Comprehensive Exam Field #1:

Locating a basis for a multi-dimensional critique of general use computing technology design in the philosophy of technology.

This field engages the philosophy of technology to construct a multi-dimensional account of how social values come to be implicitly ascribed to technologies. It does so by bringing together discussions of technical function, technological rationality, and technical artifacts to assemble a theoretical apparatus capable of accounting for and deconstructing the many dimensions of a technology.

Technical function, as discussed here, encompasses the particular plan for performing a given task using a selected artifact and the underlying rationale for taking that approach, executing that task, selecting that particular artifact or design of artifact, and the suitability of each of these choices given the agent who will be executing the use plan. Technological rationality will be understood as the underlying instrumental mindset through which the world is taken to be an explainable collection of physio-chemical material, governed by mechanistic laws of interaction, ready to be used.The artifact dimension of technology refers to the materially embodied component of a technical device or system. These dimensions of technology are not wholly separate; they are understood to mutually influence each other as facets of a conceptual framework for understanding technology.

With respect to general use computing technology, this field seeks to provide the groundwork necessary for answering questions such as: “what are the rationalities of computing?”; “what is the function of a computer?”; “what is a computer?”; and “how do the rational, functional, and artifact dimensions of the computer produce the social meaning and cultural horizon of the computer (and what are the social meaning and cultural horizon of computing)?"

Technical Function:

Vermaas and Houkes (2010) situate a theory of technical function, based upon use plans, in three traditions—the intentional, causal-role, and evolutionary theories of function. From each of these traditions, Vermaas and Houkes (2010) assemble their ICE theory of technical function that states a function can only be rightfully ascribed to an artifact if conditions of belief regarding the artifact's capacity to fulfill the intended use and contribute to the plan for said intended use can be accounted for adequately. In circumstances where a user lacks adequate knowledge to fulfill these conditions of belief, further conditions concerning knowledge of testimony from someone with these justified beliefs, a justifier, are added to the formulation of the ICE theory. As such, Vermaas and Houkes' (2010) theory bases function on the intent of the designers and users of the artifact but adds conditions inspired by causal-role and evolutionary theories of function in order to ensure that only those intentions grounded in justifiable understandings of the limits of the artifact are given credence.

Taking function to be "the role that an entity plays in serving the goal of an agent, or its role in the operation of a larger system such as a geology, ecology, or religion," Barsalou, Sloman, and Chaigneau's (2005) HIPE theory similarly understands function to be determined through the user's intentions bound by history, physicality, and ordering of events.

Both the ICE and HIPE theories of technical function understand technical function as being ascribed to artifacts through the intentions of an agent so long as those ascriptions of function correspond adequately to the physical, logical, and socio-historical realities of said agent's world. The central role played by intentionality in theories of technical function reinforces the relevancy of criticisms of technological rationality.

Technological Rationality:

Criticisms of instrumental reason and technological rationality have attempted to make values implicit to technology explicit. The discussion of how instrumental reason applies to the management of society through the rationalization of institutions and practices, found in Weber (2005) and Lukacs (1971), provides a foundation and context for Adorno and Horkeimer's (2002) analysis of how the values of enlightenment reason produce a pseudo-rational unreason and Marcuse's (1964) account of the technocratic administration of society (Schecter, 2010). These discussions of how instrumental reason becomes problematic form the basis of a central theme of Frankfurt School critical theory, upon which Feenberg (2001, 2002) bases a critical theory of technology. Feenberg's theory seeks to understand how technical codes structure and shape the character of technical practices in a society.

Heidegger's (1977) theory of enframing offers a parallel understanding, to the Frankfurt School's, regarding how technical thinking leads to a problematic instrumental mindset, wherein the world is reduced to standing reserves of raw material in which previous, traditional relationships between things are diminished and potential uses perceived as more productive are favoured.

Mumford (1970), through his concept of megatechnics, offers a related critique, arguing that a modern technical mindset is overly influenced by market forces and discourages valuing technical longevity, robustness, reparability, and the fulfillment of human needs.

Foucault's (1995) theory of discipline and Latour and Woolgar's (1986) work concerning the construction of scientific facts provide a basis for understanding how practices of a professional field construct and perpetuate a perceived normalcy and neutrality of instrumental reason and technological rationality by practitioners in that field.

Taken together, these accounts of technical function and technical rationality provide a basis upon which it can be argued that the worldview of technical experts who design and devise technical artifacts influences the functions said artifacts are to perform and how their functions are to be performed. This is to say, the worldview of those who ascribe functions to an artifact originally will be implicitly in the artifact inscribed through its design and use.

Technical Artifacts:

Artifacts take on values through their use, intended and actual, as a result of intentional use being an aspect of their existence. Kroes (2006) argues that this is because technical artifacts have a dual nature. Technical artifacts can always be understood both structurally and functionally. If understood merely as physical objects, it makes sense to discuss their physical capacities and qualities, not function. Furthermore, the structural and functional dimensions of an artifact are mutually constitutive; for Kroes the design process is where the structural and functional conceptions of an artifact are brought to bear on each other. It is the intentional prescription regarding how a thing is to be used that designates it as technical; a purely physical account can only ever describe objects. So, by virtue of being a technical object, a technical artifact necessarily exists beyond its physical characteristics. In this sense, technical artifacts are value laden objects with social meaning.

In “Technology is society made durable”, Latour (1990) argues that technology is a “loaded” program that employs artifacts and artifice to implicitly reinforce the same behaviour a “naked” program explicitly demands. By “loaded” and “naked” Latour means the degree to which a program is encumbered with entrenched patterns of behaviour that are implicitly prioritized through the design of the program. He explains his definition of “loaded” through an example of a front desk clerk at a hotel who takes successive steps to ensure guests return their room keys anytime they exit the hotel. When requests at the time of check-in prove unsuccessful, the clerk adds a sign that permanently reiterates the request, and finally affixes a bulky weight to each key, such that it becomes a burden of which the majority of guests are happy to rid themselves when exiting the hotel. It is this process of supplementing a practice with material components that encourage performance of that practice that Latour calls “loading”. Conversely, a practice without the addition of material components is “naked” according to Latour’s terminology. For Latour, it is counterproductive to understand technology and society as disparate things; technology can be understood as the everyday practices, behaviours, and intentions translated into tangible, material form through the process of “loading”.

Kittler (1995) argues there is no software. His foundation for this argument is based upon understanding software as writing that has taken a form that presents its product as new. This is because, Kittler argues, the speed at which as a silicon central processing unit (CPU) is capable of inscribing data and the language in which it records said data alienates everyday human understanding from experiencing the activity of CPU as writing.

Similarly, Simondon believes that the relationship between culture and technology is often misunderstood. Simondon (2017) argues that culture and technology should not be understood as oppositional, respectively, human and alien phenomenon. He argues that culture has become impoverished with respect to technology by understanding technical objects only in terms utility and function while simultaneously ascribing a malicious or menacing character to them. Likewise, Simondon's description of the process through which technologies develop, expresses a basic, structural similarity to Latour and Kittler. Simondon provides an account of how a technical object emerges when a successive iteration of a technology gains more self-regulatory autonomy and its components integrate more closely that in its previous forms. As such, for Simondon, more developed technology has been less transparent and, hence, less readily accessible to everyday human understanding. In this sense, Simondon, Latour, Kittler,— and Marxist reification— although arising from divergent theoretical traditions that do not always align, express a similar point with regard to technology being the embodied, material form of a behaviour or practice.However, this similarity between Simondon's work and that of the other figures discussed with regard to this particular point concerning the development of technology is not a suggestion that their respective theories align beyond this point. Simondon's project is concerned with how culture can be enriched with a fuller appreciation for the modes in which technical objects exist such that humans can more transparently understand them.

Science and technology studies' (STS) analysis of the social construction of technical artifacts reinforces discusses the social forces that influence and shape just which technologies rise to prominence and become cultural dominants.

Bijker (1997), in Of bicycles, bakelites, and bulbs, expresses, through the example of competing bicycle designs, how it is a technology that best expresses and embodies a desirable behaviour or practice through its design, function, and cultural context of use that often triumphs, supposed technical superiority of alternatives notwithstanding. Similarly, in collaboration with Pinch, Bijker reiterates the social dimension of how technologies develop through their conception of "interpretive flexibility". According to the Pinch and Bijker the design of a technical artifact is not something natural or given to be discovered, but the result of inter-subjective negotiation among those participating in the technology's development.

Furthermore, reinforcing the argument that a technology, as a behavioural program given external form, is susceptible to taking on and perpetuating the biases and prejudices of its designers, Winner (2010), in "Do artifacts have politics?", provides the example of freeway overpasses on Long Island, New York. According to Winner, the overpasses were built at a height suitable for typical family vehicle to pass under it. limiting opportunity for intercity bus service. This design choice, according to Winner, carried socio-economic implications relating to class and race insofar as it limited access to those with their own car, which is to say, well off, white families predominantly.

Winner's analysis provides an understanding of some of the social consequences of this process of obfuscation a technology goes through as it develops. Neither is a technology merely that pre-existing behaviour or practice wrought material, nor is it the neutral, objective product of applied science. Instead, it is a social practice translated through technical practices based upon the logics of applied science, imbued with reflections of its makers' subjectivity and worldview at every step of this process of translation. So, a technology as complex as, say, a personal computer will be loaded with the implicit biases and prejudices in every layer of its making, based upon how its designers felt it ought to function, what it ought to be used for, and all associated socio-cultural implications.