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Slovenian social scientists' understanding of public knowledge and participation in sustainable development: from deficit to mutual learning

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ABSTRACT: *Public participation in decision-making has in the last decades become a common refrain in political and scientific discourse, yet it does not often truly come to fruition. The present study focuses on the underlying issue, that of the construction of the difference between scientific and public knowledge and its consequences. Through discourse analysis of scientific texts on sustainable development three distinct groups of Slovenian social scientists were discerned that differed in their views on the relationship between scientific and public knowledge and consequently the role and nature of public participation in decision-making processes. With a rise in participatory practices the preponderance of the deficit model found in this study remains problematic.*

KEYWORDS: *Democracy and science communication, Science communication: theories and models, Public engagement with science and technology*

Introduction

The participation of citizens in decision-making processes has become a key part of political discourse in the period since the 1970s, when environmentalists demanded the inclusion of the public in the decision-making about complex environmental problems. The public's participation on the one hand meant the democratization of decision-making processes by opening up the exclusive domain of political actors and experts, and including anyone who was or would in the long term be significantly affected by the decisions made by others. On the other hand, because the environmental problems were seen as the (unintended) consequences of scientific developments, democratization was also aimed at science, in order to allow other experiences, modes of thought and observation to contribute to the "betterment of scientific knowledge" [1, 2].

In the past decade, especially with the rise of the concept of "the knowledge-based society", the necessity to engage with wider society has become an important topic of science policy at the European and national (in this case Slovenian) level as well as on the level of individual universities — administrations and faculty. Bucchi and Neresini [3] point out a linguistic shift: "from 'public awareness of science' to 'citizen involvement', from 'communication' to 'dialogue', from 'science and society' to 'science in society'".

Participatory, civil, public and democratic science — these are the buzzwords that indicate the rise of a participatory paradigm. As is almost inherent to buzzwords, the participatory paradigm has multiple and somewhat vague meanings. Unfortunately, in the majority of cases they seem to have also become a "blind mantra" [4].

The aspirations of environmentalists in the 1970s did not come to bear, despite the growth in the use of different forms of co-operation: from participatory conferences, workshops and roundtable discussions to knowledge cafés and other collaborative techniques. Although the inclusion of the public in decision-making processes is becoming more prevalent and in some cases (e.g. in environmental issues) obligatory, it has become somewhat of a formality or simply, a ritual. Despite the calls for the democratization of science, which means "to acknowledge non-scientific actors as knowledgeable partners" [5], participation is most often perceived in a rather limited sense [6–8]. It mainly involves "top-down" communication of science, teaching and persuasion [4, 9, 10] or boils down to just "publicity for science" [11].

Unfortunately, the scientific (and political) spheres too often consider the role of the public sphere *post festum*, and thus limit the role of the public to the legitimation of policies. These new forms also serve the purpose to fulfill established commitments to democratize decision-making processes and thus "procure trust" without actually changing anything [12, p. 41]. Even if participatory forms are lauded as bottom-up, some elements remain top-down — they are organized and managed by political or scientific actors and institutions who decide on the format and the topic to be covered [13, 14]. This means that the agenda is already constrained; often broader structural decisions have already been made which denies the public the possibility of questioning them [15]. It basically means a choice between limited options.

In certain fields of research public participation is par for the course, yet in many of these cases participants are interpellated into the role of a user (e.g. of a certain space in urbanism) or consumer (e.g. of a certain technology or service). The participant is therefore a direct "stakeholder", which also represents a prior framing of the problem, as it implies that the "stake" is agreed upon [12, p. 58] as well as implicitly predefines the type of knowledge they bring to the table. As a user or consumer their knowledge is based on local contingencies, individual interests and tacit knowledge and not on the interest in the common good.

Objective

The objective of the presented research was to gain a better understanding of the construction of the gap between scientific and public knowledge through boundary work and the scientists' subsequent understanding of public knowledge and public participation in decision-making processes. It focused more specifically on the social sciences which have rarely been studied in fields devoted to researching the construction and use of scientific knowledge. Furthermore, the study focused on the case of sustainable development not only as a complex social problem, but one, in which public participation is seen as inherent.

The relationship between science and the public

The role scientists impart to the public and consequently act upon is based on their view of public knowledge and the relationship between it and scientific knowledge. The nature of this relationship can be represented in more detail since the 1960s with the emergence of the inquiry into the communication and understanding of science, due to the remarkable growth of (basic) science coupled with the rise of the mass media after World War II [16]. In the literature recounting and analyzing these developments three approaches are generally pointed out to have developed since then — namely, the so-called deficit model, Public Understanding of Science and Public Engagement with Science [11, 12, 17–19]; Felt[11] and Callon [18] also add recent critical developments as a distinct fourth approach.

On the surface these accounts deal with approaches social scientists take in researching this relationship between public and scientific knowledge. They refer to distinct models of understanding, coupled with specific types of participatory practices. Although most authors point out the (lingering) dominance of the deficit model, they nevertheless frame these approaches as developments: as a progression towards greater engagement and a rise in participatory practices. This obscures the factors underlying these different understandings: the specific developments of modern science in the 20th and 21st centuries, more generally, as well as the scientists' paradigmatic positions and those prevalent in their respective fields.

The relationship between scientists and the public and consequently the envisioned role of the public in decision-making is based on the expanding gap between scientific and public knowledge, which in the 20th and 21st century represents an essential element of the modern understanding of science. Yet, this gap is not inherent or essential for this division of labor — in the 19th century the gap was understood as a consequence of different modes or styles of argumentation and grew with the formalization and mathematization of science and later on with its professionalization. It started off with the exclusion of the public from involvement in scientific practices, but did not automatically entail "a disqualification of the publics' knowledge" [20, p. 101]. Modern scientific culture, generally, has transformed this epistemological gap into an ontological gulf.

For one, the reclusion of scientists into the proverbial "ivory tower" is due to the rapid growth in science in the 20th century. The sciences developed into rather self-referential, "autopoietic" systems, organized in such a way as to reinforce the relations and processes that had generated them [21]. As conveyed by Calhoun [22]: "[a]s academia grew, other academics became an ever more important audience for researchers", which reduced the need of the sciences to seek public legitimization of their work. This is not to say that science has excluded itself completely from contributing, directly or indirectly, to public culture, but that there was just no more impetus to do so.

Towards the end of the 20th century this reclusion was seemingly countered by the current discourse on science and in science, typified by the concept of "knowledge-based society", which widens the gap through the construction of two clear categories: scientists

hold the monopoly on truth and the public "has no access to true and valid statements" [20, p. 106] [23]. In essence, this discourse denies the public's capacity to hold and articulate independent concerns and meanings "which cannot be domesticated and controlled by scientific forms of representation" [24]. The public thus cannot be understood as a partner or contributor of complementary knowledge, but is mainly understood as a passive consumer of scientific knowledge and technological artifacts [20, p. 101].

The construction and maintaining of this gap is not just a byproduct of the circumstances of growth, professionalization and specialization. For one, it was crucially deployed in the struggles for the autonomy and freedom of scientific research. For example, in the struggle for the autonomy of science, scientists resist the concept of social relevance determined by others, as well as other criteria in the context of decisions about science funding. The reactions to these impositions into what was supposed to be a self-regulatory institution, as e.g. calling it "the politicization of science" [25], have sometimes culminated in trends of self-isolation [see e.g. 26]. Also, and this should in no way be discounted, the gap is an immense source of social power [27].

The essential difference of scientific knowledge from public knowledge has become the foundation for the (construction of) authority and autonomy of the scientific sphere. What demarcates science from other spheres and practices considered by scientists as non-science, are not the inherent characteristics of science itself. This difference is constructed through what Gieryn [28] termed "boundary work" — i.e. the discursive practices by which scientists attempt to attribute selected qualities to science in order to draw a "rhetorical boundary between science and some less authoritative, residual non-science". These processes and practices of boundary work need to be understood more broadly than just intentional "ideological strategies" aimed at securing academic recognition and "maximization of scientific profit" and the "monopoly of *scientific authority*" [29]. They comprise of routine practices that reflect "historically resonant discourses" about science as politically neutral, distinct from values, interests and opinions, about "science for the public good as well as orthodoxies of behavior for scientists and scientific societies" [30]. These practices are therefore not only episodic and are not necessarily intentional or agonistic, as they do not exclude communication, co-operation and negotiation. They are ever present in scientific discourse, "routinized as standard practice" [31] and often not reflected upon.

The case of sustainable development

Sustainable development has become in the last decade, at least on a declarative level, one of the key goals in international politics. Yet, as a complex social goal (and also as an object of research) it is extensive and ambiguous, both in professional and public discussions. In public and political discourse, on the one hand, the rate of use of this concept has rocketed; on the other hand, the discussions display an ease and level of simplicity, without regarding sustainable development as a complex social problem. With the concept of sustainable development becoming a catchword, while retaining a certain

flexibility of meaning, it has opened up a struggle for the power to define the reality of the problem. Here the traditional questions of theories of democracy come into sharper relief.

International policy documents portray citizen participation as an essential part of sustainable development. On the one hand, it is seen as important in itself — as an integral part of the pillar of social development or even a separately standing principle [32–34]. On the other hand, the participation of citizens is deemed necessary, because achieving sustainable development requires a radical change in attitude towards the environment, social equity and political power. Participation in the decision-making process would lead to a greater legitimacy of political decisions, a basis for shared responsibility and support for long-term implementation of policies and motivation for lifestyle changes [35–37]. Advocates of public participation in decision-making processes see it as the only way to achieve effective individual solutions and see gaining a consensus among experts, politicians, various stakeholders and citizens as imperative [38].

However, the primary goal of the inclusion of the public should not be seen merely as a way to gain consensus and thus potentially marginalize conflicts of interests and values implicit in the concept. Public participation must not be supported solely for instrumental reasons — as a way of gaining formal legitimacy and constructing the basis for the delegation of responsibility to individuals. Here sustainable development is seen more as the domain of experts, decision-makers and/or the market and thus frames the role of the public in an individualized and depoliticized way. It should be seen as a normative and political problem, which needs to include the participation of all those who are significantly and/or in the long-term affected by the consequences of the actions of others, whom citizens can not directly influence — that is, for normative and substantive, not just instrumental reasons. Only an inclusive dialogue can bring about a common understanding of sustainable development, a critical rethinking of the concept and deliberations about policies and their underlying/guiding assumptions [7, 8, 39].

Methodology: sampling procedure and analysis

For a comprehensive understanding of the role of public participation and the relationship between science and the public in the case of sustainable development the analysis focused on the scientific contributions of Slovenian social scientists working on sustainable development. The research population was designated in two steps. Firstly, the list of social scientists was defined by the use of the SICRIS database [40], where inclusion represents the best available indicator of the status of scientist, and by their ARRS classification [41] which indicates their main field(s) of research. The determination of the population was then performed in a reverse sequence — by reviewing Slovenian scientific texts on sustainable development and eliminating authors that did not fulfill the above criteria. Due to the imprecision of the criteria — the ARRS classification codes and the parameter "key word" in the COBIB.SI database [42] — the preliminary sample included a greater number of the most prolific scientists.

The final sample of twenty scientists[1] was defined after a preliminary analysis of the texts through the usage of a sampling matrix in order to include as much of a diverse set of discourses about sustainable development and the role of the public as possible as well as to achieve research symmetry by including those appearing in the media as well as those who do not. The final sample included scientists from the following fields: geography, economics, urban planning, pedagogics, theology, sociology, political science and environmental protection. The prevalence of geographers in the study (8 out of 20) is due to the selection of the most prolific writers as well as the relatively small scientific community in Slovenia — for a more structured sample a much broader topic would need to be chosen.

All in all the sample of their scientific texts included 255 texts, published from 1997 to 2012, and included scientific, expert articles, published conference papers, edited book chapters as well as a few scientific monographs. The scientific texts were collected and analyzed in full, except in the case of the three most prolific writers, where an unsystematic sample was chosen in order to reach saturation.

The writings of these Slovenian social scientists were analyzed using discourse analysis; not ascribing to any particular "school" of discourse analysis, but rather in a broader sense as critical close readings of the texts. Discourse analysis is concerned with the production of meaning through texts, with how discourse inscribes a specific way of understanding [43]. This method is therefore anti-essentialist and is appropriate for analyzing the differences in conceptualizations of sustainable development as well as analyzing the practices of boundary work. In line with the methodological approach the analysis was informed, but not limited by previous attempts to categorize different ways of understanding the relationship between scientific and public knowledge. The analysis of practices of boundary work is less grounded in the theory which specifies only the principles and intentions of these practices; thus attention was directed to the way key themes were framed by the selection of words and metaphors, the positioning of social actors and invoking particular meanings [43]. After a preliminary reading of the scientific texts, key themes were coded and sorted, with attention focused also on the silences or omissions in the scientists' discourse.[2]

Additional information on the participatory practices of scientists was gained through in-depth interviews with 16 of these scientists. For them to speak freely and from experience the in-depth interviews were semi-structured, (all but one) conducted face-to-face

[1]The sample includes the following scientists: Anko Boštjan, Jurinčič Igor, Kirn Andrej*, Kolnik Karmen, Kovačič Art, Kovačič Lukman Rebeka*, Lukšič Andrej*, Marentič Požarnik Barica*, Mlinar Anton*, Mrak Irena*, Mulej Matjaž*, Plut Dušan*, Praper Gulič Sergeja*, Resnik Planinc Tatjana*, Sedmak Suzana, Šašek Divjak Mojca, Špes Metka*, Urbanc Mimi, Vintar Mally Katja*, Vovk Korže Ana*. Besides those with an asterisk the following were interviewed: Juvančič Matevž, Nared Janez, Slabe-Erker Renata (the latter by email).

[2]Because not all fields of research ascribe a distinct meaning to the concept of the public or the public sphere, the analysis encompassed all the writing about the public, citizens, Slovenians, the population etc. as well as other roles in which the scientists interpellate members of the public — users, consumers, stakeholders, etc.

and carried out with the help of a topic guide, where questions did not guide them towards a specific type of public engagement, but related to their own activities or what they wrote in their scientific texts.

Whereas the analyzed scientific texts were published over a span of over 15 years, the interviews were conducted in May and June 2013. The whirlwind of events in Slovenian society in the year prior to the interviews, especially the growing financial crisis, public spending cuts and large public protests in the winter of 2012 and spring of 2013, brought into sharp relief the dissatisfaction, as well as anger, of the citizenry with their exclusion from political decision-making at different levels. These circumstances as well as the response of only some of the scientists,[3] has had an impact on the approach to the gathering and analysis of the accrued data — the interview data serve "only" as an insight into the scientists past public engagement, not for triangulation.

Ways of understanding participation in sustainable development

With the rise of the participatory paradigm, coupled with the seeming inherentness of public participation in reaching the goal of sustainable development it is not surprising that all of the researched scientists delve into this topic in their scientific writings, to a greater or lesser extent. Because most of them are also publicly engaged in various ways,[4] it is important to inquire into their understanding of the relationship between scientific and public knowledge and of the role public participation plays in their conceptualizations of sustainable development.

On the basis of the analysis of scientific discourse — the extent to which public participation is discussed and how it is characterized as well as the rationale and preconditions for their inclusion — three groups of scientists can be discerned that represent three different ways of understanding this relationship; these run parallel to the different approaches recounted in STS literature. Due to the methodological approach as well as the ensuing sample size, these three patterns of discourse serve as a summary and elucidation of the findings; this to some degree may map them out too neatly, but avoids the individual recounting of the specificities of wording of each of them.

In the majority of the cases, by distinguishing public knowledge from science, their discourse constructs a boundary between public and scientific knowledge. The other examples include scientists who, through their discourse, try to break down the boundary or even explicitly call for a closing of this gap.

[3] Even though the analysis of the data generated by the interviews is inherently not representative, the sample may be skewed — it is possible that positive responses indicate a higher propensity towards engagement outside of their professional obligations.

[4] The extent of their actual public engagement was not estimated or compared as, especially in the case of unmediated engagement, the findings are based on self-reporting.

Deficit model in the social sciences

While emphasizing the importance of the participation of the public, the writings of the biggest group of scientists (ten out of twenty) resemble the continuation of the deficit model in the so-called PUS model. In contrast to research on the natural and technical sciences, none of the scientists in the whole sample subscribes to the more technocratic form of the deficit model, which presupposes "a continuum of rationality in the treatment of technical and practical problems" — where the presumption is that all (political) decisions can be legitimated through reason [44, p. 63, 64]. While agreeing that these kinds of political problems include questions of values, goals and needs, for this group the focus is on the lack of knowledge and on the values deemed as inherent to "appropriate knowledge".

Despite emphasizing the importance of public participation this group of scientists establishes (additional) education and awareness raising as a fundamental prerequisite for it.

- *It is not possible to achieve the desired development without appropriate education, which has to encompass the whole population.* [45]
- *If we wish to ensure the development of such communities, the planning of only experts, well-versed in their knowledge, is not enough. [. . .] with competent citizens in all fields we will ensure the successful actualization of sustainable development. [. . .] Their effective inclusion into the planning process, though, is possible only if they are appropriately educated and informed.* [46]

The focus on education in itself is not necessarily a case of boundary work, as it follows from the division of labor; it is, though, when discussed as imparting "objective" information and being "appropriately" informed as well as seeing it as a condition for the inclusion of the public in decision-making. As one scientist in this group wrote, the public's perception of the environment "almost never corresponds to the actual state of affairs" [47]. It is therefore necessary to expand ecological education and education in general to enable a broader understanding of the interdependencies between different (environmental) elements and of the importance of these relationships and values in decision-making [48]. There needs to be a move towards "the responsible use of knowledge" [47], that is, with an "appropriately" educated and informed general public [49].

The texts also reveal two distinct notions of value-ladenness of knowledge: one in the sense of having the "proper" environmental-protection, more ecocentric values, which the scientists hold and are seen as congruent or perhaps inherent to scientific knowledge; and the other in the sense of personal interests in contrast to general or public interest. The difference lies in the notion of "appropriate" education and knowledge: the public because of a lack of knowledge often forms opinions based on self-interest and short-term thinking instead of being able to, in an informed way, "define the *right* balance between preservation and development" [50]. Additional education and informing is thus seen as a way of introducing and ingraining "proper" values and redirecting actions and thinking

based on personal interest to actions in the public interest:

> *People usually do not have enough knowledge about the factors and processes [. . .] for this reason the opinions of individuals are formed in accordance to their current interests or are expressed through their disinterest in solving societal problems.* [51]

This notion of value-ladenness can also be discerned in the ways scientists working in the fields where public participation is par for the course — public planning and sustainable tourism — interpellate the public. They are discussed as users or stakeholders which automatically positions them as (personally) interested parties.

In this group the rationale for including the public does not lie in the possible contributions of the public to solving sustainability issues, or for that matter, what these issues are for them, but in the publics' contribution in gaining a broad consensus and consequently in actual implementation. Education and knowledge are seen as a vehicle towards greater trust, support, acceptance; insufficient knowledge is said to lead to baseless rejection of everything resulting in unproductive, also harmful debates.

- *Conflicts arise out of poor knowledge of the activities of others and lack of information, all of which can lead to blockades of economically and environmentally justifiable development projects.* [52]
- *Unfortunately it often happens that due to the insufficient knowledge about the problem and in this sense poor education, public debates turn into unfounded advocating of individuals' interests.* [53]

The role of the public is thus seen in an instrumental manner, in order to gain support for long-term changes in behavior. Through participation the public gains an understanding of the issues at stake, the decisions to be executed gain support, as well as lead to personal identification and consequently taking responsibility for sustainably oriented development and acting accordingly.

As with those subscribing to the PUS model, the discourse of this group is based on a few underlying assumptions that withhold the boundary between scientific and public knowledge. First of all, science is seen as authoritative and superior. Secondly, the responsibility for the bad relationship between science and the public, i.e. the rejection and fear of scientific developments, is put squarely on the public as passive and insufficiently literate [17]. The public is conceptualized as an aggregation of naïve or ignorant spectators and pupils. Communication with the public would bring knowledge and understanding, where "understanding" indicates the assimilation of scientific knowledge, including framings, assumptions and the conceptions of society underlying and influencing scientific practice [54].

Democratization of science model

The second group (five out of twenty) argues for the inclusion of the public for normative reasons — the inclusion of the public in decision-making processes is seen as intrinsic to

the democratic resolution of public problems. They criticize the previous approach as individualistic, as it positions the individual as a user or consumer first and citizen second. Their view on the participation of the public resembles the PEST model, which problematizes the rigid demarcation between science and the public, especially the exclusion of public attitudes toward science and technology [19].

On the one hand, public participation is seen as important in a procedural sense - "in order to protect democratic procedures and the principle of publicity" [55] or, more concretely, to bring transparency, honesty, fairness, and in the end legitimacy to the process:

> *to guarantee implementation of the principle of inclusiveness, to collect as many opinions and views as possible, for legitimity of the final product, to strengthen the processes of social learning.* [56]

In this context, they criticize the reality of the decision-making process as being displaced by expertise and technology [57] and/or as intransparent, including the public as observers and means of legitimation only at later stages, when "possible changes are already very complicated or practically impossible" [58].

On the other hand, public participation also has a functional role — opening up the political arenas and democratization are crucial for implementing sustainable development, in their view, because it would allow for the inclusion of a variety of perspectives, important local and tacit knowledge, adding the voices of marginalized groups in particular and the parts of the public, that do not want political authority, in general.

> *There are often problems with participatory processes, but we know from experience, that the initial investment (of time, effort and finances) pays off, because the participants in this process are a source of valuable information, experience and knowledge.* [59]

This does not mean that this group sees scientific knowledge as equal to public knowledge — this group follows the so-called "decisionistic model" — that is based on the separation of the functions of scientists and other political actors, be it politicians or citizens, as well as drawing a boundary between the two by the separation between questions of values, goals and needs and objective and technical knowledge [44, p. 63, 66]. The division they construct through their discourse is between different types of knowledge. On the one hand the public represents a "common-sense perception of the world" and a broader social type of rationality [60], yet holds more fragmented, local and experiential knowledge. On the other hand scientists represent an expert limited "highly intellectualized system of ideas" [60], yet have less localized, broader perspectives. The public is the bearer of different or particular (local) knowledge, different perspectives as well as values and interests. They are thus seen as "originators, as identifiers, potential victims or implementing actors" and thus less objectified [36, p. 462], [61], yet just as a complement to scientific knowledge.

While these instances of boundary work in the case of sustainable development are not as problematic, since they are based on the division of labor and couched in discourse

on inclusiveness and democratization, this group's understanding of the relationship between science and the public has important implications. Sustainable development is in their discourse designated as a complex public issue — as a case of "trans-scientific" problems [57], "complex political decisions" [62], where decisions cannot be based on reason alone. In matters riddled with uncertainties and without scientific consensus, the public needs to be included:

> *there is no other solution than public confrontation of different views, arguments and values. This is a kind of public learning process of all participants, where in situations of cognitive uncertainty nobody can speak on behalf of incontrovertible facts, the authority of knowledge, objective truth.* [55]

While both types are seen as essential, scientific knowledge is more or less explicitly seen as the precursor. Because the public cannot fully understand sustainability and imagine its effects, scientists have the role of "ensuring the knowledge needed and facilitating a discussion" in order to reach a consensus [63]. The task of discussing values is then imparted on the public after the experts have done their work:

> *Expert evaluation [. . .] can be only the first step. Because it is in this case firstly a value and ideological question, it is ever so important that the debate is opened also for the broad interested public, the role of which is precisely the reflection of values.* [60, p. 68]

As with those subscribing to the PEST model, these scientists agree that the public is not bare of rationality [11], that there indeed exists a specific public knowledge that is complementary to that of science. More significantly, the discourse of these Slovenian social scientists echoes the calls for the democratization of science that appeal for public participation (only) in cases of scientific uncertainty or in the case of complex social problems, which explicitly include issues of social values — as in the concepts of "Mode 2 science" [64], "trans-science" [65] or "ambiguous risk situations" [66]. They thus postulate science as an objective, exact way of attaining facts and getting closer to "the truth", where there is no place for values or uncertainty. Calling for participation only in complex cases, and not in others, "cleanses" social problems by delimiting "scientific" and "political" components and thereby distances science from the question of values [1, 2, 67]. This implies that uncertainty or "cognitive indeterminacy" is not intrinsic to science [2, p. 201], but is rooted in the political process, forgetting that even "defining the scientific questions to be asked [. . .] is itself a value laden and political act" [68].

Critical model — breaking the boundary

The third group (five out of twenty) represents those who do not uphold the boundary between science and the public as universal vs. particular or local, objective vs. experiential or burdened by interests. They reject the false premise of the division between facts and values, which "conceal[s] pre-existing, unreflected social interests and prescientific

decisions" [44, p. 59] and bring a critical reflection to the issues brought up by the needed division of labor between the public and scientists — those of the asymmetry of power and access to information as well as of (veiled) conflicts of interest, assumptions and values.

As with a more recent critical approach to understanding the relationship between science and the public, exemplified by the writings of Brian Wynne [24, 69], this groups' understanding of the relationship between science and the public is marked by a weakening of the boundary and stems from their critique of current scientific practices and the ways in which the public is (or indeed is not) included in the decision-making process. As with the previous group they emphasize that decisions are not made based on "objective knowledge" alone, but are based on values and social processes. Therefore there needs to be a realization, that what is and can be known is not enough — the choice between "alternative futures" presented by an authority can lead to a possible solution to the wrong question [70].

On the one hand, scientific knowledge "suffers" from the same issues as public knowledge — the lack of reflection about (hidden) assumptions, interests and values, as well as the inconsistencies between declared and realized values. Therefore hierarchical structures need to be replaced by democratic forms of organization, co-operation and team work:

> *you are either a rather narrow specialist, who knows a lot / enough / something about a small fraction of reality, or you know nothing deeply enough.* [71]

On the other hand, one of them especially, criticizes the state of science that either hides and hoards knowledge or is distinguished by its disconnectedness, one-way discussions, rigidity and concentration of power [72]. Scientific engagement represents a model of transmission and dissemination of knowledge where scientists turn up their nose at unprofessional informal knowledge [73]:

> *'the public' is pushed to the margins of our thinking and of our expert work. We deal with it only in stressful situations, when this amorphous creature starts protesting and poking its nose into the experts' work or demanding something unprecedented: change.* [74]

Solving public issues has to be based on democratic principles and methods, through inclusive and reflective social learning and reasonable democratic decision-making. They advocate what Habermas [44, p. 86] called the "pragmatist model" — that is for critical, reciprocal interaction, which must be "rooted in social interests and in the value-orientations of a given social life-world" that determine the practical needs in a concrete situation. As one of them wrote, in the end the following is important:

> *We have to be aware of uncertainties and risks. We are more interested in the importance of the questions we ask ourselves than the results, knowing that we cannot propose the 'right' solutions, but just the possible solutions and that our values and social processes play an important role in decision-making.* [75]

Out of the three groups, these few scientists are an outlier — while they acknowledge the division of labor they do not see scientific knowledge as a precursor to public debate — either as a precondition for participation or as the authority setting its agenda. The role of the public here has evolved from naïve spectator, witness, supporter and ally or participant, to partner. In contrast to many calls for the democratization of science, which deconstruct only scientific knowledge and idealize public knowledge as more authentic and reflexive, these scientists point out that both are not beyond contestation. The solution they see is in co-operation and mutual learning. In order to achieve this it is necessary to "remove the severe boundaries between science and society" [73] and to start:

> *thinking differently about a common space of education, about a new relationship between ordinary people and experts and between traditional and untraditional students.* [76]

Discussion

The importance of understanding these different groups of discourses on public participation becomes more pressing in the context of the scientists' own engagement. They do not only write about its importance, but the majority are also engaged in such practices. While they as social scientists experience a level of disinterest on the side of the mass media, they also engage in other public, yet less visible ways: as part of their work (e.g. field work, implementation projects, public presentations etc.) as well as in extracurricular activities (e.g. round tables, educational activities, cooperation with associations and NGO's etc.). Whereas the attitudes towards their public engagement were to a large extent homogeneous, these scientists hold different views on the public and its role in political decision-making, which has implications for the nature of their engagement. The different views, though, did not relate to different choices regarding forms of engagement.

In comparison to other studies of science communication that have found that the deficit model is dominant, here in the Slovenian social sciences it represents approximately half of the sample. In addition, this research found a greater presence of approaches based on an interpretive and critical paradigm. Yet, what remains dominant in the case of the Slovenian social scientists is the notion of demarcation between public and scientific knowledge. The different forms of boundary work can to some extent be seen in what is considered as the proper way of engaging. A certain level of homogeneity can be discerned among them in that they do not see public engagement in itself as conflicting with scientific authority or professionalism, yet posit knowledgeability and scientific authority as a condition of worthy engagement. The main difference, though, lies in the nature of communication — those who draw a distinction between scientific and public knowledge tend to see science communication as a form of simplification and as a linear, one-way model of communication.

Through interviews with these scientists it was also established that the motivation for their engagement is not based on instrumental reasons, but rather on their personal inclinations and interests and relate to the positive feelings of contributing to the betterment

of society and the environment. Their engagement also relates to their understanding of the role of science and of scientists in society. Many emphasized that science should be "useful", "concrete", not an end in itself; these activities are in their minds important not only as vehicles for informing and raising awareness, but leaving a trace in society. This can be seen as encouraging, if considered in the context of the division of labor. However, considering their understanding of the role of science and the public — their boundary work — it can be discerned that, for the majority of them, the notion of social relevance does not follow from the formulations of social problems in the public itself, but is designated autonomously within the scientific community. However, if scientists wish to contribute to the public sphere, they must approach relevance differently, not merely as an indicator of autonomous activity. By not incorporating or, for some not even acknowledging, the public's understandings of public problems into their work, their engagement can serve to constrict public debate despite their best intentions. While they contribute their knowledge, they constrain the agenda and limit or even work against the construction of a common understanding of a certain problem. More specifically in the case of sustainable development, the majority of the researched Slovenian social scientists contribute to the, otherwise prevalent, depoliticized discourse on sustainable development, which sees the role of citizens in an individualized and depoliticized way — only or primarily as consumers.

The importance of (the scientists' understanding of) societal relevance coupled with the domination of demarcation in the views of social scientists also does not bode well in the context of the rise of the participatory paradigm. In the past decade, especially with the rise of the concept of "the knowledge-based society", the necessity to engage with wider society has become an important topic of science policy at the European and national level as well as on the level of individual universities. While the engagement of scientists is currently not overtly supported or stimulated within Slovenian scientific culture or science policy, the inclusion of participatory practices in research project requirements (especially those funded by the EC) as well as growing austerity in Slovenian funding of higher education and research could lead to a rise in these practices, yet for the wrong reasons. Previous studies [77, 78] have shown that the main factors for the engagement of scientists with and in the public remain instrumental — for funding and recruitment purposes. In the context of the prevalence of the deficit model even with these Slovenian social scientists, this does not bode well for the public.

Without reflexive and epistemologically open engagement of the scientists — that is, reflexivity in relation to questions of power, the relative sequestration of scientists in a certain way of thinking and a certain social environment as well as a move towards non-objectivistic epistemology — the push towards public participation could remain just lip service for scientists, expertly solving problems the public does not have.

Notes

References to cited texts from the empirical study are marked with an asterisk.

References

[1] M.S. Carolan (2006), "Science, Expertise, and the Democratization of the Decision-Making Process", *Society and Natural Resources* **19**(7): 661–668, p. 661.

[2] S. Jasanoff (1987), "Contested Boundaries in Policy-Relevant Science", *Soc. Stud. Sci.* **17**(2): 195–230.

[3] M. Bucchi and F. Neresini (2008), "Science and Public Participation", in E. Hackett, O. Amsterdamska, M. Lynch, J. Wajcman and W. Bijker eds., *Handbook of Science and Techologies Studies*, MIT Press, Cambridge, MA, U.S.A., p. 457.

[4] A.R. Davies (2002), "Power, politics and networks: Shaping partnerships for sustainable communities", *Area* **34**(2): 190–203, p. 201.

[5] R. Lindskog and G. Sundqvist (2004), "From consensus to credibility: New challenges for policy-relevant science", *Innovation* **17**(3): 205–226, p. 209.

[6] S.M. Lele (1991), "Sustainable development: A critical review", *World dev.* **19**(6): 607–621.

[7] A. Irwin (1995), *Citizen Science: A Study of People, Expertise and Sustainable Development*, Routledge, London, U.K. .

[8] G.B. Walker (2007), "Public Participation as Participatory Communication in Environmental Decision-making: From concepts to structured conversations", *Environmental Communication* **1**(1): 99–110.

[9] J. Burgess and C.M. Harrison (1998), "Environmental communication and the cultural politics of environmental citizenship", *Environmental Planning* **30**(8): 1445–1460.

[10] A. Irwin (2008), "STS Perspectives on Scientific Governance", in E. Hackett, O. Amsterdamska, M. Lynch, J. Wajcman and W. Bijker eds., *Handbook of Science and Techologies Studies*, MIT Press, Cambridge, MA, U.S.A., p. 583–608.

[11] U. Felt (2003), "When Societies encounter 'their' sciences: Conceptualising the Relationship between Sciences and Publics", *OPUS Final Report*: 16–46, http://www.univie.ac.at/virusss/OPUSReport/ (accessed April 23, 2013), p. 16.

[12] B. Wynne et al. (2007), *Taking European knowledge society seriously: report of the Expert Group on Science and Governance to the Science, Economy and Society Directorate, Directorate-General for Research, European Commission*, Office for Official Publications of the European Communities, Luxembourg.

[13] S. Joss (1999), "Public participation in science and technology policy- and decision-making — ephemeral phenomenon or lasting change?", *Science and Public Policy* **26**(5): 290–293.

[14] L. Phillips, A. Carvalho and J. Doyle (2012), "Introduction", in L. Phillips, A. Carvalho and J. Doyle eds., *Citizen Voices: Performing Public Participation in Science and Environment Communication*, Intellect, Bristol, U.K., pp. 3–17.

[15] D. Mercer (1998), "Science, Technology and Democracy on the STS Agenda: Review Article", *Prometheus* **16**(1): 81–91, p. 85.

[16] B. Schiele (2008), "On and about the Deficit Model in an Age of Free Flow", in D. Cheng et al. eds., *Communicating science in social contexts: new models, new practices*, Springer, Houten, Netherlands, pp. 93–117.

[17] M.W. Bauer, N. Allum and S. Miller (2007), "What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda", *Pub. Underst. Sci.* **16**(1): 79–95.

[18] M. Callon (1999), "The Role of Lay People in the Production and Dissemination of Scientific Knowledge", *Science, Technology & Society* **4**(1): 81–94.

[19] R.P. Hagendijk (2004), "The public understanding of science and public participation in regulated worlds", *Minerva* **42**: 41–59.

[20] B. Bensaude-Vincent (2001), "A genealogy of the increasing gap between science and the public", *Pub. Underst. Sci.* **10**(1): 99–113, p. 101.

[21] S. Splichal (2011), *Transnationalization of the Public Sphere and the Fate of the Public*, Hampton Press, New York, U.S.A., p. 124.

[22] C. Calhoun (2009), *Social science for public knowledge*, Social Science Research Council, New York, U.S.A., http://publicsphere.ssrc.org/calhoun-social-science-for-public-knowledge. (accessed October 12, 2010).

[23] B. Trench (2008), "Towards an analytical framework of science communication models", in D. Cheng et al. eds., *Communicating science in social contexts: new models, new practices*, Springer, Houten, Netherlands, pp. 119–135.

[24] B. Wynne (2008), "Elephants in the rooms where publics encounter 'science'? A response", *Pub. Underst. Sci.* **17**(1): 21–33, p. 30, note 5.

[25] R. Hoppe (2005), "Rethinking the science-policy nexus: from knowledge utilization and science technology studies to types of boundary arrangements", *Poiesis and Praxis* **3**(3): 199–215, p. 204.

[26] T. Bender (1993), *Intellect and Public Life. Essays on the Social History of Academic Intellectuals in the United States*, Johns Hopkins Press, London, U.K. .

[27] F. Mali (2002), *Razvoj moderne znanosti: Socialni mehanizmi*, Fakulteta za družbene vede, Ljubljana, Slovenia.

[28] T. Gieryn (1999), *Cultural Boundaries of Science: Credibility on the Line*, University of Chicago Press, Chicago, U.S.A., p. 4, 5.

[29] P. Bourdieu (1975), "The specificity of the scientific field and the social conditions of the progress of reason", *Soc. Sci. Inform.* **14**(6): 19–47, p. 19, 22, 23.

[30] A.J. Kinchy and D.L. Kleinman (2003), "Discursive and Organizational Orthodoxy on the Borders of Ecology and Politics", *Soc. Stud. Sci.* **33**(6): 869–896, p. 871–2, 881.

[31] M.S. Evans (2009), "Defining the public, defining sociology: hybrid science-public relations and boundary-work in early American sociology", *Pub. Underst. Sci.* **18**(1): 5–22, p. 19.

[32] S. Baker (2006), *Sustainable development*, Routledge, London, U.K. .

[33] K. Murphy (2012), "The social pillar of sustainable development: A literature review and framework for policy analysis", *Sustainability: Science, Practice, & Policy* **8**(1): 15–29.

[34] M. Jacobs (1999), "Sustainable Development as a Contested Concept", in A. Dobson ed., *Fairness and Futurity: Essays on Environmental Sustainability and Social Justice*, Oxford University Press, Oxford, U.K., p. 21–45.

[35] P. Macnaghten and M. Jacobs (1997), "Public identification with sustainable development: Investigating cultural barriers to participation", *Global Environmental Change* **7**(1): 5–24.

[36] S. van den Hove (2000), "Participatory approaches to environmental policy-making: the European Commission Climate Policy Process as a case study", *Ecol. Econ.* **33**(3): 457–472.

[37] P.P. Rogers, K.F. Jalal and J.A. Boyd (2007), *Introduction to Sustainable Development*, Earthscan, London, U.K. .

[38] E. Swyngedouw (2007), "Impossible/Undesirable Sustainability and the Post-Political Condition", in J.R. Krueger and D. Gibbs eds., *The Sustainable Development Paradox*, Guilford Press, New York, U.S.A., 13–40.

[39] J. Læssø (2007), "Participation and Sustainable Development", *Environmental Politics* **16**(2): 231–250.

[40] The SICRIS (Slovenian Current Research Information System) database http://www.sicris.si/default.aspx?lang=eng.

[41] The ARRS classification of fields of research http://www.arrs.gov.si/en/gradivo/sifranti/sif-vpp.asp.

[42] COBIB.SI (Union bibliographic/catalogue database) http://cobiss6.izum.si/scripts/cobiss?ukaz=INFO&id=1953088535739564&pg=1.

[43] F. Tonkiss (2004), "Analysing text and speech: content and discourse analysis", in C. Seale ed., *Researching Society and Culture*, Sage, London, U.K.: p. 367–382, p. 373.

[44] J. Habermas (1970), *Toward a rational society; student protest, science, and politics*, Beacon Press, Boston, U.S.A. .

[45] * M. Urbanc and J. Fridl (2007), "Ozaveščanje o prostoru kot pomemben dejavnik izobraževanja za trajnostni razvoj", in *Veliki razvojni projekti in skladni regionalni razvoj*, Založba ZRC, ZRC SAZU, Ljubljana, Slovenia: p. 221–229, p. 222.

[46] * M.P. Demšar Mitrovič, T.P. Resnik and M. Urbanc (2007), "Geografsko izobraževanje o vrednotah prostora za zagotavljanje trajnostnega razvoja", *Geografija v šoli* **16**(3): 3–11, p. 10.

[47] * M. Špes (2008), "Pomen okoljske ozaveščenosti in sodelovanja javnosti za trajnostni razvoj", *Dela* **29**: 49–62, p. 53.

[48] * K. Kolnik (2006), "Trajnostni razvoj kot izobraževalna nujnost in izziv", in *Strokovni posvet Didaktika v šoli v naravi: Zbornik*, CŠOD, Ljubljana, Slovenia: 202–207, p. 204

[49] * K. Kolnik (2010), "Tendence razvoja geografskih kurikulov", in A. Žakelj and M. Borstner eds., *Zbornik povzetkov*, Zavod RS za šolstvo, Ljubljana, Slovenia, p. 35.

[50] * T. Resnik Planinc (2009), "Values of space and geographical education", in D. Schmeinck ed., *Teaching geography in and for Europe*, MBV, Berlin, Germany: 13–28, p. 23, emphasis added.

[51] * J. Fridl, S. Kušar, T. Resnik Planinc and M. Simoneti (2007), "Vključevanje vrednot prostora v proces izobraževanja", in *Kurikul kot proces in razvoj: zbornik prispevkov posveta*, Zavod RŠ za šolstvo, Ljubljana, Slovenia: 195–209, p. 196.

[52] * I. Jurinčič (1998), "Sustainable development of tourism on the Slovene littoral, and carrying capacity assessment", *Public Enterprise* **16**(3/4): 345–357, p. 355.

[53] * J. Fridl and M. Urbanc (2008), "Kartografski in drugi grafični prikazi kot nepogrešljiva učila pri izobraževanju za trajnostni razvoj", *Geodetski vestnik* **52**(4): 653–667, p. 654.

[54] A. Irwin and B. Wynne (1996), *Misunderstanding Science? The public reconstruction of science and technology*, Cambridge University Press, Cambridge, U.K. .

[55] * A. Kirn (2004), *Narava — družba — ekološka zavest*, Fakulteta za družbene vede, Ljubljana, Slovenia, p. 123.

[56] * A. Gulič and S. Praper (2000), "Indicators as tools for sustainable local development", *IB revija* **34**(3-4): 82–87, p. 84.

[57] * A. Kirn (2011), "Heidegger in naraščajoča sodobna družbeno-ekološka kriza", *Teorija in praksa* **48**(anniversary edition): 1095–1138.

[58] * S. Praper (1997), "Trajnostni prostorski in regionalni razvoj ter regionalizacije Slovenije", *IB revija* **31**(12): 34–45, p. 39.

[59] * A. Vovk Korže, D. Vrhovšek, A. Sajovic and V. Jurač (2009), "Priročnik za orodje ERM", in *Zaključna konferenca Natura 2000 - ERM*, Služba vlade RS za lokalno samoupravo in regionalno politiko, Ljubljana, Slovenia: 1–33, p. 11.

[60] * A. Lukšič and M. Bahor (2009), "Konceptualna refleksija strategije razvoja Slovenije", in J. Nared and D. Perko eds., *Razvojni izzivi Slovenije*, Založba ZRC, Ljubljana, Slovenia: 61–69.

[61] A. Stirling (2006), "Analysis, participation and power: justification and closure in participatory multi-criteria analysis", *Land Use Policy* **23**(1): 95–107.

[62] * A. Lukšič (2011), "Zavedanje državljanov o pomenu demokratiziranja političnih aren", in A. Lukšič ed., *Politološke refleksije*, FDV, IDV, Center za kritično politologijo, Ljubljana, Slovenia: 105–121.

[63] * M. Golobič, W. Pfefferkorn and S. Praper (2007), "Nove oblike odločanja za trajnostni razvoj", *Urbani izziv* **18**(1/2): 5–13, p. 7.

[64] M. Gibbons, C. Limoges, H. Nowotny et al. (1997), *The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies*, Thousand Oaks, London, U.K. .

[65] A.M. Weinberg (1972), "Science and trans-science", *Minerva* **10**(2): 209–222.

[66] W.E. Bijker, R. Bal and R. Hendriks (2009), *The Paradox of Scientific Authority: The Role of Scientific Advice in Democracies*, MIT Press, Cambridge, MA, U.S.A. .

[67] S. Hilgartner (2000), *Science on Stage: Expert Advice as Public Drama*, Stanford University Press, Stanford, CA, U.S.A., p. 4.

[68] D. Demeritt (2006), "Science studies, climate change and the prospects for constructivist critique", *Economy and Society* **35**(3): 453–479, p. 467.

[69] B. Wynne (1996), "Misunderstood misunderstandings: social identities and public uptake of science", in A. Irwin and B. Wynne eds., *Misunderstanding Science? The public reconstruction of science and technology*, Cambridge University Press, Cambridge, U.K.: 19–46.

[70] * S. Sedmak (2009), "Izobraževanje za trajnosti razvoj — opredelitev področja", in S. Sedmak ed., *Danes za jutri*, Fakulteta za management, Koper, Slovenia: 21–38, p. 35.

[71] * M. Mulej and V. Potočan (2000), "Economic reasons opposing Bertalanffian thinking in practice: the law of requisite holism in decision making", in M. Rebernik and M. Mulej eds., *STIQE '00*, Institute for Entrepreneurship, Maribor, Slovenia: 187–200, p. 192.

[72] * A. Mlinar (2010), "Paradigma trajnosti in izobraževanje: raziskava na slovenskih univerzah s posebnim ozirom na Univerzo na Primorskem", *Annales: Series historia et Sociologia* **20**(1): 119–130.

[73] * A. Mlinar (2011), *Trajnost in univerza: možnosti, retorika, resničnost*, Univerza na Primorskem, Koper, Slovenia: p. 126.

[74] * B. Anko (2003), "Interes javnosti v razvojnih perspektivah slovenskega gozdarstva", in A. Bončina ed., *Območni gozdnogospodarski načrti in razvojne perspektive slovenskega gozdarstva*, Biotehniška fakulteta, Ljubljana, Slovenia: 187–198, p. 194.

[75] * B. Marentič-Požarnik (2007), "Okoljska vzgoja kot vzgoja za trajnostni razvoj", in *Kurikul kot proces in razvoj*, Zavod RS za šolstvo, Ljubljana, Slovenia: 210–220, p. 212.

[76] * A. Mlinar (2010), "Ovire in možnosti vplivanja strategij trajnosti na izobraževalne programe", in A. Brezovec and J. Mekinc eds., *Management, izobraževanje in turizem*, Turistica, Portorož, Slovenia: 1466–1480, p. 1475.

[77] British Royal Society (2006), *Science Communication: Survey of factors affecting science communication by scientists and engineers*, http://royalsociety.org/Content.aspx?id=5232 (accessed January 14, 2013).

[78] European Commission (2007), *European Research in the Media: the Researcher's point of view*, http://ec.europa.eu/research/conferences/2007/bcn2007/researchers_en.pdf (accessed January 14, 2013).

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