zbMATH is open: a practical guide to open an information service

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Since 1931, the information service zbMATH informs its subscribers worldwide on current advancements in mathematics and related disciplines. Now edited by the European Mathematical Society (EMS), FIZ Karlsruhe, and the Heidelberg Academy of Sciences, zbMATH will be open to the public from January 2021. We describe the details of zbMATH's transformation process to foster adaption by additional information services and publishers. The key idea was to substitute revenues from subscriptions with public funding. This has been made possible by the approval of an application to special German federal and state funds provided through the Leibniz Association, following a scientific evaluation of FIZ Karlsruhe. Consequently, zbMATH made an effort to document their usefulness to the public and created a roadmap that takes foreseeable future needs into account. Besides continuing the shift from using scientific, peer-reviewed publications as information sources alone, zbMATH Open also considers various mathematical research data, such as research software, repositories, formula collections, community forums and blogs, interactive notepads, etc. While more than 7000 active and mostly long-term contributors write reviews for the published journal and book articles, building a community to ensure high research data quality is a significant challenge for zbMATH. This process of extending the classical mechanism of quality control is overseen by the editorial institutions, with the jointly appointed Editor-in-Chief and an EMS committee gathering users' needs. With dedicated community managers, zbMATH Open motivates mathematicians worldwide to contribute their knowledge, review, cite, and share mathematical research data. Their contributions are more visible with the open infrastructure, and more than one million existing reviews, written by 7000+ mathematicians, are immediately accessible. zbMATH Open partners horizontally with other math-specific organizations and vertically with publishers and other data providers on one end and with aggregators and post mathematical indexing services on the other end. For low-barrier data exchange, zbMATH implements several API endpoints. On the one hand, these API exchange data such as preformatted citation blocks, full texts, and datasets using metadata harvesting standards allow for incremental updates or specific in-depth queries. On the other hand, usage data to evaluate science zbMATH captures and shares usage data according to GDPR. Sharing and exchanging usage data of the contributions of individual authors, institutions, journals, or internet platforms draws a detailed picture of their impact. Combining factual and statistical data combined with the human reviewers' community, zbMATH Open presents an effective solution to provide mathematicians' information services. Moreover, zbMATH Open is a significant contribution to the evaluation impact within mathematics. According to our analysis, zbMATH Open can serve as a blueprint for other information services or publishers that aim to become open.