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Workshop T01W09. Policy learning in contemporary policy contexts: Where? How? And for whom?

Collective learning in collaborative networks: diversity and social interactions in the public administration of Schaerbeek (Belgium)

Author: Nadège CARLIER

ABSTRACT

Collaborative governance networks are increasingly put in place in the public administration to enhance interactions between a diversity of actors (e.g., civil servants, companies or citizens) in a more horizontal setting, in the hope that cross-cutting public policies (e.g., climate policies) gain coherence and become more innovative. To do so, collective learning, defined as the broadened and mutual understanding of public issues arising out of repeated social interactions, is critical but not spontaneous. How does diversity lead to collaborative learning in context of collaborative networks? To address this research question, we look at two collaborative networks occurring in the administration of the city of Schaerbeek (Belgium), with questionnaire items and semi-structured interviews, as well as a social network analysis. Collective learning is innovatively measured with mental models' elicitation. The findings highlight the importance of the subjective appreciation of diversity as well as informal social interactions to favor collective learning. It also confirms the potential of collaborative networks to foster innovative ideas. These results provide a better understanding of collective learning in administrative collaborative networks, as well as the interactions between the factors of collective learning.

Keywords: Collaborative governance; Collective learning; Diversity; Mental model; SNA

1. Introduction

Many projects carried out in municipalities touch upon the competences of several departments. A city decides to rethink the mobility of its agents by setting up a team composed of, for instance, employees from the departments of human resources, urban development, communication, public procurements, as well as the mobility fleet manager. These agents are specialized in certain topics and processes, and they deal with their own day-to-day work. They have their own interests, priorities, expertise, hierarchical levels and affinities. How will these public servants interact to produce added public value compared to a team limited to a single department?

Such a diverse team in terms of competences can be considered a collaborative network. One of the main arguments to bring people together in a collaborative governance setting is the pool of resources in terms of expertise and experiences. By interacting, members learn from each other and enrich the process, leading to more informed and more relevant decision-making. In this regard, the notion of collective learning captures the extent to which members of a collaborative network gained insights into each other's view. This output of collaborative governance is particularly sought to deal with cross-cutting problems, which are characterized by a multitude of actors and point of views. In such situation, developing mutual understanding is crucial to avoid conflicts and blockades. (Klijn and Koppenjan, 2016) In theory, social interactions among a diverse working group should lead to collective learning. Yet, it is not always the case. Even if the ideas and background are diverse, these do not always circulate. If the key role of trust has been established in the literature (Siddiki, Kim and Leach, 2017; Riche, Aubin and Moyson, 2021), uncertainty subsists about the way ideas diffuse in a network throughout social interactions.

To explore the link between diversity and collective learning, we carry out two case-studies of collaborative networks organized in Schaerbeek, a city of about 120.000 inhabitants situated in the Region of Brussels (Belgium). The administration resorted to collaborative settings to elaborate and implement two plans: one relates to the promotion of diversity within the administration, the other aimed at making public procurements more sustainable. We collected data with all the participants to these two networks using questionnaires and semi-structured interviews. Mental models were used to assess collective learning. We performed a Social Network Analysis to understand the structure of interactions between diverse members. The research design allows us to look at the micro processes and to bridge this individual-level analysis with the collective output produced.

Conceptually, this research deepens our understanding of collective learning by distinguishing between consensus and mutual understanding, as well as measuring it with mental models inspired by psychology and resource management literature. We also consider different channels of learning by distinguishing between formal and informal social interactions and look at the way beliefs diffuse through these different channels. Empirically, we investigate a somehow neglected field for the strand of research interested in collective learning, that is the local administration.

After a brief literature review of the main theoretical concepts that are collaborative governance, and collective learning and diversity in this context, we expose our conceptual

framework. Next, this paper exposes the methodology used to operationalize and measure collective learning and diversity in our two cases. We then proceed to the presentation of the results obtained before discussing their implications for our research question. The conclusion summarizes the main findings and situates them in the literature.

2. Theoretical framework

2.1. Collaborative governance and networks

Collaborative (or network)[1] governance designates the latest movement in public governance, adding up to hierarchical governance and market governance (Agranoff, 2006; Bouckaert, Peters and Verhoest, 2010). It did not replace the previous models, but accounts for the tendency of public administration towards enhanced horizontal coordination aiming at the realization of a collective purpose. Interactions between actors are not imposed hierarchically nor ruled by competition, but rather occur as the result of "mutual awareness of interdependence and common interests" (Bouckaert, Peters and Verhoest, 2010, p. 45). Ideally, these motivations create a voluntary cooperation and trusted relationships. Actors internalize shared values and are thus willing to cooperate in order to reach a common goal. Considering these main characteristics of collaborative governance (enhanced horizontal coordination; collective purpose arising from interdependence or common values), we define it as the "type of public governance system in which cross-boundary collaboration represents the predominant mode for conduct, decision making, and activity between autonomous participants who have come together to achieve some collective purpose defined by one or more target goals" (Ansell and Gash, 2018).

The way we understand it, collaborative (public) governance is a general model of interaction in the public administration that takes concrete form in the organization of collaborative settings that we name *collaborative networks* (Agranoff, 2006; Mischen, 2015; Bodin, Sandström and Crona, 2017). These collaborative networks are stable working groups composed of members from different organizations (or departments) and backgrounds, working together on elaborating or implementing solutions to public issues. Participants are set

[1] We choose the term 'collaborative governance' rather than 'network governance' as we focus on the value-based interaction within such governance. Indeed, the shift in governance is characterized by both horizontal interaction (structure) and a motivation to interact that is motivated by common values and/or interdependency (motivation). As horizontal interactions (network type of interaction) were somehow present in market governance, it seems clearer to us to qualify this new type of governance by its distinguishing characteristics: that is collaboration.

on an equal footing and take decisions to consensus (Booher and Innes, 2002; Agranoff, 2006). We will use the terms ‘participants’ and ‘members’ interchangeably.

Compared to hierarchical and market forms of governance, collaborative governance is analyzed by scholars as prone to create advantages (Huxham and Vangen, 2005) in terms of horizontal coordination. Indeed, collaborative governance enhances direct exchanges between distinct organizations or departments and builds social bridges between them. On the contrary, in a hierarchical model, departments would interact through the top management. This can sometimes lead to public servants ignoring each other work, and ultimately in policies overlap. In a market governance setting, we observe a combination of specialization, according to the belief that one-goal bodies gain in efficiency, and competition-based interaction. Consequently, public organizations multiply and sometimes compete for resources, equally leading to contradictions in the public actions. For instance, the condemnation of tobacco by a health agency contradicts the subsidizing of tobacco culture by the agriculture body. In a collaborative governance system, these public organizations would interact in a tobacco network. Transversality locates at the sector-level rather than at the top-management level, thus possibly improving coherence of the public action. (Bouckaert, Peters and Verhoest, 2010; Klijn and Koppenjan, 2016)

Additionally, horizontal coordination in collaborative governance allows for more resources sharing and thus would be more prone to foster innovations. Different expertise and tools laying in different organizations can be combined in a creative and relevant mix to solve the issue at hand. For instance, a public body willing to improve the sustainability of its construction public procurements would need legal experts in public procurements, sustainability experts assessing the footprint of different alternatives, financial expertise to set the budget limit, and workers explaining the needs on the field. Collaborative networks would allow all these different experts to directly exchange and blend their knowledge. (Sørensen and Torfing, 2022)

These advantages of coherence of the public action and resources sharing are particularly linked to the solutioning of complex problems (Gerlak and Heikkila, 2011; Siddiki, Kim and Leach, 2017). Indeed, public issues tend to be increasingly characterized by substantive (conflict on the nature of the problem or even the facts to account for), strategic (conflicting agendas and shifting preferences) and institutional complexity (unclear rules) (Klijn and Koppenjan, 2016). In such situations, collaborative governance is expected to foster dialogue and ease agreement. Actors might be forced to work together due to a situation of

interdependency, which is increasingly the case (Lubell, 2013). When competencies and territories are interwoven, and that actors acknowledge this situation of interdependence without one of them having the possibility to take over, then collaborative setting is inevitable. In these complex situations, collaborative governance brings more resources to the table, and fosters holistic approaches (Gerlak and Heikkila, 2011; Siddiki, Kim and Leach, 2017).

Despite all these promises, collaborative governance is not a panacea. If it works, it is a very costly solution. Many times, it fails to create the expected collaborative advantages and gets stuck in collaborative inertia (Huxham and Vangen, 2005). These may be due to trust issue, power imbalances, poor management, collaborative tiredness, lack of political support and attention, or the presence of strong silos (Huxham and Vangen, 2005; Bianchi, Nasi and Rivenbark, 2021; Sørensen and Torfing, 2022).

2.2. Collective learning in collaborative networks

Learning lays at the heart of collaborative governance, as the coordination between actors is expected to occur along a process of mutual adjustment out of learning. By voluntarily exchanging information and expertise, they update their view and beliefs on the issue at hand. On the contrary, market governance builds on the idea that actors would adjust to each other by following their own interest whereas hierarchical governance relies on top-down authority for coordination.

The concept of learning fundamentally refers to a change or evolution in what actors might think, in their cognition. We can distinguish between a vision of learning as a change or update in beliefs[2] (Dunlop and Radelli, 2013; Leach *et al.*, 2014; Koebele, 2019; Riche, Aubin and Moyson, 2021), and a conception of learning as the acknowledgement of new information. In this article, we adopt the latter vision, captured by the definition of learning by Gerlak *et al.* (2018) as the "acquisition of new ideas, information, or beliefs by actors involved in policy process, which can result in changes to policies, decision-making processes, and governance outcomes". The distinction made here highlights the possibility that an actor acknowledges someone else's position without adopting it as its own. We conceptualize the process of information exchange as able to result in both a change in belief or simply in an acknowledgement of another actor's belief.

[2] Beliefs are defined as "the subjective probability that an object has a certain attribute" (Fishbein and Ajzen, 2010, p. 96).

This conception of individual learning as acquisition of new ideas is to be transposed at the collective level. Collective (or social) learning designates this phenomenon of mutual understanding progressively appearing in the course of collaboration (Muro and Jeffrey, 2012; van der Wal *et al.*, 2014; Gerlak *et al.*, 2018). Reed et al. (2010) propose to conceptualise collective learning around three elements. First, a cognitive change at the level of the individuals involved has taken place. Secondly, collective learning implies that this change has not only taken place at the individual level but is generalised to the group. Thirdly, this cognitive change takes place through social interactions, not through reading articles for example. (Emerson, Nabatchi and Balogh, 2012). When applying these elements to the purpose of our paper that is collaborative governance in the public sector, collective learning can be defined as *broadened and mutual understanding of the public issues at hand arising out of repeated social interactions*.

Indeed, despite expected outcomes for public action such as enhanced coherence and relevance, one of the main outputs of collaborative networks is precisely the production of collective learning. It reflects the effective exchanges between participants to a network and acknowledgement of each other's activities and positions. Collaborative advantages entail that the participants go through a process of actively listening to the others and sharing his/her own beliefs (Booher and Innes, 2002). We can consider the cognitive resources brought to the table by each participant to the collaborative network as building blocks. Only if everyone understands all the available building blocks can they really start to build relevant, coherent and innovative solutions to the public issue at hand. The aspect of pooling resources is not solely about participants willing to share their knowledge, but also about their will to seize it. Collective learning thus constitutes the basis of collaborative advantages.

Reproducing the distinction made earlier between individual learning as update of beliefs and as acknowledgment of the other's point of view at the collective level, we differentiate between consensus and collective learning. Consensus means unanimity and results from of convergent update of beliefs. Yet, it does not necessarily involve an enlargement of the vision of the problem. Collective learning, in our view, is about understanding of other's visions without necessarily agreeing with them. We thus depart from the vision of van der Wal *et al.* (2014) who assimilate collective learning and convergence of views. Rather, we take Herrero and colleagues' perspective according to whom "Social learning leads to mutual agreement that is different from consensus: "agreement on a common framework, through

which the diverging values, perceptions and goals of the participants can be integrated" (Herrero, Dedeurwaerdere and Osinski, 2019, p. 2018).

When participants to a collaborative network interact and exchange their ideas, the desired output is for all the participants to have extended their understanding of the problem by hearing alternative perspectives. To operationalize such collective learning, we resort to concept of mental models. Mental models are one's internal representations of his/her environment (Johnson-Laird, 1983), or 'external world's internal model' (Vogt *et al.*, 2021), that is a (necessarily incomplete) internal structure that mirrors the external environment of ego (Halford, 2014). At the individual level, it can be conceived as a system of beliefs, in the sense that a mental model is a web composed of concepts and links between them. Mental models as concepts thus refer to the organisation of an individual's beliefs.

When confronted to certain situations or new information, mental models can evolve: that is a learning process. In that way, mental models' evolution and learning processes are the same. (Rouse and Morris, 1986; Vandenbosch and Higgins, 1996; Halford, 2014). Since the aim of the research is to identify whether beliefs about a given issue have evolved as a result of repeated interactions, mental models seem appropriate. Indeed, collective learning can be conceived as the evolution of individual mental models, as a result of interactions, and in the direction of mutual understanding or even consensus. In the literature, mental models are a well-established way of assessing individual learning in the field of education (Mumford *et al.*, 2012; Fiorella and Mayer, 2015; Batlolona and Souisa, 2020; Vogt *et al.*, 2021). Management research imported mental models to use it at the collective level, and more precisely to assess team learning (Pahl-Wostl and Hare, 2004; Chang, Wiewiora and Liu, 2021; Steger *et al.*, 2021). Using mental models precisely fits particularly well to our research question for two reasons. Firstly, we can compare individual and collective mental models. Secondly, it allows us to capture a global view of the topic of the actors themselves, rather than the researcher selecting a topic beforehand in a top-down attitude (van der Wal *et al.*, 2014) or relying on self-reported learning in a questionnaire item (Vandenbosch and Higgins, 1996).

2.3. Diversity: resource or drawback for collective learning?

The whole narrative of collaborative governance supposes that there is a diversity of resources brought to the table of the collaborative network. To keep on with the metaphor, building blocks are of different materials and colors so that they offer more possibilities of assemblage and more solid construction. Diversity is seen as a resource to unlock and a key

ingredient for learning. The multiplicity of knowledge types and sources are found to foster learning (Cox, Lobel and McLeod, 1991; Muro and Jeffrey, 2008; O'Brien, Marzano and White, 2013; Leach *et al.*, 2014). As put by Booher and Innes (2002): "Participants start with diverse views of the world and the problems they face. As they try to understand the problem and each other's interests, they develop a more nuanced and complex understanding of the problems from various perspectives. While they each bring to the dialogue their identities as stakeholders or agency representatives, in the process of discussing a problem" (p.227). Diversity can pertain to different characteristics. The literature distinguished between observable diversity in terms of profiles, and non-observable diversity in terms of beliefs and content (Milliken and Martins, 1996; Siddiki, Kim and Leach, 2017). Yet, we expect these two types of diversity to be linked as individuals from different background are more likely to hold different beliefs. Therefore, we need to know whether network participants come from different professional, educational and socio-economic background, if they belong to different gender, generation, and hierarchical level.

The literature testing the role of diversity in learning is not exactly unanimous and the results are conflicting (Riche, Aubin and Moyson, 2021). Some argue that diversity is also a challenge as it can foster distrust, defensive attitudes and conflicts (for a review of the mechanisms at play between diversity and conflicts, see Jehn, Greer and Rupert, 2008). The corresponding mechanism of homophily (McPherson, Smith-Lovin and Cook, 2001) refers to the way individuals tend to engage more with resembling others rather than to interact with different individuals. Trust is easier between alike individuals and in turn facilitates learning (Riche, Aubin and Moyson, 2021). Others found diversity to be simply irrelevant to explain learning (Newig *et al.*, 2019).

Finally, the potential of diversity can also be nuanced and mediated by other factors such as trust: "Overall, trust is a potent elixir that amplifies the positive and dampens the negative influences of diversity" (Siddiki, Kim and Leach, 2017, p. 9). Newig and his colleagues argue that diverse networks indeed provide an opportunity for new information, but that they make deliberation activities more complicated. (Newig, Günther and Pahl-Wostl, 2010). Siciliano et al. also found mixed results as diversity seemed relevant for some cases but not for all of them (Siciliano, Carr and Hugg, 2021). Thus, scholars consider that a diversity of perspectives and knowledge in a context of collaborative governance is useful to reach an enlarged and holistic understanding of the problem at hand. Diversity provides more opportunities for learning than homogeneity, but this opportunity is not automatically seized.

Participants may not want to pick up on the knowledge nor do the effort of understanding the other's viewpoint. Such missed opportunity can be due to a simple lack of interest or open distrust. On the contrary, if actors engage in learning, it occurs through repeated interactions.

To conclude, we expect diversity to be generally positively associated with collective learning. Yet, we know that this relationship is intermediated by trust, as evidenced by Siddiki and colleagues (2017). We want to fine-tune the analysis by looking at the role of social interactions in that picture.

2.4. Social interactions as a mean for collective learning

Several studies established the importance of social relations and the intensity of interactions for learning (Gerlak and Heikkila, 2011; Crona B. and Parker J., 2012; Newig *et al.*, 2019). Plus, since collaborative governance is about creating more direct interactions and exchange, and since we defined collective learning as occurring throughout repeated social interactions, investigating the structure of interactions seems unavoidable. One cannot speak of collaborative learning if it is not for human interactions between diverse actors. Plus, it is established in the literature that the more frequent are the contacts, the more likely individuals will learn. It indeed seems quite intuitive that frequent contacts increase the opportunity for individuals to exchange information, beliefs, to explain themselves and to be confronted to alternatives point of view. If the occasions to share beliefs are limited, we can expect a corresponding limited level of learning (Gerlak and Heikkila, 2011; Muro and Jeffrey, 2012; Newig *et al.*, 2019). Furthermore, socialization is found to help with trust, openness and commitment (Pekkola and Ukko, 2016).

Yet, besides the frequency of interactions, little is known about the nature and structure of these social interactions regarding learning (Bodin, Crona and Ernstson, 2006; Newig, Günther and Pahl-Wostl, 2010; Crona and Parker, 2012). The aim of this paper is to unpack this relationship. We distinguish between two categories that are formal and informal interactions. Indeed, in the framework of a collaborative network, meetings are organized as occasions for everyone to interact with everyone. It is obviously an important part of the learning opportunities. To what extent where these spaces favorable to the exchange of ideas? As for informal exchanges, we want to know about hallways talks, that is who exchanges with whom about the project, outside of the organized meetings. We hypothesize that these informal discussions – bilateral or in sub-groups – are important interactions and channels for beliefs exchanges. More precisely, we expect that more informal exchanges throughout the network

are positively associated with collective learning. At the individual level, it is expected that the most-connected individuals are also the ones who learn the most and whose ideas are the most widely shared across the network.

We are interested in the intermediation between diversity, collective learning and social interactions, which requires us to look at who interacts with who? These side interactions can indeed also inform us on the existence of eventual subgroups and affinities within the networks. If such groups exist, do they gather alike individuals. Put differently, does homophily subsist in a collaborative network and what effect does it have on collective learning? We hypothesize that homophily hinders collective learning as it functions as an opposing mechanism to diversity. If most of interactions take place between alike individuals, we expect that members are less confronted to new ideas, and thus learn less.

3. Methodology

3.1. Cases and data collection

We conducted an analysis on two collaborative governance networks organized in Schaerbeek, which is a city counting 120.000 inhabitants, located in the Brussels Region in Belgium. As such, this empirical material is interesting as the internal functioning of local administration is quite rarely studied. Yet, the day-to-day reality of these public servants is just as important to understand for public administration as national administration. Our first case is a network organized to elaborate a Diversity Plan for the administration (Diversity network). It is a legal obligation for municipalities of Brussels to adopt such a plan to promote the representation of all components of the population in the public administration. It also fights against discriminations because of gender, age, origin, and disabilities. The process is launched in 2017 with the recruitment of a diversity manager in charge of steering the plan in a collaborative way. The first step was the creation of a large (40 members) working group composed of volunteers who met for two workshops to assess the situation, collect testimonies and ideas of solutions. From this large working group, a smaller accompanying committee was constituted through a process of election without candidate. The resulting smaller group is the network we study, composed of 13 members from 8 different departments. They met 8 times from June 2018 to November 2020. Some meetings were cancelled because of Covid-19. They had two meetings to finalize the measures, and the following meetings were about the implementation and follow-up.

Our second case is a collaborative network working on the sustainability of public procurements (SPP network) of the municipality. In 2017, Schaerbeek joined Making Spend Matter, a European network (funded by URBACT) of 6 cities exchanging good practices on public procurements. Within Schaerbeek, it was thus led by the Subventions and partnership department. The coordinator of the network quickly gathered a team of 12 members based on the *a priori* relevant persons on the topic of sustainability and public procurements. During the first part of the project, the collaborative network proceeded to a spend analysis. Based on this analysis, the team elaborated a Strategic Plan for Sustainable Public Procurements which was adopted by the city executive authority in March 2021. The team worked quite intensively, meeting 30 times between 2018 and March 2021, as they met monthly – yet not in complete team. Plus, 3 trips were organized in the cities participating to the Making Spend Matter network. Not all participants traveled the three times. For both networks, individual semi-structured interviews were realized with all the participants, and they were asked to fill in a questionnaire.

3.2. Mental models to operationalize collective learning

To assess collective learning, we use mental models and more precisely, a method similar to the one developed by Özesmi and Özesmi (2004). It consists in eliciting individual mental models during interviews. Depending on the network they participated, members were asked “How to improve diversity in Schaerbeek?” or “What are the drawbacks to make public procurements more sustainable in Schaerbeek?”. They openly shared their vision on the topic, while the researcher was taking note in the form of a mental model and under the look of the respondent. The mental model was estimated complete once the respondent thought so and had no more elements to bring. Once the mental model was complete, participants were asked to which elements they had learnt and which ones they knew before participating to the collaborative network. The interviews are carried out at the end of the collaborative network activities so that the participants had enough opportunities to meet, interact and learn. We make the hypothesis that their mental models could not have been similar in the beginning because of initial diversity, the newness and the not consensual nature of the issues at hand.

All the beliefs shared by the participants in their mental models were then listed. As stated above, a belief is the subjective association between an object and attribute (Fishbein and Ajzen (2010). For instance, the declaration that the market is not mature enough for sustainable public procurements, or that a review of the recruitment procedures is necessary to

improve diversity are beliefs. These were listed as the lines of a table of which the columns were each participant to the network. Once coded, we had an overview of the mental models and proceeded to an assessment of their similarity. Mainly, it consists of calculating the number of beliefs that all mental models have in common. The more similar the mental models of participants, the more collective learning there have been. Plus, the number of beliefs declared as learnt also consists in a key information to assess collective learning.

3.3. Objective and subjective measure of diversity

In our cases, the most relevant criteria to look at in terms of profile diversity is mainly their place in the public administration, that is the department they work in and their hierarchical status. We also wanted to look at basic demographics such as gender, age, and educational background (Siddiki, Kim and Leach, 2017; Siciliano, Carr and Hugg, 2021). For each of these characteristics, a Blau heterogeneity index (Siddiki, Kim and Leach, 2017) is calculated. The larger the Blau heterogeneity score, the greater the diversity. The categories used are the hierarchical level (A, B, C), gender (M, F, X), age (less than 20 years old, between 20 and 29 years old, between 30 and 39 years old, between 40 and 49 years old, between 50 and 59 years old, older than 60 years old) and educational background (social sciences, law, literature/languages, hard sciences, field work). We thus obtain four Blau scores for each network, of which we can then calculate the mean.

For the diversity in terms of departments, we do not use a Blau index. Indeed, this measurement requires to set categories beforehand, which would be irrelevant for our cases. Indeed, the municipality we studied counts 38 services, and there is no chance that they would be represented in a collaborative network of about 15 members. Plus, the relevant services differ between our two analyzed networks, making it irrelevant for comparison. We therefore count the number of services involved and we interpret it at the light of qualitative data. The members were asked about the appreciation of the composition of the network, and the extent to which the members were representative of the expertise needed. We thus have a quantitative measurement (number of departments involved) and a qualitative one (subjective appreciation of the diversity of the network).

We also wanted to control for belief diversity, which is why we use two questionnaire items. The first asks straightforwardly to the participants if they were confronted to new ideas in the network and had to be answered on a Likert scale from 0 to 10. The second is an open question asking how were justified the statements made during the meetings. We want to

capture the extent to which different perspectives (scientific, practical, moral, etc.) were mobilized during the discussions. This measurement is based on Koebele's (2019) work where she assesses the use of different categories of information (scientific, experiential, personal values/perspectives) into the discussion.

3.4. Social interactions

To look at interactions between members of the collaborative networks, we examine both formal and informal exchanges. Formal exchanges relate to the discussion organized during the meetings and it is appreciated with a measure of an item questionnaire asking to the participants if they had the opportunity to listen to everyone's ideas during the meetings. Respondents had to answer on a Likert scale from 0 to 10.

As for informal exchanges, we want to know about hallways talks, that is who exchanges with whom about the project but outside of the organized meetings. To do so, we carry out a Social Network Analysis (Knoke and Yang, 2008). The nodes are the participants to the network, and the edges are the informal relationships collected by asking to all participants with who they had informal discussion about the project outside of the meetings. These links are directed, because A may have declared that s/he talked about the issue of the collaborative network with B, without B to declare that s/he discussed it with A. We realize an analysis on three levels: the network, the clusters, and the members. For the network-level analysi**s**, we look at density to assess if there was intense social and informal activity. Did everyone discussed with everyone or did the opportunities to exchange were limited to the official meetings? Density, which refers to the number of existing relationships compared to the total number of possible relationship if everyone was connected. Density is expected to favor learning in that it gives more opportunities for exchanges (Bodin, Crona and Ernstson, 2006; Newig, Günther and Pahl-Wostl, 2010). Centralization gives an idea of the repartition of the relationships, that is the extent to which one individual is central or not. We expect that information circulates less equally in a centralized network. If one individual hold most relationships, it can be expected that his/her ideas easily reach the other parts of the network, whereas individuals in the periphery hardly share theirs with the rest of the network (Bodin, Crona and Ernstson, 2006; Heikkila and Gerlak, 2013; Pietri, Stevenson and Christie, 2015). We thus expect that collective learning is favored in a low centralized network. In a centralized network, the ideas of the central individual(s) are expected to be found in the collective mental model at the expense of others' ideas.

Clusters analysis shows if some members exchanged more with some than others. This allows us to check for homophily dynamics: did members of a same department stuck together, or did they mix with persons from different background? To do so, we look for cliques which are a set of nodes all connected to each other. We took bidirectionality in account in our analysis, meaning that clique members all cited each other and were cited by all the others. We also calculate assortativity scores for different characteristics, that is the extent to which alike individuals are more connected. We check such assortativity for gender, department, hierarchical level, age, seniority, and educational background.

Analysis at the node level reveals the relative importance of some nodes compared to others. Were they some individuals being particularly central in the network? To do so, we resort to four network measurements that are degrees (How many connections has a person?), closeness centrality (How likely is a person to be the most direct route between two people in the network?), eigenvector centrality (How fast can a person reach everyone in the network?), and betweenness centrality (How well is this person connected to other well-connected people?). Based on these measurements, we identify the key individuals in the network.

4. Results

4.1. Collective learning

Mental models of each participant to the networks were elicited through interviews. Then we coded them into one table with the items in lines and the participants in columns, which allow us to compare the items cited by members of a network, and then to assess the similarity between them. The results are displayed in Table 1.

For the SPP network, the participants spontaneously mentioned 14,42 items on average to answer the question “What are the drawbacks to make public procurements more sustainable in Schaerbeek?” which amounts, in total, to 26 beliefs around public procurements. They also cited quite often the same beliefs. On average, a belief elicited was spontaneously shared by 54 % of the members. Plus, three concepts were cited by everyone: the legal constraints of public procurements (free market and choice of the lowest price) are not in favor local Small and Medium Enterprises; there is a lack of political will to transform good intentions into prioritized actions; there is a lack of lead manager in the administration. The other metrics of learning, that is beliefs which members declared they have learnt thanks to the network, is also insightful. On average, members declared that they discovered about a quarter (0,24 %) of the beliefs they cited in their own mental models.

In the network on Diversity, participants cited 14 beliefs on average, but the total of beliefs collected in the mental models amounts to 38. The citation score is of 29 %, meaning that a belief was shared, on average, by about a third of the members to the network. No concept was unanimous. On the contrary, some beliefs were quite subversive in the sense that they were very critical towards the institution and/or against the main goal of the collaborative network. For instance, some participants reported a cultural laxism towards discriminations or even open racism, as well as clientelism ('*piston'*) in the recruitment. Some were skeptical about the main idea of favoring diversity, arguing that meritocracy as a system is enough or that the public servants are already representative of the population in Schaerbeek. As for beliefs declared as learnt during the project, it amounts to 2 on average (or 14 % of the beliefs they shared).

	Sustainable public procurements (12 members)	**Diversity Plan (13 members)**
Number of beliefs cited	26	38
Citation (how often is a belief cited?)	Mean: 6,46 St. deviation: 3,80 Min: 1 Max: 12	Mean: 3,89 St. deviation: 2,38 Min: 1 Max: 9
Citation score (normalized by network size)	Mean: 0,54 Min: 0,08 (the least cited concept) Max: 1	Mean: 0,29 Min: 0,08 (the least cited concept) Max: 0,69
Beliefs declared as learnt (per person)	Mean: 3,33 St. deviation: 3,39 Min: 0 Max: 13	Mean: 2 St. deviation: 1,29 Min: 0 Max: 4
Beliefs declared as learnt / Beliefs recalled	Mean: 0,28 Min: 0 Max: 1	Mean: 0,14 Min: 0 Max: 0,33

Table 1. Comparison of individual mental models

Comparing these results, it seems that SPP network reached a higher level of collective learning than the network on diversity. Indeed, the beliefs were cited by a greater proportion of participants, their mental models are closer, and they declare having learn more beliefs than the Diversity network.

4.2. Membership diversity

We assessed diversity in terms of socio-demographics and background of our networks with Blau indexes. The results for each category and the Blau indexes are displayed in Table 2. As explained earlier, the greater the Blau index, the greater the diversity. Except for the

gender characteristics, the Diversity network has systematically higher Blau indexes than the SPP network, suggesting a higher membership diversity.

	Sustainable public procurements	**Diversity Plan**
Gender	5 Male – 7 Female – 0 X ***Blau index = 0,49***	3 Male – 10 Female – 0 X ***Blau index = 0,35***
Age	Younger than 20 yo.: 0 20-29 yo.: 1 30-39 yo.: 6 40-49 yo.: 5 50-59 yo.: 2 Older than 60 yo.: 0 ***Blau index = 0,54***	Less than 20 yo.: 0 20-29 yo.: 1 30-39 yo.: 5 40-49 yo.: 2 50-59 yo.: 3 Older than 60 yo.: 0 ***Blau index = 0,73***
Educational Background	Social sciences: 7 Law: 1 Literature/languages: 1 Sciences: 2 Field work: 0 Other: 1 (Architecture) ***Blau index = 0,61***	Social sciences: 7 Law: 2 Literature/languages: 1 Sciences: 2 Field work: 1 Other: 0 ***Blau index = 0,65***
Hierarchical level	A: 12 B: 0 C: 0 ***Blau index = 0***	A: 9 B: 2 C: 2 ***Blau index = 0,47***
MEAN OF BLAU INDEXES	0,41	0,55

Table 2. Membership diversity

As for diversity in terms of departments, which is particularly relevant for collaborative networks in the public administration, the SPP network gathered members from 6 different departments. All members declared being satisfied of the network composition, indicating that all the necessary expertise were represented. They did not express some missing departments. The network is absolutely not diverse in terms of hierarchy.

The participants to the network on diversity came from 9 different departments. Yet, in terms of qualitative data, it was frequently mentioned by the members of the diversity network that the composition was not diverse enough regarding several categories. Indeed, when the network was constituted, all volunteers were women, and thus some men had to be actively recruited. Even afterwards, the composition remained predominantly feminine. During the interviews, the participants also brought up the lack of hierarchical diversity as there were only office employees (mostly A-level) and no field worker. Some were also concerned of the lack

of ethnic diversity (mostly white people). These statements were linked to the topic of the network which was the fight against discriminations. Indeed, how to discuss these issues without the presence of the categories affected by the discriminations?

It is thus quite interesting to note that the two measurements (quantitative and qualitative) oppose. The diversity network counts more departments involved but more subjective dissatisfaction, whereas the SPP network displayed a lesser departments representation but a greater subjective satisfaction.

4.3. Belief diversity

Belief diversity is assessed by two questionnaire items. The first asked members which type of information or justification was used to back arguments during the meetings. In both networks, the most relevant categories were field experience, administrative expertise and political/moral views. To a lesser extent, scientific and legal arguments were used. Recent events were also occasionally brought up during the discussions. Overall, all the types of proposed information have been used. The debates were not about solely one type of arguments. Yet, field and administrative expertise were largely predominant, indicating a certain loyalty of civil servants to their neutrality and specific expertise. It is noteworthy that the use of political and moral views, as well as recent events, is quite higher for the Diversity network than for the SPP network. On the contrary, scientific arguments were more frequently resorted to in the SPP network than in the Diversity network. The results are summed up in Table 4.

Sustainable public procurements	**Diversity Plan**
Field experience: 10	Field experience: 12
Administrative expertise: 11	Political and/or moral views: 9
Political and/or moral opinions: 4	Administrative expertise: 8
Scientific arguments: 3	Recent news/events: 5
Legal arguments: 3	Scientific arguments: 2
Recent news/events: 2	Personality: 1
Consultancy: 1	Feasibility: 1
Feasibility: 1	Legal arguments: 1

Table 4. Descriptive statistics to the questionnaire item "During the project meetings, how were the opinions put forward justified?"

The second questionnaire item (which results are displayed in Table 5) attempted to capture the subjective appreciation of the participants of the extent to which they were confronted to new ideas and perspectives in the network. The results indicated that it is the

case. As the minimum is only 5 for the SPP network, we can say that all members were in a context of learning. Even though the mean of this metrics is a bit lower in the diversity plan network, the minimum is also high (6), indicating that all members were confronted to new ideas to a certain extent.

	Sustainable public procurements	**Diversity Plan**
Min	5	6
Max	10	10
Mean	8,25	7,85
Standard deviation	1,66	1,21

Table 5. Descriptive statistics to the questionnaire item "During the project, were you confronted with new ideas and perspectives?"

4.4. Social interactions

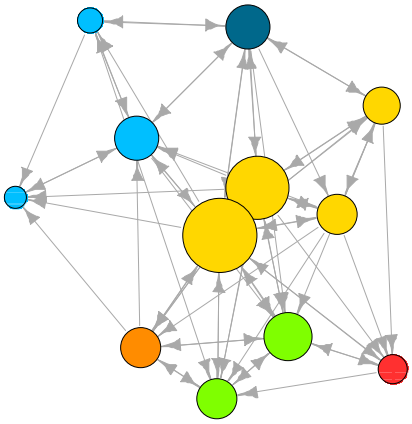
To assess the exchanges of beliefs in the network, we first control exchanges during the meetings by asking the participants to answer a questionnaire item about the extent to which they had the opportunity to listen to everyone's ideas during the meetings. The answers (see Table 6) on the Likert scale show that, during the formal meetings, participants to both networks did share their beliefs. Indeed, the mean answer for the SPP network is 8,67 (on a scale from 0 to 10) and 7,69 for the Diversity network. In the latter though, we find more standard deviation with participants scoring to 2 their opportunity to listen to everyone's ideas. Despite this exception, not to be dismissed, this suggests a formal belief circulation that was quite fluid, particularly in the SPP network.

	Sustainable public procurements	**Diversity Plan**
Min	7	2
Max	10	10
Mean	8,67	7,69
Standard deviation	1,07	2,39

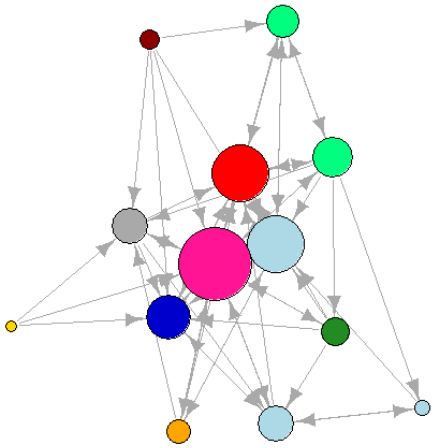
Table 6. Descriptive statistics to the questionnaire item "During the meetings, did you have the opportunity to listen to everyone's ideas?"

In terms of informal exchanges, the participants to the network were asked to list the persons with whom they had informal discussions about the project outside of meetings, based on what we proceeded to a Social Network Analysis as described in the previous section. A visual representation of the networks can be found in graph 1 and 2. The size of the nodes is

depending on their number of degrees. The color of the vertices represents the department to which the participant belongs.



Graph 1. Visual representation of SPP network



Graph 2. Visual representation of Diversity network

At the network level, we look at the density of the network which is of 52 % for the SPP network and significantly lower (38 %) for the Diversity network. We also look at centralization, which indicates the repartition of the relationships. More precisely, degree centralization is similar in both network and not particularly high (0,40 and 0,42), suggesting that relationships are quite evenly distributed. One individual does not hold them all. The other metrics of centralization that are closeness centralization (the extent to which one node is the closest to the others), eigenvector (the extent to which one node is better connected to well-connected others) and betweenness centralization (the extent to which there a node on the geodesic path of many others), are not significant either. The results are displayed in Table 7.

	Sustainable public procurements	**Diversity Plan**
Density of the network	0,52	0,38
Degree centralization	0,42	0,40
Closeness centralization	0,55	0,52
Eigenvector	0,44	0,50
Betweenness centralization	0,11	0,15

Table 7. Network level metrics

For clusters analysis, we found the presence of one clique in the SPP network, corresponding to the department of the coordinators (4 members, yellow nodes in graph 1). This was confirmed by interviews, during which members of this department explained that they were having weekly meetings, and that the main coordinator was sharing her difficulties

within her department. The members discussed the projects between them intensively. For assortativity scores (see Table 8), no category is significant, meaning that ties did not form along similarity regarding these criteria. Homophily did not seem to drive the network here.

In the Diversity network, we found 5 cliques of 3 members without clarity about their formation. That is, they are different possibilities of connections between the most connected nodes, but they did not particularly work together on a topic, nor are from the same department. There are no cliques of more than 3 members. Gender scores the highest on assortativity. Yet, it is still quite low and to be interpreted in the light of the unequal composition of the network in terms of gender (3 men and 10 women).

Assortativity scores:	**Sustainable public procurements**	**Diversity Plan**
Gender	-0,08	-0,19
Age	-0,11	-0,10
Department	0,04	-0,05
Educational background	-0,11	-0,09
Hierarchical level	0	-0,16
Seniority	-0,08	-0,02

Table 8. Assortativity scores

Finally, the individual level analysis aims at identifying the key actors in the network. In the SPP network, we found the two coordinators to be particularly well connected regarding all the indicators (degree, eigenvector, closeness and betweenness). The director of the Public procurements department was also well-connected, which is the department detaining the most technical expertise. Another key member was working on strategic transversal plans in the municipality, and seemed to have develop a particularly good informal relationship with the coordinator of the project. On the contrary, one individual was particularly isolated though also detaining important expertise. This member was indeed less involved and sparsely present in the meetings. In the Diversity network, the mostly connected individual was also the coordinator. The second-best connected member was the project manager for accessibility and disabled persons. Quite interestingly, the most cited concept of this network was precisely the accessibility of buildings and the provision of reasonable accommodations.

5. Discussion

How does diversity lead to collective learning in a collaborative governance setting? We know that diversity creates potential for learning in a group, but that the link is far from automatic. Interpersonal exchanges must take place for the beliefs to circulate among members of a network and thus bring a mutual understanding of the situation at hand. In this paper we carried out an SNA on two collaborative networks to explore this belief circulation and interpersonal exchanges more in depth. Table 9 sums up the results developed in the previous section and compares both networks. In the following, we discuss three intuitions introduced in the theoretical framework: the relationship between diversity and collective learning, the relationship between social interactions and collective learning, and the interaction between diversity and social interactions for collective learning.

Firstly, regarding the link between diversity and collective learning, our analysis shows that even though both networks had potential in terms of belief diversity and membership diversity, these did not translate into the same level of collective learning. The members of the SPP network learned more about each other beliefs than the participants to the Diversity network whose mental models were quite distant. Yet, in both networks, learning seemed to emerge out of exchanges with individuals with different experiences. For instance, in the Diversity network, one of the ideas considered as particularly innovative related to the issue of language mastering by workers. Such idea came from the interaction between a manager working on field and office workers. In the SPP network, many participants declared having learned a lot about the technical procedures and legal aspects around public procurements. This transfer of expertise was the fruit of exchanges between participants from different departments who were not used to work together. These results indicate that diversity did contribute to produce collective learning, but that other variables intermediate this relation. Such mixed results confirm the versatile role of diversity for collective learning (Newig, Günther and Pahl-Wostl, 2010; Siciliano, Carr and Hugg, 2021). Our data would indicate that diversity is necessary but insufficient for collective learning. For future research, the use of methods such as QCA on more cases are needed to confirm such a relation. A large-N analysis with variability in both variables could also be useful to confirm the correlation between diversity and collective learning.

On the type of diversity investigated, we note interestingly that diversity in terms of profile was particularly relevant in our cases. Indeed, the content of learning seemed to relate to experiences on the field and to administrative expertise that were under the radar screen of

some participants. Taking part to a network with more distant colleagues allow the members to broaden their vision with realities they did not acknowledge before because of their role and day-to-day work. That is, members learnt from situations of members with different profiles.

A surprising result was the difference between the objective and subjective measures of diversity. Indeed, the SPP network displayed a lower objective level of diversity but a high level of subjective satisfaction; whereas the opposite was true for the Diversity network. It indicates that diversity is not an absolute notion, but rather relates to specific criteria. The Diversity network was meant to discuss discriminations, and the relevant knowledge of the discriminated people was insufficiently represented. On the contrary, the SPP network focused on technical issues, and the relevant experts seemed to be present in the network.

Secondly, we investigated the role of social interactions as the intermediate variable between diversity and collective learning. Formal interactions were equivalently fluid in both networks. Informal interactions had quite different structure. They were significantly denser in the SPP network than in the Diversity network, confirming our hypothesis that informal interactions favor collective learning. The analysis of the individual level also seems to confirm this relation, as the coordinator of the SPP network was both the most connected person and the one declaring she had learned the most. Let us also note that the participants to this network frequently mentioned the importance of trips to create informal relationships with colleagues. In the Diversity network, they were less informal contacts and also less collective learning. We note that the most connected individual spread her ideas quite effectively. Density of social interactions and collective learning seem to be correlated. Our hypothesis on centralization could not be confirmed, as neither networks had a significant level of centralization.

Finally, what can be said about the interactions between diversity and social interactions for collective learning? We looked at the dynamics of homophily and clustering in our networks. In the SPP case, members did have more informal discussions about the project with colleagues from the same department, which is not surprising regarding the “silo” structure of the administration. Yet, informal bridges were clearly built beyond departments. Here, even though (objective) diversity was not exceptional, socialization was intense and a significant level of collective learning was achieved. Relative homophily was clearly not an obstacle to collective learning. In the Diversity network, we found no particular homophily dynamics, except for the gender dimension. (Objective) diversity was consequent, but informal socialization and collective learning was limited. These findings indicate that collaborative

networks can indeed make knowledge and expertise circulate and cross-cutting issues to be discussed beyond administrative silos without making them disappear.

	SPP network		**Diversity network**
Collective learning	A lot of beliefs in common and of learnt beliefs; consensual beliefs	>	Few beliefs in common; some learnt beliefs; presence of subversive beliefs
Membership diversity	Objective measure of diversity: relatively significant	<	Objective measure of diversity: high
	Subjective measure of diversity: satisfying	>	Subjective measure of diversity: dissatisfaction
Belief diversity	Yes, both in terms of types of information and of subjective confrontation to new information	=	Yes, both in terms of types of information and of subjective confrontation to new information
Social exchanges	Formal: high Informal: quite dense, not very centralized, polarized between to cliques (departments), key actors are coordinators and director of the public procurements department. No significant assortativity.	>	Formal: high Informal: not very dense, not very centralized, no clear clique, key actors are coordinator and manager for the disabled. No significant assortativity.

Table 9. Synthesis table

What do these analyses say about the relationship between diversity, formal and informal interactions, and collective learning? We conclude to the relevance of diversity for collective learning as the beliefs that were shared and learnt in our networks emerged out of the interactions between members with different experiences and expertise. For future research, we would advise to measure diversity with subjective appreciation rather than "objective" criteria. Diversity is indeed relevant to participants depending in the expected knowledge to be brought to the table. For the SPP network, technical expertise was needed and was gathered. In the Diversity network, experiences of victims of discriminations or individuals from underrepresented minorities was expected and yet not reached.

We also conclude to the relevance of social interactions for collective learning. The SPP network displayed both an important density of relationships and a consequent of collective learning. The opposite was true for the Diversity case. In both cases, formal exchanges were important opportunities for learning, but informal interactions allowed for more specific beliefs to become prevalent. The latter observation could be confirmed in future research by tracking more precisely how ideas diffuse in the network through formal and informal interactions.

Process-tracing methodology could be useful in detailing such dynamics, requiring longitudinal data.

In terms of limitations to our conclusions, we must highlight two alternative explanations of the reasons why the SPP network produced more collective learning. Firstly, the number of interactions for the SPP networks was significantly higher. Going on trips contributed to intensifying informal exchanges. It is indeed established in the literature that frequency of contacts is key (Gerlak and Heikkila, 2011; Crona B. and Parker J., 2012; Newig *et al.*, 2019). Yet, this remark does not invalidate our findings in the idea that informal exchanges do matter for learning. Secondly, content-wise, the nature of the issue dealt by the network might also matter (Bundi and Trein, 2022). Indeed, technical issues such as public procurements seemed to trigger less debates and to produce learning easily, compared to issues such as diversity that is more prone to lay discussions. Again, this can alternatively be linked to the issue of membership diversity. That is, participants to the network on diversity might have learned less because of the lack of members from the minorities sharing their experience. The experts by experience were not present enough in the network.

6. Conclusion

Resorting to collaborative governance settings is increasingly frequent in the public administration, including at the local level. Gathering members from different backgrounds is expected to improve the quality of public policies. Collective learning is a crucial intermediate output indicating the emergence of a mutual understanding throughout social interactions. Yet, this latter aspect is quite understudied and the interplays between diversity, social interactions and collective learning are unclear. In this paper, we attempted to investigate these different concepts in two case studies in Schaerbeek.

Our findings indicate that diversity can indeed be a resource to bring up issues and share expertise (technique or by experience), as in both of our cases, members learnt new beliefs from the others. This confirms the potential of collaborative governance to bring different expertise together to develop a more comprehensive understanding of the issue at hand. Yet, we found that diversity can only produce such learning through intense social interactions, during organized meetings and especially through informal interactions. In our case analysis, socially active individuals were indeed key to propagate beliefs in the network, and thus collective learning. Indeed, we can trace the intense social activity of some members in the

mental models, suggesting that the most informal relationships one has, the more chances of diffuse his/her beliefs there are.

Theoretically, this paper contributes to the field by showing the importance of the distinction between formal and informal interactions as it unveils different dynamics of learning. This allows for more fine-grained analysis of the processes of learning. If formal interactions are important opportunities for exchanges, the informal interactions seem to be the ones explaining the prevalence of some beliefs. We subscribe to the work of scholars who investigate the structure of informal social interactions with SNA (Bodin, Crona and Ernstson, 2006; Newig, Günther and Pahl-Wostl, 2010; Crona and Parker, 2012). More specifically, the analysis by levels (individuals, subgroups, and network-level) was particularly insightful to understand the parallel dynamics at play and the different channels of learning possible. It confirms that the frequency of interactions is positively linked to collective learning (Newig, Günther and Pahl-Wostl, 2010; Crona and Parker, 2012; Heikkila and Gerlak, 2013).

Our work also adds to the debate on the role of the coordinator. Beyond their role of connecting actors from different organizations (Klijn, Steijn and Edelenbos, 2010; Crona and Parker, 2012; Nederhand, Van Der Steen and Van Twist, 2019), their skills of connection inside of the network seem to be particularly important for learning. It highlights the importance for the coordinator to leave space for such exchanges and involve him/herself in those exchanges. Engaging in informal discussions with the members allow him/her to know about the circulating ideas that are maybe not brought up in official meetings. Yet, our analysis nuances the role of the coordinator as hallway talks – which are out of the coordinator's hands – do matter for learning.

The present paper also sheds light on collaborative governance in the public administration as it provides an analysis at a micro-level of this general phenomenon (Newig, Günther and Pahl-Wostl, 2010; Crona and Parker, 2012; Heikkila and Gerlak, 2013; Ansell and Gash, 2007; Bouckaert, Peters and Verhoest, 2010). It suggests that types of governance indeed coexist, since the structure in 'silos' is still in place. Cross-cutting exchanges allow public servants to meet colleagues they never work with before, to exchange about new topics and to go out of their procedural routines, therefore fostering new knowledge. Creating direct interactions between individuals from different organizations do foster new knowledge in the public administration, as public servants go out of their procedural routines.

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