Extended Abstract

Mohandes al-Mulk: A Bridge Between the Past and the Future of Mathematics Education in Iran

Original article information
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Original language: Persian
Journal: *Mathematical Culture and Thought*, Vol. 43, No. 2, Fall/Winter 2024, pp. 261–278
DOI: 10.30504/mct.2025.1524.2065
Original Persian version: Read the original Persian article
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Figure 1: Mohandes al-Mulk

Although this article bears the name of Mohandes al-Mulk, its main focus is neither simply his life nor his own mathematics. Rather, the paper uses him as a vantage point from which to examine one of the most important transitional moments in the history of mathematics in Iran: the passage from older traditions of rhetorical mathematics to the newer world of symbolic

mathematics. Mohandes al-Mulk is important precisely because his life connects several layers of that transition. He studied at Dar al-Fonun, later taught there, wrote influential textbooks, and stood at a point where earlier Iranian mathematical traditions, Dar al-Fonun mathematics, and more modern currents could still be seen together.

A central task of the article is to distinguish Mohandes al-Mulk from other similarly named figures with whom he has often been confused. The paper carefully separates him from Mirza Nezam Mohandes al-Mamalek Ghaffari, who studied at the École Polytechnique in France and held various state posts but was never a teacher at Dar al-Fonun, and also from Mirza Reza Mohandes-Bashi, one of the early students sent abroad in the Abbas Mirza period in 1815 and later associated with the design of Dar al-Fonun. By clearing away these confusions, the paper restores Mirza Reza Mohandes Najmi, known as Mohandes al-Mulk, to his proper place: a lifelong teacher and textbook author whose role in Iranian mathematics education was deeper than later short biographical notices suggest.

The article also challenges the shallowness of the standard biographical treatment of Mohandes al-Mulk. Born in 1879, he came to Tehran as a child, graduated from Dar al-Fonun, and by 1899–1900 had begun teaching mathematics there. In 1906–7 he received the title Mohandes al-Mulk and continued teaching for many years. Later reference works sometimes reduce him to a man with a few books and even add unsupported remarks about his supposed lack of good reputation. The article rejects this flattening and reconstructs a richer historical picture in which he appears as an important intermediary figure in the genealogy of modern mathematics education in Iran.

One of the article's most effective moves is to place Mohandes al-Mulk inside a chain of teacher–student relations. The paper situates him between Mirza Abd al-Ghaffar Isfahani, one of the central mathematical figures of Dar al-Fonun, and later educational figures such as Ahmad Birashk. Through him, aspects of Dar al-Fonun mathematics passed into the broader world of Iranian schooling. This is especially important because, once mathematics education began to spread beyond elite institutional settings, figures like Mohandes al-Mulk helped adapt it for a wider student population.

The article supports this claim by tracing the range of his students and readers. It points to later prominent figures who encountered him directly or indirectly, including Isa Sadiq, Mahmud Najmabadi, and Mehdi Bazargan. These testimonies show that Mohandes al-Mulk was remembered not merely as a nominal teacher but as someone who shaped the mathematical formation of generations of students. At the same time, the article shows that his influence extended far beyond the classroom through his textbooks. His elementary geography book was printed around one hundred times, and his geometry text remained a major teaching resource for about two decades, until it was displaced by Ahmad Birashk's geometry book in 1936–37. In this way, Mohandes al-Mulk occupies an important place in the history of textbook culture in Iran.

Yet the paper is not content with describing textbook success in quantitative terms. Its larger aim is to use Mohandes al-Mulk's writings to look backward into the mathematics of his teacher, Mirza Abd al-Ghaffar. This is one of the most original aspects of the article. In particular, *Hall al-Masa'el al-Jabriyeh*, published in 1905, is treated as a unique window into the algebra taught by Mirza Abd al-Ghaffar. Although the book appeared in print in 1905, the paper notes that its intellectual preparation goes back to 1899–1900, when Mohandes al-Mulk first rose from student to teacher and had freshly gathered what he had learned from Najm al-Dowleh. For

that reason, the book becomes more than a school manual: it becomes a rare historical opening onto the mathematical world of an earlier generation.

The article shows that this problem book follows the same broad syllabus as *Bedayat al-Jabr*, the algebra text associated with Najm al-Dowleh: polynomials, linear and quadratic equations, arithmetic and geometric progressions, powers, logarithms, radicals, combinations, and continued fractions. But Mohandes al-Mulk is not merely a copyist. His text expands some topics further and, because of his role as both student and teacher, preserves a version of Dar al-Fonun mathematics that would otherwise remain only partially visible.

From there, the paper moves to one of its most historically suggestive themes: the treatment of higher-degree equations. After recalling the earlier tradition of work on cubic and higher equations by figures such as Biruni, Khayyam, Sharaf al-Din Tusi, and Jamshid al-Kashi, the article brings into focus a much less well-known figure, Molla Ali Mohammad Isfahani, father of Mirza Abd al-Ghaffar. According to the paper, he had an important but now largely forgotten presence in the mathematical world behind Dar al-Fonun. His surviving work, *Takmilat al-Oyun*, dealt with approximate solutions of cubic equations by progressively narrowing intervals containing the root. The article suggests that this tradition continued into Dar al-Fonun teaching through Mirza Abd al-Ghaffar, who seems to have been deeply committed to preserving and transmitting his father's mathematical legacy.

The paper then detects, within Mohandes al-Mulk's own algebra book, traces of another mathematical presence: that of Mirza Nezam Mohandes al-Mamalek Ghaffari. The key evidence lies in the continued-fraction expressions given for approximate solutions to certain higher-degree equations. The article shows that these continued fractions do not simply arise from converting the decimal approximations already printed in the book. Instead, they agree with the method associated with Lagrange and Vincent. This is a striking finding, because Vincent's work of 1836 was not widely known even in Europe. The paper argues that Mohandes al-Mulk's access to this method likely came through Mirza Nezam, who is known to have possessed issues of Liouville's journal, where Vincent's paper appeared.

This discovery allows the article to frame Mohandes al-Mulk's historical role more subtly. He was not himself a major research mathematician. Rather, he was a gifted and productive teacher, someone with pedagogical talent and the practical habit of writing books suited to students' needs. As he himself wrote, over fifty years of service in education he prepared books for each subject he taught, adapted to the curriculum and to the level of the learners, and shaped them through experience into an easier and newer method. His significance lies in having linked the mathematics of Dar al-Fonun to audiences outside Dar al-Fonun. He made difficult material more teachable, even if, as Birashk later remarked, this simplification sometimes reduced the intellectual struggle demanded of the student.

The article's closing argument is both historical and reflective. It suggests that Mohandes al-Mulk stood between two figures whose fuller scientific interaction might have made the transition of Iranian mathematics into the modern world smoother and richer: Mirza Abd al-Ghaffar, rooted in a living but fragile Iranian tradition, and Mirza Nezam Mohandes al-Mamalek, who had stronger contact with modern European mathematics. Through Mohandes al-Mulk there was some passage, but not enough to produce a deep or continuous transformation. As a result, the article argues, Iranian mathematics entered its future somewhat discontinuously, separating from parts of its past without fully integrating them into a sustained modern development.

Overall, the article makes an important contribution to the history of mathematics education

in Iran. It rescues Mohandes al-Mulk from biographical flattening, clarifies his place among several often-confused figures, illuminates the educational reach of his textbooks, and uses his writings to reveal a much larger story about transition, inheritance, discontinuity, and unrealized possibility in Iranian mathematics.