

# Digital Studies for Philosophy of Mathematical Practice

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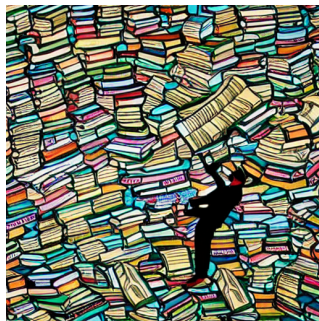
DMRCP Seminar April 28, 2023



# Outline

Part 1: The Great Unread

Part 2: Digital tools to the rescue!



StableDiffusion v1.5:  
“Painting of a man  
drowning in a sea of books”

# Part I

## The Great Unread

# 'Traditional' methods for PMP

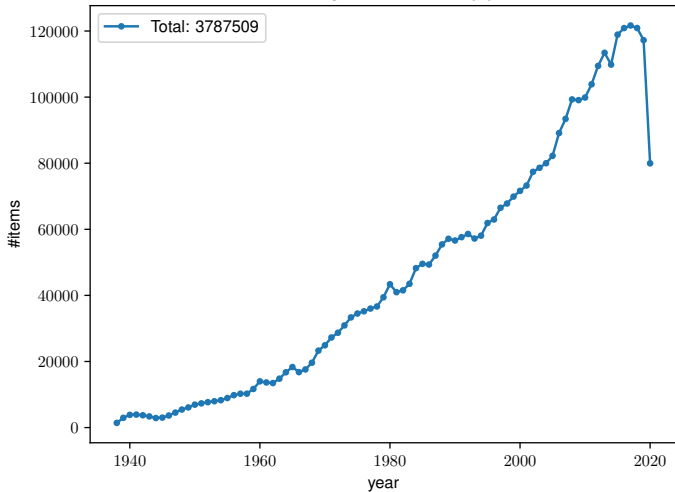
- Interviews
- Observations
- Embeddings and collaborations
- Focus groups
- Delphi studies
- Historical case studies
- Questionnaires
- ...

Andrew Aberdein and Matthew Inglis, eds.  
(2019). *Advances in Experimental Philosophy of Logic and Mathematics*. *Advances in Experimental Philosophy*. Bloomsbury.



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Articles registered in MR by year



## Part II

Digital tools to the rescue!

- Develop digital tools for philosophy of mathematical practice (and history and philosophy of science, more generally)
- Reflect on empirical methodologies in philosophy of science
- Empirical tools to address philosophical topics
- Develop a multi-modal approach to digital studies of mathematical practice
  - ▶ Diagrams
  - ▶ Mathematical textual elements

# Methodology in a nutshell

- It starts with a philosophical question — and it ends with a philosophical answer
- We can use digital tools (both big data and NLP/CV) to enrich our corpus
- We can use quantitative analyses to inform qualitative studies (close readings)
- Choice of question, corpus, and methods go hand-in-hand for operationalization



- arXiv — popular, but heterogenous
- Published papers in (Elsevier) journals
- Post-publication reviews (MR + ZbMath)
- Online fora
- Digitized historical sources
- ...

# Some of our work

Henrik Kragh Sørensen, Sophie Kjeldberg Mathiasen, and Mikkel Willum Johansen (2022). “What is an experiment in mathematics? New evidence from mining the Mathematical Reviews”. *Intended for the Topical Collection Linguistically Informed Philosophy of Mathematical Practice* in Synthese. Submitted.

Vincent Coumans and Henrik Kragh Sørensen (Sept. 2022). “Corpus Analysis for Definitions”. Manuscript. In preparation.

Henrik Kragh Sørensen and Mikkel Willum Johansen (2022). “Epistemic roles of diagrams in short proofs”. In: *Diagrammatic Representation and Inference. 13th International Conference, Diagrams 2022, Rome, Italy, September 14–16, 2022, Proceedings*. Ed. by Valeria Giardino et al. Lecture Notes in Computer Science 13462. Cham: Springer. Chap. 20, pp. 235–242. DOI: 10.1007/978-3-031-15146-0\_20.

Charles Pence and Henrik Kragh Sørensen (June 2022). “Extending Ourselves? On the Concept and Future of Digital Humanities”. *SPSP Newsletter*, vol. 17. Interview conducted by Ariel Roffé and Sara Green. URL: <https://sway.office.com/9BA0rK8koNZYYsKe> (visited on 06/22/2022).

## Other recent, related works

Moti Mizrahi (2020). “Proof, Explanation, and Justification in Mathematical Practice”. *Journal for General Philosophy of Science*, vol. 51, no. 4, pp. 551–568. DOI: [10.1007/s10838-020-09521-7](https://doi.org/10.1007/s10838-020-09521-7).

Alison Pease et al. (2020). “Using crowdsourced mathematics to understand mathematical practice”. *ZDM*, vol. 52, no. 6, pp. 1087–1098. DOI: [10.1007/s11858-020-01181-7](https://doi.org/10.1007/s11858-020-01181-7).

Fenner Stanley Tanswell and Matthew Inglis (2022). “The Language of Proofs. A Philosophical Corpus Linguistics Study of Instructions and Imperatives in Mathematical Texts”. In: *Handbook of the History and Philosophy of Mathematical Practice*. Springer International Publishing, pp. 1–28. DOI: [10.1007/978-3-030-19071-2\\_50-1](https://doi.org/10.1007/978-3-030-19071-2_50-1).

Come play with us!



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