Understanding the Italian Academic Movement
(1450-1700): from Paper to Relational Database
to Graph

https://graphentechnologien.hypotheses.org/

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The Italian Academic movement was one of the most influential social and cultural phenomena of the early modern period. Spontaneous associations of learned individuals, separated from universities, religious groups, or professional groups such as guilds, sprang among circles of humanists in early Quattrocento Tuscany, and spread to the rest of the Italian peninsula and then to Europe, to the point that by 1700, there were hundreds of academies, in big cities as well as in small centers.

Academies engaged in all sorts of disciplines, such as history, geography, poetry, music, theater, rhetoric, politics, diplomacy, medicine, mathematics,
physics, engineering, etc., and generally promoted knowledge as a collaborative effort. While sociability and oral communication were obviously crucial during their meetings, academies’ outputs included networked publications, either in manuscript or in print, where the name of the academy and the names of academicians were proudly declared. In this way, academies highlighted the importance of belonging across intellectual circles, which made them more famous than other kinds of groups.

Despite their widespread and pervasive presence, the representation of Italian academies met both good and bad press. Lately, the phenomenon is being re-evaluated in light of current forms of social networks, and Social Network Analysis. Due to a number of different reasons, such as the difficulty of retrieving information, the bad press that for many decades the academic movement has received, and the difficulty of reconstructing complex and extended networks on the printed page, scholars have focused their attention on famous or exemplary instances. Thus, the attention on the whole phenomenon has diminished.

Academies on paper

Michele Maylender’s five volume work *Storia delle accademie italiane* (1926 – 1930) offered the first history of each Italian academy, from the first instances to the end of the 19th century. However, Maylender had limited access to the sources, and the critical bibliography he could consult is now mostly out of date. Moreover, Maylender listed all academies by name, and indexed the academies by city at the end of each volume, which makes it difficult for scholars when they try to reconstruct the intellectual networks across the peninsula.

From 2006 to 2014, the Arts and Humanities Research Council, United Kingdom (AH/H023631/1), funded the project *Italian Academies (1525 – 1700): The first intellectual networks of Early Modern Europe*. The main output of the project is the Italian Academies Database (http://www.bl.uk/catalogues/ItalianAcademies).

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5This is an open access database hosted by the British Library. It was created by Simone Testa and Lorenza Gianfrancesco, and directed by Jane Everson, Denis Reidy, and Lisa Sampson, with the assistance of Tom Denman. The raw data are accessible at https://data.bl.uk/iad
Academies in a database

The Italian Academies Database (IAD) is a digital resource based on prosopography, bibliography and hypertext. It allows the representation of the geography and history of Italian academies by linking academies, publications, cities, and people (in their various roles of academician, printer, author, dedicatee, contributor, engraver, censor, editor, and publisher), and solves the limits imposed by the printed page. The hypertext offers users an interactive tool to link to other information and offers a broader perspective on the Italian academic movement and its networks. So far, the IAD represents 22 cities, with 496 academies, and 905 publications related to the aforementioned academies. The number of academicians included thus far is over 4,000. Out of the 7,042 persons catalogued, the IAD list 527 authors, 1,793 contributors, 795 dedicatees, 217 editors, 396 printers, 73 publishers, and 549 censors. The structure of the relational database has significantly expanded and facilitated the research on the relations among the elements that make up the academic movement, allowing us to navigate from a general search term to specific entries. For example, if we search for the word “gelat*” (i.e. all the occurrences of the words beginning with “gelat”) we obtain the list shown in the figure below, where each item has a link to its full description.
So for example, when we click on “Carracci, Agostino”, we enter into his personal page, and we see what academies he was linked to, and to what publications he was associated with.

By clicking on the first book in the list, we see that, despite he was not part of the Bocchiana academy, he contributed as an engraver to one of its publications, as shown below.

The examples above show how we can surf the database through Academies, Persons and Books by following individual links.
Academies in a graph

Despite network and networking has long been recognized as a fundamental feature of the Italian academic movement, the relational database does not allow scholars to explore wider networks across the peninsula and through time, and thus visualize indirect relationships among academies, people, and books. For instance, the relational database does not allow to answer the following questions in an easy way:

- How many Bolognese individuals were part of academies outside Bologna?
- What academy played a central role (they had more than N members) within a specific set of cities?
- How many books are the product of a collaborative effort between two or more academies?

This is why it has been useful to develop a graph model of the IAD, by using the Neo4j open software. The original data contained in the relational database, through successive transformations from the XML format provided by the British Library to a CSV format, has been converted into a graph, where it is easy to reconstruct the complex network of groups (namely the academies), individuals, and published books. By connecting in a graph people, academies, and books not directly connected to each other, it is possible to bring the study of the academic movement one step further than the relational database, allowing a better vision of the whole academic landscape.

Maintaining the same conceptual model of the IAD, where the main entities are Academies, Persons, Works and Cities, the nodes and relationships defined in the IAD Graph are shown below.

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Thinking of the complete graph, where there is a node for each person and a node for each academy, it should be clear how easy it would be to obtain, e.g., all the persons associated with more than one academy, or all the publications associated with a given city. For each type of node also its properties have been defined, as shown in the table below, capturing all the information contained in the IAD database.

It is interesting to note that Neo4J allows the definition of properties for a relation, and in our case this possibility has proven useful in those cases where a person is associated with more than one academy. In the IAD, some of the personal characteristics of the association of a Person with an Academy depend on the Academy. For each person, the following three properties depend on the academy with which the person is associated.

- motto
- personEmblemDescription
- nickName_for_this_Academy

In the graph, this information has been captured as attributes of the relationship, allowing the definition of one single type of relationship between a person and an academy (Person – DEALT_WITH_THIS_ACADEMY → Academy), where the string in capital letters is the name of the relationship.
To show the potentials of the graph database, we present here some graphs and the results returned by the IAD Graph, when submitting some of the queries mentioned before. The queries are in Cypher (the query language of Neo4J) and the number of nodes in some of the results has been limited for typographical reasons.

- How many persons are associated with more than one academy?

```
MATCH (p)-[r1:DEALT_WITH THIS_ACADEMY]-(a:Person)-
[r2:DEALT_WITH THIS_ACADEMY]-()-(s)
RETURN DISTINCT COUNT(a) as Persons_belonging_to_two_academies_or_more
```

The answer to the above query is:

**Persons_belonging_to_two_academies_or_more**

2778
How many publications were produced in Bologna?

```mermaid
MATCH p=(c:City) WHERE c.cityItalianName="Bologna" RETURN COUNT(p) as Publications_in_Bologna
RETURN p
```

The answer to the above query is:

*Publications_in_Bologna*

110
• How many Bolognese individuals were part of academies outside Bologna?

MATCH p=(d:Person)-[r:DEALT_WITH_THIS_ACADEMY]->(a:Academy)-[:IS_LOCATED_IN]->(c:City)
WHERE d.nationality="Bolognese" AND NOT c.cityItalianName="Bologna"
RETURN COUNT(DISTINCT d) as Count_of_Academics, a.name as Academy,
COLLECT (d.name + " " + d.surname) as Academic_name, c.cityItalianName as City
ORDER BY COUNT(DISTINCT d) DESC

The first few lines of the answer to the above query are:

<table>
<thead>
<tr>
<th>Count_of_Academics</th>
<th>Academy</th>
<th>Academic_name</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>&quot;Sorrelt (Accademia degli)&quot;</td>
<td>[&quot;Pietro Albergati&quot;, &quot;Domenico (Bologna) Guglielmotti&quot;, &quot;Valerio Zani&quot;, &quot;Ludovico Panini&quot;]</td>
<td>Padova</td>
</tr>
<tr>
<td>4</td>
<td>&quot;Istituti (Accademia degli)&quot;</td>
<td>[&quot;Claudio Acalin&quot;, &quot;Giovannetta Cappon&quot;, &quot;Ippolito Nanni Ferrari&quot;, &quot;Giovanna Passerini&quot;]</td>
<td>Ferrara</td>
</tr>
</tbody>
</table>

• What academies had more than 50 members within a specific set of cities (e.g. Venezia and Padova)?

MATCH q=(p:Person)-[r:DEALT_WITH_THIS_ACADEMY]->(a:Academy)-[:IS_LOCATED_IN]->(c:City)
WITH COLLECT(DISTINCT p.personId) AS people,
COUNT (DISTINCT p.personId) AS Academics_number,
COUNT (*) AS occ, c, c.cityItalianName AS Location_City, a
WHERE c.cityItalianName in ["Venezia", "Padova"] and occ >50
RETURN Academics_number, a.name as Academy_name, Location_City
ORDER BY Academics_number DESC
The answer to the above query is:

MATCH (a:Academy)-[:WORKED_ON]->(w:Work)
WITH COLLECT(distinct a.name) AS Associated_academies_for_this_book,
     w.shortTitle AS Book_short_title, w.workId AS Book_ID,
     COUNT (*) AS occ, w
WHERE occ>=2
RETURN COUNT(w) AS Total_countBooks_belonging_to_more_than_one_academy
RETURN Associated_academies_for_this_book, Book_short_title, Book_ID

The total number of books is here below, followed by just the beginning of the table containing all the books related to two or more academies.

<table>
<thead>
<tr>
<th>Academics_number</th>
<th>Academy_name</th>
<th>Location_City</th>
</tr>
</thead>
<tbody>
<tr>
<td>399</td>
<td>&quot;Ricovrati (Accademia dei)&quot;</td>
<td>&quot;Padova&quot;</td>
</tr>
<tr>
<td>149</td>
<td>&quot;Incogniti-Venezia (Accademia degli)&quot;</td>
<td>&quot;Venezia&quot;</td>
</tr>
<tr>
<td>136</td>
<td>&quot;Argonauti-Venezia (Accademia degli)&quot;</td>
<td>&quot;Venezia&quot;</td>
</tr>
<tr>
<td>68</td>
<td>&quot;Veneziana (Seconda Accademia)&quot;</td>
<td>&quot;Venezia&quot;</td>
</tr>
<tr>
<td>59</td>
<td>&quot;Dela (Accademia)&quot;</td>
<td>&quot;Padova&quot;</td>
</tr>
</tbody>
</table>

- How many books are the product of a collaborative effort between two or more academies, and what are they?
Conclusions

To conclude, the IAD Graph allows users to interrogate the IAD relational database and answer complex questions, which neither the paper or the relational database can answer. Moreover, the IAD Graph visually reveals the mobility, and the network underpinning the academic movement, and reconstructs the “intellectual life of small groups, circles, networks, or ‘epistemological communities’ viewed as the fundamental units which construct knowledge and direct its diffusion through certain channels.”8 While we usually underline the serious aspect that underpins the circulation of knowledge, we should always remember that the foundation of such groups as the academies originates in the implementation of learned sociability, often associated to conviviality, in the typical Renaissance imitation of ancient Greek and Roman models. Thus, IAD Graph sheds light on how to interpret the whole academic movement in light of social network analysis, by exalting the surface of the relations among individuals. Through the implementation of a graph database, users can both actively reconstruct and demonstrate their results about the large and complex knowledge network that anticipated the European Republic of Letters. Thus, we can confirm that Graph is knowledge.

BIBLIOGRAPHY


8. Lisa Sampson, “Finally the Academies”: Networking Communities of Knowledge in Italy and Beyond, in I Tatti Studies in the Italian Renaissance (2020), pp. 369-381


13. Open access database hosted by the British Library: Simone Testa and Lorenza Gianfrancesco (directed by Jane Everson, Denis Reidy, and Lisa Sampson), with the assistance of Tom Denman, The raw data are accessible at https://data.bl.uk/iad.