The preliminaries project: Geography, networks, and publication in the Spanish Golden Age

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Abstract

This study uses information gleaned from the front matter, or preliminaries, of Spanish Golden Age texts to model the social networks underpinning the early modern publication industry. Using a data-driven approach, we examine the historical and political conditions that influenced the process of approval, censorship, and publication in the Spanish Empire, with a particular focus on the concept of geography, as it relates to the process of community formation and composition. We find that the literary publishing scene was dominated by a small group of authors, generally tied to Madrid, but highly published across Iberian cultural and political capitals. These authors, together with the powerful literary patrons who they relied upon for support, served as local bridges between communities that formed primarily at the local level. Regionally, we find groups of literate bureaucrats, clergymen, printers, and booksellers working together to fulfill the legal requirements for publication as dictated by the Spanish crown. Finally, we see how certain individuals tend to stand out at the regional level as gatekeepers to the publication industry, interacting equally with high- and low-profile individuals to approve and publish texts.

1 Introduction

Recent studies that focus on the preliminaries sections of early modern texts have sparked a new interest in the individuals involved in the publication of Spanish Golden Age literature (Bouza Álvarez, 2012; Rico, 2005). The information contained within the preliminaries, or front matter, consists of a wide variety of metadata regarding the people, places, and institutions involved in the creation of texts such as Cervantes’s Don Quixote and Lope de Vega’s Comedias. To better understand the patterns of social interactions encoded in these texts, the Preliminaries Project extracts this information to build a network model of early modern Spanish publication (Fig. 1). Using a data-driven approach backed by techniques borrowed from graph theory and statistics, this essay investigates the interaction of geography with the production of early modern Spanish literary texts and the underlying social networks made up of the authors, printers, bureaucrats, and nobles involved in their production. Our methodology and analysis are guided by the following questions:

1) Was Spanish Golden Age publishing primarily a local phenomenon, or did it transcend geographic bounds?
(2) Did individuals form communities around the process of publication? If so, what types of individuals interacted to produce a book? How do these communities relate to the historical context of Spanish book production?

(3) What kind of interactions can be observed in the preliminaries data? Were certain individuals able to exert more power over the process of publication? If so, what conditions led to this imbalance?

To begin answering these questions, the following section provides a brief, but necessary, introduction to the political, social, and historical context surrounding the publication of literature in the Spanish Golden Age.

2 Historical Context

The printing press was introduced to Spain around 1472, with the earliest Spanish printers being located in Seville and Valencia (López-Vidriero, 2013). Throughout the 16th century, the Spanish printing business grew into a small yet important industry (Marsá, 2001). Although many of the texts published in this period focused on theology and law,
a variety of notable literary works were produced that gave way to what historians call the Golden Age of Spanish literature (Rodríguez Cacho, 2009). Among these were the poetry of Garcilaso de la Vega, the works of Santa Teresa de Jesús y San Juan de la Cruz, pastoral romances such as Jorge de Montemayor’s *Diana*, the famous picaresque novel *Lazarillo de Tormes*, and an endless production of the chivalric romances that corresponded to the popular taste of the moment. At the same time, Spain was developing its empire in the Americas and early presses were installed in Mexico City (1539) and Lima (1581), while other major colonial American cities such as Puebla and Guatemala City established presses much later in 1640 and 1660, respectively (Woodbridge and Lawrence in Calvo, 2003).

The rise in publication was accompanied by a boom of regulation, as the Spanish government became increasingly bureaucratized (Fernández Albaladejo, 2009), which had broad repercussions in the printing industry. In 1502, a judicial law was passed concerning the publication and sale of books, stating that no book would be sold or printed without express licensing from the Crown or one of the archbishops of the various municipalities in the Spanish realms (Spain, 1805). Later, in 1558 under the reign of Philip II, a new mandate was produced detailing a step-by-step process of approval and licensing controlled by the Castilian Council, and over the next 40 years new laws concerning pricing were also promulgated (Marsá, 2001). These laws are reflected in the richness of the preliminaries sections of early modern Spanish texts, where the process of approval, licensing, pricing, and content verification was documented (Fig. 2).

This regulation had another important effect: by the time that authors such as Miguel de Cervantes and Lope de Vega began their literary pursuits, an author’s ability to publish had become highly dependent on who they knew (Bouza Álvarez, 2012). To receive the necessary support to fund and license their texts, authors wrote extensive dedications to various nobles and clergymen in the form of letters, essays, and poems. Designed to curry favor at court and influence the publication process, these dedications were also included in the preliminaries sections of these texts (Fig. 2). Unsurprisingly, the noble recipients of this literary praise were highly positioned individuals who exerted extensive influence in court, with family members active in various

![Example preliminaries documents from Suárez de Figueroa’s El pasajero, published in Barcelona in 1618. They include information about pricing, licensing, and civil/ecclesiastic censorship and approval](http://dsh.oxfordjournals.org/ by guest on September 26, 2016)
levels of government. Therefore, the preliminaries sections provide broad insight into the identity of the literary patrons of the day, reading like a who is who of powerful early modern Spanish nobles.

The period covered by this project corresponds to the administration of a particularly powerful noble, Francisco de Sandoval y Rojas, the Duke of Lerma, who came to power as a royal favorite when Philip III succeeded to the throne in 1599. In Medieval and Early Modern Spain, these favorites, called validos (Tomás y Valiente, 1963), had varying degrees of political influence and became central to all aspects of government throughout the 17th century (Feros, 2006). In the case of the Duke of Lerma, the valido was more akin to a prime minister and was the de facto ruler of Spain (Banner, 2009). Unsurprisingly, Lerma was the recipient of dedications present in the front matter of a number of early 17th century books written by authors seeking royal patronage and protection. However, the dedications of the most famous texts of the period, such as Cervantes’ Don Quixote, Lope de Vega’s Arcadia, and Mateo Aleman’s Guzman de Alfarache, typically were addressed to other high-profile nobles—most notably Pedro Fernandez de Castro y Andrade, Count of Lemos—many of whom were closely related to Lerma either by blood or politics (Enciso Alonso-Munímer, 2008). In fact, the extent of the influence exerted by Lerma led many nobles associated with his administration to fear for their positions at court when he was dispossessed in 1618, and individuals who were previously held in favor were replaced by new courtiers as the power structure of the Spanish government changed (Feros, 2006).

These historical conditions are relevant to the study at hand in several ways:

(1) They defined a strict process of regulation around the book trade, requiring the interaction of a variety of individuals to produce a single book. At the very least, a text was subject to the approval of the Castilian Council or a local archdiocese, necessitating the interaction of at least one bureaucrat or clergyman. Generally, a variety of civil and ecclesiastic authorities were involved in the approval of a text in collaboration with the author and/or printer. This type of interaction forms the core of the concept of the Preliminaries Network.

(2) They created the precedent and motivation for including a variety of documentation in the front matter of each printed text, including legal documentation as well as letters, essays, and dedications. This documentation is at the very core of this project, as it allows us to extract the metadata for modeling and analysis.

(3) They established the Castilian Council as the central body of regulation for the printing industry, while also permitting publishing to be managed locally by the various Spanish archdioceses. This is particularly important for this study because it motivated the creation of geographically based communities of clergy, bureaucrats, and printers that produced texts under local regulation without having to always defer to the centralized government.

(4) They limited an author’s ability to publish independently by requiring the approval of their texts. This created a climate of favoritism, in which authors competed for the patronage and favor of the court, resulting in feuds, exile, and even duels (Martínez, 2011; Rodríguez Cacho, 2009).

Keeping these factors in mind, we begin to understand the complexity of the story told by the preliminaries. It is the story of complex interactions between a variety of individuals with different motivations: social control, economic gain, political support, and cultural enlightenment. It is a story of the publishing industry, in which documentation was used and reused to legitimize the printing and reproduction of texts and court the favor of nobles. It is a story of locales, and the groups of individuals that came together at the local level to produce cultural objects. And finally, it is a story of creation, travel, and reproduction as authors created works that were spread and reprinted across a network of cities. The following sections detail our approach to better understand these fascinating documents.
3 Methodology

The Preliminaries Project methodology was carried out in a variety of phases beginning with data acquisition and extraction, followed by the creation of a data model that would undergo a series of transformations to produce the data structure used for social network analysis. The following subsections detail this process.

3.1 Data set

The data set was built as follows. We began by developing a catalogue of editions published within the Spanish Empire between the years of 1598 and 1618, focusing on literary texts from genres such as prose, poetry, and theatre. Using a variety of resources (Pedraza et al., 1980), along with the National Library of Spain and OCLC WorldCat, we were able to identify 321 editions. Of these, 160 were classified as prose, 106 as poetry, and 55 as theatre; however, it is important to note that the majority of the editions classified as theatre were actually collections of twelve plays. The texts were then located using WorldCat, and scanned copies of their preliminaries were requested using the interlibrary loan system. Of the initial catalogue, we successfully obtained 196 (61%) texts for use in the network model.

Basic text metadata was organized into spreadsheets, and analyzed/visualized using a combination of Python libraries including Pandas (McKinney, 2010) and Matplotlib (Hunter, 2007). Specific analysis techniques will be further discussed in the results section.

3.2 Network model

The model used for this study is based on the concept of the collaboration network, a bipartite (two mode) network that generally consists of two distinct node types: individuals and some sort of object they have collaborated on to produce (Peltomäki and Alava, 2006). In the case of the Preliminaries Project, they are individuals who have somehow collaborated in the production of a text; however, as opposed to a simpler collaboration network—like the coauthorship networks observed in fields like physics and math—the semantics of the individual's relationship to the text can vary wildly. For example, a noble patron who receives a dedication in a text has a different sort of relationship to a text than the author who wrote the original manuscript, or the printer who printed it, or the clergyman who signed its approval. To account for these differences, the initial data model employed by the Preliminaries Project is considerably more complex, consisting of five unique node types (Fig. 3):

1. Nodes of type ‘document’ include any document found in the preliminaries sections: license, approval, dedication, erratas, etc.
2. Nodes of type ‘manuscript’ refer to the original manuscript (or collection of manuscripts) produced by the author that was later printed.
3. Nodes of type ‘edition’ represent an organized and consistent collection of documents and texts printed in a particular press during a particular year. These nodes may have several print runs.
4. Nodes of type ‘print run’ represent a physical set of copies produced of an edition. There may be minor variations in the front matter between print runs (Bowers, 1949).
5. Nodes of type ‘person’ refer to any name that appears in the preliminaries sections. They can refer to authors, printers/booksellers, noble literary patrons, and government/eclesiastic officials (hereinafter referred to as signatories).

To analyze this data model as a social network, we performed a series of transformations to produce a one mode social network consisting only of nodes of type ‘person’. This was achieved in a two-step process. The first transformation compressed nodes of type ‘document’, ‘manuscript’, and ‘print run’ to produce a two-mode collaboration network where nodes of type ‘person’ are directly connected to nodes of type ‘edition’ (Fig. 4).

To compensate for the inevitable information loss (Zhou et al., 2007) during the compression of the aforementioned node types, two types of data were transferred to the nodes of type ‘person’:
Any geographic data that are associated with the compressed node. This transfer, which we refer to as attribute aggregation, takes into account the many-to-many cardinality of graph relationships, and therefore uses a hash-map to count and store the number of times a transfer occurs along with the specifics of the transfer. For example, even though we lost the ‘document’ nodes, we know that ‘person’ $a$ signed $x$ number of documents in ‘city’ $a$, and $y$ number of documents in ‘city’ $b$.

**Fig. 3** Diagrams representing the typical coauthorship bipartite network model (left) observed in fields like physics and math, and the more complex five-mode network model used in the Preliminaries Project

**Fig. 4** In the first transformation, new edges are projected over nodes of type ‘print run’, ‘document’, and ‘manuscript’ to create a bipartite collaboration network
A single cardinality attribute ‘role’, which roughly corresponds to the type of node compressed to generate the new ‘person to edition’ relationship. No node may have more than one ‘role’ and therefore they are assigned based on the following order of precedence: ‘author’, ‘noble’, ‘printer/bookseller’, ‘signatory’.

The second transformation compressed the nodes of type ‘edition’, creating a one mode projection of a social network (Fig. 5). This achieved our goal of producing a monopartite social network, with all nodes having type ‘person’; however, determining what constitutes the criteria for generating an edge between two network nodes is often problematic, and the Preliminaries Network is no exception. The following section details our criteria for determining the distribution of edges in our final model and the reasoning behind it.

3.3 The edge problem

The preliminaries section of Spanish Golden Age texts presents a very basic problem: in many cases, there is simply very little known about the individuals involved in their production. While studies of high-profile individuals such as Francisco Murcia de la Llana, Corrector General of the Crown, have appeared throughout literary history (Díaz Moreno, 2009), many others, such as Juan de Amezqueta, typically only appear as brief references in the literary history of famous texts (Canavaggio, 2009; Disanti, 2006; Knowles, 1947; Pérez-Abadín Barro, 2003). Due to this lack of information, it is often impossible—even through detailed research—to determine whether individuals whose names appear together in texts actually knew one another. Furthermore, earlier approvals and licenses were included in later reprints in different geographic locales, such that books were approved in Madrid, yet printed in Barcelona, Zaragoza, or Lisbon. This editorial practice—often referred to as piracy—further complicates the matter of determining the criteria for establishing an edge between two individuals. To compensate for these two difficulties, we determined that the only reliable criteria for edge creation was identifying the consistently repeated collaborations across the 20 year period addressed by this study.

To identify these repeated interactions, we used a technique called Newman’s method to assign edge weight during the projection process. This measure is based on the number of repeated co-occurrences of individuals in the preliminaries (Newman, 2001), and calculated from the bipartite network as follows:

\[
W_{v,u} = \sum_{k} \frac{\delta_{v} \delta_{w} k_{w}}{k_{w} - 1}
\]

We chose Newman’s method because it favors long-term repeated collaboration, while downplaying infrequent interaction (Zhou et al., 2007). For example, in our data set, we have thirty-three texts published by Miguel de Cervantes, nine of which were published in Madrid. Of the Madrid texts, seven (78%) were printed by the printer Juan de...
la Cuesta, famous for printing the first edition of *Don Quixote de la Mancha*. De la Cuesta also printed nineteen other literary texts during this period, making him one of the most prolific printers in our data set. Both Cervantes and De la Cuesta represent high-profile, highly connected nodes in the Preliminaries Network, each working with a wide variety of individuals in the publication world. However, despite their other interactions, Newman’s method calculates a very strong edge that represents the repeated, long-term collaboration between the two individuals. This is precisely the kind of relationship we are interested in capturing.

To determine which edges were sufficiently strong to constitute a real relationship, and which could be removed from the graph, we used a fairly unconventional technique designed to minimize graph density in the giant component (GC) of the network. We chose an edge weight cut threshold that maintains the maximum number of nodes in the GC, while minimizing the number of edges in the GC. All edges with a weight < 0.14 were removed from the GC, maintaining 236 of 305 nodes in the GC and cutting 55.7% of 2,174 edges, which produced a density of 0.0445 (Fig. 6).

After completing the aforementioned transformations, edge weighting, and edge cut, the model was visualized and analyzed using standard graph analysis software including Python’s NetworkX (Hagberg et al., 2008) and Gephi (Bastian et al., 2009). While the majority of the analysis focuses on the GC produced in the process of projection and edge removal, the original projection and/or its subcomponents are also discussed briefly for illustrative purposes. The specifics of this analysis will be presented in the analysis section.

4 Analysis

The following subsections merge a description of the analysis performed on the Preliminaries data set with a discussion of the significance of their results within a broader historical context. Beginning with a simple descriptive analysis of the original catalogue of texts, we discuss the relevance of this study as it applies to the domain of literary history, as well as providing a standalone approach to this topic not found elsewhere within the literature of the field.

**Fig. 6** Plot of data used to minimize density in GC. The y-axis shows the density of the giant component in relation to the edge weight (x-axis) used for cutoff.
4.1 Publishing in the time of cervantes: Places, authors, and printers

The original catalogue consisted of 322 texts printed in thirty-three cities, primarily within the Spanish Empire. Of these texts, over 30% were published in Madrid, over 15% in Barcelona, and just over 5% each in Lisbon, Valencia, and Brussels (Fig. 7). A variety of other Spanish cities appear as well, including the early printing center Seville, and Valladolid, the temporary seat of the Crown during a 5-year period from 1601 to 1606 (Bleiberg, 1979). Also appearing are Milan, at the time under the control of the Spanish Monarchy, and Paris, where a variety of Spanish novels were published including Cervantes’ *Los trabajos de Persiles y Sigismunda* and *Novelas Ejemplares* in 1617 and 1618, respectively. Furthermore, limited literary publication occurred in the American colonial capitals, Mexico City and Lima, as well as cities outside the Empire such as Rome, where Juan de Jáuregui published a translation of *Aminta* in 1607.

In a similar pattern, we find that the majority of these texts were authored by a small number of individuals. Just over four authors account for a little over 63% of these texts: Felix Lope De Vega Carpio, Alonso de Ledesma, Miguel de Cervantes Saavedra, and Mateo Alemán (Fig. 8). Lope de Vega is particularly notable; his works were produced in 100

![Initial catalogue values for number of editions per city in Western Europe, Mexico, and Peru mapped by region](http://dsh.oxfordjournals.org/)

*Fig. 7* Initial catalogue values for number of editions per city in Western Europe, Mexico, and Peru mapped by region
editions, and many of these were collections of twelve plays that were published as a single edition with a single set of preliminaries.

While the publication of Lope’s work continued at a relatively consistent pace across the 20 year period, the other three most prolific author’s activity appears to be associated with the publication of specific texts. The arc of these authors’ publication over time becomes apparent examining Fig. 8 and taking into account the following:

(1) Alonso de Ledesma’s success is based primarily on the repeated publication of Conceptos espirituales during the period 1600–1606, with a brief renewal of popularity upon the publication of Conceptos espirituales part 2 and 3 in 1608 and 1612, respectively. These texts were representative of the allegorical Christian poetry popular in the urban centers of Spain in this time period (Serés, 2003). He also published several other texts, Juegos de Nochebuena and Romancero y monstruo imaginado, that had moderate success at the presses.

(2) Cervantes enjoyed several periods of success at the presses beginning with publication of Don Quixote in Madrid, with a declining number of reprints until the publication of Novelas ejemplares (1613), followed by La segunda parte de don Quixote (1615) and the widely successful—and posthumously published—Los trabajos de Persiles y Sigismunda (1617).

(3) The success of Mateo Alemán is based upon the publication of Guzmán de Alfarache, which dominated the presses, being published approximately nineteen times over a period of 5 years in nine cities. To a lesser extent, he achieved renewed popularity upon the publication of its sequel Segunda parte de la vida de Guzmán de Alfarache, atalaya de la vida humana. In 1608, Alemán migrated to Mexico, and is presumed to have died there at an unknown date after 1615 (Alemán, 1979).

Printers are much more evenly distributed in terms of edition count than authors or cities (Fig. 9); however, certain individuals stand out and are worthy of noting here. The most prolific printer in the catalogue is none other than the famous Sebastián de Cormellas, widely speculated to be owner of the print shop referenced in La segunda parte del Don Quixote, located at 14 La calle del Call in Barcelona (Cervantes, 2005). The second most prolific printer, Juan de la Cuesta, also holds a special place in the history of Don Quixote as the printer of the first edition (along with several other early editions) of El ingenioso hidalgo don Quixote de la Mancha. Also of note are Pedro Crasbeek, the Lisbon-based publisher responsible for the first editions of La Florida del Inca and

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**Fig. 8** Catalogue values for number of editions per author over the 20 year period. Notice the prominent spikes in the publication of Mateo Alemán and Alonso de Ledesma in 1600 and 1606, respectively.
Los comentarios reales by the Inca Garcilaso de la Vega (2001) and Roger Velpius, a Dutch printer who produced early editions of works by authors such as Miguel de Cervantes and Lope de Vega in Brussels.

Furthermore, while no printer in this data set was active in multiple locations, sixteen of the cities had at least two printers producing literary texts during this period (Fig. 10). Interestingly, the city of Seville had eight printers, despite the fact that it only accounts for ten editions. On the other hand, we see that Lisbon’s eighteen editions were produced by only three printers. Despite anomalous data such as these, we find a positive linear relationship between total numbers of editions published and number of printers (Fig. 10).

Fig. 9 Observed (acquired data set) and expected (initial catalogue) values for number of editions per printer. All printers who are associated with less than five editions are categorized as ‘other’

Fig. 10 Regional map of printers that produced literary texts in Spain between 1598 and 1618 (left). The linear relationship between number of printers in a city and number of editions produced in that city (right)
The above description begins to paint a picture of the world of early modern Spanish publishing. Quite expectedly, we see that the majority of literary publication occurred in the European political and cultural centers of Madrid, Barcelona, Lisbon, Valencia, and Brussels, with the most famous authors being published in other major cities across Spain. Texts by Lope de Vega, Ledesma, Cervantes, and Alemán dominated the panorama of publication, accounting for nearly two-thirds of overall production. However, while Lope de Vega was published regularly, the other authors’ success was associated with spikes in production around the time of the first edition of a major literary text. Finally, we see a variety of printers active in the major publishing centers. While a few notable individuals stand out, we typically see that printing centers host a number of printers that roughly corresponds to their production.

To expand this picture, the following sections detail the network analysis performed on the preliminaries data after they were manually extracted and modeled as described in the methodology section.

4.2 Geographic communities: Regional networks of cultural production

The initial one-mode projection of the Preliminaries social network (before edge cut) produced three distinct connected components. Perhaps unsurprisingly, two of these are small subcomponents centered around texts associated with geographically isolated areas (Fig. 11). The first comes from the preliminaries of Relacion de la entrada de algunos padres de la Compañía de Jesús en la China, written by Diego de Pantoja, a text published in 1605 in Seville that documents an early Jesuit expedition to China. The second is centered around the group known as the Academica Antártica, a group of creole authors active in Lima during this period (Pedraza et al., 1980). While these two sub-components are not the focus of the remainder of the study, it is interesting to note the presence of members of the House Zúñiga in both networks. This family was one of the grandees of Spain, and was composed of a variety of notable individuals including Viceroyos, Archbishops, and the famous Count of Lemos, the most well-known literary patron of this period.

The third connected component—the aforementioned GC—consists of 305 nodes and 2,174 edges. It is composed of individuals who were involved in literary production across the Spanish Empire, the vast majority of whom were primarily associated with one of the major Iberian printing centers. To quantify this, we used the measures produced by the process of attribute aggregation discussed in the methodology section. Each individual in the network has an attribute ‘place’, which contains a map of places associated with that individual. For

Fig. 11 The two small subcomponents produced by the projection. Diego de Pantoja’s network (left) consists primarily of Iberian collaborators. The Peruvian network (right) includes individuals important in the Peruvian viceregal court
example, an individual that signed five documents in Madrid and one in Valladolid would have the following ‘place’ attribute: {‘Madrid’: 5, ‘Valladolid’: 1}. This allows us to approximate the geographic reach of an individual involved in the network; however, as Table 1 demonstrates, we observe the following:

1. Printers and signatories average approximately one geographic association, which suggests that they are typically only active in one location throughout their career.
2. Patrons have very few geographic associations. This is due to the fact that they were recipients of dedications, and did not sign/produce a document/text in an explicitly documented place.
3. Authors typically are associated with multiple places. This is largely due to the fact that their editions travelled and were reproduced in various printing centers.

Overall, these observations corroborate previous results suggesting that geographic transfer of cultural information is carried out by objects (Suárez et al., 2013)—in this case texts—due to the fact that people simply do not tend to move very far during the course of their lives (Schich et al., 2014). Accepting this as true, we posit that the topology of the Preliminaries Network is highly influenced by geography, with large communities concentrated in the major printing centers.

To test this hypothesis, we used our cut weight model of the Preliminaries Network to investigate the concept of geographic homophily. In general network terms, homophily refers to the tendency of similar nodes to form relationships (McPherson et al., 2001). More specifically, if we look at a network in which nodes can be grouped into distinct categories (male/female, etc.), it measures the proportion of inter- and intra-category edges as it compares to the overall distribution of nodes by category in the network (Easley and Kleinberg, 2010). In the context of the Preliminaries Network, we chose categories for this measure based on geography by designating a property for each individual that corresponds to the most frequently occurring locale in a node’s map of place associations. This property, referred to as ‘top place’, was then used to calculate the homophily using the implementation provided by Python’s NetworkX module (Newman, 2003). The result of this calculation, 0.251043, indicates strong geographic homophily at work in the network, i.e., nodes tended to be connected to other nodes with the same ‘top place’.

To further explore the implications of geographic influence on our model, we examine community structure throughout the network and its relationship to the geographic associations of individual nodes. Using the community detection algorithm (Blondel et al., 2008) implemented in Gephi graph analysis software, we identified eight communities in the network; the largest six of these account for over 94% of the nodes in the graph. We then mapped the geographic associations of the individuals included in each community (Fig. 12).

Interestingly, we see that while each community seems to have a geographic center, they all span several regions, which can lead to the assumption that these networks are not as local as one would think. However, taking into account the data presented in both the network and map visualizations, we see that these geographic regions are primarily connected by authors and patrons. This fact,

<table>
<thead>
<tr>
<th>Role</th>
<th>Number of places</th>
<th>Number of known places</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>2.89</td>
<td>2.89</td>
</tr>
<tr>
<td>Patron</td>
<td>0.19</td>
<td>1.0</td>
</tr>
<tr>
<td>Printer</td>
<td>1.09</td>
<td>1.09</td>
</tr>
<tr>
<td>Signatory</td>
<td>0.95</td>
<td>1.12</td>
</tr>
</tbody>
</table>

The rightmost column provides the same statistic, but only takes into account individuals with known place associations.
illustrated by the following example, is crucial to understand publication during this period.

Examining the largest community, two primary details stand out: (1) the network is completely dominated by the node representing Lope de Vega, which is also the only node of role ‘author’ present in this community, and (2) its geographic reach is strong in a variety of Iberian printing centers, including Madrid, Valladolid, Barcelona, and Valencia. Taking a closer look, we see that within Lope’s community there are truly several smaller geographic communities held together by connections to Lope de Vega and the noble patrons to whom he addressed dedications (Fig. 13). While this phenomenon is in some cases driven by the editorial practice of reprinting texts with original dedications—and as an artifact of the Preliminaries Project’s methodology—historical data suggest that authors and patrons did indeed act as local bridges. For example, we know that Lope de Vega was active in a variety of locales in Spain during this period, including Madrid, Valencia, Sevilla, and Toledo, where he participated in tertulias with a variety of important authors, such as the priest Jose de Valdivielso, while under the protection of Bernardo de Sandoval y Rojas, uncle to the Duke of Lerma (Martínez, 2011). Other authors’ activity extended even farther, crossing the Atlantic to form ties between the New and Old World literary communities. For example, Bernardo de Balbuena, author of the poem *Grandeza mexicana*, spent time as a young adult in Mexico, and was later educated in Spain before rising to become a bishop in Puerto Rico, thereby providing a strong link between Mexican and Peninsular communities (Chang-Rodríguez, 1996).

While it is beyond the scope of this discussion to analyze each of these relationships at length, it is safe
to say they are present due to a combination of both real relationships between authors, patrons, printers, and signatories, and the simple fact of reprinting an author’s work in various locations, generally including the dedications found in previous editions. This sort of network, reconstructed from historical documents, can be better understood conceptually as a cultural network: a mix of actual social interactions that also reflects the flow of information and interactions through cultural objects (Suárez et al., 2015). Regardless of the source of the relationship, authors and patrons’ role as local bridges (Granovetter, 1973) in the network is undisputable. To illustrate this point, we removed the authors and patrons from the GC, as well as any other nodes that did not have a specific geographic reference, and performed a new round of analysis. This produced a geographic homophily in the network of 0.62, and community structure in the remaining nodes became almost entirely dependent on geography. In Fig. 14, the minimum spanning tree of the new projection is shaded for top place, and it is easy to notice how the nodes are grouped based on geographic ties. Furthermore, the network has broken into a series of sixteen of connected components, many of these representing a regional publishing community. Plotting the geographic associations of these individuals by community, we see that there are still some interactions between regions, but the communities are considerably more geographically centralized than in the initial projection (Fig. 14).

These results suggest the following image of the early modern publishing world: a variety of regional networks of individuals collaborating locally within a larger network held together by key actors (authors and patrons) that functioned as local bridges. Proceeding from this conclusion, the following sections discuss the types of interactions that occurred in the Preliminaries Network to better understand the collaborative process of publication and how it affects network structure.

4.3 Collaborative communities: Inter-role interaction in the production of texts

To understand collaboration in the context of early modern Spanish publishing, let us first consider an example taken from the first edition of *Don Quixote*, published in 1605 in Madrid by Juan de la Cuesta. The preliminaries of this text consist of seven documents:

1. The title page, which specifies the author, Miguel de Cervantes, along with the printer and bookseller associated with this edition, Juan de la Cuesta and Francisco de Robles, respectively.
2. The *tasa*, or pricing, signed by a scribe from the chamber of the king, Juan Gallo de Andrada.
Fig. 14 The minimum spanning tree of the fractured series of component graphs produced by the removal of the author and patron nodes, shaded for attribute ‘top place’ (top). The geographic association of individuals by community plotted regionally on the Iberian Peninsula (bottom)
(3) The *fe de erratas* or erratas, signed by Francisco Murcia de la Llana, general corrector of the crown (Díaz Moreno, 2009).

(4) A document simply titled *El Rey*, or The King, which conceded license to print the text signed by Juan de Amezqueta in the name of the king.

(5) A dedication written by Cervantes to the Duke of Béjar, Don Alonso Diego Lopez de Zúñiga Sotomayor, a literary patron of the time. As a side note, this was the only dedication written by Cervantes to the Duke of Béjar. The rest of his texts contained dedications to the Conde de Lemos, another member of the House of Zúñiga.

(6) A prologue written by Cervantes addressed to his readers.

(7) A series of poems written by fictional characters from the history of Spanish literature (Cervantes, 1998).

In many ways, *Don Quixote*’s preliminaries section is a like a microcosm of Spanish publishing: authors received funding and political support from noble patrons and in turn wrote dedications, bureaucrats and clergymen signed off on content, licensing, and pricing, and printers and booksellers arranged, printed, and sold books. This activity is precisely what we refer to when we use the term interaction. Each time an individual’s name appears in a preliminaries document, we consider it to be an interaction with all of the other individuals whose names appear in other documents in the same preliminaries. Therefore, the preliminaries of a text as a whole represent a series of interactions that involved a variety of individuals in different roles. In our model, an interaction is represented as an edge, which again facilitates analysis within a network framework. The following paragraphs detail this analysis, focusing on the concept of role and how it affects the structure of the interactions across the network.

As shown in Fig. 15, there is an uneven distribution of roles across the network, with a much larger population of signatories and printers than authors and patrons. This is easily explained by the fact that the many of the texts published in this period were in fact reprints, and while successive editions required local licensing and approval, the author and dedications remained the same. Perhaps more importantly, we see that interactions between roles are distributed quite proportionally, a property that can be demonstrated by calculating a measure of role homophily. The calculation—identical to the one used for geographic homophily—produced a result of $-0.12$. This suggests that the proportion of roles in the graph reflects the proportions of...
individuals that typically collaborated on a text, with a tendency toward interaction between individuals fulfilling a variety of distinct social and economic roles in the production process. This can be explained by the necessity of inter-role interaction, and further indicates that there is a pattern in the types of interactions that needed to occur for a text to be produced.

Figure 16 shows the percentage of total interactions (edges) between nodes based on role, with the largest number of interactions occurring between individuals occupying the most common roles of signatory and printer/bookseller. Due to the highly localized community structure of this network, we would also expect that the distribution of inter-role interactions would hold true across communities, creating a sort of recipe for the type of collaboration necessary to produce an edition. As Fig. 16 shows, these proportions are indeed consistent across the communities, which is informative to some degree in that it reflects the formal structure of approval/licensing as mandated by the Spanish government. However, in terms of understanding these networks, quantifying interactions in this way does little to inform us about their nature. Combining this information with the average edge weight across the roles and communities provides more insight (Fig. 16).

Here we see that while the printer/signatory interaction is by far the most common, it is also one of the weakest. Conversely, the least common interaction, patron/author, was the strongest. While this inverse relationship does not hold true across all the categories—at least in a statistically significant way—it is quite interesting considering both the criteria used for edge weighting and the historical context surrounding the production of these texts. The following points stand out:

1. Author/patron interactions are the least common due to the fact that they only wrote dedications to an average of two patrons during this period; however, this relationship was particularly strong due both to the editorial practice of reusing dedications and to the fact that many authors would repeatedly dedicate their texts to the same patron.

2. The patron/signatory and author/signatory interactions are fairly common, accounting for ~15% each of the total. This is due primarily to the large population of signatories in the network. Both of these categories also tend to have fairly strong relationships, which could reflect active participation of both patrons and authors in the selection of the individuals involved in the approval of their texts (Bouza Álvarez, 2012).

3. The signatory/signatory interaction is both highly common and tends to be fairly strong. Partially, this reflects the editorial practice of reusing preliminary documents, but also represents long-term collaborations within a geographic or institutional context. For example, it was common practice to sign a document in the name of a superior, such as when a vicar general signed a document in the name of an archbishop.

4. Printers, while common in the network, tend to have the weakest bonds to other individuals. This is not to say that long-term collaborations did not exist, as the earlier example of Cervantes and Juan de la Cuesta demonstrated, but in general printers seem to be less tied to particular individuals.

To summarize these results, we can observe multiple collaborative communities of individuals fulfilling various roles to satisfy the artistic, economic, and legal requirements of the Spanish book trade. These communities consist primarily of signatories, bureaucrats, and church officials operating in a legal capacity to regulate the production of texts, often acting in the name of higher ranking church or government officials. Authors and patrons form strong bonds, and often interact with the same groups of signatories to influence the process of approval, while printers generally seem to have weaker ties to particular authors, members of the court, and the literate bureaucracy.

These insights are informative; however, they are still quite abstract, ignoring individual interactions in favor of global trends across the network. The final section delves into the nature of these interactions with a finer granularity, considering local
Fig. 16 Average number of inter-role interactions by community (top). Average edge weight of inter-role interactions by community (bottom)
conditions and how they affect the distribution of power and influence across the network.

4.4 Influence and interaction: Authors, patrons, and signatories

Like so many networks, the topology of the Preliminaries Network is dominated by the presence of a small number of high-degree nodes. These nodes, having a much larger number of connections than the average node in the graph, are often referred to as hubs (Barabási and Albert, 1999), and represent central individuals that typically exert a high level of influence in the network. Specifically in the Preliminaries Network, an individual’s degree corresponds to the number of unique individuals with whom they interact, and serves as a proxy for their power and influence within the network. Looking back to Fig. 1, we see that certain nodes stand out due to their high degree (shown by their large size): Lope de Vega, Miguel de Cervantes, The Count of Lemos, Gutierre de Cetina, and Francisco Murcia de la Llana. Each of these individuals has been documented in the history of this period, and they all were undoubtedly very important in this publication network.

A wide variety of factors contributed to the success of all of these individuals, but the meteoric rise of Lope de Vega is perhaps the easiest to quantify here. By the time this period began, Lope was already a well-established playwright on the Madrid scene with strong connections at court (Martínez, 2011). After spending time under the protection of Bernardo de Sandoval y Rojas in Toledo, he briefly entered the service of the then Marquis of Sarria (future Count of Lemos) Pedro Fernandez de Castro y Andrade (Martínez). In the years that followed, Lope began to produce his corpus of poems and novels, and between 1599 and 1618 he authored at least twenty-one unique texts that were published in approximately 100 editions. These texts contained dedications to over eight (not counting theatre editions) unique recipients, including the Duke of Osuna, the Marquee of Sarria, the Count of Saldaña, and the Marquee of Priego, as Lope sought to further his position as a court favorite. In 1605, he began a relationship with the Duke of Sessa, Luis Fernandez de Cordoba, that he would maintain until his death in 1635. Beyond his prolific production of poetry and prose—combined with a talent for befriending powerful individuals—a parallel phenomenon spurred the publication of more of his texts: the rise in popularity of printed theatre. This prompted a wave of publication of Lope’s theatre in editions containing groups of twelve comedies, totaling in approximately forty-one editions of Lope’s comedias published during this period. However, it is important to note that much of theatre published during this period was done without his consent, as he preferred to focus on what he considered to be more refined genres, including the pastoral and Byzantine novel, and epic poetry (Samson, 2008). Furthermore, these pirate publications resulted in financial disputes, perhaps rooted in Lope’s earlier practice of selling his plays for the purpose of performance, but not publication (Martínez). Regardless of Lope’s disapproval, the relatively novel practice of reading theatre in the home sparked a small but lively printing business centered around the prolific dramaturge’s work. Overall, this activity resulted in the enormous number of editions carrying the name of Lope de Vega during this period, and account for the high degree of influence he achieved in this network.

The relationship between Cervantes and the Count of Lemos VII is also of note, and has been the subject of a variety of historical indagations (Enciso Alonso-Munúmer, 2014). Lemos was closely tied to the crown and to the Duke of Lerma through his mother Catalina de Zúñiga y Sandoval, sister of the Duke of Lerma. Through this connection, Cervantes achieved royal support and protection, a fact Cervantes knew all too well as evidenced by his dedications. Editions of Novelas Ejemplares, La segunda parte de don Quixote, Los trabajos de Persiles and Sigismunda, and Ocho comedias y ocho entremeses published in this period contained dedications to the Count of Lemos, making it by far the strongest author/patron relationship by nearly a factor of 4. This patronage, as well as Cervantes great talent and wit, translated to a dominating presence in the publishing industry, with six texts published in approximately thirty-six editions.

Finally, the two signatories Francisco Murcia de la Llana and Gutierre de Cetina stand out. Murcia
de la Llana, the Corrector General of the Crown, was responsible for checking subsequent versions of texts for errors, and documents titled *Fe de Erratas* and signed by Murcia de la Llana are present in over thirty-seven editions in the sample. Similarly, documents signed by Gutierre de Cetina, Vicar General of Madrid, appear in twenty-five editions, the vast majority of them published in Madrid. However, despite their prominence in the Preliminaries Network, they are largely overlooked by historical studies, appearing only in a limited, often superficial, capacity.

Aside from the historical context associated with these influential individuals, we explored their influence in terms of the network metric assortative mixing. The measure of assortativity is quite similar to homophily, except in this context we use it to describe a node’s tendency to connect to other nodes that have similar connectivity to their own (Newman, 2002). In a typical social network, we tend to see strong assortative mixing such that high-profile nodes tend to be connected to other high-profile nodes—think actors and politicians—and low-profile nodes tend to be connected to other low-profile nodes. On the contrary, the Preliminaries Network displays what is known as disassortativity (−0.13), which suggests that high-profile nodes tended to interact more frequently with low-profile nodes and vice versa. Figure 17 shows relationship strength between nodes organized by descending degree along both axes starting in the upper left hand corner of the diagram. From this chart we see that there were relatively strong relationships between nodes of disparate degree. Therefore, we see that high-profile nodes such as Gutierre de Cetina and Lope de Vega not only shared interactions with lower-profile individuals, they did so on a regular basis.

This atypical pattern of interactions in the Preliminaries Network can be attributed to a variety of factors. Again, we see that the reprinting of famous texts can easily lead to this kind of disparate relationship between high-degree authors/patrons and low-degree signatories and printers; however, in the case of signatories, this phenomenon is often associated with the historical conditions surrounding the regulation of the printing industry. Looking again at figures such as Gutierre de Cetina and Murcia de la Llana, it becomes apparent that to publish a book in Madrid during this period, you basically had to be approved by these individuals. Whether you were an established author like Cervantes, or a newcomer to the literary scene, the path to publication inevitably passed through a series of key individuals. Furthermore, due to the fact that the approval of a text could be handled at a regional level, we see these gatekeepers emerge across a variety of cities, especially in the Iberian Peninsula. A particularly clear example of this was the influence of Tomás Gracián Dantisco in Valladolid, who was not part of the titled nobility, but emerged as a powerful influencer with connections great and small in the literary world (Marín Cepeda, 2010)

In summary, we see that the Preliminaries Network was dominated by a group of high-profile, high-influence individuals, with certain authors, noblemen, and signatories at the heart of the Madrid scene standing out. While certainly well connected, these individuals interacted with many other types of people, great and small, across the network. This was in a large part due to the legal framework surrounding the production of texts at this time, controlling licensing through the central government and organizational units of the Catholic Church. This practice facilitated the emergence of high centrality hubs that acted as gatekeepers to the publishing world. While these hubs are particularly visible in the context of Madrid, this phenomenon occurred across regions in every area that had an active publishing industry.

5 Conclusion

In conclusion, we believe that through a combination of historical contextualization and systematic analysis, the preliminaries sections of these texts allow us to paint a clearer picture of the social aspects of the early modern Spanish publishing industry. In summarizing our results—and trying to respond to the questions posed at the beginning of this article—we begin to see that certain patterns emerge consistently across the data set; however,
as these patterns are broken down and analyzed at the individual level, we see that they are laden with idiosyncrasies and historical curiosities. Overall, we have found that publishing was in many ways a very local phenomenon, with printers and signatories having strong roots associated with particular cultural centers, both American and Western European. Regardless, authors did seem to travel, both literally as they navigated the world of social and political intrigue of early modern Spain, and through their texts that were shipped and reprinted within and without the realms of the Spanish Crown. Texts, as they were produced and reproduced, were highly collaborative objects requiring the interaction of individuals fulfilling very specific roles that were defined both through explicit legislation and the economic and social demands of the book market. At the core of these interactions, we see the author/patron relationship, actively cultivated through dedications and poetry, and used as leverage to push texts through the process of censorship. With or without the support of a patron, all authors were required to interact with certain powerful bureaucrats, who had strong ties to the legal and ecclesiastic infrastructure of the time. Finally we see that Felix Lope de Vega Carpio, the Fenix de los Ingenios and Cervantes’s ‘monstro de la naturaleza’, stood out above all others due to his

Fig. 17 This figure shows edge strength based on node degree. Nodes are organized from top to bottom and left to right with the highest degree nodes appearing on the top and on the left. Edge strength is denoted by the tone of the fill.
extremely prolific authorship, his profound talent, and his skill at creating and maintaining powerful relationships.

References


