



NETWORK PLOT – Graph of the research network

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Background – justification.

The Network Plot (or Communities Plot) was initially created as a non-traditional visualisation method of collecting data about early career researchers' (ECR) research network and position in the research community. It is based on the notion of 'communities of practice', defined as groups of people who engage in shared social practices and collective learning (Lave & Wenger, 1991). Individuals can participate in many communities of practice in relation to one or multiple spheres of activity (Camps & Castelló, 2013; Engeström & Sannino, 2010), for example, by participating in two research teams or being member of different research associations. Moreover, this participation can take different forms. Lave and Wenger (1991) differentiate between full and legitimate peripheral participation (Lave & Wenger, 1991), as a way to emphasise the learning process of newcomers into a community. Others, however, have identified multiple and diverse forms of participation (Hopwood, 2010; Prior, 1995; Sala-Bubaré & Castelló, 2017), such as those of individuals who intentionally stay outside the community.

In research contexts, individuals' engagement, participation in and interaction with research groups, communities and other individuals is related to higher levels of well-being, learning research productivity and motivation (Gardner, 2010; Pyhältö, Vekkaila, & Keskinen, 2015) as they are important sources of support and can act as proxies for ECRs socialization in the research community (Lave & Wenger, 1991; McAlpine, Pyhältö, & Castelló, 2017).

The graphic representation of the network promotes individuals' recall and reflection about the experience, offers guide and structure to the narrative. Moreover, the multimodality of the representation (visual and oral) allows participants and interviewers or researchers to contrast the description of the network with its graphic representation (McAlpine, 2016), in order to compare, ask or provide more detail or clarify in situ misunderstandings and inconsistencies (Sala-Bubaré & Castelló, 2017). On the other hand, Network Plot is a useful tool to clarify, summarise and contrast certain aspects of the network that may remain inaccessible through language, such as the intersections among individuals and groups, and especially the general overview of the network and the position of the individual. Finally, in research or teamwork contexts, the graph facilitates quick and visual comparison of the network of two or more individuals.

Description of the instrument.

The Network Plot (originally named Communities Plot) is a simple graph created to capture individuals' network, that is, the individuals, groups and communities that they perceive as relevant in their research activity (Sala-Bubaré & Castelló, 2017). It is typically composed of a number of circles of different sizes. They can be presented in a digital environment (e.g. Power Point) or as a hard copy (e.g. paper). The size of the circles can



be used as an indicator of importance perceived by the individual or the size of the group/community. Participants are given the cercles and are asked to represent their research network by identifying the individuals, groups and communities that are relevant in their research activity and positioning themselves within this network. They are asked to use as many cercles as they need: they can create more cercles or delete or disregard some of the given cercles, if needed, and name each cercle they use. Participants reflect on their research network, the importance of each item and the position assigned to themselves. Moreover, they are invited to reflect on their ideal or desired network, the position, relationships and contacts they would like to have and not have. To this end, participants can create a new Network Plot graph.

Used as a pedagogical tool, the Network Plot is presented in the context of an interview, counselling session or training to promote awareness, reflection and sometimes discussion about individuals' relationships with and participation in different groups and communities and the affordances, potential limitations and effective strategies to improve their network in relation to individuals' professional goals. The ultimate objective is to extract useful learning for the person, for instance, to introduce changes in the selection and engagement in their participation in and relationship with individuals, groups and communities in order for them to achieve their professional goals. It is usually used along with a more or less structured protocol of questions that guide the reflection. Below we present a protocol sample (pages 3-4).

Use of the tool for researcher development

This instrument can be used at any moment of researchers' development. However, it can be more beneficial for researchers that have some experience and insights on the relevant communities in their research field. Moreover, it can also be a useful instruments for supervisors in planning and promoting supervisees' engagement and participation in the research community.

Thus, we suggest two main uses of the Network Plot related to two different aims:

- NP as a tool to reflect and improve one's own research network.
- NP as a tool for supervisors to reflect and promote supervisees socialisation and research network.

In both cases, the activity can be individual or in pairs (e.g. supervisor and supervisee) or groups (e.g. in a workshop for doctoral students). In collective activities, the emphasis will be on the shared reflection of the goals for researchers' development, the opportunities offered by the current network and the potential limitations, as well as the strategies and solutions that can be implemented to achieve the goals. Moreover, when used in a supervisor-supervisee meeting, in addition to the former aspects, the reflection should also focus on the negotiation of goals and strategies and on the collaboration between them to achieve the goals (e.g. what will be the role of the student in increasing her network? How will the supervisor support the student? Which are interesting option for a research stay? Which of the supervisor's contacts should be also part of the doctoral student's network?).



Protocol of questions to guide reflection.

In the following, we present a protocol of questions that promote in-depth analysis of the different aspects of the graph. To use it, it is suggested that individuals adapt it in relation to the objectives of each specific situation and person.

To reflect on the Network Plot - improve supervisees' and one's research network.

... for each cercle included in the NP

Why is this individual/group important for you?

Do you feel comfortable with your position in relation to this individual/group?

Why do you think you have this position (e.g. far away, periphery, center...) in relation to this individual/group?

Where would you like to be in relation to this individual/group? Why?

What should you do to achieve this position?

... to compare and reflect on the relationships among items

How are *these* cercles related?

Why do some/these cercles overlap?

Why are *these* groups/individuals more relevant than *these*?

... for the general shape of the graph

How do you feel about your research network? Are you satisfied with it? Why?

How would you like to be positioned in your network? Why?

... in relation to your career development goals

What are your goals in relation to your development as researcher?

What individuals and groups would you want to have access to?

How can your network help you achieve these goals? Who can help you win this access?

What would you need to do in order for this to happen?

For supervisors - to reflect on the formative use of their research network

... in relation to your current research network

(in addition to the former questions - see box above)

What kind of network do you have?

Does your network have formative potential for your students?

What role can you play in using this network as a formative tool?

How can your network benefit your student/s?

... in relation to your supervisees' networks and goals

What goals do/es your student/s have in relation to their development as researcher/s?

How would you like them to benefit from your network?





What is the students' current network? What individuals, groups and communities are/is your student/s currently engaged with?

How did they become involved with them?

... in relation to the development of your supervisees' networks

What individuals, groups and communities should they engage with?

What can the student/s do in order for this to happen?

What is your role in helping students improve their research network?

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