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Analysing the relation among disciplines through the use of doctoral theses. The case of television, radio, cinema and photography in Spain

Rafael Repiso [CV] [] [] Teacher of the Department of Communication. International University of La Rioja, Spain / rafael.repiso@gmail.com

Daniel Torres-Salinas [CV] [] [] Technician of Investigation. University of Navarra, Spain / torressalinas@gmail.com

Emilio Delgado López-Cózar [] [] Professor of University. Department of Information and Communication. Universidda de Granada, Spain / edelgado@ugr.es

Abstract
Introduction. This paper proposes a new method of analysing the relation between disciplines measuring academic participation in doctoral theses across different disciplines. **Methodology:** Doctoral theses and the relationships produced through the direction of theses and co-participation in doctoral thesis examination committees are used to construct the interdisciplinary relationships. This study uses doctoral theses defended in Spain in the field of audiovisual communication (television, radio, film and photography) for the period 1976-2007 as an example. Multidimensional scaling allows us to create a bi-dimensional representation of the specialties studied, calculate distances and quantify the degree of error of the representation. **Results and Conclusions:** The results demonstrate how two differing groups are produced, firstly television and radio and secondly film and photography. Television is the most representative specialty of the group; the different types of participation produce hardly any variations.

Keywords
[EN] Audiovisual Communication; Film; Television; Radio; Photography; Interdisciplinarity; Thesis.

Contents

Directors and Examiners jointly. 3. Results. 3.1. Analysis of participation in doctoral thesis examination committees and thesis directions. 3.2. Separate Analysis of thesis directions and doctoral thesis examination committees. 4. Discussion and Conclusions. 5. Note. 6. Bibliography.

1. Introducción

Reality is multidisciplinary and complex, but science, and the influence exerted over it by reductionist methodology, demand the compartmentalisation of knowledge for acquisition, investigation and exposition. The degree of specialisation of a discipline is akin to the tip of the iceberg, determining the quantity of its own unique elements. Yet, beneath these elements there is a majority of elements in common with other related disciplines, representing in addition an essential part of the same. Studies of interdisciplinarity attempt to defend the complexity of science and how the different paradigms and areas relate. Interdisciplinarity, from a holistic standpoint, allows us to study the disciplines in their scientific context.

Interdisciplinarity has been studied on multiple levels using different bibliometric methods and with different study objectives; micro (academics and papers) (Bar-Ilan, 2006; White, 2001) meso (departments and journals) (Bourke & Butler, 1998; Leydesdorff, 2007a; Morillo, Bordons & Gómez, 2003; Porter & Chubin, 1985; Tomov & Mutafov, 1996) and macro (universities, disciplines and subdisciplines) (Leydesdorff & Probst, 2009; Leydesdorff & Rafols, 2009; Qin, Lancaster & Allen, 1997; Rafols & Meyer, 2009; Urata, 1990). The most common unit of analysis has been the different academics' publications, augmenting the level of aggregation and increasing the data until all the articles published by an author, in a journal, for a department, in a university or in a scientific field are obtained. The area of Communication in Spain is not a different reality (Martínez Nicolás & Saperas Lapiedra, 2011). Scientific articles are a type of scholarly publications, especially those indexed in the Web of Science database, which have been established as the main information source for the construction of interdisciplinary studies.

Van Raan proposes three typologies of bibliometric methods for studying the phenomenon of interdisciplinarity in the sciences. 1. The construction of a research activity profile; 2. The construction of a research influence profile; 3. The construction of bibliometric maps (Van Raan, 1999).

'The construction of a research activity profile' mainly analyses the scientific production of the people ((Bergmann, Dale, Sattari, Heit & Bhat, 2016) or centres specialising in research and dedicated to a specialised field. By studying their curriculums the diversity of other sub disciplines used in the study of a particular scientific field can be detected and quantified. For example, it is expected for a centre specialising in Psychology to produce mainly in this area, but it is also true that, due to affinity, a researcher from this area will produce papers in related areas, such as Medicine, Sociology, and Communication etc. This interdisciplinary profile is quantifiable and is achieved by measuring the number of papers produced by authors or entities, normally scientific articles, and analysing their relevance to different fields.

Within this methodology, and with some similarity, is 'the construction of a research influence profile.' The main objective of this type of study has been to measure influence, by measuring relational objectives between different disciplines. So, for example, citations that are exchanged between disciplines are studied. Articles and journals have been the principal study objective of these interdisciplinarity studies, mainly using techniques of "Bibliographic Coupling" (Larsen, 2007), "Citation" (Leydesdorff, 2007b), "Co-citation" (Bjurström & Polk, 2011) and "Author Co-citation" (Tsay, Xu & Wu, 2003). They have mainly analysed the citation standards between journals, the assignation to one or more categories of the JCR or the study of keywords. A somewhat more complex recent paper measured the relationship (interdisciplinary relationship) by way of publication in scientific journals between universities (García, Rodríguez-Sánchez, Fernández-Valdivia, Robinson-García & Torres-Salinas, 2012).

Bibliometric maps are the third quantitative method proposed by Van Raan for analysing interdisciplinarity. His objective is to go beyond the two previous methods and, using quantitative and relational techniques, generate different levels of structures that represent the relationships between disciplines. The most common method is to group scientific papers together by area and analyse the citation crossover between them in order to establish the similarity between fields (Moya-Anegón *et al.*, 2004). This differs from the previous methods in that it operates at macro levels and prioritises general visual representation over more concrete measurements. This area has grown, especially in recent years, due to technological advances; the creation of ever more exhaustive scientific databases and the software capable of computing and representing the data (Boyack, Klavans & Börner, 2005).

As it has been previously mentioned, scientific articles are the main units for analysing interdisciplinarity and specialization (Tur-Viñes *et al.*, 2014). Nevertheless, there are other elements which provide important information on the matter, such as patents, which have been used to measure the links among disciplines (Scheu *et al.*, 2006). Cassidy Sugimoto's recent papers have provided new bibliometric indicators through the study of theses. Although mainly orientated towards scientific genealogies and their members (Russell & Sugimoto, 2009; Sugimoto, 2009), they have nevertheless produced a complete study of the interdisciplinarity existing in "Information & Library Science", due to the study of directors of theses in the area, their disciplinary origin and their contribution to the creation of theses in LIS (Library and Information Science) and scientific genealogies. (Sugimoto, Ni & Russell, 2011). It can be stated that the specialisations of the academics who participate in an area influence the development of the same. Each academic contributes their theoretical and methodological perspective on the area to research and teaching.

Continuing this line of research, a new method of measuring the relationship between disciplines is proposed, using doctoral theses and the relationships forged between the people who participate in their direction (directors) and examination (doctoral thesis examination committees). The aim is to identify the relationship between disciplines through the level of participation of the different academics who participate in more than one specialty. We start from the premise that a professor is only capable of examining or directing a thesis in their areas of expertise, and if several professors frequently participate in several areas, this signifies the existence of a relationship between them. This paper, following White and Griffith (1981), maintains that the participation of an author in a discipline transcends their individual name and relates directly to their theoretical and

methodological knowledge, their collected papers, and therefore their ability to produce and examine papers in more than one area. The other major innovation, and where the originality of the paper may lie, is that the objective of study is the doctoral thesis, a scientific document with singular characteristics, as opposed to the scientific articles. Theses, as stated by Emilio Delgado *et al*. "are good mirrors for reflecting the scientific lines and tendencies of the University" (Delgado-López-Cózar, Torres-Salinas, Jiménez-Contreras & Ruiz-Pérez, 2006).

Communication studies in Spain are divided into three differing degrees: Journalism, Advertising and Public Relations, and Audiovisual Communication. The first two areas respond to studies having a clear professional orientation, whereas Audiovisual Communication responds to the characteristics of the study objective, audio and visual information. The interdisciplinarity of Audiovisual Communication studies in Spain is mainly demonstrated in two aspects. Firstly, research papers are produced from the area (Television, Radio, Film and Photography) in other faculties outside Audiovisual Communication studies (Repiso Caballero, Torres Salinas & Delgado López-Cózar, 2012; Repiso, Torres & Delgado-López-Cózar, 2011; Repiso, Torres-Salinas & Delgado López-Cózar, 2013; Repiso, 2013). Secondly, the curriculums of researchers in Audiovisual Communication departments show that in many cases they come from related disciplines, specifically in the case of the first generation of professors. Furthermore, the scope of Communication allows for researching by having into consideration the techniques or paradigms instead of the subject itself (that is, the positivist, the interpretative, the critical paradigms, among others.), (Bermejo-Berros, 2014). Thus, in Spain there are many interdisciplanary studies in the Communication field, and this is because quite often the topic is not the subject for analysis.

1.1.Objectives

The principal objective of this paper is to propose a new method of measuring interdisciplinarity through the measurement of the academic relationships that doctoral theses produce, more especifically the contribution is in analyzing thesis coupling through advisorship.

- Measure interdisciplinarity through theses directors
- Measure interdisciplinarity through theses evaluation panels
- Measure interdisciplinarity through a combination of theses directors and evaluation committiees
- Analyse the way the areas involved are interrelated and gathered

The underlying hyphothesis presents an alternative process, due to the critical mass of information to be analysed, where data can be measured and so there will be no important differences among the different samples, as long as there are enough data. Thus, the set option has to be the most desirable.

2. Material and Methods

The comparative study between the specialties of Audiovisual Communication; Television, Radio, Film and Photography; by analysis of the participation of academics from the area in the direction

and examination of theses, for the period 1976-2007. By applying aggrupation techniques, specifically Multidimensional Scaling (from here on abbreviated to MDS MultiDimensional Scaling), we expect to identify the similarity that exists between these specialties, taking into account Spanish academics' participation (direction of theses, participation in doctoral thesis examination committees and both).

2.1.Selection of theses, period of study and database

Audiovisual Communication contains elements of a technological nature, the physical recording mediums that utilise visual or audio images or both, used in the communication process. It would therefore include the study of media such as Television, Radio, Film or Photography. In order to identify the corpus of theses, the Teseo database, belonging to the Spanish Ministry of Education and Science, was selected as the information source. Teseo, although known by the scientific community to have certain problems of coverage (Fuentes Pujol & Arguimbau Vivó, 2010) and normalisation (Delgado-López-Cózar *et al*., 2006), is currently the most exhaustive database of Spanish theses, and the only one which identifies the members of doctoral thesis examination committees.

Once the source was selected the theses were then recovered, discipline by discipline. In order to identify the corpus of theses relevant to the study a two phase search strategy was designed. The first phase searched for all doctoral theses defended in departments dedicated to the teaching of professionals linked to audiovisual communication media.

In the second, a terminological analysis of the results of this search was undertaken and the most frequent keywords were extracted (Table 1). Through the key terms four clusters (thematic categories) were identified that grouped the related terms together: Television, Radio, Film and Photography. Subsequently, a thematic search was undertaken in the fields "Title" and "Abstract", the results of which, after a process of filtration, normalisation and elimination of duplicates, were added to the initial search. A second observer verified the correct assignment of the doctoral theses recovered. This is due to the challenges that the UNESCO thesaurus presents, which is used in TESEO to define the field of Communication (García García, 2000).

Table 1. Keywords used for identifying theses produced in Television, Radio, Film and Photography

TELEVISION	RADIO	FILM	PHOTOGRAPHY	GENERIC TERMS
Tv	Radio	Cinematogr*	Photogra*	Audiovisual
Television	Channel	Documental	Images	Media
Channel	Audience*	Fiction	Photojournalism	Multimedia
Televis*	Broadcasting	Film*	Camera	Telecommunications
Audience*	"Radiophonic programming"	Hollywood		
Broadcasters	Broadcasters	Filmmaker		
Radiotelevision	Radiophon*			
Vídeo	Radiotelevision			
RTVE	RTVE			

News				

Finally, 1148 theses on Television, Radio, Film and Photography were recovered. An analysis was carried out of the professors in common (those who had participated directing or examining theses) to two, three or the four specialties studied, and their level of implication in each one. These values were analysed using MDS techniques, and groups of disciplines were created. We attempt to measure and quantify the "distances" of the specialties and represent them in a bidimensional plane.
The set of data analysed is the perceived relationships between the four specialties (academics' participation in thesis production processes), most specifically in thesis direction in more than one specialty and the participation in doctoral thesis examination committees in more than one specialty. A symmetric matrix Δ (nxn) has been created, where the similarity between each pair of the same specialties appears. The objective of MDS is to construct a model of the proximities between the individuals in such a way that it can be represented in a small dimensional space (in our case, 2 dimensions).For this, the SMACOF (Scaling by MAjorizing a COnvex Function) algorithm model has been used. The minimum number of elements needed in order to measure the distance is three. In our case we have four elements and a fifth element, the centroid, situated in the axis of abscissas, representing the mid-point of distances of the group.
The distances between the disciplines with the centroid have been obtained by triangulating the coordinates generated by the MDS.

$$\textit{Distance to the centroid } = \sqrt{x^2 + y^2}$$

$$\textit{Distance between two disciplines A and B} = \sqrt{(x_a - x_b)^2 + (y_a - y_b)^2}$$

2.2. Thesis Directors

A total of 122 academics, only those who have directed theses in more than one specialty (participation in a single specialty does not provide information on similarity between sub disciplines) have been used for the study of thesis directions. Table 2 uses four professors to illustrate how relationships between disciplines are established. By way of example, Professor Emili Prado Picó directed eight theses on Television, seven on Radio, yet only one on Film and Photography. If the profile of Professor Prado Picó's directions is shared with many academics in the sample, it would indicate that Television and Radio have a special similarity. The value of the number of theses directed is weighted in order to construct the matrix of relationships between specialties. In total, 529 theses have been assessed, although theses that include two or more themes have been counted several times, depending on the number of specialties addressed. For example, a thesis on "photography in the work of Steven Spielberg" has been counted twice, once for Film and again for Photography.

Table 2. Example of data structure used to construct the matrix of relationships between specialties. Directors

n	1	2	3	4	…122
	Aguaded Gómez, José Ignacio	Prado Picó, Emili	Lara García, Antonio	Gubern Garriga Nogués, Román	….
RADIO	0	7	0	0	…
PHOTOGRAPHY	0	1	4	1	…
FILM	1	1	17	8	…
TELEVISION	1	8	4	1	…

2.3. Doctoral Thesis Examination Committees

As in thesis directions, only those members who have participated in two or more committees have been used. A total of 586 professors who have participated in doctoral thesis examination committees in more than one specialty have been studied.

2.4. Directors and Examiners jointly

In total, the data of 612 academics who have participated in the production and examination of theses (directing, examining or both) was analysed. Merging the two groups achieves an increase in the number of academics. Participation includes 26 academics that in the previous groupings (directions and doctoral thesis examination committees) only participated in one discipline and were therefore eliminated from the analysis. In addition, many academics that appeared in the previous groups have increased their data with regards to discipline participation.

Algorithm 1 Calculation of distances between specialties using theses

1. Extraction of academics' participation in doctoral thesis examination committees and thesis directions.
2. Normalisation and elimination of professors who only work in one specialty.
3. Similarity calculation between specialties by participation data-Pearson Correlation Coefficient.
4. MDS of the specialties using the similarity matrix.
5. Measurement of the distances in the plane and in the given model.

3. Results

3.1. Analysis of participation in doctoral thesis examination committees and thesis directions

A sum total of 2804 academics have participated in the processes of examination and production of theses. The total number of participations rises to 6663. 65% of the academics (1825) have participated only once, and an elite of 30 professors has individually taken part in more than 20 theses (1043 participations), as directors, examination committee members or both.

It can be observed that, in the four sub disciplines studied, it is common for the academics to participate in more than one area (Table 3). Radio is the discipline that shares most of its professors with the other specialties studied. 69.19% of the academics who participate in Radio, directing theses or examining in doctoral thesis examination committees, have also participated in committees for the other disciplines studied, principally Television.

Table 3. Academics and their participation in disciplines

Disciplines	Academics who only participate in one area	Academics who participate in more than one area	Percentage of participation in multiple areas
FILM	764	691	47.49%
PHOTOGRAPHY	329	334	50.38%
RADIO	114	256	69.19%
TELEVISION	618	524	45.88%

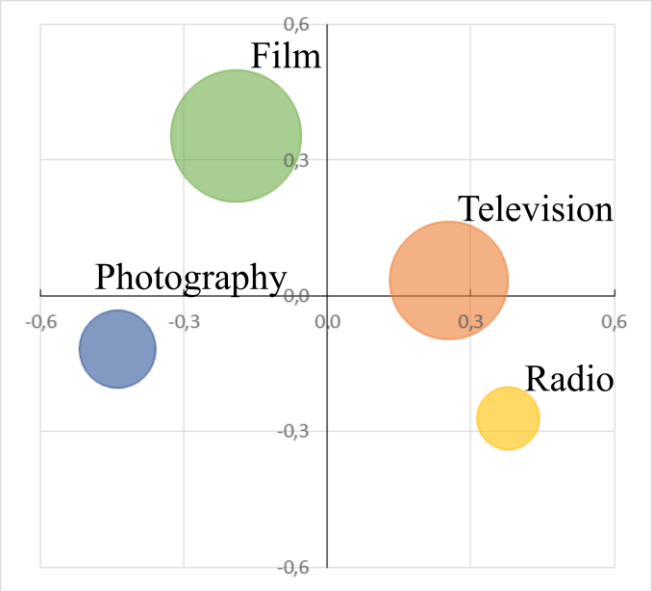
A similarity matrix has been created with the participation data of the academics in the different specialties studied (Table 4), where the similarity of the disciplines to each other can be appreciated. Radio and Television are the two specialties with greatest similarity. Few negative correlations exist, but their low value indicates that there is no apparent relationship between Film-Radio, Photo-Radio and Photo-Television.

Table 4. Proximity matrix of specialties in Audiovisual Communication

	FILM	RADIO	TELEVISION	PHOTOGRAPHY
FILM	1	,1862	0,4220	0,4610
RADIO	0,1862	1	0,6481	0,1560
TELEVISION	0,4220	0,6481	1	0,3047
PHOTOGRAPHY	0,4610	0,1560	0,3047	1

The distances between the different specialties can be seen in a heuristic plan represented bidimensionally in Figure 1. The distance between specialties in the bidimensional plan should be measured from the centre of the spheres, this information should not be confused with the region occupied by the spheres, as this area only represents the thesis production of each specialty. With regard to the distances, we should interpret this graph in two ways. Firstly, the distance between each specialty and the axis of abscissas (X and Y= 0), which gives us an idea of each discipline's representation in the whole group, Television being the discipline that appears able to present to the rest of the group. Secondly, the distances between the disciplines have to be examined, where two apparently strong relationships are seen: Radio-Television and Film-Photography; and an intermediate relationship Film-Television.

Figure 1. Representation of the distance of the disciplines using academics' presence in theses



Notes: Kruskal Stress = 0.037. The size of the spheres represents the number of theses produced in each area in Spain (1976-2007).

These distances can be quantified in the representation space, as seen in Table 5. The greatest distances between two disciplines occur between Film and Radio (1.047) and Radio and Photography (1.045). The proximity between areas and to the centroid can be quantified in the same way.

Table 5. Distances between the measurements in the representation space.

	FILM	RADIO	TELEVISION	PHOTOGRAPHY	CENTROID
FILM	0				
RADIO	0,845	0			
TELEVISION	0,548	0,329	0		
PHOTOGRAPHY	0,533	0,832	0,710	0	
CENTROID	0,402	0,465	0,256	0,456	0

Because of the fact that MDS reduces the dimensions of the original model, in this case to two, it is normal for there to be a loss of data. In our case, the Kruskal stress test gives a result of 0.037, which is considered to be quite good [01]. However, a certain loss of data and of representation in the distances occurs when reduced to two dimensions (in three dimensions this difference is negligible). The real distances calculated according to the bidimensional model generated by MDS are seen in Table 6. The maximum error occurs in the distance between Film and Radio, with a residual distance of 0.043, and the minimum between Film and Photography, with a distance of 0.012. The rest of the residual distances are found between these two figures, with an average of 0.029, confirming the Kruskal stress test result that the representation is good and the loss of information minimal.

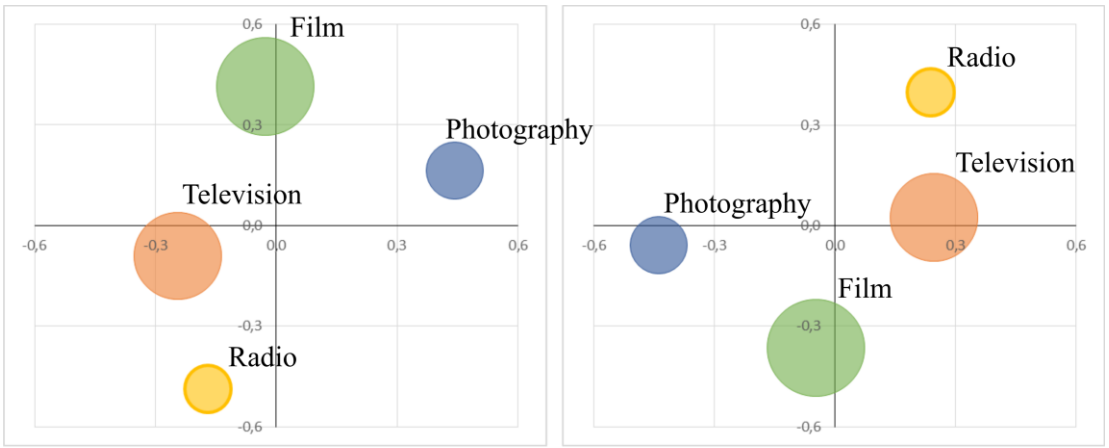
Table 6. Similarity between communication specialties on the basis of the co-participation in doctoral thesis examination committees

	FILM	RADIO	TELEVISION	PHOTOGRAPHY
FILM	0			
RADIO	0,8138	0		
TELEVISION	0,5780	0,3519	0	
PHOTOGRAPHY	0,5390	0,8440	0,6953	0

3.2. Separate Analysis of thesis directions and doctoral thesis examination committees

If thesis directions and participation in doctoral thesis examination committees are analysed separately, some very similar results are obtained (Figure 2 and Table 6). The results indicate that Radio and Television, just like Film and Photography, group together. In both representations Television is the closest discipline to the axes intersection, which confirms the data. The groupings do not vary if examination committees or directors are used, the only difference being that distances obtained between the disciplines using only examination committees are inferior to those obtained using directions. That is to say, the use of examination committees gives a result in which the disciplines are closer than when using directors.

Figura 2. Representations of the distance of the disciplines using thesis directions and doctoral thesis examination committees



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Notes. Kruskal stress for thesis directions is 0.017 and for doctoral thesis examination committees is 0.026. The size represents the number of theses produced in each area

The distances to the centroid change briefly if Directions and Examination Committees are compared (Table 7), but the order of the disciplines is maintained and fully coincides with that of the presence indicator.

Table 7. Distances measured in the representation space. Directions and committees.

Directions					
	FILM	RADIO	TELEVISION	PHOTOGRAPHY	CENTROID
FILM	0,000				
RADIO	0,914	0,000			
TELEVISION	0,550	0,405	0,000		
PHOTOGRAPHY	0,533	0,894	0,733	0,000	
CENTROID	0,416	0,517	0,261	0,471	0,000
Committees					
	FILM	RADIO	TELEVISION	PHOTOGRAPHY	CENTROID
FILM	0				
RADIO	0,814	0			
TELEVISION	0,488	0,372	0		
PHOTOGRAPHY	0,498	0,817	0,692	0	
CENTROID	0,368	0,464	0,249	0,443	0

4. Discusión y Conclusiones

This study confirms, as have other earlier papers (Delgado-López-Cózar *et al*., 2006; Repiso *et al.*, 2013; Russell & Sugimoto, 2009; Sugimoto *et al*., 2011; Sugimoto, 2009; Xifra & Castillo, 2006), the importance of the thesis for characterising a discipline, specifically the interdisciplinarity and the interrelation between related specialties. In addition, it does so measuring a new parameter, analyzing thesis coupling through advisorship.

The research on theses has some advantajes if compared with scientific articles when studying interdisciplinarity. A lot of research on interdisciplinarity has traditionally been carried out through coauthorship analysis, although most works in Humanities and Social Sciences are solo works or produced by a small number of authors. The number of theses in the diferent areas is quite alike, so their study does not suffer differences among specialities and can be applied in a homogeneous way for any discipline.

In addition, the current methodology incorporates a different aspect. It does not measure the number of papers common to more than one discipline, something that can be the product of a person or highly productive elite, in one specific interdisciplinary objective and that distorts the reality. On the contrary, it measures the number of people and their ability to participate in the production of scientific papers in more than one specialty, thus providing a more conservative vision of the reality. It is a methodology, subject not to the production but to the characteristics of those who constitute the academic world.

It is, therefore, a methodology that enables interdisciplinarity to be studied holistically, given that doctoral theses offer a more complete and precise representation of the academic communities than, for example, other types of scientific production such as journals indexed in the databases of Thomson Reuters, that represent the Research World, a part of academy. It is known that Thomson Reuters do not collect the scientific production of a substantial part of the humanistic disciplines and social sciences, especially from non-English speaking national settings. Equally, there exist communities that have not developed the level of scientific maturity and international projection necessary to appear represented in these databases, especially in disciplines with a professional focus. Doctoral theses enable the visualisation of an invisible community that does not emerge in the journals, and therefore offer us a much more accurate portrait of interdisciplinarity.

The use of MDS not only allows for the distances between specialties to be calculated individually, but also creates a heuristic plan of bidimensional representation where, by means of the Kruskal stress test, the prosperity of the representation can be calculated, and whose information loss is quantifiable, unlike other methods such as the force algorithms of network analysis Kamada-Kawai (Kamada & Kawai, 1988) and Fruchterman-Reingold (Fruchterman & Reingold, 1991). MDS further allows for the level of integration of the specialties in the group to be known.

The results show that a slight difference exists between results obtained through the analysis of directions and the composition of doctoral thesis examination committees. For examination committees, the distances are reduced, so which of the two is the most reliable? If high specialisation in a discipline were the main criteria when selecting a doctoral thesis examination committee, the results should be similar and therefore, the most reliable data would be that resulting from the conjunction of direction and committee personnel; which we have called "Participation in the processes of examination and production of theses". On the other hand, the selected sample pertains to theses produced in Spain, where the selection process for doctoral thesis examination committees guarantees a committee specialised in the area, but does not entirely guarantee the academic suitability of its members. In this selection other external criteria are borne in mind, such as the social relationships of the thesis director, or perceptions of informal power, academic authority ascendancy and preeminence (Casanueva Roche & Espasandín Buestelo, 2007). However, it is logical that the greatest distance between disciplines is to be found using directors, given that thesis direction is a procedure for which the director should be highly specialised in the subject being studied. Therefore, and by way of conclusion, we would say that both indicators are valid, always provided that the production system recognises academics' specialisation as the main criteria for directing and examining theses. The indicator that unites both will be the most statistically reliable, as more information is included in order for the relationships to be quantified.

Television and Film are the two most generic disciplines within the area. Radio, in spite of maintaining relationships solely with Television, has a low number of its own professors, which indicates to us that it probably has a small corpus that has been absorbed by Television, a specialty that has a somewhat larger corpus.

The specialties that are positioned near to the centroid and therefore those that best represent the group, are Television in first place followed at a certain distance by Film. The results of the specialties' grouping and positioning is explained from a theoretical perspective of their

development. Photography incorporates the mechanisation of the image and brings with it animated photography, giving rise to cinematography, whereas television originates from the sum of two technologies; audiovisual and telecommunications. The audio component of Television is resolved due to the achievements of Radio and also develops the line of Mass Media initiated by Radio. Television and Film are similar in so far as they are media that include visual images and audio images but only Television is a Mass Media, therefore incorporating greater transversality, which explains it being the discipline most proximate to the centroid.

It is particularly interesting to analyse Audiovisual Communication subspecialties in contrast to other disciplines, given that its studies have traditionally been highly polarised. For example, journals from the area can be in two Web of Knowledge databases and therefore in two different categories. The articles relating to these fields are found in the "Communication" category of the "Social Sciences Citation Index" and in the "Film, Radio & Television" category of the "Arts & Humanities Citation Index". The allocation of categories in Web of Knowledge is achieved by following heuristic and subjective methods, based principally on the citations received and given, with the rest of the previously indexed Journals (Pudovkin & Garfield, 2002). It is for this, amongst other reasons, that studying the relationship between different specialties of Communication is of importance, and more so using a study objective outside of scientific articles. In this paper, two differing clusters appear. This is explained in that they arise from two different cognitive paradigms: a first cluster related to Mass Media and more typical of Social Sciences, represented by Radio and Television, and a second, related to Semiotics and Fine Arts, mainly related to Arts and Humanities, represented by Film and Photography.

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5. Note

[01] Kruskal (1964) suggests the following interpretations of the Stress:
- 0.2 → Poor
- 0.1 → Acceptable
- 0.05 → Good
- 0.025 → Very good
- 0.0 → Excellent

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