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Social Learning, Natural Resource Management, and Participatory Activities: A reflection on construct development and testing

Rodela Romina [a,b,*]

[a] Wageningen University and Research Centre, Laboratory of Geo-Information Science and Remote Sensing, Wageningen, Netherlands
[b] University of Nova Gorica, Laboratory for Environmental Research, Vipavska 13, 5000 Nova Gorica, Slovenia

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ABSTRACT

This analysis reflects on the use of multidimensional constructs for the study of social learning in natural resource management. Insight from deliberative democracy and adult learning literature are used to ground the identified four dimensions (the moral dimension the cognitive dimension, the relational dimension and trust). Then, a selection of empirical cases is surveyed with the aim to develop and understanding how well the empirical outcomes reported by these sit against the insights borrowed from the deliberative democracy and pedagogy literature. The paper concludes with some recommendations for future research.

1. Introduction

Recent scholarship in resource management is rich of empirical cases that, rather than predictability, emphasise adaptation (e.g., co-management, adaptive management, adaptive co-management). Central to these approaches is learning, seen to have an important role at different levels of involvement to include resource users, resource managers as well as policy-makers [1–3]. Of an interest is that the resource management literature that emphasises learning and adaptation is not limited to the investigation of one type of learning processes but is open to more. It borrows insights from pedagogy and adult learning in order to study learning process in relation to current environmental issues. A marked feature of that literature is the interest for participatory approaches and the opportunity these have to trigger a type of transformative change process that some have came to call social learning. Here it is important to mention that although more than one definition of social learning is available the literature generally uses it to refer at a "sustainability" type of transformative change occurring at different levels and, in this, social learning is framed as a normative goal [4–6]. Differently from other disciplines where social learning is used to refer at socially-situated learning processes (e.g., management studies, adult education, criminology) in the resource management literature the term is used to refer at a type of outcomes and processes assumed to be in place when, with the support of participatory approaches, people/stakeholders meet in order to discuss, or take decisions, in relation to a natural resource, or an environmental issue. Therefore, while learning is a process that individuals experience within and outside participatory settings, in much of the resource management literature social learning is rather framed as a construct used to guide research and practice, and as such it is loaded with meanings researchers give to it. For instance it is used in the critique of reductionist and top-down approaches, or when placing expectations and value statements on what, and how, is to be achieved with participatory approaches.

The presence of more than one definition led to several operationalisations of social learning. An earlier analysis of current research undertaken by the author highlights the emergence of three perspectives, each with its own assumptions about the learning process and learning outcomes [7]. That analysis identified that a group of literature operationalises social learning as a change of internal-reflective processes participants to participatory activities experienced; a second group of literature operationalises the concept as a change of practices/way in how things are done; while a third group as a move of the social-ecological system on a more sustainable trajectory [7]. The research reported here builds on that study. More precisely, in focusing on the assumptions brought forward by the first group of literature, named individual-centric, it seeks to reflect further on the operational measures suggested by Webler and colleagues [8], i.e., the *moral dimension* and the *cognitive dimension*, later picked up by others and extended to include the *relational dimension* and *trust*. It is an aim of the present research

* Corresponding author.
E-mail address: rominarodela@hotmail.com

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to consider if, and how well, these four can perform as a multidimensional measure of social learning. Also, it is an aim to reflect on participation driven learning processes and the implications that arise for the participant and the society.

There are several scholarly streams within policy studies research that are relevant to this end. However, taking into account the assumptions and interests of contemporary environmental and resource management literature, where emphasis is placed on process rather than outcome, and on collaboration rather than competition [9], the literature on deliberative democracy can be useful in the study of the implications that arise from participatory approaches [10]. Having assumed that *social learning* is a multidimensional construct I account for insights from deliberative democracy and in the next Section consider the four dimensions mentioned above. In Section 2, I also consider insights from pedagogy literature which are used to conceptually deconstruct learning interactions within a participatory context. Then, after giving methodological detail in Section 3, I turn to a selection of empirical studies and in Section 4 try to understand how well the empirical outcomes reported in selected publications *sit against the insights borrowed* from the deliberative democracy and pedagogy literature. Section 5 concludes the paper with some recommendations for future research.

2. Theoretical Background

In this section I make an attempt to bring together insights from deliberative democracy, and pedagogy literature in order to explore the moral and cognitive implications that arise from participation, and consider how participation influences relations, trust, and *learning interactions.*

2.1. Deliberation as a form of communicative interaction

Research on natural management has an interest in participatory approaches that are processes in which recourse users, managers and other stakeholders gather so to discuss and/or take decisions in relation to resource management. While some of that research focuses on the outcomes of participation [10], other research focuses on the process itself [8,10]. The process dimension of a participatory activity is an aspect of interest to the social learning literature since much of that research assumes that in the course of a participatory activity, through repeated interaction, participants can learn, enhance knowledge and develop shared understanding. In their analysis Parkins and Mitchell [9] take interest in the *process* and demonstrate that the deliberative democracy theory, which emphasises process over outcomes, can help to challenge some of the established traditions in resource management, and in so doing can lead to new ways of conducting and evaluating participation.

The theory on deliberative democracy developed as a critique of decision-making based on the competition of interests [11,12]. It assumes that the individual is an ethical and moral agent able to collaborate with others and critically reflect on the issues at stake [13,14], and that "deliberation leads to better decisions than alternative procedures, since everyone gets to express their opinion on the matter and since different opinions are subject to open scrutiny, so that the better argument triumphs" [15:1]. The theory on deliberative democracy assumes that deliberation can better bridge the gap between the preferences, needs and concerns of citizens and the decisions made on their behalf by appointed representatives [13]. Decision-making based on deliberation can led to outcomes that are fairer, and more legitimate as made during an exchange of arguments, which Gutmann and Thompson [14: 52-53] see to be 'the capacity to seek fair terms of social cooperation for their own sake'. In its classical conceptualisation deliberative democracy concentrates on the ideal conditions for reasoned discussion and it assumes that deliberation facilitates a convergence toward shared outcomes and a transformation of deliberators' preferences (e.g., Habermas's ideal speech situation). However, much of the early literature on deliberative democracy is prevalently theoretical and for this reason was subject to criticism. Yet, later this changed as scholars tried to move from the articulation of theoretical claims in the abstract to research that seeks to ground empirically the assumptions advanced [16]. Unlikely to the classical model, where systematic reason-giving is the ideal, recent literature chooses a »practical« model where deliberative forums (e.g. citizen juries, assemblies, consensus mapping) are used in relation to real-life issues. This perspective acknowledges that reason-giving is one type of communication that occurs in parallel to other e.g., rhetoric, storytelling, testimony and humour, but also it acknowledges that participants may not always be open-minded, willing to consider others' arguments and adjust own positions in the light of a reasoned discussion [13,15].

The type of influence such forums have on participants is of interest to this research. Namely of an interest is what deliberative democracy literature has to say about the participants' experience that some social learning literature has put forward as the *moral dimension* of civil virtues, the *cognitive dimension* of knowledge acquisition, the *relational dimension* and *trust* [7].

On this regard, theorists of democratic participation have argued that when people are engaged in a discussion they benefit in terms of improved **civic virtues**; that is the qualities and skills needed for the functioning of the public good [17]. The argument is that when participants to a deliberative forum have to justify their arguments they do so not by bringing forward "particular" interests but by appealing to normative principles that are acceptable to others e.g., common good, justice [12]. Thus, participants have to think and weight what would count as a good reason for the other participants since justifications, which refer to self-interest would not work out well in a context where the decisions to be taken will have an impact on the whole community [15:71–72]. However, as discussed by Elstub [16] while the first generation of theorists as is Rawls and Habermas focus on the ideal conditions for rational debate and assume people will act rationally and reasonably, recent literature moves away from the rationalist position to acknowledge the complexity of modern society and the role moral sentiments i.e., judgments over right and wrong, have in such contexts. In their discussion of this aspect Goodin and Niemeyer [17: 629] bring forward the role of emotions and affirm that "empathetic extensions are crucial for such forums" since these allow participants to make sense of one another claims over the course of discussions. Their position is aligned with the emerging »practical« model that recognises how deliberation might not always unfold along the ideal of a "reasoned discussion" but is a forum where people bring their moods and temperaments, and use testimony and humour to advance their arguments. To this end of an interest is the study of Doheny and O'Neill [18] where they make a case for the transformative potential of deliberative forums. They look at Hambermans' ideas about moral learning and explore the assumption that at the end of deliberation participants are equipped »with new tools with which to evaluate the normative dimension of social issues.« [18:646]. They provide empirical evidence about participants to a deliberative forum moving along stages where have become more reflexive, have developed the capacity to take up differing points of view and presented arguments for the consideration of other participants [18: 633].

Theorists of democratic participation have argued that as participants, in the course of an activity, come across new information about the issue at stake they can link it to past experience and knowledge, and use it in formulating claims to defend their

position against opposition [16–18]. Although, learning is not a key topic in the deliberative democracy literature, empirical studies have found evidence of **knowledge acquisition** and/or **knowledge enhancement**. For instance, Hansen and Andersen [19] report on a quasi-experimental setting, a deliberative poll, set out in the occasion of Denmark considering the Euro, in order to verify some of the assumptions associated with deliberation. Their results suggest that participation to the poll led to an increase in knowledge about the issue at stake as well as improved ability to form a reasoned opinion about it. Also Grönlund and colleagues [20], in their study on nuclear power in Finland, found that information exchanged among participants in the course of a deliberative session led to learning and contributed to an increase of knowledge on the issue being discussed which in their case was nuclear power. The study of Goodin and Niemeyer [17] sheds further light on knowledge acquisition and participants' learning. Their analysis highlights the links between the "state" in which an individual enters the process, or rather the type of activity done. In their study this involved an initial informative phase (i.e., site visit, background briefings, presentations) followed by a later discursive phase (i.e., group discussion). Their research suggests that participants who entered the process with no, or less, information or had distorted/exaggerated opinions about the environmental issue under discussion were more likely to be influenced by the initial informative phase. These participants have changed/recalibrated own opinions upon having received scientific information and had been influenced to a limited degree by a later discursive phase. On the other hand, participants who had a well formulated opinion, or were holding polarized attitudes, were more influenced by the discursive phase where they had to advance and defend their claims.

As for what concerns the **relational dimension** i.e., relationships that are in place between those participating to a deliberative forum, the deliberative democracy literature has most frequently focused on power relationships and trust. Scholars emphasised trust as an important prerequisite for deliberation as participants should believe that counterparts speak out honestly and are not pursuing hidden agendas, and suggested that deliberation can enable existing power relationships to be transformed and common interests to be promoted [21: 83]. Of an interest is the study of Wilhelmson [22:248] where she analysed discursive interactions between participants at meetings held about a child care system. Wilhelmson [22] observed that the participants' societal role provided them with a perspective from which they looked at the issue being discussed (superiority *vs*. subordination) and this influenced communication; superiors were inclined to stuck to their own perspective and distanced themselves from that of others, while subordinates followed their superiors and refrained from speaking out own experiences. This created difficulties when participants needed to go beyond the own perspective; superiors had to learn and develop the capacity for critical self-reflection and listening while subordinates for critical reflection and assertive speaking [22:250]. In a study where Hendriks and colleagues [23] investigated partisan and non-partisan forums, they found that design and moderation of deliberative fora is an important element as it mitigates for power asymmetries. Scholars suggest that deliberative forums may also facilitate for an increase of **trust** as during a repeated interaction participants can better understand the position of others, adjust misconceptions and understand reasons of counterparts [21]. As such, through repeated interaction deliberative forums can offer an opportunity to develop, or to strengthen relationships.

If we assume that change in one, or more, of the above dimensions is the result of a learning process that participants experience during a workshop of an interest is to reflect further on the type of learning that can lead to such a change. Pedagogy can help to this end.

2.2. Learning processes

The research on adult learning is rich of explanations on how adults learn. There are many theories that explain what happens during the learning process, however, how these can be classified is a debated topic [24]. Adult learning theories differ from one another, but they share the assumption that adults have grown personalities and as such learn differently from children. For instance, andragogy which has been the primary model of adult learning during the last thirty years, assumes that adult learners accumulate a reservoir of experience that is used during learning; learn in relation to developmental tasks of a social role; are more problem oriented than subject oriented, and are motivated to learn by internal drives rather than external [25,26].

The learning theories most frequently used to study social learning in relation to resource management include transformative learning, experiential learning, and emancipatory learning [27]. However, of an interest to this research is Jack Mezirow's theory of transformative learning, where the core assumption is that learners are capable of self-reflexivity and engagement in critical discourse, which has a transformative potential that touches upon values and perspective from which individuals look at the world [25,26,28]. As such the transformative learning theory offers a framework to study the mechanisms that are in place when individuals undergo a change of world-views and explore the implications this has for the individual, and the society. Although it is not widely used in the deliberative democracy literature, the theory of transformative learning has been considered by some. For instance, Doheny and Neill [18] draw parallels between Mezirow's transformative learning and Haberman's moral learning and point at shared features as is reflection and transformation of perspective, but also at differences in how the two conceptualised learning processes. Mezirow's transformative learning emphasises metacognitive reasoning defined as "the process of advancing and assessing reasons, especially those that provide arguments supporting beliefs resulting in decisions to act." [26:58], while Haberman's moral learning emphasises the implications that arise for moral insight from discourse between two, or more, individuals.

Mezirow's school of transformative learning emphasises experience and critical reflection and offers a "comprehensive and complex description of how learners interpret, validate and reformulate the meaning of their experience" [28]. The theory emphasises learning that occurs at deeper levels as opposed to learning that is more superficial. Transformative learning theory assumes that learners have *meaning structures* formed by specific beliefs, attitudes, and emotional reactions. A meaning structure, or frame of reference is based on the totality of one's contextual and cultural experience and it influences how people behave and interpret events, how people chose to vote, react to specific situations etc. [24,25]. On the basis of his work with adult learners Mezirow formulated the assumption that when, at a certain point, meaning structures adult learners have are challenged this could lead to a *perspective transformation* with learners undertaking a change process that could involve, for instance, a change of life-style, political preferences, etc. Mezirow assumes that perspective transformation involves critical reflection, either in group interaction or independently, over the assumptions one holds [25]. However, this is a gradual process as the learner moves through "phases of meaning" at the end of which there is a perspective transformation [26]. Cranton [28] suggests that transformative learning results in three types of change: change in the assumptions one has, change in perspective one holds, and change in behaviours one engages.

Mezirow's concept of transformative learning offers an explanation for learning induced change processes however there are several points on which it has been criticized. For some it is problematic that the theory operates in a de-contextualised space

and it does not consider the historical, cultural, and sociological context where the learner is located, while for others is problem the emphasis Mezirow places on rationality, underestimating emotions and spirituality [29,30]. Baumgartner [30] comments that perspective transformation is a process that involves feelings, focusing only on cognitive process would leave out some explanatory input for why and how some people have undertaken a perspective transformation, and others have not. Emotions can be a powerful force which influences learning processes [31]. For instance when in the course of a participatory activity participants' claims regarding access to clean water, or safe neighbourhoods go unheard, or are downplayed, it is likely that an emotional reaction will follow e.g. anger, disappointment. This, in turn, can influence how participants will respond to the counterpart, how they will defend their position, or relate to the opposing part during, and after, a participatory activity.

As mentioned perspective transformation is the point on which the theory of transformative learning meets Habermas' ideas. Mezirow [26] himself makes a parallel between metacognitive reasoning and Habermas' discursive rationality. He writes that adults generally develop skills needed to exercise reflective judgment, and that the task of adult education is to support learners in developing the skills needed for critical-dialectical discourse. He states that adult educators are facilitators of reasoning and promoters of learning environments that support openness and reflectivity, a model that is of an interest also to participatory literature. We conclude this brief overview suggesting that transformative learning theory not only can serve to study learning and change in the context of participatory resource management, but also it offers valuable input for those who are interested in the design of processes that, among other things, aim to facilitate transformative change.

3. Material and methods

The present analysis builds on the research discussed by Rodela [7] where selected literature on resource management (i.e., 98 articles published after peer-reviewed) was reviewed and differences, in how the concept of social learning is defined and made operational, were identified and described along three approaches (i.e., individual-centric, network-centric, systems-centric). From the 98 articles selected for that study, we chose to narrow down to the first group of papers classified as individual-centric (n = 16) and from these have focused on those that complied with two criteria: i) reported on research about participatory approaches in relation to real-world resource management cases and ii) reported about social learning in terms of empirical observations/results. Therefore, from the sixteen papers identified in Rodela [7] four were excluded since one is a literature review, one reports on a role-play game, while research presented in further two is not about participatory processes. From the eleven publications that remained, by applying the second criteria, additional four papers were excluded and thus narrowed down to a sample of seven publications that are used for the present analysis (Table 1).

3.1. Analysis of selected literature

The selected studies (n = 7) were used as data points and scrutinised against the four dimensions. Some of the selected studies drew on the work of Welber and colleagues where they operationalise social learning as *moral development* and *cognitive enhancement* then used as a criterion to assess the participatory process. However, while studies are still looking at knowledge acquisition these have not used that same terminology i.e., cognitive enhancement and moral development. For this reason the present analysis focused on what is written in the selected publications with a special interest for change indicative for the type of processes as described by the deliberative democracy literature.

A note of clarification is needed here, the present is not a narrative literature review nor a systematic review in the sense as described in Rodela [7]. The present is a survey of published empirical studies where data reported within selected publications is used to critically consider a set of assumptions. As such it can be regarded as an explorative study where outcomes that arise are used for reflection purposes.

4. Results and Discussion

Selected publications report about research focusing on participatory activities as are workshops, meetings, search conferences, environmental assessment consultations, all used in relation to real-world issues. The selected papers defend the assumption that participatory activities can function as a platform where social learning can be facilitated. An exception to this is the study of Webler and colleagues [8] for whom social learning is a quality criterion used to assess participatory processes along with fairness and competence. All of the selected studies suggest, and seek, evidence of change occurring as specified above. In this, the publications advance the assumption that a type of intervention can trigger a type of processes which in turn will result in certain outcomes. In the following I survey selected empirical literature and consider how the results reported sit against the four dimensions, grounded earlier in deliberative democracy (Table 1).

4.1. Social learning within a participatory activity: a multi-dimensional construct

Webler, Kastenholz and Renn [8] were among the first who have conceptualised and operationalised social learning in the context of participatory processes and environmental decision-making. Webler, Kastenholz and Renn [8:445] define social learning as "the process by which changes in the social condition occur, particularly changes in popular awareness and changes in how individuals see their private interests linked with the shared interests of their fellow citizens". Theirs is an interdisciplinary attempt that brings together insights from policy sciences and psychology. Under the influence of participatory democracy Webler and colleagues [8] support the assumption that public participation helps to direct uncoordinated individual actions into collective action, reflecting collective needs and understandings. They used insight form participatory democracy to design workshops where local inhabitants participated and discussed the siting of a landfill. On the other hand, the interest for what happens within the group of participants during the participatory activity led them to borrow from behavioural psychology in order to capture the influence this type of interaction has for the individual. From the work of Albert Bandura they borrowed the term "social learning", however, for the operationalisation of this term they did not used Albert Bandura's analytical framework [32]. With an interest in the normative aspect of change processes they turned to the Frankfurt school of critical theory where explanations for social change are offered i.e., Habermas. Therefore, Webler and colleagues [8] have operationalised social learning within two dimensions, a cognitive and a moral, and assumed that social learning is manifested in a *cognitive enhancement* made of knowledge acquisition, information and understanding as well as in a *moral development* manifested within a sense of solidarity, ethical principles and civic values (Table 1). In their empirical study Webler and colleagues [8] found that participants have experienced an increase in both dimensions "*the citizens learned a lot about waste stream composition, incineration technology,*

Table 1
Classification of empirical observations as reported in selected literature along four categories of outcomes.

	Cognitive dimension	Moral dimension	Relational dimension	Trust dimension
Cheng and Mattor, 2010 Place-Based Planning as a Platform for Social Learning: Insights From a National Forest Landscape Assessment Process in Western Colorado. Society & Natural Resources 23, 385 - 400.	Knowledge increase.	Not reported.*	Not reported.*	Not reported.*
Garmendia and Stagl, 2010 Public participation for sustainability and social learning: Concepts and lessons from three case studies in Europe. Ecological Economics 69, 1712-1722.	Knowledge increase.	Understanding others viewpoints.	Not reported.*	Not reported.*
Pahl-Wost and Hare, 2004 Processes of Social Learning in Integrated Resources Management. Journal of Community & Applied Social Psychology 14, 193-206	Technical knowledge	Not reported.*	Improved relations between participants.	Improved trust.
Schusler et al., 2003 Social Learning for Collaborative Natural Resource Management. Society and Natural Resources 15, 309-326	Learning about facts, presence or lack of resources available to their communities, and actions that might address problems.	Understanding concerns of other participants, areas of agreement and disagreement	Collaborative relationships, group common purpose.	Trust gained in others.
Selin et al., 2007 Social learning and building trust through a participatory design for natural resource planning. Journal of Forestry 105, 421-425	Factual information.	Learning about concerns of others, differences across concerns, change of concerns.	Developed a common purpose with participants,	Trust towards other participants.
Sinclair and Diduck, 2001 Public involvement in EA in Canada: a transformative learning perspective. Environmental Impact Assessment Review 21, 113-136.	Information exchange.	Not reported.*	Not reported.*	Not reported.*
Webler et al., 1995 Public participation in impact assessment: A social learning perspective. Environmental Impact Assessment Review 15, 443-463.	Learning about facts.	Understanding of others' perspective, mutual respect for positions, feelings of solidarity, empathize with others, meaning of citizenship.	A sense of collegiality, commitment to the project, group identity.	Trust change.

* The publication does not reported about aspects specific for this dimension as defined in Section 2.

landfill technology, geology, and hydrogeology. In every interview, the citizens mentioned that they enjoyed learning" [8: 454], "*moral development was encouraged or facilitated by our process by offering people opportunities to work together with their peers to solve a common problem.*" [8:456]. As a consequence they concluded that the participatory activities used led to social learning which for them served as a quality criterion.

I was interested in later developments of their analytical framework which I believe offers some interesting hints about how to conceptualise, and study learning in the context of participatory activities. According to material accessible through bibliographic databases it seems that while Webler and colleagues [8] continued with the investigation of participatory approaches, and social learning continued to be a topic of their interest, they did not used that specific analytical framework in later research. However, their publication from 1995 influenced other's research. For instance Germendia and Stagl [34] used that framework (integrated with organizational learning) and sought evidence of a cognitive enhancement with a questionnaire administrated before, and after, a participatory sustainability appraisal activity. They found that participants perceived an increase in the **knowledge** held about the issue at stake after the activity in two out of the three empirical cases investigated and assumed that in the third case this did not occurred because participants already had knowledge about the issue before participating to workshops. On the other hand, an increase in what Webler and colleagues [8] named **moral development**, which Germendia and Stagl [34] reformulated into "**mutual understanding**", was found only in one out of three empirical cases. Germendia and Stagl [34] assumed this being the result of the duration of the activity since in that empirical case the participatory process took longer and so participants had more opportunities to interact with one another, which could have favoured higher scores on the questionnaire item "mutual understanding". Their result supports the assumption discussed in earlier literature where an argument is made that the *conditions* under which participation occurs influences group dynamics and thus' learning processes. More precisely, the analysis done by Schusler and colleagues [35], where they gathered testimonies from participants to a search conference, identified eight process characteristics. These include open communication, diverse participation, unrestrained thinking, constructive conflict, democratic structure, multiple sources of knowledge, facilitation, and extended engagement. In that study, also Tania Schusler and colleagues [35] found evidence of participants having learned about facts, concerns others have and areas of agreement and disagreement. They have extended this to include aspects of social capital and reported on participants' experiences with interpersonal relationships which led Schusler and colleagues [35] to advance claims that participatory processes have potential to create new, strengthen existing and transform adversarial **relationships** and influence **trust** levels (Table 1). Interpersonal trust was an aspect of interest to Webler and colleagues [8]. They found that citizens' views on trust changed slightly during the process; some of the participants have developed trust toward a representative from a public institution they distrusted before. Interviews revealed that citizens started to trust to this representative after they got to know him at a personal level, however (mis)trust towards the institution did not change. Also, Selin and colleagues [36] reported about the same mix or results, with some

participants having gained trust while others being still suspicious (also towards a public institution). Issues with trust were a topic also in the study of Pahl-Wost and Hare [37].

As mentioned most of the selected literature reported about an increase of **knowledge** and I was interested in the approach used for its appraisal. Cheng and Mattor [38] took inspiration from the analysis undertaken by Schusler and colleagues and in defining social learning as a "processes in which people share their perspectives and experiences to create common understandings of a situation" they sought to capture social learning within a questionnaire where have included questions about participants' perceptions, about interaction and the value of sharing knowledge with others [35:386]. Cheng and Mattor [38] found that some participants regarded the knowledge and contributions of other fellow participants and the civil servants higher than their own. A result that points at how participants enter participatory processes with different knowledge levels, degree of skill, and confidence, and the ways in which such differences influence the discussion (e.g., lay *vs.* expert, traditional *vs.* scientific). The mentioned result might have been a case where respondents look at expert and scientific knowledge as something more valuable as is lay, and traditional knowledge, however, this is a speculation as we do not know the details beyond what is described in the paper of Cheng and Mattor [38].

The theory on deliberative democracy emphasises "process" over "outcomes" and assumes that communicative interactions have certain implications e.g., on knowledge, learning, and civic virtues. From that perspective some of the above highlighted differences across the results reported in the selected papers can be perhaps sought in the "state" in which participants entered the process as well as in the "type of exchange" they had during the activity. Current research on deliberative democracy can help to deconstruct the relationship between knowledge and the positions people have since attitude, and attitude change, are topics of interests to that research. For instance, the study of Goodin and Niemeyer [17] suggests that the link between knowledge and attitude is not straightforward as it seems to be mediated by the type of participatory activity participants are engaged in. Thus, when prior knowledge about an issue is low, and the topic accompanied with an overblown rhetoric, a participatory process where facts and figures are given could help to dismantle some of the preconceptions people have with a resulting change of attitudes towards the issue at stake. A similar situation could occur in cases of ignorance, apathy, or non-attitude [17]. However, in situations where participants (e.g., experts) have good knowledge but clash over value positions, a process that delivers facts and figures will do little regarding attitudes. In this case, a process where emphasis is given to the exchange of view points, and the deconstruction of claims, might help to better understand disagreements and positions counterparts hold and this in turn could favour change. However, research suggests that in such cases change is commonly of a modest magnitude and rarely moves towards extremes e.g., strongly disagree, strongly agree [19]. Differently from some social learning literature, knowledge acquisition and change of opinions are not taken as criterion for a successful deliberative process in deliberative democracy literature. Chambers [13:318] writes that deliberative democrats believe that deliberation should rather broaden perspectives, promote tolerance and understanding between groups.

Therefore, the survey of selected publications finds that the selected literature reports with different degrees of frequency, depth and interest on the identified dimensions, with *knowledge* and *moral development/mutual understanding* the two most frequently used as an operational measure of social learning (Table 1). Yet, secondary material as the one used for this analysis does not allow verifying empirically the assumptions advanced and for this reason it is not possible to propose claims on construct and criterion validity. However, in comparing and contrasting descriptive material a few things have emerged worth further reflection.

First, in surveying the empirical results reported in the selected literature I became uncertain about the way research measured knowledge enhancement. In policy sciences correct answers to questions are usually taken as a proof of acquired knowledge while some social learning research uses self-reported statements of having gained/improved knowledge levels. Both are methodologically valid; yet provide a measure of two quite different processes. The first informs about the extent to which participants acquired new information (objective), the second informs about perceived gains in knowledge (subjective) and as such it rather reflects how the individual positions him/herself (own stock of knowledge) in relation to the knowledge others have shared/displayed. Thus, one could argue that self-reported answers might not be a good way to measure the information gained as rather serve in the understating of other dynamics.

Second, as mentioned above trust building is a complex matter and selected studies reported on a mix of results on this aspect. According to a line of thought interpersonal trust is embedded in the relationships people have [33,39]. While the specifics of a participatory activity can unveil wrongly held assumptions and help in dismantling stereotypes, participants need time to develop an understanding if they can trust, or not, to that particular person, or institution [33]. More precisely, participants need to engage with one another in ways that can allow the appraisal of trustfulness of the other counterpart. It follows from this, rather than featuring as a dimension on its own, trust is better placed within the relational dimension as it signals for the quality of a relationship that exists between two or more participants.

4.2. Participation and learning processes

Selected studies assume that participatory workshops can function as learning environments where stakeholders can take part to a learning process. In surveying the selected papers it comes forward that only a few have borrowed from the field of adult learning and used the theory of transformative learning. For instance, Sinclair and Diduck [40] in a study of selected Canadian environmental assessment cases, reached on Mezirows' theory to interpret data and on the basis of theoretical assumptions have developed criteria then used to assess environmental assessment in Canada. They did not focus on whether participants might have experienced change of frames of reference, which is the way the theory is most frequently used by adult learning research, but tried to understand if the environmental assessments provided an opportunity for mutual learning by all the participants involved. The cases analysed allowed them to conclude that the environmental assessments offer a platform for learning interactions, and that the exchange between participants who hold different perspectives proved to be an important element for the learning processes. In the study reported by Schusler and colleagues [35] the theory of transformative learning is mentioned in the theoretical parts where they refer to work of Cranton [28] and reflect about learning through participation, but it is not used it in the empirical analysis. On the other hand, others have looked at learning from a different viewpoint and have, for instance, used collaborative learning (e.g., Chang and Mattor [38]) and the communities of practice framework (e.g., Pahl-Wost and Hare [37]), focusing on the collaborative outcomes as is a future scenario map in the first case, or concept model of a water supply system in the latter case. While Garmendia and Stagl [34] reached upon the organizational management literature for explanations of the type of learning outcomes of their interest i.e., change in knowledge and mutual understating.

In this it comes forward that none of these studies has done a more detailed and deeper analysis of learning through participation

and has, for instance, considered the type of "learning processes" participants were engaged in. An explanation for this can be sought in the purpose of participatory approaches which commonly is issue-driven and seeks the development of shared solutions to current resource issues.

It seems that adult education literature is mostly used to advance assumptions about how learning takes place, to inform and to justify the combination of conceptual and methodological choices, all this without an empirical "test" of learning processes. For instance, some research used Mezirows' theory to inform a set of choices but then has not considered the transformative processes (or lack of) that are at the core of this theory. Transformative learning theory centres on deeper learning processes which according to Cranton [28] can result into three types of change: change in the assumptions one has, change in perspective one holds, and change in behaviours one engages. Participatory processes aim for an exchange of points of view and research has highlighted the transformative potential this holds for the individual, who in being exposed to new information can get own assumptions challenged and reframes. In a study of an environmental impact assessment Saarikoski's [41:692] notes how the "different frames, that the parties held, operated in the discussion of emissions, shaping the parties understanding of relevant facts and their interpretation" e.g., risk. She observed that as new information was presented this led some of the stakeholders to partially reconsider their positions.

To conclude, research and praxis could benefit from established theories about what contributes to the participant's learning experiences and what does not. Future research could try to look closer at the way participants engage with the information/knowledge being presented and ways in which this promotes the capacity for critical engagement and reflective practice. According to the theory of transformative learning both are important as allow the learner to move closer to the perspective of other participants. Also, of an interest is what motivates participants to get engaged in learning interactions and what motivates them to stay tuned after the activity.

4.3. Some further considerations

There are advantages in using a multidimensional approach to the study of complex phenomena as it allows the matching of broad predictors with broad outcomes [42]. This is the point on which multidimensional constructs face criticism since it might not be very clear what change is due to. Multidimensional constructs are criticised of being conceptually ambiguous, of hiding the direction of the relationship and differences between variables [42]. In order to tackle criticism, the literature where multidimensional constructs are common (e.g., psychology) uses statistical tests to verify criterion and construct validity. This is a type of quantitative approach that goes against current practice in social learning research which on the other hand is more qualitative as it is moving between the interpretative, the critical and the post-normal [27]. Other research than the one cited in this analysis has approached social learning as a multidimensional construct [e.g., 43]. However, some uncertainties remain in this regard. While each of the identified dimensions could help in framing/conceptualising participants' experience at a participatory activity, less clear is whether these together can constitute a measure of the type of change process i.e., social learning, which is of an interest to the environmental and resource management research community.

5. Conclusions

The literature investigating social learning in relation to resource management issues has been contested on several aspects and one of these is the conflation of terms i.e., learning with social learning. This is problematic for several reasons. First, it creates misunderstandings as to what type of processes research aims to conceptualise and has collected evidence about. Second, using the two terms interchangeably hinders the analysis of relationships that are in place and this in turn slows down the advancement of research. In order to avoid terminological confusion this study differentiated between the two and has looked at how selected literature has made social learning operational. The analysis highlights that some research identifies social learning with a combination of change processes a person experiences as a result of being involved in a participatory activity. The research selected for this analysis has operationalised social learning as a change in one or more dimensions i.e., cognitive, moral, relational, and trust. Yet, the present study advances some reservations on the identified dimensions and suggests for further tests and refinement of assumptions, in particular for what regards the relationship between the construct and its dimensions.

Also, while participatory workshops are identified as the method that can facilitate social learning, the *conditions* under which "change" can occur are not well elaborated in the literature selected. Empirical research in deliberative democracy has been more scrupulous when it comes to the conditions under which attitudes, knowledge, and moral sentiments change. In that context change is seen to be the result of a specific type of social interaction where participants in the course of repeated interaction defend own positions in the face of those advanced by others i.e., reasoned discussion. The theory of transformative learning offers further explanations for change in such contexts, as it as it highlights the lived experience and participants capacity for critical reflection. The deliberative democracy literature as well as transformative learning could offer useful insight for the study of social learning in resource management and future research could benefit in borrowing more intensively from these.

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