Preparatory Ethics University prior to Participatory Technology Assessment (PEUPTA)

– A New Approach to Public Engagement in Science and Technology

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Abstract

This paper provides a new approach to public engagement in science and technology. The work derives from the idea to recall the necessity of a paradigm shift for not only agent-focused, but also agent-centered as well interactive-deliberative engagement mechanisms with low or high policy relevancy. For this purpose, an evaluative synthesis is presented, aimed to offer the modern concept of the Ethics University as a preparatory element prior to the traditional Participatory Technology Assessment. The primary aim of a Preparatory Ethics University, in the form of a seminar with learning stations, would be to supplement and support existing participatory mechanisms. But also it would lay ground for new designs in public engagement processes. This interlinked concept shall increase effectiveness of public engagement and deliberation for decision-making purposes. Being informed about ethical matters in educative and reflective dialogues can be a fruitful pre-step to a well-informed decision during an important Technology Assessment. In this interdisciplinary work, I will first justify why public participation and deliberation was necessary and then present the understanding of public participation in science and technology. Second, I will present relevant public engagement concepts, as previously mentioned, and interlink them to point out combined strengths and benefits from a Preparatory Ethics University. Third, I will open a discussion about the challenges each concept poses, objections that might occur towards a Preparatory Ethics University prior to Participatory Technology Assessment, and the accompanying answers to those. I will conclude that this new approach creates substantive opinions, empowers, educates, and deliberates on complex and controversial issues while increasing reasonable decision-making. Thus, this new approach can be considered as a new type of public engagement in the field of science and technology.

keywords: science and technology, participatory technology assessment, public engagement, public participation, public deliberation, ethics university
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Decision-making about emerging technologies requires collaboration among all stakeholders and especially the involvement of the public. Public engagement and participatory mechanisms open a forum where valuable knowledge between scientists, experts, and laypersons can be exchanged or decisions made. In the field of science & technology (S&T), public engagement can be applied, for example, in Participatory Technology Assessment (pTA). Literature reviews of public engagement in science & technology show that public engagement concepts are theoretically embodied in pTA and that many authors (Rowe & Frewer, Korthals, Gastil among others) highlight the need for more empirical studies in the field in order to improve public engagement in science & technology. Recent studies in the field focus more on presenting and transmitting information and selecting participants than how to make engagement models more accessible to the wider public and to increase effectiveness of engagement mechanisms.

Technology Assessment itself has two branches: evaluation of the critical aspects of emerging technologies and policy-making relevant to technologies. The public can be involved at different levels in science & technology assessments and policies, depending on the objective of a public setting. Participatory mechanisms can offer a forum of discussion and deliberation with higher or lower policy relevance. I argue, that one way to improve the participatory aspect of TA is to assess new models of public engagement that are more interactive and deliberative than the traditional informative and consultative ones. The traditional objective of deliberation is to deliver consensus and decision-making in a discussion; to decide ultimately which controversial action would be right or wrong. Yet, the deliberation exercise per se can support policy-making effectively, and therefore I suggest a mechanism that supports this idea. My idea also corresponds with the required paradigm shift that can be found in the broad field of science & technology, and that shifts the focus toward deliberative public engagement. I agree with Korthals (2013) that the aim of an involvement process should primarily be “increasing the awareness of participants of the ethical and social problems of new sciences and not always decisions or regulations with respect to these sciences” (Korthals 2013: 103)\(^1\). Nonetheless, an effective

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\(^1\) Although Participatory Technology Assessment provides a wide ground for ethical discussion, where one can find multiple ethical concerns within the practical application of the concept, I will not focus on the ethicality of pTA per se. For example, concerns about individual vs. mass opinion (see Mill 1859, Dworkin 1966, Hart 1963), unequal participation (Korthals 2013), etc. Ethical Technology Assessment (eTA) discusses within TA ethical aspects of emerging technologies. However, there is yet no focus on ethics and public engagement mechanisms.
deliberation process will have direct or indirect impacts on policy-making, and it is therefore important to put the focus on the level of involvement of public within the concept of Participatory Technology Assessment. Since public deliberation in pTA is rather passive due to different societal and political reasons, I argue that another supplementary mechanism is needed for backing up pTA. For this purpose, I suggest a new approach, namely the Ethics University, which can be interlinked with the concept of Participatory Technology Assessment in science & technology. A Preparatory Ethics University\(^2\) would be a public engagement mechanism in form of a seminar of 2-4 days. It is a new participatory approach to public engagement that is based on a consultative-informative and deliberative-educative concept with the goal of discussion and substantive opinion generation on complex issues concerning science & technology. My aim is to realistically interlink both concepts in various venues, and to use their strengths for an increased effectiveness of public engagement in science & technology. In this paper, I will not focus on a particular technology since I believe this is not important for this instance.

The conceptual framework can be found in the first part of the paper. The essential introductory questions are as follows: why public participation and deliberation was necessary, and what participation technically meant. I will provide a summarized literature review about public engagement in S&T and only highlight aspects that I believed to be relevant to answer my questions\(^3\). Rowe & Frewer (2000; 2005) provide a typology and evaluation of engagement models. I will mainly refer to these authors to clarify certain definitions used in the literature of public engagement.

In the main part of the paper, I will introduce the relevant concepts: first, Participatory Technology Assessment; second, Ethics University; and third, their interlinking with each other: Preparatory Ethics University prior to Participatory Technology Assessment (PEUPTA). In this section, I will present benefits that I see from PEUPTA as an interlinked concept of public mechanisms.

Since there will also be objections to this new approach, I will open a comparative and evaluative discussion in the final part. The discussion will start with challenges that public engagement and science & technology are generally opposed to, followed by possible objections to a Preparatory Ethics University. The main criteria which shapes the discussion is the effectiveness to provide an interactive and educative public engagement

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\(^{2}\) I will use the term “Ethics University” based on the concept of Strech et al. (2016) which is a title for a seminar like public involvement mechanism and not a formal educational body.

\(^{3}\) I will not focus on policy-making per se nor in-depth on public mechanisms as such.
mechanism, and thus a forum for all stakeholders where it is possible to elaborate mutual understanding, mutual knowledge transfer, collaborative deliberation, and substantive opinion generation at a high level. I will conclude that the concept of an Ethics University fulfills these criteria and therefore can be recommended as a preparatory element for public engagement in science and technology.
1 Public Engagement

In this part, I will shortly present why public engagement was necessary and why society should, at best, be integrated into policy decision-making in general, and at processes of moral deliberation. The reasons are normative according to democratic principles but also functional. I will also explain the understanding of public engagement and participatory mechanisms\(^4\) in the literature of science and technology.

1.1 Why Public Engagement?

Concerning emerging technologies, there is in general an academic, political, and ethical consensus for the necessity of public engagement with high or low policy relevancy. The evolution and rise of public engagement is marked by several turns and models. Cases from the United States, United Kingdom, the Netherlands, and Germany are predominant in the academic literature. Some specific deliberative developments in the past two decades can be especially found in Canada, Brazil, and India (see Gastil 2013: 13)\(^5\).

From the democratic perspective, the main idea to make policy-making more inclusive derives mainly for the need to regain public trust that institutions and politics has lost (see Hennen 2013: 32), as well to promote democracy and “democratic values, accountability, and non-domination” (Dodds 2013: 69). Socially seen, public engagement is a way to reconcile society and technology and to include the public into processes of “developing, implementing, and regulating a technology” (Carroll 1971: 647). Public engagement can also be seen as a legislative requirement. Van der Burg (2001) criticizes the understated use of the expressive-communicative dimension, or the “symbolic function” of legislation (Van der Burg 2001: 40), especially concerning contentious moral issues. According to Van der Burg, legislation is a tool to express collective and individual identity as such and by doing so, it can define important values, irrelevant from the fact whether those values are controversial (see ibid.: 36f; 43). From the communicative perspective, policy influences social reality through the provision of discussion forums, for example, through court proceedings, parliaments, or lively public debates on moral issues supported by legal and non-legal institutions. These institutions might be explicitly created

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\(^4\) Synonyms for mechanism are i.e. exercise, setting, model, technique etc.

\(^5\) For further reading, see Hendriks (2005) for the beginnings of participatory mechanisms, Chambers (2003) for the origins and for recent developments.
by law for communicative purposes, for example through ethics committees, review boards, societal groups, or others. They play an important role in the discussions, not to make a decision but to guide through the discussion (see ibid.: 48-50). From the scientific perspective, public engagement can be seen as “a method of citizen engagement with science” (Cobb 2013: 106). In the early 1980s, it was also believed that the general public was illiterate in science, and had to be educated in understanding science⁶ (see The Royal Society 1985). From the pedagogical perspective, documented evaluations show that contrary to this notion, non-experts can also participate at discussions and argue reasonably about difficult issues in science and technology and engagement mechanisms (see Hennen 2013: 34). Furthermore, public engagement is suited perfectly “for initiating cooperative learning processes” (ibid.).

To conclude, public engagement is grounded in democratic theories with informative, communicative, educative, and epistemological arguments. Its practical implementation can be found, for example, in the concept of Participatory Technology Assessment within science and technology, which I will present later in this paper.

1.2 Why Public Deliberation?

The deliberation process builds the main body of modern public engagement. The so-called “deliberative turn” in the late 19th and early 20th centuries came along with political philosophers such as James, Peirce, and particularly Dewey’s democratic theory (see Dodds 2013: 72).

According to Cobb, there is no single definition of deliberation, yet it can be said that deliberation “involves a particularly sophisticated version of talking, listening, and reasoning” (Cobb 2013: 121). He clearly points out that discussing a topic during an engagement was not automatically the same as deliberating on it (see ibid.). He argues that “the literature frequently blurs the crucial conceptual difference between having citizens talk about science and having them deliberate about it; […]” (ibid: 115, italics in original). Cobb discerns that “an implicit level of cognitive activity is required when explaining one’s preferences and when considering others’ viewpoints. […] Deliberation requires offering explanations and evaluating competing claims” (Cobb 2013:121). Korthals (2013)

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⁶ For example, the “deficit-model” in public engagement in the early 1980s, the UK concentrated on science literacy and “regards science as the only knowledge capable of informing debates” (Reid 2013: 241). As a counter-movement, the “contextual model” took turn in the 2000s in the UK that “respects scientific expertise but also tries to validate forms of non-scientific knowledge” (Reid 2013: 241).
delivers five reasons why deliberation about technologies was a right of the public and why governments should be motivated to enable engagements. First, he names strategic reasons such as information gathering. Scientists express the need of support by society and their involvement so that innovative technology is applicable in the end by having filtered out what society wants or not. Second, the public, as taxpayers for projects in science and technology, has a right to participate in decision-making. Third, an epistemological reason is to see public functioning as a source of knowledge, since laypersons can also be experts in some fields. Fourth, the public as end consumers have to deal with consequences of technologies. In his last point, in reference to Kitcher (2002), Korthals argues that scientists seek the significant truth and not every truth and that public can be engaged in deliberations on “research priorities” (see Korthals 2013: 101-103). According to O’Doherty, the “deliberative discourse is characterized by a kind of convergence towards not necessarily agreement, but certainly, mutual understanding” (O’Doherty 2013: 138). It can be said that deliberation on moral issues includes multiple perspectives from various fields. Engagement mechanisms can be conceptualized and institutionalized accordingly.

In conclusion, reviewing academic literature on deliberation, many authors deemphasize seeking consensus in decision-making, in favor of an effective deliberative process as such. In an active moral deliberation on complex and debated issues, the public can serve as a source of value and knowledge. Even though literature sees deliberation as educating stakeholders or promoting communication of values solely implicitly, yet, I would argue to put an explicit focus on the multiple educative aspects of deliberation and its valuable enrichment in the field of public engagement that goes beyond exchanging information among stakeholders.

1.3 What is Public Participation?

Public participation is one type of public engagement next to non-participatory types such as public communication or public consultation (see Rowe and Frewer 2005: 261). Public engagement characteristics differ according to information flows, representation, role and interest of the public (see Beierle 1998: 2). The lowest level of public engagement is a top-down process where communication is one-sided with a one-way flow of information. Higher or the highest levels of communication are enabled through dialogue and two-way information exchanges (see Rowe & Frewer 2000: 6). For the purpose of this thesis, I will
focus on public participation with two-way information flows, since the interactive-
deliberative aspect can be found therein. According to the International Association for
Public Participation (iap2), the public participation goals are to inform, consult, involve,
collaborate, and to empower (iap2 2007).

The following table shows public engagement objectives and examples (see iap2 2007):

<table>
<thead>
<tr>
<th>Public Engagement</th>
<th>Example Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>example mechanism</td>
</tr>
<tr>
<td>Inform objectively</td>
<td>fact sheets, web sites, open houses</td>
</tr>
<tr>
<td>Consult and obtain public feedback</td>
<td>public comments, focus groups, surveys, public meetings</td>
</tr>
<tr>
<td>Involve and work directly with the public</td>
<td>workshops, deliberative polling</td>
</tr>
<tr>
<td>Collaborate and identify preferred solutions</td>
<td>citizen advisory committees, consensus building</td>
</tr>
<tr>
<td>Empower and place final decision making in hand of the public</td>
<td>citizen juries, ballots, delegated decision</td>
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Table 1: Public Engagement Objectives and Examples (see iap2 2007)

Rowe and Frewer (2005) provide a typology work, in which they create five categories
through descriptions made by different authors from the field that I will summarize here.
Since there are several hundred different mechanism types in the field of public
engagement, I prefer to look at them as categorized groups. Mechanisms can be
categorized through the following features (see Rowe and Frewer 2005: 261-284):

a. Empowerment (Arnstein 1969 mentions eight mechanisms).

b. Objectives (Glass 1979 identified twelve mechanisms).
   Objectives can be, for example, information exchange, education, support building,
supplemental decision making, representational input.

c. Structure (Glass 1979).
   The structure can be defined as unstructured, structured, active, or passive.

d. Public acceptability.
   Nelkin and Pollak (1979) see this feature as very problematic and mention three
definitions of the problem: lack of confidence, alienation, and inadequate
information for different mechanisms.

e. Function (Rosener 1975 set 14 mechanisms for four functions).
   A function can be used to solicit impacted groups, disseminate information, resolve
conflict, or facilitate advocacy among others.

The process of categorization is very complicated since there is an “unmanageable (in both
a research and practice sense) plethora of mechanisms” (Rowe & Frewer 2005: 264).

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7 I do not agree with this description of empowerment, since empowerment is a broad concept and the
implementation of a final decision made by the public is not the key element on which to focus. In general, I
would argue that these iap2-objectives are very superficially described, and need to be defined more
comprehensively.
Differences in general arise due to “between-mechanism variables” and “within-mechanism variables” (ibid.). Variables are for example: quantity of information, number of participants\(^8\), time consumption, purpose, resources, and contingent effectiveness (see ibid.: 261). Within-mechanisms comprise, for example, comprehensibility: “That is, it is important that recipients *fully understand* all of the information they receive” (Rowe & Frewer 2005: 272, italics in original). Due to the limited scope of this work, I will mainly refer to effectiveness and principally on objectives and comprehensibility.

Further, in their typology work, Rowe and Frewer (2005) classify four participation types with examples (see Rowe and Frewer 2005: 281f.) that I will summarize below. The authors identified in an earlier work nine common participation processes: referenda, public hearings, public opinion surveys, negotiated rule making, consensus conferences, citizen juries or panels, citizen advisory committees, and focus group (see Rowe and Rewer 2000).

**Participation Type 1**

Type 1 is characterized by a controlled selection of participants, facilitated face-to-face discussions, and unconstrained participant responses. It can also be identified by flexible information input from the sponsors, often in form of “experts” who are available for questioning by the public participants throughout a number of days. However, group output is not structured.

Examples: Action planning workshop, Citizens’ jury, Consensus conference

**Participation Type 2**

Type 2 is similar to Type 1, however there is no specific facilitation of the information elicitation process/input from group members, and no aggregation of opinions. Rather, there are small groups of participants (public representatives) with ready access to all pertinent information to solve specific problems. The focus here is not on controlling the group process and gaining fair consideration of all views, but on solving a problem.

Examples: Negotiated rule making, Task force

**Participation Type 3**

Type 3 exhibits similarities to Type 1, but with the difference that structural aggregation takes place. Structured aggregation is attained, for example, during a deliberative opinion poll, when selected participants are polled twice: before and after deliberation on the issue and questioning of experts. Planning cells (a German

\(^8\) Rowe & Frewer suggest controlled selection of those engaged in order to maximize the relevant population involved, according to the participant selection method (see Rowe & Frewer 2005: 268).
mechanism) use various decision aids to ensure structured consideration and assessment, and hence aggregation of opinions. Examples: Deliberative opinion poll, Planning cell

Participation Type 4
Type 4 is very different from the other types of participation. Aggregation (i.e. voting) is structured, however selection is uncontrolled (self-selected participants) and there is no facilitation of information elicitation. Nonetheless, public input takes place and therefore differentiates this type from general public meetings which are communication mechanisms. Example: Town meeting (New England model) with voting

The type of participation highly depends on the objective and expected outcome of the process and therefore has to be chosen carefully. The focus on a particular type and exercise puts inevitable restrictions on its design and implementation. However, the effectiveness of a participatory mechanism depends on more than function or structure. But when can participation be deemed effective?

The previously mentioned variable contingent effectiveness has two main concerns in terms of a mechanism’s fairness and competencies, such as democracy or consensus seeking (see Webler 1995; Rowe & Frewer 2000 in Rowe & Frewer 2005: 261). Effectiveness can be also extended by comprehensibility, “[e]ffectiveness […] depend[s] also on whether the participants understand and correctly process the information they receive” (Rowe & Frewer 2005: 283). According to Hennen, it is “visibility” and “resonance” that renders participation effective (see 2012: 33). Information elicitation and aggregation techniques can differ between and within a particular mechanism. Therefore, the authors suggest considering those aspects for the best enactment of public engagement mechanisms (see in Rowe & Frewer 2005: 283).

<table>
<thead>
<tr>
<th>Mechanism Variable: Contingent Effectiveness</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>General structure</td>
<td>Quantity of information&lt;br&gt;Number of participants&lt;br&gt;Time consumption&lt;br&gt;Purpose&lt;br&gt;Resources&lt;br&gt;Etc.</td>
</tr>
<tr>
<td>Fairness</td>
<td>Public acceptability&lt;br&gt;Equity&lt;br&gt;Democracy&lt;br&gt;Representativeness&lt;br&gt;Transparency</td>
</tr>
</tbody>
</table>
Influence Etc.  
Competence in achieving intended purpose  
Education  
Consensus  
Elicitation of views  
Etc.  
Comprehensibility  
Understanding and processing information input  
Context  
Use of specific techniques of information elicitation and aggregation for specific contexts

Table 2: Mechanism Variable: Contingent Effectiveness (see Webler 1995; Rowe and Frewer 2000 in Rowe & Frewer 2005: 261 and Rowe & Frewer 2005: 283 for extensions).

There is not a single effective universal participation method since its definition and application highly depends on contexts (see Rowe & Frewer 2000: 11). Therefore, a participatory mechanism needs to be carefully designed, according to a specific context, for a specific group and a specific purpose.

In my opinion, a full understanding of information that participants receive from sponsors, the organizers of a public participation session, is not enough to deem public participation as effective. Of course, a certain level of “mutual understanding” (O’ Doherty 2013: 138) could be reached, yet participants should also understand why they are present at a particular setting and why they are directly selected and actively involved in relevant decision-making activities with policy relevance. Thus, I argue, the effectiveness of a participatory mechanism also depends on understanding responsibilities: a setting would be successful if participants do not only understand technical facts to make decisions, but the reason for decision-making per se. For this purpose, participants could be provided with an educative-interactive arena of public engagement where self-development in ethicality and reasonable decision-making can also be evolved. This goal could be achieved, for example, via the concept on of an Ethics University integrated into concepts of public engagement in science & technology. I will focus on the concept of Ethics University in the following part of this work.

2 Interlinking Two Public Engagement Concepts

In the first part, I have explained why public engagement and deliberation in science and technology was important and necessary. I also described participation types and presented criteria to evaluate public engagement’s effectiveness. Expectedly, there are further criteria

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9 For example, national political styles, expectations about the role of government, local mechanisms for participation (e.g. Nelkin and Pollak 1979 in Rowe & Frewer 2000: 25).
to evaluate participation mechanism as such. Some unfixed criteria are, for example, representativeness of participants, early involvement, policy impact, transparency, resource accessibility, task definition, structured decision-making and cost-effectiveness (see Rowe & Frewer 2000: 12-20). However, Rowe and Frewer (2000) also point out that it is almost impossible to call a certain mechanism the best, and suggest, along with other authors (Smith, Nell, and Prystupa 1997), “hybrids of more traditional models” and in line with Fiorino (1990) “to complement one mechanism with another” (see Rowe & Frewer 2000: 24). While creating an exercise for science and technology, Korthals (2013) suggests considering transparency, to include the public as much as possible, set a clear and fixed agenda, provide impartial expert input, to remember that output of deliberation should affect decision-making, and keep public awareness lively (see Korthals 2013: 105). In this part, I will present an interlinking of two concepts where public engagement takes place, with the aim to meet the above-mentioned criteria. I will, therefore, suggest considering the concept of Ethics University as a supplementary mechanism for Participatory Technology Assessment. In principle, an Ethics University meets the basic objectives ipa2 has put for participatory mechanisms and the general criteria reviewed in the literature. It also fits the criteria for effective public engagement, as well serves as an appropriate approach to design a new or complementary participation mechanism.

2.1 Public Engagement and Participatory Technology Assessment

With the growing impact of emerging technologies on society, technological issues are increasingly regarded as societal and political issues. In science & technology, academic literature deals mostly with emerging technologies in health care (i.e. ARTs), environment (i.e. nuclear waste), or food and agriculture (i.e. Genomics). Carroll (1971) interpreted participation as a “countervailing force to technological alienation in contemporary society [US in 1970s]” (Carroll 1971: 647) and “redistribution of power” (ibid.: 653) while seeing Technology Assessment as an “attempt to comprehend, and to make informed decisions about, the [socially desirable or undesirable] implications of technological movement” (ibid.: 650). With the inclusion of society directly, or via representatives, into the process of Technology Assessment, the concept moved beyond impact analysis and established two different models that can be taken into consideration: a policy analysis model, that is

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10 For further reading, see Frankenfeld’s (1992) “technological citizenship.”
more contested since the creation of the Office of Technology Assessment (OTA)\(^\text{11}\) at the US Congress in the 1970s, and the public deliberation model that found more importance in Europe in the 1980s and 1990s. The deliberative model has not lost dominance in Europe, creating a “participatory turn” in Technology Assessment and science and technology policy making (see Hennen 2013: 27f). Hence, TA “aims at preparing a policy analysis that is as comprehensive as possible prior to decision making” (ibid.: 37). There are several types of pTA as policy consultation. A very common TA is Parliamentary Technology Assessment where mechanisms have to identify themselves with models of institutionalization: The “committee model” can be seen as a classical hearing sessions with a consulting character, where questions are answered and can be found, for example, in Greece, Italy, France, Finland. A second model, the “office model” is exercised in, for example, the EU Parliament, Germany, United Kingdom, and Catalonia. The “interactive model,” for example, is present in Flanders, Switzerland, Netherlands, Norway, or Denmark, and makes the concept of Technology Assessment public itself and gives a stronger voice to the public, through mediums such as scenario workshops, citizen conferences, public forums, science festivals or TV formats (see ibid.: 30). Indeed, in Hennen’s words: “PTA is obviously not a substitute for representative decision-making procedures, but it is meant to inform and supplement decision making in representative democracies. (ibid.: 40). Carroll points at the beginnings of pTA and its empowering function for “the individual who feels powerless in the face of technological complexity […] for the expression of his views” (Carroll 1971: 652). However, despite its implementation for decades, pTA is still very much criticized for not allowing laypeople to be involved at a serious level, which is contradictory to the very aim of participation per se, since “the authentic perspective of a layperson is systematically distorted in such procedures” (Hennen 2012: 32). As further Hennen explains: “A layperson’s rationality does not have a chance against expert knowledge and the formalized decision-making procedures aligned on factual reasoning” (ibid.). This criticism shows that pTA theoretically involves including laypeople in decision-making processes, yet practical participation, according to a set of public engagement goals, can be seen as very much neglected. The expectations towards a Participatory Technology Assessment are in general first, “to improve the knowledge basis of policy decisions,” second, contribute “to an informed public discourse”, and third, “to give a voice to perspectives” (Hennen 2013: 40).

\(^{11}\) OTA is closed meanwhile. Different countries apply different institutional models, i.e. the European Parliamentary Technology Assessment Network (see Hennen 2013: 28).
To conclude, Participatory Technology Assessment is a concept based on democratic and political practice. It is a medium to reconcile society, science and technology and to enable stakeholders to express opinions. However, substantive opinion generation among laypeople and holding a voice against experts is still a challenge for TA procedures. In order to contribute to an improved fulfillment of the expectations towards Technology Assessment, along with the general expectations towards public engagement, I will consider the concept of an Ethics University in the following paragraph.

2.2 Public Engagement and Ethics University

Ethics University is a four-day pilot project first initiated by the Hannover Medical School in Germany in 2012 and 2013. The concept is presented as a new public involvement model based on two concepts. This is firstly ethics literacy, which comprises information, interaction, and reflection. “According to the concept of “ethics literacy,” people need to be educated on each of the three levels in order to develop well-informed opinions on ethical issues” (Strech et al. 2016: 3). Secondly, the patient university\(^\text{12}\) that was already established to inform patients at the Hannover Medical School needed improvement. Ethics university is a combination of both concepts, ethics literacy and patient university, and can be seen as an advanced form of public involvement that shall “foster the formation of justified opinions” (Strech et al. 2016: 7). Its objective is therefore to inform lay people about ethical, legal, and social aspects of complex issues. At the pilot project adolescents and young adults were successfully informed about biomedical and health-care issues. In the pilot project, 227 participants comprising students and apprentices of the school, on average 20 years old, were involved. The events are intended to be on a specific topic, in this case regenerative medicine. Its evaluation and results are published recently in February 2016 by Strech et al. At the end of the project, questionnaires were distributed to the participants. Results show that 82% showed interest in further ethics universities on other topics. Discussions and role-playing were welcomed among participants to exchange with others and to weigh arguments. Also, it was important that participants could ensure the correctness of the statements (see Strech et al. 2016: 7). Yet, the authors see two main areas to refine. First, concerning time management, participants wished improvement of the interactive and reflective part of the event and suggested “a reduced number of learning stations, […] the opportunity to work more intensely on specific topics and to have longer

conversations with the respective experts and tutors” (ibid.: 8). Since the pilot project of Ethics University was successful, the authors suggest research in other “public information activities that apply the model of the Ethics University to participants of other age groups or other school formats” (ibid.). Additionally, they propose an empirical assessment of the “effectiveness of ethics universities as parts of larger [multi-staged] public involvement processes that include consultative or even deliberative components” (ibid.). Therefore, I suggest employing the concept of an Ethics University as a mechanism for public engagement in science and technology in line with Strech et al. (2016). Learning processes can increase factual knowledge, decision-making competences of laypersons, the understanding of ethics and disseminate ethicality per se. The study of controversial issues can be exercised in pedagogically creative manners such as in learning stations as exhibited in the pilot project. However, since participants asked for longer discussions, a more vivid “theoretical workshop” could be for example through courtrooms13 with science experts, ethicists, a moderator, and a jury composed by different stakeholders.

To conclude, Ethics University is a successful pilot project and can be considered as an informative, interactive, reflective and educative engagement mechanism. According to the demand to employ this concept also in other fields, I suggest that an Ethics University can be applied effectively within public engagement in science and technology. Further empirical research on how to operationalize this approach in particular for science and technology policy is of course indispensable.

2.3 Preparatory Ethics University and Participatory Technology Assessment

In order to be able to participate at a Technology Assessment successfully, where lay persons as deliberants can contribute to an important outcome or decision, it is only fair and necessary to provide them with an appropriate level of knowledge at first. O’Doherty also confirms that a special design of public engagement is needed to provide lay people with information about a debated topic (see O’Doherty 2013: 135).

In the previous parts, I provided reasoning as to why Technology Assessment and Ethics university could best be combined, primarily to increase mutual understanding among participants (O’Doherty 2013), to fully understand the issue (Rowe and Frewer

13 Alike the scientific BBC dramadoc show If... Cloning Could Cure Us that was designed to trigger public participation, see Reid (2013). However, it is important to note that BBC used fictional narratives that lead to fiction/fact confusion, and that see (Reid 2013: 241).
to increase cognitive ability to deliberate (Dodds 2013), to involve the public at a very early level (Rowe and Frewer 2000), to develop so-called well-informed “better citizens” (Cobb 2013), and to keep public awareness lively (Korthals 2013). Also, I pointed out that Technology Assessment expected laypeople to be better informed (Hennen 2013) as well Ethics University to be possibly performed in other formats (Strech et al. 2016). In this part, I will show further utility of the new approach of Preparatory Ethics University (PEU) as a supplementary mechanism to traditional participation mechanisms in science and technology, for example, for the purpose of Technology Assessment, where deliberative processes can be evolved with low or high policy relevance. This new approach could serve as a pre-step towards more inclusive and educative Technology Assessment and policy decision-making, meanwhile it is deliberative in a particular topic and in being ethical per se.

Having presented both concepts in and for public engagement, I personally and conclusively find additionally five main results in the supplementary fit of Preparatory Ethics University prior to Participatory Technology Assessment, which are not in a particular order14:

1 – Systematic deliberation. Interlinking both concepts can divide the deliberation process in public engagement for TA purposes into two steps. Ethics university can be seen as the first step and first technique for an intensive reflexivity on a certain topic with the functions of information, consultation, education, and facilitation of opinions. Whereas in the second step, a traditional public engagement mechanism can be used for a final competent deliberation on a controversial topic. Traditional mechanisms supported by a systematically organized Preparatory Ethics University will eventually provide stronger collective statements made by the public that can be of high relevance for policy-making.

2 – Mutual understanding and knowledge transfer. Ethics University can provide an arena for the exchange of so-called “push” and “pull information”15 (Castle 2013: 153) and transfer of knowledge between laypersons and scientists, while contributing to a mutual understanding. For example, outcomes of a particular setting can be used to give an insight

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14 These are of course theoretical and hypothetical results which require empirical investigation.
15 ““Push of information to citizens by government, civil society or other groups […] “pull” of preferences from citizens” (see Castle 2013: 154).
about the interest, awareness, motivations and capabilities\textsuperscript{16} of deliberants for researchers, but also researchers and academics have the opportunity to transfer knowledge. A setting at the Ethics University can also provide results for risk managers or policy experts and input for regulation making by governments. Reid (2013) refers to studies\textsuperscript{17} conducted in the field of science and technology and concludes first, that laypersons simply “had alternative knowledge […] that scientists did not take into consideration” which was mistaken as an unwillingness to follow scientific knowledge (Reid 2013: 241). Second, that people “want evidence that policy changes are scientifically necessary” and not only to support scientific discoveries (Reid 2013: 241). Ethics University could be seen as an independent information forum where mutual understanding can be developed, uncertainties be reduced, and epistemological injustices between laypeople and experts decreased.

3 - Interdisciplinary education. Ethics university promotes the cognitive ability to reason decisions made by deliberants themselves. Hence, empowered participants will be motivated for acquiring knowledge, creating abilities of knowledgably reasoning and expressing opinions for increased engagement. O’ Doherty shows in his empirical studies\textsuperscript{18} with biotechnologies that “the purpose of deliberation can be reconceptualized as producing substantive opinions” (O’ Doherty 2013: 137, italics in original). O’ Doherty’s studies also show that participants in deliberation settings need to understand their reasoning, why they explicitly decide on one aspect of the issue and not another (see O’ Doherty 2013: 143). However, I argue, science and technology literature shows education more passively, as a tool to inform society about topics, for example, via leaflets, exhibitions, and media (Cobb 2013: 122). An Ethics University can provide an active forum where education goes beyond passive information distribution and includes learning stations and discussion arenas from different fields that reduce the uncertainty of stakeholders and educate laypeople in interdisciplinary fields.

\footnotesize{\textsuperscript{16} For further reading about research in S&T and knowledge mobilization, study design, date collection etc, see Castle (2013).  
\textsuperscript{17} First result is in reference to study concluded by Wynne (1992) that “people’s lack of support was not necessarily caused by low levels of scientific literacy” (Reid 2013: 232). Second reference: Focus group participants at the BBC program If ... Could Cure US had to answer questionnaires before and after the policy assessment based on fictional narrative (see Reid 2013).  
\textsuperscript{18} See studies on human tissue banks and salmon genomics, i.e. on the question if salmon genomics should be created and sold in supermarkets. In terms of reasoning, one result was that deliberants decided to agree on GM salmon’s sales but only with labelling. Though, they did not know why or could not explaining and thus reason the necessity of labelling (see O’ Doherty 2013).}
4 – Empowering subjectivity and authenticity. The focus of traditional participatory mechanisms is usually solely objective with the focus on the outcome of the exercise purposeful for policy decisions. Within the new agent-centered concept of Ethics University, there would be a stronger emphasis on the supportive personal development of the subjects. Involvement at this stage goes beyond the theoretical and traditional participation expectations aimed at finding the truth in a debated complex issue, making concrete decisions or simply regaining democratic trust. Shifting the lens from objectivity to subjectivity and putting subjects as the main focus of the engagement mechanism will increase participants’ subjective value and hence motivation and encouragement for effective participation. Ethics University could empower stakeholders through strengthening their viewpoints, helping them to develop and express substantive opinions that they might not be able to deliver properly due to lack of knowledge and hence confidence.

5 – Conscious re-call of virtues. On a meta-ethical level, Ethics University can provide a better understanding of ethicality within society – of being ethical per se\textsuperscript{19}. Members from the society are directly addressed to make responsible decisions with the total awareness of doing so. For this purpose, they know that they will eventually need to attend an educative-deliberative participatory setting and to deal collectively with ethically relevant matters.

To conclude, the results presented show that a Preparatory Ethics University not only provides information about an issue and empowers participants at public engagement exercises. In my viewpoint, it also actively deliberates on an issue, educates, and supports reasonable self-development of capacities for decision-making as well virtues. Technology Assessment in science and technology can benefit from an Ethics University in all these aspects and can increase effective participation with policy relevance.

3 Discussion

\textsuperscript{19} It is not enough to argue ethically, but to understand the necessity to be ethical. I argue that society needs supportive education in “living ethically” by institutions specifically designed to re-call ethicality as a virtue achieved through self-development and with the purpose of human-flourishment following Aristotelian thoughts.
Challenges and objections towards a certain mechanism can derive mainly from questioning the need and implementation of a certain mechanism. In this part, I will summarize challenges that both concepts may have and discuss objections towards the new approach of PEUPTA.

3.1 Challenges for Public Engagement and Ethics University

As with every concept, public engagement concepts also have drawbacks and implementation challenges in various aspects. These are, for example, concerning democratic principles, legitimation, trust and epistemology, financial resources, conceptualization, and implementation. For the discussion, I reviewed general challenges from the literature on public engagement in science and technology.

In terms of public engagement, the biggest challenge above all is probably to make the public aware about concepts that favor involvement and engagement in participatory processes. Participatory Technology Assessment itself has to be known to the public first, so that society is willing to participate in debates or on policy-making processes. Especially, the institutional setting and its mission is very important (see Hennen 2013: 35). Imprecise definitions also pose a challenge, that hinder research and practice in the field, thus effectiveness of the public participation domain (see Rowe and Frewer 2005: 284). Much more empirical research has to be done about the outcome and impact of mechanisms and the deliberation process (see Rowe and Frewer 2005, Gastil 2013, Cobb 2013, Hennen 2013). In terms of collective judgment and public consensus, Gastil (2013) refers to intercultural challenges that might occur due to collectivist vs. individualist principles and/or egalitarian vs. hierarchical/traditional principles (see Gastil 2013: 12). In terms of deliberation, challenges in general are unequal participation, cognitive and normative uncertainties, different scripts, multi-level problems and the deliberative role of deliberation-eliciting technologies (see Korthals 2013: 109). Within Preparatory Ethic University, the challenge would be to design an effective and appropriate concept that is compatible with Technology Assessment goals. In general, the number of participants is

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20 For further reading, see Phillips (2013): Democracy, Governance and Public Engagement.
21 For further reading, see Dodds (2013): Trust, Accountability, and Participation.
22 Denmark and the The Danish Board of Technology as an institution in pTA is a successful example.
23 “[T]hese individualists celebrate scientific discovery and technological entrepreneurialism, with reservations only about its use for (or association with) surveillance and social control. Their counterparts, the collectivists, are leery of science and technology when it breaks up a social consensus and weakens community ties” (Gastil 2013: 13). Gastil modifies eight modern mechanisms and suggest five new ones for more cross-cultural mechanisms.
restricted, thus only selected or unselected smaller groups of the population are addressed. Additionally, intensive resources would be needed for the establishment of such an Ethics University. To determine the viability of capacities and resources, empirical research is needed.

To conclude, the main challenges are to set a proper typology and to design a mechanism according to the needs of a particular citizenry. For the latter purpose, Irvin and Stansbury (2004) created a guide that policy-makers can follow to check whether citizen participation was needed and how it could be implemented in order to be worth the effort (see Irvin & Stansbury 2004). Also, Bryson et al. (2013) offer a general guideline to overcome the challenge of “a specific design for participation” (Bryson et al. 2013: 31) according to “context, purpose, stakeholder involvement, leadership, process management, and evaluation” (ibid.). There remain many more challenges that can be discussed, however, I would like to shift the discussion towards objections that may occur against a Preparatory Ethics University, primarily due to similar challenges as for public engagement.

3.2 Objections against Preparatory Ethics University

In regards to challenges for public engagement, it can be argued that a Preparatory Ethics University would not facilitate any participation due to intensive use of resources, time, and lack of trust in public’s capacities.

The main concerns towards a Preparatory Ethics University prior to Participatory Technology Assessment could include critique towards its deep focus on interactive discussions that can hinder risk evaluation and slow down decision-making processes. Researchers and scientists may show distrust in laypeople’s knowledge and even acquisition. Risk managers might see Preparatory Ethics University as not adequate for decision-making processes, because it simply provides too much space for discussion. Rowe & Frewer (2000) refer to Chakraborty and Stratton (1993) who suggest that a broad discussion of “all standpoints (i.e., technical, economic, social, political, ethical, and public)” would only mislead, rather than provide clarifications, resulting in more difficult decision-making, and eventually “only produce defensive arguments of one standpoint against another” (Chakraborty and Stratton 1993 in Rowe & Frewer 2000: 14). Also, supporters of fast policy-making could see PEUPTA hindering processes where solely ethical arguments are delivered and not an ultimate, definite decision useful for policy
makers. Studies also show that experts and political elites do not really favor public engagement results since they often oppose their wishes and expectations (Hennen 2012: 36). Even if Preparatory Ethics University exactly provides an arena to advance knowledge acquisition and development of responsible argumentation for an upcoming public engagement, scientists may still not see promising results in such a concept, since trust in laypeople’s competences is missing per se. Scientists or researchers might not favor the public deciding on a complex technological issue, because they do not trust non-expert knowledge and do not see any capacity for deliberation on a topic. Scientists fear that the public cannot distinguish between arguments that are stronger than others, and cannot prioritize complex issues one over another according to their relevance for and weight in policy-making.

To conclude, objections comprise primarily trust and cognitive capacity issues. Against these objections, I would argue, that there is no other option than to implement a Preparatory Ethics University and hence to evaluate the first results. These two must be interlinked from the very beginning and the institutional setting must be made accordingly, since a participant’s trust in the process depends upon on the degree to which their views are perceived by the organizers. Results might show that exactly this type of arena, where laypeople and experts come together and face similarly challenges, enables them to communicate to achieve the same goal: establishing mutual understanding at first, in a Preparatory Ethics University and then establishing mutual agreement in a public engagement mechanism, for example Technology Assessment with policy relevance.
Conclusion

In the literature of science and technology and public engagement, there is almost only theoretical focus on participation processes, yet public engagement is a concept that needs more focus on its active character and a paradigm shift with a deeper focus on its practical implementation. An effective public engagement mechanism therefore at best includes interactive deliberation and will eventually increase the degree of public involvement and impact decision-making for policy purposes. The aim of this paper was to show that two different public engagement mechanisms, one modern and one traditional, could be interlinked together in order to increase effective public participation in science and technology and Technology Assessment. For this purpose, I suggested a Preparatory Ethics University prior to Participatory Technology Assessment.

Ethics University is a pilot project that was developed only recently in 2013 by the Hannover Medical School providing education in health issues. Yet, it is a very good concept that can be also implemented in science & technology, for example as a preparatory session for upcoming public engagements. This supplementary mechanism will provide laypeople information about complex and controversial issues and an arena where they can interactively study, discuss and deliberate on topics relevant for policy making in science & technology. Laypeople will understand scientific backgrounds, develop argumentation skills and build substantive opinions that they can hence pronounce in important public engagement sessions with high or low policy relevance.

In the first part of this thesis, I provided arguments to show why public engagement and deliberation was necessary and also presented the concept of public participation. In the main part, I summarized both relevant concepts, interlinked them and concluded five main results: systematic deliberation, mutual understanding and knowledge transfer, interdisciplinary education, empowering subjectivity and authenticity, conscious re-call of virtues. In the final part I discussed various challenges of both concepts; epistemological, strategic, cultural, political or societal, and objections that can be made against a preparatory Ethics University prior to Participatory Technology Assessment. I concluded that since the focus is on deliberation during Technology Assessment and not necessarily decision-making as outcome, a Preparatory Ethics University can be an effective concept for democratic development and virtuous self-flourishment in modern societies with emerging technologies. I also concluded from my analysis and literature review on science and technology that clarification of terminology and an explicit typology in public
engagement is still needed. Furthermore, the meaning of deliberation in science and technology in particular has to be precisely examined. There is also an urgent need for empirical studies on strategies and effectiveness of particular engagement mechanisms in science and technology. Also, in my opinion, the angle on education is very narrow and one-sided. Education should also comprise awareness about the relevance of being involved in a public process with the aim of important decision-making about a complex topic. Educative mechanisms will provide society with an arena where one can also make judgment by own rationality, capacities, and abilities. Knowing that decisions are relevant to policy making will encourage individuals to put efforts into the understanding and knowledge transfer process. Ethics University can provide sustainable competences in ethical thinking that is a pre-requirement for reasonable decision-making processes. Through a Preparatory Ethics University integrated into the concept of public participation prior to participatory settings, awareness about ethicality and education in ethical issues will be raised, meanwhile virtues will be developed and social responsibility through cooperation and negotiation will be increased. The more frequently participatory mechanisms with explicit ethical background are integrated into society, the more this will help to develop virtues consciously. This kind of preparatory deliberation for policy purposes will result in better responsiveness of regulations due to higher effective cooperation between society and the regulatory body and due to improved communication between experts and lay participants.

This evaluative synthesis offered to consider a Preparatory Ethics University as a new approach to public engagement in science and technology, primarily in order to increase effectiveness of Technology Assessment. This work should be seen as a start and needs of course completion.

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24 In my opinion, morality does not need to be seen as a biological precondition of people. Ethics can and must be taught by pedagogical and integrative means, so that morality can be maintained and its understanding developed for a harmonious cooperative and interactive living in society.
References


Tables

Table 1: *Public Engagement Objectives and Examples.*

Table 2: *Mechanism Variable: Contingent Effectiveness.*