

POSTER PRESENTATION

Measuring with indicators the endogamy in the academic assessment boards of PhD theses

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BACKGROUND

Theses are dissertations on a particular subject in which original research is done. Theses are presented by a candidate for a diploma or degree, being usually this a doctor's degree. In Spain, several academics are involved in the assessment of the theses: Supervisors (Directors), Chairs of the Academic Assessment Boards (AAB) and other members of the Academic Assessment Boards. The fact that Supervisors propose members of the definitive AAB generates evident relationships of reciprocity and endogamy between all of them that can be analysed and measured using indicators.

Social Sciences define endogamy as "the custom of marrying only within the limits of a local community, clan, or tribe" (Oxford dictionary, 2016). We can extend this concept to measure the openness of academics when choosing other peers to collaborate or to participate in their own activities. Endogamy has been studied in several topics involved in information science, as endogamy of the research teams publishing in conferences on Computer Sciences (Lopez Montolio, 2013), or endogamy/exogamy referring on how narrow or wide and even cross-disciplinary is a paper's or author's citation fan-in, fan-out, and wider interconnectivity (Harnad, 2009).

Our hypothesis states that: a) some Supervisors concentrate the majority of participations in few academics which closes the participation in the AAB to a reduced number of them; b) the degree of endogamy of the communities in a research area will allow us to better understand the types of the cross-community ties (bridges) and their relations of dominance and power. Our objective is to propose indicators describing relations of endogamy between Supervisors involved in the academic assessment in the Spanish theses. These indicators can provide insights on relations of patronage and academic power between academics and contribute to draw a picture of the field structure from a sociological point of view.

METHODS

We use data from 3,413 theses obtained from TESEO, database of the Ministry of Education, which includes the Spanish theses defended and approved after its evaluation. The search was limited to the theses indexed by UNESCO code related to Sociology.

To measure the level of relation between supervisors and members of AAB, we propose a Endogamy Index (EI), which measures the level of closing of each supervisor in relation to the participation of different members to the AAB in supervised theses. To obtain the EI, we need to combine two sub-indexes: the Closedness Index and the Concentration Index (Castelló Cogollos et al, 2015).

1. Closedness Index (CI), which measures the level in which a supervisor closes the participation in the AAB to a reduced number of academicians. We assume that each AAB is compound for five members. First, we establish a maximum number of academic participants in all the AAB of the theses of a same supervisor (MaxM): a maximum of two members repeated in all the AAB and three members that are always different. We obtain this maximum adding two to the number of theses (Nth) multiply by three. Therefore, $MaxM=2+(3*Nth)$. Second, we calculate a ratio between the number of members participants (NM) and the maximum of members (MaxM). When $NM=MaxM$, the ratio will be 1 indicating the maximum openness. Therefore, if we discount this ratio to 1, we obtain a no-normalised closedness index (Cia) (Since the maximum depends of the number of theses supervised). So, $Cia=1-(NM/MaxM)$. Third, we calculate the maximum of no-normalised closedness (MaxCia), which we obtain with the division of 5 (minimum of participants in all the AAB) for the maximum number of possible members (MaxM). Therefore, $MaxCia=1-(5/MaxM)$. Finally, we obtain the CI as the ratio between Cia and MaxCia. So, $CI = Cia/MaxCia$.

2. Concentration Index (CoI), which measures the level in which a supervisor concentrates the majority of participations in some few academicians. First, we calculate the geometrical average of the relative participations of each member of the AAB over all the participations in the AAB of the theses of the supervisor –Relative Participation (RP)–. Second, we calculate the value of the proportion that

supposes a theoretical equal participation of all the participants in the total of participations –Equitable Participation (EP)–, which is the ratio between 1 and the number of members (NM). Finally, to obtain the Col, we calculate the ratio between EP and RP. When RP=EP, we have an equitable distribution. Therefore, if we subtract 1 to the ratio obtained, we have an indicator of concentration. So, $Col=(PE/PR)-1$.

3. Endogamic Index (EI) is the result to combine the CI with the Col, so: $EI=C1*(1+Col)$.

RESULTS

Table 1 shows the development of the EI using a sample of 4 Supervisors participating in a set of 71 theses. Supervisor 2 (S2) is the academic with a higher Endogamic Index (85.5%), followed by S3 (77.7%). However, S3 has the highest Concentration Index (37.1%), followed by S2. S4 has the lowest Endogamic Index. So, S2 and S3 are the most inbred Supervisors; that is, they invite often the same people to join the AAB of their theses.

Table 1. Development of the Endogamic Index

Supervisors	Nth	NM	MaxM	CIA	MaxCla	CI	TR	RP	EP	CoI	EI
S1	14	27	44	38.6%	88.6%	43.6%	51	3.1%	3.7%	20.4%	52.5%
S2	12	17	38	55.3%	86.8%	63.6%	45	4.4%	5.9%	34.3%	85.5%
S3	21	31	65	52.3%	92.3%	56.7%	87	2.4%	3.2%	37.1%	77.7%
S4	24	67	74	9.5%	93.2%	10.1%	102	1.3%	1.5%	18.6%	12.0%

Nth: number of theses; NM: number of members participants; MaxM: maximum of members; Cla: no-normalised closedness index; MaxCla: maximum of no-normalised closedness; CI: Closedness Index; RP: Relative Participation; EP: Equitable Participation; Col: Concentration Index; EI: Endogamic Index

CONCLUSIONS

This information can contribute to a better knowledge of the relations and interactions between academics in a scientific field. It also helps to better understand the role that some of them play in the field, including academic power and leadership. As a future piece of work we could analyze the performance of these indicators in other scientific areas and in other countries, as well as identify the role of women in these networks, e.g. analyzing the level of endogamy among women.

ACKNOWLEDGMENTS

This work has benefited from assistance by the National R+D+I of the Ministry of Economy and Competitiveness of the Spanish Government (CSO2012-39632-C02-01; CSO2015-65594-C2-2-R) and Prometeo Program for excellent research groups of Generalitat Valenciana (GVPROMETEO2013-041).

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