Teaching Mathematics with Primary Historical Sources: A Curated Bibliography

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David Pengelley, Oregon State University
Janet Heine Barnett, Colorado State University-Pueblo
Daniel E. Otero, Xavier University
Dominic Klyve, Central Washington University

Selected online resources

TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources (TRIUMPHS) website:

https://blogs.ursinus.edu/triumphs/

Provides access to the TRIUMPHS (Transforming Instruction in Undergraduate Mathematics via Primary Historical Sources) database of classroom-ready PSPs (Primary Source Projects) and mini-PSPs, and information on allied publications and presentations

Learning Discrete Mathematics and Computer Science via Primary Historical Sources website:
http://www.cs.nmsu.edu/historical-projects/

Information connected to the 2008-2011 NSF grant project which was the "parent" of TRIUMPHS, with similar but more focused curricular goals; includes 20 classroom-tested Primary Source Projects

Teaching Discrete Mathematics via Primary Historical Sources website:
https://www.math.nmsu.edu/hist_projects/

Information connected to the 2005-2006 NSF grant project which was the "grandparent" of TRIUMPHS, with similar but more focused curricular goals; includes 16 classroom-tested Primary Source Projects

Selected papers on the use of primary historical sources as a tool for instruction

Barnett, J. H., Clark K., Klyve, D., Lodder, J., Otero, D.,Scoville, N., White, D. A Series of Mini-projects from TRIUMPHS: TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources, *Convergence* (June 2017).

Barnett, J. H., Lodder, J., Pengelley, D. Teaching and Learning Mathematics from Primary Historical Sources, *PRIMUS*, 26 (1) Jan 2016, pp. 1-18.

Barnett, J. H., Bezhanishvili, D.G., Leung, H., Lodder, J., Pengelley, D., Pivkina, I., Ranjan, D., Zack, M. Primary Historical Sources in the Classroom: Discrete Mathematics and Computer Science. *Convergence* (July 2013).

Barnett, J. H., Bezhanishvili, D.G., Leung, H., Lodder, J., Pengelley, D., Pivkina, I., Ranjan, D. Designing student projects for teaching and learning discrete mathematics and computer science via primary historical sources, in *Recent Developments on Introducing a Historical Dimension in Mathematics Education* (editors V. Katz, C. Tzanakis), MAA, 2011, pp. 187 – 198.

Pengelley, D. Teaching with primary historical sources: Should it go mainstream? Can it?, in *Recent Developments on Introducing a Historical Dimension in Mathematics Education* (editors V. Katz, C. Tzanakis), MAA, 2011, pp.1-8.

Laubenbacher, R., Pengelley, D. Mathematical Masterpieces: Teaching With Original Sources, in *Vita Mathematica: Historical Research and Integration with Teaching*, R. Calinger (ed.), MAA, Washington, DC, 1996, pp. 257-260.

What does the research say about this approach to teaching and learning?

Primary Sources and Meta-discursive Rules

Barnett, J. H., Can, C. and Clark, K. Learning mathematics from primary sources: Metadiscursive rules, exogenous growth and transgressive acts, Different perspectives on transgressions in mathematics and its education, (Editor B. Pieronkiewicz), 2021, pp. 293-310. DOI 10.24917/9788380846678.17.

Barnett, J. H., Can, C. and Clark, K. "He was poking holes": A case study on figuring out metadiscursive rules through primary sources, *Journal of Mathematical Behavior*, Special Issue: Advances in Commognitive Research, Volume 61, March 2021.

Barnett, J. H., Lodder, J. &Pengelley, D. (2014). The pedagogy of primary historical sources in mathematics: Classroom practice meets theoretical frameworks. *Science & Education: Special Issue on the Philosophy and History of Mathematics in Mathematics Education* 23(1), 7-27.

Bernardes, A. & Roque, T. (2018). History of Matrices: Commognitive Conflicts and Reflections on Metadiscursive Rules. *Mathematics, Education and History*: *Towards a Harmonious Partnership* (Clark, K. M. et al, ed.) Springer, Berlin, 209-228.

Güçler, B. (2016). Making implicit metalevel rules of the discourse on function explicit topics of reflection in the classroom to foster student learning. *Educational Studies in Mathematics*, 91(3), 375-393.

Kjeldsen, T. H., & Blomhøj, M. (2012). Beyond motivation: history as a method for learning meta-discursive rules in mathematics. *Educational Studies in Mathematics*, 80(3), 327-349.

Kjeldsen, T.H., & Petersen, P.H. (2014). Bridging History of the Concept of Function with Learning of Mathematics: Students' meta-discursive rules, concept formation and historical awareness. *Science & Education*, 23, 29-45.

Other History and Pedagogy of Mathematics

Glaubitz, M. (2010). The Use of Original Sources in the Classroom: Empirical Research Findings**.** *European Summer University-6, History and Pedagogy of Mathematics (ESU-6/HPM) Proceedings*, Vienna, 373-381.

Jahnke, H.N. et al. (2002). The use of original sources in the mathematics classroom. *History in mathematics education: the ICMI study* (Fauvel, J. and van Maanen, J., ed.), Kluwer Academic, Dordrecht, 291-328.

Jankvist, U.T. (2009). A Categorization of the 'Whys' and 'Hows' of Using History in Mathematics Education, *Educational Studies in Mathematics*, 3, 235-261.

McBride, J. C. & Rollins, J.H. (1977). The effects of history of mathematics on attitudes towards mathematics of college algebra students. *Journal for Research in Mathematics Education* 8, 57–61.

Witzke, I., Clark, K.M., Struve, H. & Stoffels, G. (2018). Addressing the Transition from School to University: Evolution of a Seminar Emphasizing Historical Sources and Student Reflections, *Mathematics, Education and History*: *Towards a Harmonious Partnership* (Clark, K. et al, ed.) Springer, Berlin, 61-82.

General Active Learning and Inquiry-Based Learning

Braun, B., Bremser, P., Duval, A., Lockwood, E., and White, D. (2017). What Does Active Learning Mean for Mathematicians?, *Notices of the American Mathematical Society* (64) 2, 936-941.

Freeman, S. Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2016). Active learning increases student performance in science, engineering, and mathematics, *Proc. Natl. Acad. Sci.* USA 111 (23), 8410–8415.

Kogan, M .& Laursen, S. (2014). Assessing Long Term Effects of Inquiry-Based Learning: A Case Study from College Mathematics. *Innovations in Higher Education* 39, 183-199.

Yoshinobu, S. & Jones, M.G. (2012) The Coverage Issue. *Problems, Resources, and Issues in Mathematics Undergraduate Studies*, 22(4), 303-316.