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Uncovering 'hidden' contributions to the history of Digital Humanities: the *Index Thomisticus*' female keypunch operators

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Introduction

Who undertook the foundational work of the discipline now known as Digital Humanities (DH)? Whose work merits inclusion in the history of the genesis of DH - the leaders of scholarly projects? Their research assistants? Their administrators? Their funders? Have important contributions to early DH projects gone unacknowledged or been silenced by the field's dominant 'founding father' narratives? How can a better understanding of previously undocumented contributions to the founding of DH allow us to evaluate the centrality of processes like collaboration and interdisciplinarity to the development and establishment of DH?

This paper describes our research on the 'hidden contributions' to the *Index Thomisticus* project of Fr Roberto Busa S.J. (1913-2011). Busa is often said to be the founding father of DH: "Most fields cannot point to a single progenitor, much less a divine one, but humanities computing has Father Busa, who began working (with IBM) in the late 1940s on a concordance [the *Index Thomisticus*] of the complete works of Thomas Aquinas" (Unsworth 2006; see also Hockey 2004 and the more nuanced analysis Busa's role in Jones (2016)). Our research has uncovered the details and nature of the contributions made by the punched card operators who transcribed the (pre-edited) texts of Thomas Aquinas and related authors into machine-actionable data using punched card technology, thus completing the essential preliminary work on the *Index Thomisticus*. The operators were the mostly female trainees of the keypunch school that Busa had set up in Milan in 1956 (and that ran until c.1967) as well as the female keypunch operators who worked with him in his Literary Data Processing Centre (CAAL). In addition to recovering the specifics of their work we have also sought to better understand their personal experiences of working on the project and whether the skills they learned were of subsequent benefit to them. Despite the formidable amount of work that they undertook, and the crucial nature of their task to the project, the identities of these women and the nature of their contributions were largely unknown and unacknowledged until this research was undertaken.

Methodology

Previous research on the history of DH has shown that when used with care oral history can contribute to a grounded history that exposes overarching processes while acknowledging through personal narratives the agency and creativity of a plurality of individuals, and not just the great men and women of scientific advancement (Nyhan, Flinn, Welsh 2015). An oral history approach was again adopted for this project; ten of the female punched card operators who had worked with Busa for various durations between 1954 and 1970 were interviewed.

The interviews were carried out from April 1st to 3rd 2014 in the Alosianum College of Philosophical Studies, Gallarate, Italy. Nyhan was present throughout though the interviews were carried out in Italian by Marco Passarotti (a former student of Busa and Principal Investigator of CIRCSE Research Centre, Università Cattolica del Sacro Cuore, Milan) as Nyhan does not speak Italian. Passarotti was given a set of core questions in advance that drew heavily on Nyhan's wider research for the Hidden Histories project (see, for example, Nyhan and Flinn 2016). The questions were prepared with two aims in mind: that of uncovering the Womens' memories of working on the *Index Thomisticus* project as well as capturing their memories of Busa himself. The core questions were:

- How did you first hear about punched card technology?
- How did you find out about the punched card school?
- How did you secure a place there?
- What training did you receive?
- What kinds of work did you do?
- Was the training you received useful to you in later life?

- Please share a memory of Fr Busa?

It was also agreed that Passarotti should ask other questions as he saw fit, for example, in response to an interesting point that was raised by an interviewee. All interviewees signed a waiver form in advance of the interview that gives permission for their recollections to be published. A grant from the European Association for Digital Humanities (EADH, see the call for funding proposals) was secured so that the recorded interviews could subsequently be transcribed and translated by a Research Associate (Ana Vela), who is fluent in both Italian and English. Nyhan then worked through the translations in order to edit them further for clarity and check them, as far as was possible, for factual accuracy. She subsequently carried out a close reading and qualitative analysis of the interviews in order to identify common themes and telling divergences. This was followed by a historical-interpretative analysis that compared and contrasted the issues identified in the oral history sources with relevant primary and secondary literature. Finally, we wrote the results up as narrative history.

Findings

What emerges from the interviews is an insight into the social, cultural and organisational conditions that the female punched card operators worked under and how they were treated in what was, structurally at least, a male-dominated environment. The interviews contain a wealth of recollections about the following issues in particular:

- The womens' discovery of the training school that Busa set up
- Their entrance test to the school
- Their training and tasks as keypunch operators
- The organisational hierarchy of the *Index Thomisticus* workforce
- Their awareness of the aims of the project and of Humanities Computing and Computational Linguistics more generally
- Their knowledge of Latin
- Usefulness of the training to them in later life
- Their memories of Busa.

For example, regarding the usefulness of their training, it opened opportunities that would otherwise have been blocked to them. A number of them went on to work as keypunch operators on an early machine translation project in the EURATOM Center at Ispra, Milan (On Busa's connection to Ispra, see Busa, 1980,

p.86). Nevertheless, the interviews collectively give the sense that the women were seen as a source of low-cost and low-skilled labour. They did not have opportunities to progress from the position of keypunch operator and their training seems to have been the minimum necessary to carry out their roles. Most were not even made aware of the wider significance or aims of the *Index Thomisticus* project. Despite the existence of other research projects like

EURATOM, mentioned above, and that an 'employment path' in the context of research computing was beginning to open up, their potential longer-term contributions to such work were not considered or fostered.

Conclusion

It is almost a cliché to say that DH's collaborative nature makes it distinct and differentiates it from traditional Humanities. However, our research on the *Index Thomisticus* project has prompted us to ask whether claims about the centrality of collaboration to DH are more problematic than they first appear. As we will show, collaboration was the basis on which Busa's *Index Thomisticus* was realised. However, in the 'incunabular phase' (see Rockwell et al. 2011) of DH some forms of collaboration were considered more worthy than others and the contributions of the many female (and occasionally male) punched card operators who did the work of the project were not acknowledged. Until our research, their identities and the nature of their contributions had essentially disappeared from both the historical record and the collective memory of the DH community. This gives rise to a number of interrelated questions that have not yet been adequately addressed by scholarship on the history of DH: when and how did collaboration take on its significance for the field? What has influenced decisions about what kinds of DH collaborations have and have not tended to be acknowledged and how has this changed over time? What is the significance of the alleged cleaving of DH from the practices of the mainstream Humanities in regard to collaboration? Accordingly, our paper will also aim to open a wider discussion about the history of collaboration and the role it played in the formation and establishment of DH.

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