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A Framework for Ontological Policy Reconstruction: Academic Knowledge Transfer in the Netherlands as a Case Study

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Abstract: This paper provides a framework for analyzing the ontology underlying a given public policy, i.e. the categories and concepts used by the policy. It provides a set of questions concerning the language, logic and deontology of a policy and their development over time. The framework is applied to a particular case study, the valorization policy for Dutch universities, in order to suggest the usefulness of the framework in the design and normative evaluation of public policy.

Keywords: Public policy; Ontology; Academic knowledge transfer; Logic; Valorization.

1 Introduction

Philosophers engage in various ways with public policy. Policy topics that have received philosophical attention include, e.g. environmental policy, treatment of the disabled, animal welfare and drugs (see, e.g. Wolff 2011). Philosophers have also asked more generally what the relationship between philosophy and public policy should be (Hook 1970; Buchanan 2009). Mostly, the philosophical subdiscipline that has been central in these treatments has been ethics, asking, e.g. what we should do about a particular policy problem from the perspective of a given ethical framework. The ethical discussions usually focus on how public policy intervenes (or should intervene) in the world. This paper, however, focuses on how policy represents the world by focusing on ontology rather than ethics.

An ontological analysis of public policy will focus on what entities and categories are postulated by a particular policy, and how these are supposed to relate to each other according to this policy. A refugee policy may create

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various categories of refugees, various categories of safe and unsafe countries, and various categories of residency permits. A public health policy may refer to various kinds of nursing activities which are subcategorized, e.g. as medical, administrative or other. A policy regarding universities may develop various kinds of societal impact indicators which relate in complex ways to pre-existing concepts like patents, editorships of journals, etc., a case we will discuss in much more detail later.

Even though a policy's most important consequence may not be how it represents the world, and even though a policy's main aim will usually not be to represent the world as accurately as possible or to capture certain natural kinds, the categories a policy creates may influence how we think about the policy domain in important and complex ways.

This paper is meant to make two contributions. As its main contribution, it provides a general framework for what I shall call *ontological policy reconstruction* (Section 4). This framework consists of a number of questions we can ask of any policy in order to make its underlying ontological structure explicit. These questions will be grouped into three categories: (1) Questions about the ontology itself, relating to the language and logic of the policy, its concepts and how they relate to each other. (2) Questions about deontology and power, relating to the rights and permissions which the policy associates with these concepts, and the institutional power structure that gave rise to the ontology. (3) Questions about dynamics, relating to changes of the ontology (and deontology) over time.

Besides this methodological contribution, the paper also makes a second more substantive contribution (Section 5) which is to apply the framework developed to a particular case, namely the emerging valorization policy for Dutch universities. The concept of valorization, of creating societal value through knowledge, is an emerging concept for Dutch universities that is playing an ever more prominent role in decisions about research grants, hiring decisions and government subsidies for universities. Applying the framework to this case will not only illustrate how to make use of the framework, it will also generate new insights into the discussion about valorization at Dutch universities.

Why does a policy's ontology matter? Firstly, the way a policy represents the world is part of how it intervenes in the world. As will be illustrated later, our classifications affect those classified. Secondly, when we view a policy as a legal or administrative text prescribing certain actions to be taken, it becomes clear that a policy can only intervene in the world given a certain representation of the world. In this sense, a policy's ontology is logically prior to the actions it prescribes. For instance, we cannot have a policy aiming to protect private property without an ontology that makes the relevant property distinctions. Hence, investigating the space of possible ontologies also enlarges the space of possible policy options.

In what follows, I will start by giving some examples of ontological issues in public policy (Section 2). The section will cover a number of authors from various academic disciplines who have written on these issues and the questions they have raised. Many of these questions will find their way into the framework developed in this paper. Section 3 then describes the various theoretical ingredients from philosophy and other disciplines that go into the framework for ontological policy reconstruction. Section 4 lays out the practical side of this framework, i.e. the questions that make up the framework. The framework is applied in Section 5 to the case of the valorization of scientific knowledge at Dutch universities, after which Section 6 concludes the paper.

2 Ontology in Public Policy: Some Examples

The purpose of this section is two-fold: On the one hand, I would like to give some examples of how ontological issues play a role in public policy. These examples will give the reader a concrete idea of how ontological issues are important in public policy, and when setting out the framework for ontological analysis in Section 4, I will refer back to some of these examples. On the other hand, this section will also survey a number of authors from various fields who have carried out (part of) an ontological analysis of specific policy issues. Hence, the second aim of this section is to survey previous research on this topic.

Fricker (2006) looked at how new concepts get introduced into public discourse, using the examples of homosexuality and sexual harassment. In the case of sexual harassment, Fricker described the difficulties encountered by women to conceptualize a shared experience. Concepts were lacking to describe the experience of sexual harassment from women's points of view, and the existing concepts (e.g. flirting) did not adequately express the meaning of the relevant social interactions from women's perspectives because they express dominant male conceptions of the interaction. Before the introduction of the concept *sexual harassment*, Fricker claims there was a hermeneutical lacuna, situations which could not adequately be described or made sense of for a group of people that was at a hermeneutical disadvantage. She points out the hermeneutical inequality and powerlessness that may prevent certain groups from contributing to a society's underlying ontology. But only once the concept of sexual harassment exists are we able to consider policies dealing with it.

The concepts of homosexuality and sexual harassment discussed by Fricker can also be viewed as creating what Hacking (1995) calls human kinds, e.g. the homosexual. According to Hacking, human kinds are value-laden: we construct these human kinds, these ontological categories, because we are interested

in them for one reason or another. Hacking looks at the examples of teenage pregnancy and child abuse, concepts constructed and investigated by the social sciences because we perceive these concepts to be useful in investigating situations we consider to be problematic. Hacking subsequently points out an important feature of human kinds: They are subject to looping effects. Humans who are labeled often care about the label they receive, the label may affect their lives. A person categorized as suffering from multiple personality disorder (another example considered by Hacking) may look at himself differently, as suffering from a disease, and may subsequently associate with others he now considers to be similar to himself. This may in turn lead to behavioral changes which may force the scientists to rethink their description of symptoms of people suffering from multiple personality disorder. In short, classifying people changes them, which in turn means that we may need to rethink our classifications. Hence, our ontology is dynamic rather than fixed once and for all.

Stone (2012) discusses public policy from a political science perspective. In her chapter "Numbers", she discusses the difficulties involved in counting, e.g. how many people are unemployed. When the policy aim is to reduce unemployment, the definition of the category *unemployed* is crucial: What about volunteer work, people who work 5 h per week, or people who work 30 h per week but would like to work more? These questions show that a concept such as *unemployment* suggests clear natural boundaries where there are none. Unemployment statistics are sensitive to how precisely the category of unemployment is defined. Different political groups will have different strategic reasons to use one definition rather than another, because they may desire the unemployment rate to come out high or low.

Stone also points out that before counting something we need to name it. While the category *unemployed* seems a natural one and pre-given, public policy is also about the introduction of new policy concepts like *the precariat* (Standing 2011) which are put on the political agenda. According to Stone the introduction of such a new concept also creates a community, people may for the first time associate themselves with other people in the same category, thereby creating new possibilities for identity formation and political action. Of course, this new label may or may not be found desirable by the people so labeled, so another question that arises is who has the power to introduce new policy concepts and determine their definition and application. Can people self-identify as, e.g. a member of the precariat, or is an outside agency in charge of determining whether or not the concept applies to a particular case? In either case, Stone points out that incentive effects need to be taken into account: If belonging to a particular category is tied to receiving financial benefits, people will have an incentive to belong to the category, whereas the agency distributing the funds may have the opposite incentive to have as few people as possible belong to the category.

Yanow (1996) has studied the use of racial and ethnic categories in the 1990 U.S. census. Yanow investigated how these categories were used in the census and what subcategories (e.g. *White*, *Black*, *Eskimo*) were used. Yanow asks who made these (sub)categories, and what the consequences of these categories are for policies such as affirmative action. Her interpretive policy analysis focuses on the meanings assigned to these categories by different actors or groups. She also considers logical questions: the categorization employed suggests nonoverlapping categories and exhaustiveness, but are there people who do not fit into any category? Also, Yanow distinguishes marked from unmarked instances of a category: Unmarked instances are those considered to be normal or typical for the category, whereas the marked instances are considered different, unusual, special. According to Yanow, the central questions of what she calls category analysis should be the following:

> "1. What are the categories being used in this policy issue? 2. What do elements have in common that makes them belong together in a single category? Does the categorical logic depend on one or more markings? 3. What, if any, elements do not fit, or does one (or more) appear to fit more than one category? Why (what are their characteristics, and how do these compare with the characteristics of the fitting elements)? 4. Do the elements as they are used in policy practices signal different meanings of category labels than what the category labels themselves appear to mean? 5. Is there a point of view from which those things implicitly asserted as belonging together are or could be seen as divergent?" (Yanow 2000, p. 51).

Bowker and Star (1999) present an extensive treatment of classification systems, covering many examples including race classification in South Africa under apartheid, the international classification of diseases and the more recent nursing intervention classification. They define a classification as "a spatial, temporal or spatio-temporal segmentation of the world" (p. 10). A classification creates a set of boxes with the following desiderata: There are consistent, unique classificatory principles in operation and these produce categories which are mutually exclusive and complete. But no matter which classification system is adopted, "[e]ach standard and each category valorizes some point of view and silences another" (p. 5). Our task is to analyze what the chosen categories are, what they make visible and invisible, who made them, and how they change in time or spread geographically. Of particular interest is the *other* category, since this category collects the cases which do not fit neatly into the classification system adopted. Bowker and Star also pay attention to the development of classifications over time: the past is indeterminate since at some future point of time we may decide to reclassify the past, by deciding that things we assumed to be in the same category in the past will be put into different categories in the future, or vice versa. Time also can lead to certain classifications becoming so ingrained

in our culture that reality converges with our classification, we cannot see other possible classifications anymore.

One example discussed in detail by Bowker and Star is the nursing intervention classification (NIC). I will briefly mention some aspects of their analysis of the NIC since these are relevant to the example of academic valorization activities to be discussed in Section 5. According to Bowker and Star, many nursing practitioners welcomed the introduction of a classification system. One reason was that to gain more equal standing with doctors, it was necessary to make visible the positive effects of nursing work through scientific studies, but scientific studies would require (or at least benefit from) such a classification system, as measuring requires classification. The classification would help to make nursing work visible, and also to create a common language for nursing. At the same time, such a classification also made nursing work more prone to social control and surveillance, for instance by supervisors and insurance agencies which can now monitor work in much more detail. The classification also will determine what records are kept of the work done: "Memory – individual and organizational – is in general filtered through classification systems" (p. 267).

3 Theoretical Background of Ontological Policy Reconstruction

> *Ontological policy reconstruction*: analyzing and/or constructing a policy's main concepts, their meanings and interrelations (ontology), as well as the power structure associated with these (deontology), and describing the development of these, ontology and deontology, over time (dynamics).

The purpose of this section is to explicate the different elements in this definition of ontological policy reconstruction (OPR). Reconstruction here can mean describing what already exists but was not visible yet, but it can also mean constructing anew in a different way. As this section will show, the ingredients or tools for this reconstruction come from different disciplines. The next section will then spell out OPR in more detail and more practically, so that it can be applied to concrete cases of public policy.

In the most general sense, ontology is the study of what there is. In this paper, the term will not be used to refer the study of whether the entities a policy postulates really exist and in what way. Rather, it refers to the description of a policy's internal ontology, the conceptual landscape underlying a policy. Besides policies,

also scientific theories come with certain ontologies (e.g. a physical theory that uses concepts such as *atom*, *electron*, etc. and relates these in certain ways), and artificial intelligence makes use of ontologies in constructing the semantic web (see. e.g. Smith 2004). Rather than simply providing information via visible text on web pages, the semantic web aims to provide information in a structured form via a specified syntax and semantics which can be processed by computers. Engineers are constructing ontologies to describe the world, creating information, with the aim of creating a shared world view and a shared language for communication. Some researchers have also thought about criteria for assessing the quality of an ontology (see, e.g. Gomez-Perez 2001): consistency (are the axioms of the ontology logically consistent?), completeness (which aspects of the world are missing from the ontology?), conciseness (are there redundancies in the definitions?), expandability (can new concepts easily be added to the ontology?) and sensitiveness (do small changes to the ontology create big effects?). Some of these criteria for evaluating ontologies will be used in the framework presented in Section 4.

The fact that the ontologies used in policy usually pertain not to the physical but to the social world raises further issues which have become central in the recently developing philosophical area of social ontology. In this area, the work of Searle (1995, 2005, 2006) is particularly useful for the aims of this paper. Searle investigates the logical structure of social reality, in particular of institutions like money and marriage which can feature in social facts. Searle's account of this social reality points out that social reality comes with what he calls deontic powers, rights and obligations which are attached to certain roles associated with social institutional reality. Searle considers institutions to be enabling precisely because they create these new power relationships. For instance, if you are married, you may be entitled to certain fiscal rights and to certain obligations of care with respect to your partner. I will use Searle's notion of deontic powers in the ontological analysis of public policy in two ways: On the one hand, ontologies arise in an institutional setup with associated deontic powers, and this raises the question which actors have the power to create and institute the ontology. On the other hand, in the domain of public policy, ontologies are used in order to link them to certain policy consequences. This link between ontology and policy actions can be captured in terms of the deontic powers associated with the different concepts postulated by the ontology. Both of these deontological aspects of ontologies will be developed in Section 4.

In contrast to Searle, Foucault has taken a more critical view of the powers associated with ontologies, or to use his terminology and book title, *the order of things* (Foucault 1966). The deontic powers which come with our constructed concepts can also have the purpose of disciplining people, as Foucault has illustrated, e.g. in his study of the prison system (Foucault 1975). Still, Searle and

Foucault agree in pointing out the importance of looking at the powers attached to our ontologies. Note that when I use the term *deontology* in this paper, I do not refer to an ethical theory usually associated with Kant. Instead, drawing on Searle, I refer to the rights and obligations associated with the ontology, and in line with Foucault, our deontological analysis will also consider the incentives created by these rights and obligations.

The last element needed for our framework is an appreciation of the dynamics of ontologies. Giddens (1976) has introduced the notion of double hermeneutics as characteristic of the social sciences: The social sciences interpret the social world which is made up of entities which themselves are interpretive beings. Human beings are hermeneutic beings, they develop ideas and concepts to describe their world. The social scientist's concepts supervene on this first hermeneutic layer, but more importantly, the social scientist's second-level concepts will in turn influence the first-level concepts of the human beings studied. This is because concepts from the social sciences can be taken up by human beings and become part of how they see themselves. What this means is that our account of ontologies in public policy must also pay attention to the development of ontologies and their associated deontological powers over time.

To conclude, taking all the ingredients introduced in this section together, we can take an ontology to be a set of logically related concepts formulated in some (policy) language. We may either ourselves be involved in constructing this ontology (as illustrated by the case of the semantic web), or we may be analyzing the construction of someone else (as illustrated by the valorization case of Section 5). Either way, the things we should pay attention to are the same: Besides paying attention to the ontology itself, we must look at the associated deontology and at their development over time. How to do this concretely is the topic of the following section.

4 Ontological Policy Reconstruction in Practice

As Section 2 has demonstrated, many different kinds of questions can be asked about the ontology underlying a given public policy. The framework for ontological analysis proposed in this section brings some order to this multitude of questions by locating them at different conceptual levels. The most basic level is the level of ontological language. Building on this level we get the level of logical relations between the different concepts. These two levels of analysis are similar to what in ethnography has been called the taxonomic analysis of a cultural domain (Spradley 1980). The third level deals with deontic questions

concerning the ontology, power issues associated with certain concepts and with the ontology itself. Fourth and finally, there is the level of dynamics which deals with changes in the ontology over time. The remainder of this section describes these four levels and the relevant questions of ontological analysis associated with each level.

4.1 Language

Ontologies make the invisible visible through the language they use for describing the world. For a regular citizen, the most tangible artefact where the ontology of a policy becomes real is the form. For instance, an immigrant in the Netherlands may be asked to fill in a form asking for his name, sex, nationality and country of birth, and a citizen of the United States was asked about his race in the census of 1990. A person applying for social security benefits may be asked for psychiatric illnesses, his employment status and the income of family members. The questions used (e.g. concerning race, nationality, psychiatric illness) and the options to choose from (e.g. Black, German, ADHD) make the language of the policy's underlying ontology explicit.

More precisely, forms present an individual with a policy language which contains a number of first- and higher-order predicates. The person filling in the form may designate himself to be an instance of the listed first-order predicates (e.g. Black, male, German). Furthermore, the form itself designates these first-order predicates to be instances of other second-order predicates (e.g. race, sex, nationality). Relevant questions to ask at the level of language are the following:

[1] Concepts: What are the central first- and higher-order predicates used by the policy to describe the world? For instance, *race*, *nationality*, *caucasian*, etc.

[2] Conceptual Neighborhood: What other predicates could have been chosen that are closely related to the chosen ones? For instance, *cultural-identity*, *African-American*, etc.

[3] Meanings: What (if any) are the meanings associated with these predicates by different people and communities? For instance, what do the people categorized as *Black* (by who?) associate with the predicate, or with *race*?

[4] Conceptual Gaps: What concepts are absent, not named explicitly or left invisible? For instance, a policy may not have the concept *intersex* but instead only refer to *male* and *female*.

4.2 Logic

Besides providing a language with concepts to talk about the world, an ontology also specifies the logical relations between many of these concepts. As mentioned above, a form may postulate the sex an individual may identify with as male or female. Note that this ontology of the sexes is not pre-given by the world: As pointed out by Mol (1998), there are at least three ways to determine biological sex, hormonally, genetically and anatomically, and since these criteria do not always yield the same result, there are at least eight possible sexes. A policy relying on this dualistic ontology thus makes this biological diversity invisible.

Consider another example from the 1990 US census discussed by Yanow (2000, p. 52). Here, the language contained second-order predicates like *race*, *ethnicity* and *sex*, and first-order predicates like *White* and *Black*. In the 1990 census, an individual could only associate himself with a single race. In the US census of 2000, this restriction was dropped, however, and people could associate themselves with more than one race.

Note that so far all the examples have used monadic predicates only. An ontology can, however, also contain predicates which take more than one argument. An example of a binary predicate relevant for policy purposes is the concept *is-a-fiscal-partner-of* which in Dutch law is different from both *is-married-to* and *is-a-registered-partner-of*, two other examples of binary predicates.

Finally, in practice, a policy may be operationalized in different ways, revealing different definitions of key concepts. Mol (1999) considers the example of anaemia, a medical condition which in actual medical practice is operationalized in three different ways (according to Mol): The clinical definition (Mol calls it the clinical performance) links it to a doctor observing symptoms of tiredness, unusual color of the eyelids and skin. The laboratory definition links the term to a low haemoglobin level in a person's blood when compared to a mean level for some population. And the pathophysiological definition judges the haemoglobin level to be low when it is insufficient for this particular individual to properly transport oxygen. These three definitions are not equivalent, and a policy to reduce the occurrence of anaemia might use one or more of these definitions in its underlying ontology. The following questions summarize the relevant issues pertaining to a policy's underlying background theory:

[5] Definitions: How does the policy define its central first- and higher-order concepts?

[6] Alternatives: What other definitions are conceivable for a given predicate? For instance, we might consider to include a third *intersex* option in the definition of *sex*.

[7] Non-overlap: Are the categories employed non-overlapping, and are they supposed to be non-overlapping? Are there cases which fit into more than one category? For instance, the 1990 US census assumed non-overlapping racial categories whereas the census of 2000 did not.
[8] Completeness or Exhaustiveness: Do the categories employed cover the whole spectrum of possibilities, or are there instances which do not fit into any category? For instance, *male* and *female* may not cover the whole spectrum of possibilities for *sex*.
[9] The Other: Which instances end up in the *other* category, provided there is such a category? For instance, when reverend Lovejoy in the Simpsons referred to the friends and neighbors of Homer as "Christian, Jew, or…miscellaneous", it was the Hindu Apu who ended up in the *other* category.
[10] Finegrainedness: Which categories are rich in detail and have many subcategories and which categories are unrefined? For instance, a policy may make fine-grained distinctions within Christianity between Roman Catholic, Russian Orthodox, Greek Orthodox and Anglican, while not making any distinctions within Islam.

4.3 Deontology

The questions raised in the previous two sections suffice to deal with ontology proper, the categories used by a policy and the way these logically relate to each other. But policies are relevant to people's lives not primarily because they classify people, things and activities into different categories, but because this categorization will impose on people certain obligations (e.g. paying taxes or fees) or entitle them to certain rights (e.g. claiming unemployment benefits or being eligible for affirmative action). These rights and obligations may attach to categories of people or to categories of activity. As an example of the latter, a person performing an activity classified as *pollution* may incur the obligation to pay a fine. This deontological aspect of public policy supervenes on the ontology, not in the sense that there is any necessary connection between ontology and deontology, but simply in the sense that one aspect of a policy is that it adds a deontological layer to its ontology. I will call this the deontological output of the underlying ontology, the rights and obligations associated with the different ontological categories.

In contrast, there is also the deontological input of an ontology: Who has or had the right to create these categories and to define them, to decide on this ontology rather than another? The ontology used in a policy is usually an outcome of a process that involves various stakeholders: politicians, policy

makers, lobbyists, interest groups, companies, etc. There may be fights about what category label to use (e.g. *Black*, *African American*, *African-American*, *Negro*, *person of color*, etc.) and different people may use different labels in different contexts. In the end, however, a policy will have decided on certain category labels, on certain definitions for these categories, and on certain relations between categories, and it is important to analyze who were the powerful actors in coming to this ontology.

Put differently, deontological output is about the powers the policy generates through the ontology, whereas deontological input considers the powers going into the creation of the ontology. Without output deontology, the ontology would have no policy effects; without input deontology, the ontology would not be there in the first place. The relevant questions regarding deontology are:

[11] Input: Who has/had the right or the institutional power to determine the ontology? First, choosing the category labels, for instance *Black* rather than *African* or *African-American*, or *Race* rather than *Ethnicity*; second, choosing the category definitions.

[12] Output: First, for each category defined in the previous section, what (if any) obligations and permissions does the policy create? For instance, what rights and obligations are associated with the category *unemployed*? Second, how will this deontological structure discipline or incentivize people? For instance, a research policy which categorizes scientific publications into A-, B- and C-publications may force people into a certain publication behavior by creating publication obligations.

4.4 Dynamics

Concepts are not timeless, but they arise at a certain historical moment and they may disappear into oblivion later (Hacking 2002). Throughout its life, the meaning of a concept may change. The same holds for concepts which are associated with public policies. Consider the example of policies dealing with mental health and psychological illnesses. A concept of relatively recent origin is attention deficit hyperactivity disorder, ADHD. This concept arose within the psychological community at a certain point, and over the course of time, its meaning changed, e.g. in moving from DSM-4 to DSM-5. Whereas the previous three sorts of questions all treat the (de)ontology underlying public policy as static, in this subsection, we consider ontology as dynamic, changing for various reasons.

As we saw earlier, classification itself may alter the people classified (looping or reactivity effects), thereby necessitating a modification of the classification in the future. Furthermore, our classifications change with time because our interests

change, and scientific research may lead us to change our views about what is similar and what is different. For example, a classification of people based on anatomic features may be replaced by a different one based on genetic similarity. Also, there may be rival ontologies in use, competing against each other, where over time one ontology will become dominant. Alternatively, different ontologies may coexist next to each other. This ontological multiplicity (Mol 1999) was illustrated earlier with the three different definitions of anaemia where the same community may work with multiple ontologies which sometimes coexist peacefully, sometimes conflict and sometimes depend on each other.

Not only our concepts change over time, but so do the associated rights and duties, and more generally the institutional framework in which these concepts are embedded. As an example, students with ADHD may at some point be given the right to ask for more time to complete an exam, and people who have sexually harassed somebody else may be obliged to take a training course. Summarizing this discussion, the dynamic dimension of public policy gives rise to the following questions:

[13] Synchronic: Are there different ontologies present at the same time in different (sub)communities? How do these interact and co-exist with each other? Examples are different definitions of concepts like *sex* and *anaemia* that may coexist in the medical community.

[14] Diachronic: How do the answers to the previous questions concerning language, logic and deontology change over time? For instance, new names or definitions for concepts get introduced at certain points in time: When did these concepts come to be introduced, by who, and why? Does the definition supplant a pre-existing alternative definition? For instance, a policy may define *scientific excellence* in terms of moral behavior, supplanting a previous definition in terms of scientific output.

[15] Reactive: How do the people classified react to the ontology? How does this knowledge of their classification change people and the ontology over time? For instance, a policy evaluating research quality in terms of the number of publications may lead researchers to publish as much as possible (deontological output, incentive effect), and this may in turn lead policy makers to revise their definition and measurement of research quality.

5 Academic Valorization Case Study

One of the current discussions at Dutch universities concerns the societal impact of academic knowledge. The Dutch term *valorisatie* is central in this discussion which we shall translate here simply as *valorization*, roughly meaning the crea-

tion of societal value from academic knowledge. In this section, I shall highlight an aspect of this discussion which deals with valorization indicators which aim to measure different valorization activities. The development of these indicators is essentially the creation of a valorization ontology, and thus it provides us with an example for applying the general framework just outlined. Note that the purpose of this section is neither to give a full analysis of the Dutch discussion about valorization, nor even to provide a full analysis of the underlying valorization ontology. Instead, the purpose of this section is to illustrate the general OPR framework presented in Section 4, and to see whether this framework can help us to generate interesting insights about policy making with respect to valorization at Dutch universities.

5.1 Case Description

Starting in the 1970s, science shops opened at different Dutch universities. Their aim was to allow citizens to approach universities with their questions. Valorization in this sense was aiming to bring science closer to the citizens, making it more democratic. In the subsequent decades, valorization became more top-down and was focusing less on knowledge transfer to the citizen and more on knowledge transfer to industry and businesses. In 2005, the law on higher education and scientific research made valorization the third main task of universities besides teaching and research. While this law was still quite vague concerning the meaning of valorization, in december of 2011, the association of Dutch universities (VSNU) and the national ministry of education, culture and science (OCW) came to a number of performance agreements concerning teaching, research and valorization. Valorization is defined here as

> *the process of value creation from knowledge, deriving from all disciplines, by making knowledge appropriate and available for economic and societal use and to translate it into products, services, processes and new industries*. (OCW-VSNU 2011, p. 6, my translation from Dutch original).

The aim was to create a valorization-infrastructure by 2015. The universities agreed to develop valorization indicators in collaboration with the government which in the long run should be used to measure valorization. Concretely, these indicators were supposed to be used to make visible how universities meet the governmental demand of spending at least 2.5% of public research money on valorization activities in 2016. At that time, new agreements would be made concerning the required output with respect to valorization.

Subsequent to this agreement, VSNU worked out the valorization indicators (VSNU 2013a,b). The idea was that these indicators form a choice menu: universities could choose which of these indicators they wanted to use, and different disciplines could also choose different indicators. The VSNU indicators essentially follow the framework developed by the European Commission (Finne et al. 2011). The European Commission's framework divides knowledge transfer (i.e. valorization) into three categories: (1) knowledge transfer through trained people (VSNU relabeled this category as simply *People*), (2) institutional co-operation in R&D and other phases of innovation (VSNU label: *Cooperation*), and (3) commercialization of research (VSNU label: *Results*). The VSNU framework adds a fourth category: This category is unlabeled, but according to VSNU (2013a) it is added for two reasons: On the one hand, to allow room for future developments in our ideas about valorization which might require additional indicators. On the other hand, the authors doubt that the three other categories allow enough room for valorization as conceived of in the humanities and the social sciences. The report does, however, not go into any further detail about what such criteria might be.

The ontology which emerges from this discussion and these reports can be summarized as follows: The central activities of an academic are of three kinds: *teaching*, *research* and *valorization*. As for *valorization*, activities can be divided into four categories: *People*, *Cooperation*, *Results* and *Other*. Within the first three categories, VSNU adds further subcategories. For instance, for the category *Cooperation*, the four subcategories are: *Contracts* (4 indicators, e.g. number of research contracts in cooperation with public partners), *Funding* (12 indicators, e.g. financial contribution by companies to research in euros per year), *Cooperation* (20 indicators, e.g. presence science park) and *Publications* (16 indicators, e.g. number of contributions to exhibitions). What insights can OPR as presented in the previous section reveal about this ontology?

5.2 Ontological Analysis

Language: The central concept is *valorization*, in the context of policy making it works as a first-order predicate which labels certain activities as valorization activities [1]. The Dutch term *valorisatie* originates in the financial and economic domain and still has this connotation [3]. Alternative terms that occasionally get used are *knowledge transfer* and *societal impact* [2], where especially the latter has fewer economic connotations. Among the four categories of valorization, note that the VSNU decided to use the term *Results* for the category that used to be called *commercialization of research* in the EU report [1&2]. This re-labeling corresponds to a moderate change in the category's indicators: While the EU

report covered only licenses, patents and spin-offs in this category, the VSNU framework also allows for products and services for the public sector such as governmental agencies. What remains unnamed in the VSNU report [4] is the fourth category *Other* which is supposed to add flexibility for future developments and for the humanities and social sciences. Here we see the emergence of something that did not exist in the EU report but which still remains unnamed and unspecified.

Logic: Valorization policy defines university activities as of three categories: research, teaching and valorization [5]. The general definition of the central term *valorization* was given above, and valorization activities are then defined by the hierarchy of indicators mentioned. Regarding non-overlap [7], note that the different indicators are not meant to be mutually exclusive but rather as a menu of possibilities universities can choose from. For instance, within the *People* subdomain of valorization, there is one indicator counting the number of PhDs working in industry and another indicator counting the number of people with advanced degrees working in industry. Since PhDs are advanced degrees, these indicators are overlapping, but overlap is intended here. A problematic kind of overlap is the fact that the subdomain *Cooperation* contains a subdomain which is itself called *Cooperation*. This may indicate that we are dealing here with a subcategory of activities which do not fit anywhere else, a subcategory *Other* [9] within the *Cooperation* category which covers other cooperation activities. Regarding completeness [8], the VSNU framework includes the fourth category *Other* as a subdomain of valorization next to *People*, *Results* and *Cooperation*. This is intended to make the classification complete, but no concrete examples are given of activities that might fit into this category. In fact, it is very difficult to come up with examples to classify as *Other*: Typical examples of valorization activities in the humanities like writing a review of a play for the newspaper, contributing to an art exhibition, giving an interview for television, or participating in a governmental advisory committee, all these activities already fit into the category *Cooperation* and are covered explicitly by existing indicators. Regarding alternative ontologies [6], a radically different vision of valorization might see teaching and research as particular kinds of valorization activities rather than as alternatives to valorization. But even without considering such drastic alternatives, many different ways of classifying valorization activities are imaginable and have been proposed in the literature. In the Netherlands, the Royal Dutch Academy of Sciences (KNAW) has published a report dealing with valorization in the humanities (KNAW 2012), where, e.g. prizes received from non-academic organizations (which VSNU puts into the category *Cooperation*) do not count as a valorization activity but rather as a sign of societal recognition. Finally, regarding finegrainedness [10], of the three categories, the category *Cooperation* has the largest number of indicators

to choose from. This is because the category is very heterogeneous, covering, e.g. contributions to exhibitions but also the presence of a science park.

Deontology: Looking first at deontological output [12], which rights and obligations are associated with the categories of the valorization ontology? Since at the time of writing this ontology is still in development and not implemented yet, it is difficult to answer this question precisely. However, the general direction is clear: Once a university or faculty has adopted certain indicators, academics will be asked (required, obliged) to increase their activities falling under these indicators, or performing certain kinds of valorization activities will incur a person certain benefits (rights). Hence, these valorization indicators are meant to incentivize or discipline the academic's activities. Turning towards the deontological input side [11], we look at how this ontology arose and the rights and powers of the different stakeholders involved. The demand for a valorization agenda comes from the Dutch government, it is not the researchers or the universities themselves that have been pushing for this. The agreement regarding the valorization framework was made between VSNU and OCW, so between the universities and the government. VSNU has (so far) secured many rights to the universities, in particular the choice of indicators to employ, and how to operationalize these indicators. In describing the genesis of its valorization framework, VSNU names as stakeholders the biggest Dutch employers' organization VNO-NCW, OCW, the ministry of economics (EZ), and finally the national valorization committee (LCV). LCV is steering the valorization agenda in the period from 2009 to 2016, and it is made up of representatives of the following organizations: the technology foundation STW, EZ, the Dutch federation of university medical centers, KNAW, the research center of the University of Wageningen, the Dutch National Science Organization, the technology transfer organization TNO, the organization of institutions for higher vocational training (HBO-raad), the Dutch business organizations MKB-Nederland and VNO-NCW, the big technological institutes, VSNU, and OCW. Looking at these stakeholders, it is clear that technology and business organizations are well represented on this committee, while organizations more focused on the humanities, democratic citizenship or the social sciences are absent.

Dynamics: Whereas before 2005, the tasks of an academic were defined as research and teaching, the law passed in 2005 added valorization as a third dimension. Research proposals submitted to the Dutch national science foundation NWO now also have to say something about valorization, and some propose that valorization should also become part of annual job evaluation talks for academics. The definition of valorization also underwent some changes [14]: As the VSNU (2013a) report notes, the original definition of valorization used by LCV and others was more business-oriented than the definition eventually adopted

by VSNU. With respect to the valorization indicators, these have been extended beyond what was proposed in the EU report to make more room for the humanities and social sciences. The indicators are still in development, and it is not clear which ones will be adopted by which universities. For this reason, it is also too early to notice reactivity effects [15], i.e. if and how these indicators will influence valorization behavior of academics. One may predict, however, that the obligations associated with these valorization indicators will increase. The freedom of choice the VSNU framework provides does, however, suggest that there will be a multiplicity of valorization frameworks in use at Dutch universities in the future [13], different research communities using different valorization (sub)ontologies.

Within the university, the claim is sometimes heard that valorization policy is driven by industry. Looking at the stakeholders in charge of determining the valorization ontology, this claim is largely confirmed. At the same time, the ontology proposed by VSNU as the backbone of valorization policy is very broad: it involves a lot of different overlapping categories, so many, in fact, that it is difficult even in the humanities to think of valorization activities which do not fit into one of the first labeled categories. And otherwise, there is always still the fourth unlabeled category. So completeness does seem to have been achieved. The fact that the ontology functions as a superontology from which specific universities and faculties can choose subontologies weakens the disciplining power that this ontology will impose on academics. So the picture that emerges is that while the government tries to impose a more business-oriented discipline on the universities, the universities so far have managed to broaden the valorization ontology and to retain some freedom as to what parts of the ontology they want to adopt, and what kinds of societal impact they want to make visible. To what extent this freedom will be curtailed in the future remains to be seen.

6 Conclusions

In the area of public policy, discussion usually focuses on the aims of the policy, and on whether it will have the desired effects. These discussions usually take for granted the ontological layer underlying the policy, but I hope that this paper has shown that this underlying ontological layer is also important in the analysis and creation of public policy. The aim of this paper was to provide a framework for such an ontological reconstruction of public policy, and to illustrate the application of this framework to valorization policy at Dutch universities. I also tried to motivate the elements of this framework (language, logic, deontology and dynamics), without trying to argue that this framework is the only possible one. The elements mentioned seem to me natural elements to consider, but

I expect the framework to evolve. The framework and its questions will have to demonstrate their usefulness in the actual analysis and construction of public policy.

When it comes to applying ontological policy analysis in practice, we are faced with the question of what to include in our ontology and what to exclude. For an extreme example, consider an ontological analysis of refugee policy that involves analyzing a form that refugees need to fill in. Suppose this form includes the line "Please use a pencil to fill in this form". Does this mean that the refugee policy ontology has to include pencils? There is no general answer to this question. Just as the scientist has to choose what aspects of reality to include in her model, a person analyzing policy similarly has to choose which aspects of the policy domain to include in her analysis, how to (re-)construct the policy domain. This is part of the creative and open-ended character of science, policy making and policy analysis.

Let me end with some more personal considerations that motivated my interest in the ontological analysis of policy, considerations that might yield another argument for the importance of an analytical tool like the one described in this paper. I observe around me a loss of ontological diversity, a lamentable consequence of globalization that has unfortunately received little attention when compared to other losses of diversity such as the degradation of biodiversity or linguistic diversity. In a globalized world where technologies tend to make unification and uniformity much easier to realize, a critical evaluation of our ontologies is becoming ever more important. In the interest of global communication and business, the ontology that is being created right now for the semantic web will first become the one way we look at the world, and after this ontology will have become entrenched, it will have become the world itself. Via double-click information (Latour 2003), the work done by ontologists will have become invisible, and therefore beyond the reach of critical discussion and possibly change. In line with Michel Serres (Bowker and Star 1999, p. 321), I see one task of philosophy as undoing this convergence, to re-open our classifications and point to alternative possibilities that have been realized in the past or that so far have not been realized at all.

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