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Techno-ethics Embedment: A New Trend in Technology Assessment

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Facing the ethical potentials of technology, there appears a new trend in technology assessment (TA) recently, which is techno-ethics embedment that aims embed ethical perspectives within the process of assessing and developing new technologies. There are two basic dimensions of this trend: the role of ethics and the status of technology. By referring these dimensions, I articulate two different TA modes of the techno-ethics embedment: One is the ethical technology assessment (eTA) that appears as a combination of an ethical judge with the objective technological force, while the other is the combination of an engaged ethical participant with an active technological mediator. Moreover, there is an ideal status of this trend that is an engaged ethical participant with an active technological mediator. As the thought of technology accompaniment shows, both the "agency" of human and technology will be embodied to the most in this ideal status of techno-ethics embedment.

Keywords: technology assessment, techno-ethics embedment, technology accompaniment

1. Introduction

As an analysis tool of policy-making in technology development, technology assessment (TA) has developed various patterns in its nearly 50 years of history from 1972 with various concerns about technology, such as the more active role of TA in technological development or technologies in specific fields. For example, Constructive Technology Assessment (CTA) broadens its decision-making process by taking social considerations into the design stage of technology via a democratic way (Smits 1990); Health Technology Assessment (HTA) focuses its attention on examining the short- and long-term impacts of technology in health field (Ten Have 2004).

As the impacts of technology turn to be far-reaching and wide, the examining range of TA is no longer limited in financial considerations and cost control, but includes Environmental Impact Analysis (EIA), Social Impact Analysis (SIA), Privacy Impact Assessment (PIA), etc. (Palm and Hansson 2006; Ten Have 2004). In the meantime, the moral implications of technology have also been widely addressed in contemporary studies of technology, and ethics began to play a more important role in technology assessment. For example, ethical technology assessment (eTA) aims at identifying potential ethical implications of new technologies at its early stage by a check-list approach (Palm and Hansson 2006); ethical-constructive technology assessment (eCTA) is proposed to be beyond the checklist approach in eTA and connect the ethics of technology more closely with technological development (Kiran, Oudshoorn, and Verbeek 2015).

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This paper aims to articulate a new trend in TA, which is called as “techno-ethics embedment.” At first, I will discuss the theoretical basis of this new trend, and elaborate two dimensions in the trend of techno-ethics embedment, which are role of ethics and status of technology. After that, I will show different statuses of current TA approaches according to these two dimensions with a detailed analysis. Finally, combining with the idea of technology accompaniment, I will propose the ideal status of techno-ethics embedment, which is the active engaged ethics with intended technological mediators.

2. Techno-ethics Embedment Trend in TA

2.1. The Theoretical Basis of Techno-ethics Embedment

The trend of techno-ethics embedment in TA is based on contemporary studies on the value-laden of technology and interactive dynamics between technology and ethics. Since the 20th century, the interaction between technology and society has gained lots of attentions in many fields, such as science and technology studies (focus on technological and societal development), economics (focus on technological and economic development), and ethics of technology (focus on techno-moral changes). In the field of philosophy of technology, instrumentalism of technology is replaced by the axiology of technology with the development of researches on social constructivism. In other words, technology is no longer regarded as the instrument controlled totally by human beings but something with non-neutral values and social impacts. For example, while Winner proposed that technological artifacts have political implications and embody social relations and power (Winner 1980), Mumford showed the relationship between technologies and bioviability and argued for a kind of “biotechnics” that function in an ecologically responsible manner (Mumford 1970).

Among those various social impacts, the morality and ethics are also changing with the development of technology. According to various studies in ethics of technology (Latour 1992; Ten Have 2004; Verbeek 2011), human’s moral action and ideas are fundamentally shaped by technologies. For example, the speed bump will help drivers to slow down for the safety condition in residential areas; and the implant technology and assisted hearing technology will introduce different definitions and ideas about deafness. Given that, it is proved necessary for us to take ethical perspective into consideration in assessing the introduction of an emerging technology.

Besides the value-laden and ethical implications of technology, researches on the dynamics of technology and society also contribute to the trend of techno-ethics embedment in TA. On the macro level, the Social Constructivism of Technology (SCOT) articulates how social factors play their roles in technology development. Against the technological determinism, social constructivists hold the idea that technology does not determine society but is shaped and embedded in social context. For example, the role of government is building a suitable environment for technology development, which includes a good education system, high-quality public research and appropriate tax policy, etc. On the micro level, the empirical turn in philosophy of technology in 1990s opened the black box of technologies. In this empirical turn, philosophers focused their attention on certain technologies and proposed a different approach including pragmatism, post-phenomenology, STS, and even engineering-oriented means, which reveals diverse practices and processes that constitute technologies (Brey 2010).

Recent insights on interactions of technology and social factors show the openness and constructiveness of technology, which provide the feasibility to introduce ethical factors into the whole process of technology

development from design, implement to use. In other words, facing the interrelatedness of technology and ethics, it is time for us to not only consider the moral implications of technology, but also bring ethical factors into practices and process of technology, which I describe as the trend of techno-ethics embedment.

2.2. Two Dimensions of Techno-ethics Embedment

Techno-ethics embedment, as we can see from its name, has two basic dimensions: the role of ethics and the status of technology. As for the role of ethics, there are two main approaches for ethicists when considering the ethical impacts of technology. One is playing as "a border guard assessing whether a technology is morally acceptable or not" from an outside position by applying the existing ethical norms and moral values, which is the consistent position that ethicists take. According to Verbeek (2013), such an outside position becomes impossible due to the blurring boundaries between humans and technologies, because the outside position and the boundary that ethics want to defend do not exist. Meanwhile, there appears a new role of ethics: an engaged participant who anticipates and analyzes the ethical implications of technologies from within, and even deals with related ethical issues by participating and making a constructive role in the processes of technology. As Brey said in his "Philosophy of Technology after the Empirical Turn,"

> The difference is that it normally does not attempt to determine whether modern technology is good or bad and whether we should reject or embrace it. It rather tends to accept that we live in a technological culture in which the constant introduction and utilization of new technologies is a normal part of how society works. It then asks how we can deal with such new technologies in a responsible manner. (Brey 2010)

As for the status of technology, there are also two statuses of technology in the practice of techno-ethics embedment: One is playing as an objective force in the dynamical interactions of techno-moral change, while the other appears as an active mediator in shaping ethical issues and moral subjectivity. According to the mediation theory (Verbeek 2011), technology plays as a moral mediator in the interactions with human beings by co-shaping the behaviors and decisions of people in their moral actions. More specifically, technological mediation can not only co-shape people's moral decision and behaviors, but also address new moral problems and create new moral situations. In practical process of technology assessment, technological mediation can be used as an analysis framework for anticipating how the emerging technology will influence people's moral idea and decision, which contributes to a well-informed technology assessment. In addition, technological mediation is neither the uncontrolled force nor instrument totally governed by human, but a mediator with some kind of hybrid intention that enables it to play an active role in ethical practice.

3. Different TA Modes in Current Practices of Techno-ethics Embedment

According to these two dimensions, we can distinguish and compare the different statuses of current technology assessment modes concerning ethical issues of technology in the trend of techno-ethics embedment, which are ethical technology assessment (eTA) and ethical-constructive technology assessment (eCTA).

According to Palm and Hansson (2006), eTA serves as a tool for identifying potential ethical issues of new technologies at its early stage, which should be taken in the form of a continuous dialogue with technology developers. More importantly, as engineers and other stakeholders lack adequate training about ethical sights, a check-list approach is provided by a systematic anticipation and analysis around ethical aspects of a technology in TA, which cover nine most common issues related to new technologies according to historical experience. In the eTA model, the role of ethics is more like an independent judge focusing on the adverse ethical impacts of a

new technology. For one thing, it insists on benefiting from keeping theory independent and applying moral philosophy to characterize problems and provide alternative solutions. For another, the focus of eTA on adverse effects restricts participants of TA to evaluating how a new technology will harm for existing morality and return to assessing the acceptability of it. As for technology, it is treated in the model of eTA as a passive object of being-evaluated, which is due to its image of objective moral force or instrument that should and can be placed totally in human's control.

Different from the eTA model, ethics loses its external position as a judge because of its mediated feature in the eCTA approach. Based on the mediation theory, which reveals how technological artifacts mediate people's experience and behaviors in daily life and then take part in co-shaping moral actions and ethical issues, the ethical implications of technology are not only limited in adverse impacts but also contribute to the realization of moral values and even the change of moral ideas. Thus, in context of eCTA, technology is not an objective force to moral changes that stay in black box and can be steered totally by humans, but a mediator with some kind of intentionality that should be treated seriously. In the meantime, it is claimed in the eCTA approach that ethical norms and societal values are always changing with the development of technology, and there is no external and neutral position for ethicists to make an assessment on technology (Kiran et al. 2015). Facing this uncertainty characteristic of technology, instead of anticipating the consequences passively, it is more feasible to engage in assessing the technology at its early stage in order to make constructive decisions about the design and implementation of a technology. Thus, the role of ethics in eCTA is more like an active participant within the process of technology development, instead of standing outside and applying pre-given ethical principles to assess the potential resulting consequences of technology.

In the family of technology assessment, eTA and eCTA are both approaches that try to address ethical issues and implications of emerging technologies by assessing them during the actual process of technology. In these two approaches, assessment does not simply mean deciding "if a technology is morally acceptable or not" any more, and the primary task of them turns to be delineating and analyzing the ethical issues and implications of technologies systematically for further evaluation (Kiran et al. 2015; Verbeek 2013). However, although both the eTA and eCTA approaches are attempts to embed ethical sights into the process of technology development through technology assessment, they appear different characteristics from each other: the former appears as an ethical judge with the objective technological force, while the latter figures as an engaged ethical participant with an active technological mediator.

4. The Ideal Status of Techno-ethics Embedment

Among various combination modes between technology and ethics in their embedment, the ideal status should be the active engaged ethics with intended technological mediators. In this section, I will give argue for this ideal status in detail by discussing the idea of technology accompaniment.

Facing the interactions between ethics and technology, it is important for us to give full play to each of them and combine them together to realize the co-development. For technology, it means to acknowledge its roles in co-shaping ethical issues and moral values, and bring their positive impacts into full play in practice. As those scholars who support moralizing technologies or our material surroundings hold, it is not a threat to humanism, or a defense of technological determinism, but a new way to enlarge the realm of ethics and enrich the possibilities and forms of approaches in which people take their moral responsibilities (Kiran et al. 2015; Verbeek 2013). For ethics, it is necessary to acknowledge its "mediated" characteristic, based on which to deal

with the ethical principles in such a way that they can still function as an active participant to engage into this embedment practice in a certain degree.

The reason why I take this combination mode as the ideal status of techno-ethics embedment is that the "agency" of both human and technology is embodied to the most in practice of this mode. Among various definitions of "agency," from causal efficacy, delegation to moral autonomy (Johnson and Noorman 2014), I will take the "causal efficacy" definition of agency, which means the ability to make a difference in short, as a theoretical base to further articulate the significance of this mode to the techno-ethics embedment practice. On one hand, by deliberate treating technology as a moral mediator, technology can gain the "legitimacy" to morally influence users' behaviors and experiences, and then mediate them according to those embedded ethical norms or values. On the other hand, instead of ignoring technological mediations and leaving them alone, the best way for defending human's agency and taking our responsibility is to actively engage in assessing and shaping technologies that impact us.

In the framework of technology accompaniment, this ideal mode of techno-ethics embedment is proceeding in the whole process of technology development by anticipating, evaluating, and designing those mediations deliberately. As Verbeek said,

> The real challenge is to develop new ways of doing ethics of technology, that shift their focus from "assessing" technologies toward "accompanying" their development, implementation and use. Rather than determining whether a technology is morally acceptable or not, the ethics of technology could focus on the question of helping to shape good hybrid. (Verbeek 2013)

In technology accompaniment, which is articulated opposed to the traditional technology assessment by Verbeek, the ethical implications of technology are exposed to all the participants in technology assessment, which contributes to making informed discussions and decisions on how to embed ethical perspectives into technologies. From this point of view, assessment on ethical aspects of technology appears to be some different significances in this mode.

Firstly, the focus of TA is broadened to the micro-level of dynamics of the techno-moral change. As we can see from the eCTA approach, by taking how individuals interact with technologies into consideration when assessing ethical aspects of a technology, the eCTA approach emphasizes the active role of technology in constitution of ethics and morality, and technology turns its role from an objective force to the active mediator. Additionally, with the empirical description of individual-technology interactions on micro level, it helps to anticipate ethical consequences of new technologies more adequately than traditional TA that is carried mainly from the macro perspective.

Secondly, the aim of TA is not only to anticipate and evaluate the ethical potentials of new technologies at the early stage, but also to clarify and balance value conflicts hidden behind for further shaping them. With this purpose, ethics plays its role more radically and practically in the new trend of technology assessment. As we can see from eTA and eCTA approaches, both of them put much attention on the involvement of various perspectives, interests and groups in the developmental process, and give emphasis to ethical insights in the dialogues among technology developers, policy-makers, and the public. More specifically in the implementation, eCTA is developed by connecting to the well-established approach of CTA (J. Schot and Rip 1997; J. W. Schot 1992), which has a different feature from traditional TA: to broaden the design of new technologies and the redesign of old technologies (J. Schot and Rip 1997).

Furthermore, it needs to be addressed that in the framework of technology accompaniment, the ethical statue of technology does not only make it possible to include technology into ethical consideration, but also direct at a practical appeal of "moralizing technology:" embed certain moral values or norms into technological artifacts through design. When technologies are inherently moral entities, this implies that designers are doing "ethics by other means:" They materialize morality (Verbeek 2006). By designing technological mediations intentionally, moral agency of both human and technology is embodied the most in practice. And technology assessment, such as the eCTA approach, serves as an anticipating tool for developers to make informed decisions when designing technological mediations.

5. Conclusion

Within the most recent development in the field of technology assessment, there appears a new trend that aims to connect the ethics of technology more closely to technology development. In this paper, this trend is articulated as the techno-ethics embedment by its concerning about the interactions between technology and ethics. There are two crucial dimensions in this trend: One is the role of ethics that turns to address ethical issues associated with new technologies at their early stage; the other is status of technology that has ethical implications and moral relevance no matter as consequences or hybrid intentions of technologies.

Among the various modes of technology assessment, ethical technology assessment (eTA), and ethical-constructive technology assessment (eCTA) are both attempts to embed ethical sights into the process of technology development, and the primary task of them is to clarify the ethical issues and implications of technologies systematically for further evaluation. Meanwhile, these two approaches appear different in terms of the two dimensions of techno-ethics embedment: The former appears as an ethical judge with the objective technological force, while the latter figures as an engaged ethical participant with an active technological mediator.

Although these different TA modes show the diversity of techno-ethics embedment, there is an ideal status of this trend that is an engaged ethical participant with an active technological mediator. And both the "agency" of human and technology will be embodied to the most in this ideal status of techno-ethics embedment. As the thought of technology accompaniment shows, technology will gain the "legitimacy" to mediate users' behaviors and experiences according to those embedded ethical norms intendedly, while ethics will retrieve its voice in practice by getting actively engaged in assessing and shaping technologies. Most importantly, with this new trend of techno-ethics embedment, TA will also get improvement in its anticipation and governance of technology development in society.

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