A-growth: Pursue social welfare over GDP growth (economic growth is possible if it increases social welfare).

1.3 **EA (Eco. growth+Env. protection):** A small group of undemocratic central authority protects the environment while pursuing economic growth. Competition for natural resources is what is harming the environment. USES POLICIES TO STAY ENACT POWER.

2. **Decoupling Resource Use from GDP:** We see that the material footprint continues to grow with GDP as growth requires extraction.

W7 Jacobson Plan for 100% renewable energy using WWS.

1. **Quotes:** [59] Key concepts of the article. [62] Lack of materials.

W7 Economist - Poorer Today or Hotter Tomorrow 1. **Poverty Reduction:** 1 National interest wins over the global good, 2 World Bank is geared towards tackling poverty rather than climate change, 3 Poor countries need money for surviving purposes rather than sustainability. 2. **Climate Change:** 1 Poor countries require most money to go green, 2 developing countries are most vulnerable to climate change, 3 money is given to middle-income countries instead.

3. **Quotes:** [54] Convergence of poverty and protection of planet. Two trade offs for focusing on national interests. [55] 1. Priorities for national governance, national interests win [55] 2. International financiers need to focus on middle-income countries. [56] Vera Songwe advocating for climate change [56] Mark Suzman's advocating for Human Capital Instead.

W7 Sadoway - Missing Link to Renewable Energy: Show us the future of large-scale batteries that store renewable energy.

1. **Cheap Materials:** Use abundant materials locally sourced that can match the current market price to create grid-level storage.

2. **Temperature:** Conventional wisdom says set it low. Liquid metal battery can operate at elevated temperature with minimal regulations.

3. **Scaling:** Conventional wisdom says reduce cost by producing many. Liquid metal battery reduce cost by producing fewer, but larger.

3. **Human Resources:** Conventional wisdom says hire battery experts. He hired students to maximize human potential.

L1/L2: Policy instruments for decarbonization: Carbon tax and permit system to purchase permits for CO2 emissions.

W8 Raworth - Doughnut Economics: 1. The devolution of Economics requires renewal, 2, the obsession with growth, 3, the need to ensure a social foundation, 4, the balance of the planet, and 5 thriving in balance. **Quotes:** [49] 5 Factors: Population, distribution, aspiration, technology, and governance [27] Definition of GDP [34] flaws of GDP [39] Explanation of doughnut economics. [45] Empirical examples of breaking bounds.

W8 MacArthur - Circular Economy Introduction 1. **Technical Cycle:** Doesn't biodegrade (eg. metals, most plastics)

1 Want to recover within a circular economy and feedback into the system as they aren't biodegradable. | 2 Keep them in use for as long as possible.

2. **Different Aspects of Technical Cycle**

2.1 **Recycling:** Reclaim these materials and feed back into the system

2.2 **Remanufacturing:** Remanufacture before it breaks into smaller parts to save energy, money, and time.

2.3 **Repair and Maintenance:** Keeps things in use at their highest level preventing failure by repairing early and maintenance to keep in use.

2.4 **Sharing:** Sharing technology with other people (eg power drill).

3. **Biological Cycle:** Would biodegrade (eg. food, wood, cotton).

-Importance: Biological materials that can return to the Earth and regenerate the soil, which has been broken by human/food waste.

4. **Different Aspects of Biological Cycle**

4.1 **Cascading:** Use the item for as long as possible at the highest value w/o putting toxicity on the bio. material. (eg. wood table -> chair -> tissue paper -> soil).

4.2 **Regeneration:** Collecting waste and feed back to the system to be able to regenerate it.

5. **Potential Problem:** Mixing both the technical and biological cycle in ways that can't be separated (ie. cotton-polyester).

W8 MacArthur - Explaining the Circular Economy

Raworth: 1. Why GDP? "Because the idea of ever-growing output fits snugly with the widely used metaphor of progress being a movement forwards and upwards" (Raworth 33). | 2. **Prioritizing People Not GDP:** "Instead of prioritizing metrics such as GDP, the aim should be to enlarge people's capabilities" (Raworth 37). | 3. **Doughnut: 1 Shortfall** "Below the Doughnut's social foundation lie shortfalls in human well-being, faced by those who lack life's essentials" (Raworth 39). 2 **Overshoot** "Beyond the ecological ceiling lies an overshoot of pressure on Earth's life-giving systems" (Raworth 39). 3 **Sweetspot** "Between these two sets of boundaries lies a sweet spot... that is both an ecologically safe and socially just space for humanity" (Raworth 39). | **Inner Ring:** "Sets out the basics of life on which no one should be left falling short" (Raworth 39). | 4. **Ecological Ceiling:** "The limits beyond which we should put no further pressure on the planet" (Raworth 42). | "Global economic development has also fuelled a dramatic increase in humanity's use of Earth's resources... Build-up of greenhouse gasses in the atmosphere to ocean acidification and biodiversity loss" (Raworth 39-40). 5. **Interconnectedness of Inner/Outer Ring:** "It becomes clear that human thriving depends upon planetary thriving" (Raworth 43). ** **Dynamic Balance:** "Dynamic balance by moving into the Doughnut's safe and just space, eliminating both its shortfall and overshoot at the same time" (Raworth 45). | 6. **Empirical Example:** Reforestation → Enrich biodiversity, increase soil fertility, water retention, and help sequester carbon dioxide → Local communities get more diverse forest food and fibre to harvest → Greater security of water supply → Improved nutrition health → More resilient livelihoods. **Jacobson** are taken into account, WWS technologies become even more cost-competitive" (Jacobson 64). \$100 trillion over 20 years, but paid back over time. 3. **Solution to Political Will:** "Feed-in tariffs plus incentives for providers to reduce costs, elimination of fossil subsidies and an intelligently expanded grid could be enough to ensure rapid deployment" (Jacobson 65). 4. **Relying on Fossil Fuels** "Relying on traditional sources would raise output from 12.5 to 16.9 TW, requiring thousands more of those plants, costing roughly \$10 trillion, not to mention tens of trillions of dollars more in health, environment, and security costs" (Jacobson 64). 5. **Mix of E:** "Wind and solar can go a long way toward meeting demand, especially when geothermal provides a steady base and hydroelectric can be called on to fill in the gaps" (Jacobson 63).

4. Emotional Contagion: Data scientists skewed what 700,000 Facebook users saw on their newsfeed | Shows that emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. **5. Cambridge Analytica:** Used psychological profiles based on harvested Facebook data (without user permission) to build targeted political advertising. **6. Few Take-Aways from Tufekci: 1 See How People React:** The deployment of wedge issues by design (ie. mobilize small segments of the population with highly divisive issues). | **2 Personalized Experiences** Epistemic Fragment where the "public sphere" is diminished by creating individualized, tailored, targeted and isolated experience information, such that people have different sources of knowledge. | **3 Surveillance** Inequities from information asymmetry (b/w the "watcher" and the "watched", where everyone becomes their own guard). **7. Take-Aways and Recommendations:** **1** Data is the new oil of the digital economy | **2** Represents a centralization of wealth and power | **3** The methods and mechanisms of big data and ML generate great opportunity but also ethical concerns around transparency, consent, privacy, and freedom from discrimination. | **4** Consider specific ways to operationalize an ethical approach to the digital sphere (eg. affordances of platform features, privacy by design policies, and stakeholder engagement through care and design for social justice).

1. Biological Cycle: Create safe and compostable materials that help grow more stuff, so no resources are lost in the making of materials.

2. Technical Cycle: A way to cycle valuable materials so they maintain their quality and continue to be useful beyond the shelf life of individual products (ie. instead of throw-away/replace, use return/renew).

W9 Cech L1: 1.0 Depoliticization: The belief that engineering is a "technical" space where social or political issues, such as inequality, are tangential. **1** Engineering work is carried out objectively and without bias. | **2 The social and cultural "taint"** of the "pure" engineering design methods, so social justice is irrelevant.

1.1 Meritocracy: The belief that inequalities are the result of a properly functioning social system that rewards the most talented and hard-working. | **1** Individuals are personally responsible for their position in society. | **2** Opportunity for achievement is widespread. | **3** Overall systems of opportunities and rewards are equitable and fair. | **4** 1-3 have been proven false as meritocracy assumes everyone started with the same privilege. (Eg. False, people born into rich family) | **5 C to ML:** assumes human potential rests with the individual. | **6 [75]** 3 reasons why meritocracy is compelling.

2. How Do Meritocracy and Depoliticization Reinforce Each Other? Since engineering is depolitical, issues of social justice and inequity are irrelevant; and the absence of some people from engineering is about a lack of talent or hard work rather than a social injustice (concerns about meritocracy is brushed off as being "politically motivated"). | **[76]** | **[77]** Who is advantaged/disadvantaged? **[79]** How to deconstruct? **[81]** Reproduction of inequalities for minorities by silencing privilege.

3. Connection of Meritocracy | Depoliticization | Dis/Dyaffordances:

Depoliticization: Engineers fail to look at the broader social and political implications of their work. This can lead to designs that promote dis/dys affordances, failing to address marginalized communities. **Meritocracy:** prioritizes individual success, making the success in design defined narrowly on technical proficiency, rather than looking at the structural conditions.

4. Logical Positivism: The belief that science and engineering work can be separated from messy "social" concerns as long as proper scientific and engineering methods of inquiry and design are followed.

5. How to Confront Meritocracy Myth? Strive to be at the intersection of diversity (fact), equity (goal), and inclusion (practice). **C to Virtue Ethics:** Working towards material well-being of all people.

5.1 Diversity: Describes ways in which people differ (ie. heterogeneity)

5.1.1 Intersectionality: The interconnected nature of social categorizations (eg. race, class, and gender) as they apply to a given individual or group, regarded as creating overlapping and interdependent systems of discrimination or disadvantage.

5.2 Equity: Acknowledgement of barriers to equal opportunities which exist and vary due to identity differences and working to reduce and/or eliminate such barriers. (Equal opportunity=Equal outcome).

5.2.0 Structuring Scope of Equity: The closer the group is to the self, the more likely we are to desire equity. (Vice versa).

5.3 Inclusion: Creating an environment where individuals (regardless of identity) feel welcomed, supported, and empowered.

6. Privilege (ie. Power): A special right, advantage or immunity granted or available only to a particular person or group of people. | This power exists with the disadvantaged.

7. Positionality: How one's intersection identities, personal experience, and operational context influences (and potentially biases) one's understanding of and outlook on the world.

8. What can we do to make engineering design more inclusive? **1** Acknowledge depoliticization and the existence of systematic bias. | **2** Diversify the profession | **3** Design for social justice.

W9 Design for Social Justice L2: 1.1 Design for Technology: "Addresses constraints such as budget, time and functionality established by a client." | **1**

Listening to the spec (ie. focuses on solving the problem, and ignores any social considerations, possible user concerns, and often implementation).

1.2 HCD for Users: "Emphasizes users' needs, desires, and cultural location, mainly through ergonomics and esthetics." | **1** Listening to their desires (ie. focus their design on creating a positive consumer experience as the main goal and being put into their shoes) | **2** Expands to consider users' input by giving them power to validate the design.

1.3 HCD for Communities: "Considers low-income and underserved communities as users... incorporate listenin to users; accommodations of human capacities, needs, and desires; and attention to people's culturally situated resources, resource limitations, and opportunities." | **1** Listening to the other and local context (ie. contextual **[6&14]**) | **2** Community holds more sway, but SJ is just another dimension that only gets implemented when the designer is aware.

1.4 Design for SJ: "Strive towards an equitable distribution of opportunities and resources in order to enhance human capabilities while reducing externally imposed risks and harms."

1.4.0 Listening to the structural conditions that give rise to inequalities **[7]** 4 ways to listen to structural conditions). This means **1** investigating the socio-economic, historical, cultural context in the comm., **2** identify cultural diff. and ambiguity, **3** build relations with comm., **4** min. deficiencies while recognizing capabilities, **5** have self-determination, free from external influence, **6** work toward shared accountability.

1.4.1 Explicitly and systematically incorporates social justice to consciously explore opportunities to enact SJ, which is to **ENHANCE HUMAN CAPABILITIES**.

1.4.2 Nussbaum's 10 HC: is defined in 1 culture, but we must enhance human capabilities according to the community, not some predefined notion.

3 [8-9] Eg. of SJ. [20] Summary of SJ. [20-21] 5 Lessons of SJ

2. Listening's Connection to Empathy: As we move from each level in types of listening, we need greater empathy and awareness.

3. LLN's Seven Criteria: **1** Listening | **2** Identifying structural conditions that give rise to needs | **3** Increasing human rights | **4** Increasing opportunities | **5** Increasing resources | **6** Reducing imposed risks and harms | **7** Enhancing human capabilities. **Connection to RP:** #4 => Autonomy | #5,7 => Beneficence | #6 => Nonmaleficence | #3 => Justice.

W10 Technocapitalism L1/2: 1. How to measure/understand economic inequality?

1.1 Wealth Not Existing in Vacuum: Represents labor, resources, energy of a larger group of people. (**C to Meritocracy**) - believing that these billionaires got rewarded for working hard and disregarding any inequalities with their rise to wealth.

1.2 Economic Spread: Large and growing differences among people in income, wealth, and other circumstances of life.

1.3 Two Measures of Equity: 1 Social mobility - measure of equality of opportunity, not outcome (ie. extent to which people can improve or decrease their social and economic status compared to that of their parents or previous generations).

2 Income inequality - measure of the disparity from rich to poor.

1.4 Key Points in Economic Inequality: **1** Median income is growing across all groups. **2** Fewer people are living in extreme poverty. **3** Some decline noted in mobility over generations. **4** High income earners are seeing bigger gains.

2. Underlying dynamics of digital tech. that contribute to economic spread:

2.0 Technocapitalism: Changes in capitalism associated with new technologies, furthering economic inequalities. | Intangible economy is a key component of technocapitalism, as it relates to eco. centralization/inequality.

2.1 Intangibles: Things you can't touch (eg. software, digital tech).

Effect of Intangibles: The emergence of intangible assets only serves to further increase economic centralization and therefore increase levels of economic inequality so long as we maintain the anti-democratic structures of capitalism" (Stubbs 34).

2.2 Scalability: Digital goods are non-rival and easy to reproduce, which can be used in mult. places at same time.

1 Near zero marginal cost, low labor costs for reproduction and updates, so fewer workers are needed | **2** First to the market invests enough to standardize and gets the majority share. **Competition** 1. **Centralization of capital** 1.

Eg. Uber/Lyft: Have near-zero marginal cost and outsources work to the gig econ.

Why 1 Tech Giants? "Companies built on intangible assets to have greater access to the economic pie because of this scalability factor, therefore thus leading to economic centralization in the long run" (Stubbs 38).

2.3 Sunkenness: Intangibles are more difficult to re-sell and therefore riskier for banks and those with less equity.

1 Tangible assets: Funded by debt | Banks will offer credit | Risks are mitigated by recoverable assets | **2 Intangible assets:** Funded by equity | Banks don't want to provide loans | Risks are higher because no physical assets to sell | Funded by VC who can afford the risk (ie. wealthy get wealthier).

VC Gaining More Power: "Those already in positions of economic power... able to invest in intangible intensive firms... when such firms succeed, this tends towards greater economic centralization for those who were originally wealthy" (Stubbs 39).

2.4 Synergies: Intangibles can be easily combined, so worth 1

1 Integrate with existing platform (eg. App Store) | **2** Buy-outs (eg. Facebook buying IG) | **3 Walled garden** (eg. Apple's ecosystem, which has total control over content, apps, etc).

Danger of Synergies: "The danger of increasing synergies in a world that is increasingly economically unequal means tendencies towards monopolization of those synergy networks, most often invested in by venture capitalists" (Stubbs 40).

[40] Synergies + Scalability, [40-41] VCs getting richer from synergies.

2.5 Spillovers: Other businesses can more easily take advantage of intangibles (leading to monopolistic behavior).

1 The nature of intangibles allows for other businesses to mimic or otherwise take advantage of one another. **2** Increases motivation towards monopoly (ie. buy firms rather than allow spillovers).

3. How do technologies change the nature of work?

3.1 Development of the Gig Economy: **1** Displaced traditional employment with more precarious labor **2** "Flexible working life" hides lack of regulation and benefits **3** Firms outsource human capital to an external labor market of competing workers **4** Traditional employer / employee relationship dissolves |

Why 1 Gig Econ: "Growth in gig-economy work is largely the result of scalability, which makes access to contingent labor easily accessible through the ways that digital platforms (such as Uber or Lyft) are scalable at a near-zero-marginal cost" (37) **[38]** Ubiquity leading to economic spread and VCs get richer.**

3.2 Technological Unemployment: Unemployment when new developments in tech. cause some workers to lose their jobs (at a rate faster than their replacement and/or re-training allows).

3.2.0 Optimistic View: Prove to be a tool alongside works to improve capabilities and expertise. **Pessimistic View:** Companies will replace jobs and they will get richer from not paying wages.

4. Strategies for These Three Questions: **1** Wealth tax | **2** Tax robots & AI | **3** Universal basic income | **4** Organize around social mobility | **5** Pay people for their data | **6** Public ownership of intangibles | **7 [42-43] "Stakeholder capitalism"** | **8** Antitrust legislation | **9** Re-training and investing in employees.

W11 Kitchen L1/2 1. Big Data: Data sets that are too large/complex to be dealt with by traditional data-processing application software.

2. Machine Learning: Derive rules that explain data or predict future data.

3. Ethical Concerns:

3.1 Privacy: To selectively reveal oneself to the world. **[5]** Different forms of privacy

3.2 Consent: Permission for something to happen or agreement to do something (ie. safeguard against manipulation and express autonomy)

-Digital tech. raises a weak consent base because many users are unaware of data collection processes (too technical).

3.3 Transparency: Operating in such a way that it is easy for others to see what actions are performed (ie. openness, communication, and accountability).

3.4 Freedom from discrimination: Fair treatment of all humans.

4. Surveillance Capitalism: **1** Leverage economies of scale (extract as much data as possible) **2** Leverage scope (sourcing data from various places) **3** Action (producing desired outcomes)

4.1 Behavioral Surplus (ie. Digital Shadow, Latent Data): Act of taking personal experiences without permission and using the data to analyze and understand human behavior. (involuntary, implicitly collected by these agencies). | **1** Personal details are used by big tech. to turn into profits.

4.2 Synergies Between Websites With Latent Data? **1** Tracks on-site activity **2** Activity on other websites **3** Works with publishers to cross-share visitors **4** Allows marketers to target ads according to data sets who have built these profiles.

4.3: Synergies Between City Systems: "Urban operating systems explicitly link together multiple smart city technologies to enable greater coordination of city systems" (Kitchin 3).

5. Big Five Personality Traits: **1** Openness **2** Conscientiousness **3** Extroversion **4** Agreeableness **5** Neuroticism.

6. What could be inferred from your activity examples

6.1 Researchers discovered that there is a linkage b/w website pref. and one's personality, which can be used by people to profile and target individuals with ads.

6.2 Facebook likes can be used to automatically/accurately predict sensitive attributes of the individual, which was done on over 58000 volunteers, which gave impressive results as good as scientific scales.

7. Programmatic Advertising: Automated buying and selling of online advertising with complex use of data and machine learning to enable hyper-segmentation based on consumer behavior.

8. What is a smart city? Uses different types of electronic methods and sensors to collect specific data. Info gained from that data is used to manage assets, resources, and services efficiently.

9. Ethical issues & smart cities (intertwined):

9.1 Datafication, dataveillance, and geosurveillance: **1 "Radical expansion in the volume, range and granularity of the data being generated about people" (K2).**

Produces two things: Digital footprints (traces we leave ourselves) | **Digital shadows** (traces captured about us) | **[5-6]** Def'n, [8] Consequence of datafication.**

2 Surveillance through the generation and use of datasets to identify, monitor, track, regulate, predict and prescribe (eg. facial recognition → This can misidentify people).

3 Tracking the location and movement of people, vehicles, goods and services and the monitoring of interactions. **[7] Examples of Dataveillance and Geosurveillance.**

9.2 Inference and predictive privacy harms: Infer from the input data, which can infer sensitive attributes. | **Implications:** No obligation under current privacy regimes to give notice to, or gather consent from its customers.

Consequence: "Such inferences can generate inaccurate characterization that then stick to and precede an individual... The profiling of both people and places can reinforce or create stigma and harm, particularly when the underlying data or models are poor" (K8).

9.3 Anonymization and re-identification: Even though people are anonymized, they are still distinguishable, which can be used to create individual profiles.

Institutions' Control: "Enable holders of large datasets to act on individuals, under the cover of anonymity... they place no inherent limits on an institution's ability to track and trace the same person in subsequent encounters" (Kitchin 8).

De-identification: "De-identification requires both direct/quasi identifiers to be carefully removed" (Kitchin 8).

9.4 Obfuscation (opacity) and reduced control: Synergy: Smart city technologies are synergized together in a complex system, which can be leaked, intercepted, transmitted, disclosed, disassembled and repurposed.

Violating Privacy: Difficult for users to seek access to verify, query, correct, or delete data, demonstrating the **WEAK CONSENT BASIS**.

9.5 Absences of notice and consent: 1 Empty Exercise: Policing privacy is too difficult (eg. smart city tech. makes it unreasonable, so no choice but to be surveilled). **Choice:** "One either consents or is denied the service... Consent thus often consists of individuals unwittingly signing away rights without realizing the extent or consequences of their actions" (Kitchin 9).

2 Entirely Absent: There is catch-all disclaimers, so one must always reveal themselves (eg. example of violating one's autonomy to privacy).

9.6 Data use, sharing, and repurposing: Original data sets are shared, but poorly documented, so bias can occur widely and w/o transparency

Data Minimization: "Data should only be generated to perform a particular task, are only retained as long as they are needed for that task, and are only used to perform a particular task" (K10).

Contrast: Big data retain the data as long as possible, so that they can be repackaged data that can be sold and repurposed.

Example of What This Data Can be Used for (Data Determinism)

"Individuals are not simply profiled and judged on the basis of what they have done, but on a prediction of what they might do in the future" (K10).

Eg. "The Chicago police force produces both general area profiling to identify hotspots and guide patrols, and more specific profiling that identifies individuals within those hotspots" (Kitchin 10). This may have fallacies in misidentifying individuals.

W11 Gebru & Buol L1/2 1. Ethics of Machine Learning (5 Issues)

1.1 Problematic because of what it gets rights:

1 Inferring Sensitive Attributes: what the data knows about us **2** Predatory Microtargeting: highly targeted advertising at exploiting vulnerable customer (eg. older people, gamblers, addicts).

1.2 Problematic because of what it gets wrong

3 Discriminatory models Use protected classes (eg. sexual orientation) as input, creating exclusionary experiences and discrimination.

4 Machine bias: variables swerve as proxies for protected classes

5 Coded gate: input data excludes particular groups

2. Discrimination in algorithms delivering job ads: Facebook showed more ads to males/females based on existing workforce even if the jobs had similar skills.

3. Recognition in Face: Facial recognition tech failed to detect her face until she donned a white mask, which is a **dyaffordance**.

G3.1 Gender Classification: The gender of a face in the image has very high error rates for women of darker skin tones.

G4. Biases in ML: Analogies: Another tool applied to social analysis is word embeddings (ie. words that are deemed to be similar in space) that can encode societal biases, propagating biases. (eg. black man in stem ~ 3%, compared to W)

G5. Social Structural Problems: People involved in creating the technology don't look like the people who are being marginalized and surveilled by the police.

G6. Resolution: **1** Safety measures | **2** take things like bias seriously | **3** not be complacent with the homogeneity of its creator.

B2. Full Spectrum Inclusion: Full spectrum training set incorporates a diverse set of people. Over time you can get a computer to learn faces, but if a face isn't seen from their training set, then it won't recognize a face of diverse people.

B3. How to Move Towards Inclusive Coding? **1** Identifying bias: Finding cases of biases of algorithmic bias. **2** Curating inclusively: Include more inclusive training sets. **3** Developing conscientiously: About the social impact of our technology.

Cognitive Em: Understanding another person's perspective | **Affective Em:** Ability to share emotion w/ others | **Compassionate Em:** Moves us to take action.

W12 Tufekci - Engineering The Public L1/2 1. Public Sphere: Location and place in which rational arguments about matters concerning the public especially regarding issues of governance and the civics can take place, freed from constraints of status and identity. 2. Computational Politics: Applying methods to large datasets for conducting outreach, persuasion and mobilization in the service of elective, furthering or opposing a candidate, or a policy or legislation. **2.1 Individuals** Unknownness About What Companies Know: "This data provides significantly more individualized profiling and modeling, much greater data depth, and can be collected in an invisible, latent manner and delivered individually" (Tufekci 2). | **2** Benefits The Powerful: Technology tends to "favour powerful, data-rich incumbents, and the technologically adept. | **3** Turns political communications into an increasingly personalized, private transaction, changing the public sphere. **3. Six Intertwined Dynamics:** **3.1** Rise of digital mediation of social, political, and financial interactions (ie. datafication and anonymization). -"Latent data": Harvestable imprints from various transactions (ie. behavioral surplus, digital shadows). **3.2** Emergent computational methods allow profiling and modeling of specific individuals (ie. inference & predictive privacy, and absence of consent). **Datafication:** Gen. and storage of data, beyond just a group-based analysis | **Social Network Analysis:** [6] Targeting people with high centrality in a network. **3.3** You can get information about said individual without asking questions (ie. inference & predictive privacy and absence of consent). **Target Individuals:** Uses info to understand political preferences and other factors to target voters (Facebook Likes Example). **3.4** Advances in behavioral sciences have resulted in a move towards a more refined and realistic model of behavior (ie. inference & predictive privacy) **Social Engineering:** [8] Model individual psychology through computational methods to tailor political advertising. (eg. Fear, anger) **3.5** Digital networks = real-time testing and immediate deployment (ie. inference & predictive privacy) Eg: Test political messages quickly with ease and effectiveness **3.6** Methods rely on costly, exclusive data and use hidden, proprietary algorithms controlled by a few major internet platforms, making them appear as opaque "black boxes" to ordinary users. (ie. obfuscation & reduced control, and sharing & repurposing). Eg. **Twitter Algorithm:** "Selects and highlights 10 "trending topics" per region, which then gain visibility as they are advertised on the platform itself. The algorithm that selects topics, however, is proprietary" | **Implications of Opaque Algorithms and Pay-to-Win:** "Groups without funds to promote their content will become hidden from public view" (T9). | "The opacity of algorithms and private control of platforms alters the ability of the public to understand what is ostensibly a part of the public sphere, but now in a privatized manner" (Tufekci 9).