

Viewpoint

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Competing interests

MM was the founder and co-editor of *Croatian Medical Journal* from 1991 to 2009 and AM from 1994 to 2011. MM is the founder and editor emeritus of ST-OPEN and AM is the member of its advisory board. AM is the past president of EASE and the member of the *European Science Editing Editorial Advisory Board*.

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How editors can help authors write better papers: Beyond journals and articles

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Abstract

We present the experience of journal editors in improving the quality of published papers. As the editors of the *Croatian Medical Journal*, a journal from the so-called scientific periphery, we realized, very early after the start of the journal in 1991, that our authors needed significant assistance with their articles. We worked individually with journal authors and then moved this activity to the next stage – intensive workshops for authors. The work with the journals enabled us to extend these activities to graduate and postgraduate students – future authors.

Keywords:

Croatia, individual mentoring, medical students, publishing in war, science education, scientific periphery

Introduction

Journal editors aim to publish good research and would like to help authors with their manuscripts so that the research is adequately and completely reported. They have editorial standards to help the authors in that aim, including the reporting guidelines for the authors. However, we know that some reporting guidelines can improve the completeness of reporting in published articles but that the quality of reporting still remains suboptimal.¹ What can journal editors then do to increase the quality of manuscripts submitted to their journals? The journals with high prestige and resources have large editorial teams to work with authors and check and edit manuscripts. Many small scholarly journals are not in a position to perform similar service because they do not have enough personnel and resources. The problem is especially serious in the environments that are colloquially called the ‘scientific periphery’, in which, for different reasons, the tradition of quality scientific research is limited and scientific production is modest. Moreover, in such cases, the limitations imposed on scientific research form a sort of ‘vicious circle of inadequacy’, where weak research practice impedes the efforts for improvement due to the lack of teachers and mentors and resistance of the target population of authors to embark onto changes of work style and ethics and efforts required to achieve quality improvement.² How can then editors of small scholarly journals work with their authors to improve the quality of published research? This is the story of journal editors from a country belonging to the so-called scientific periphery (Figure 1).

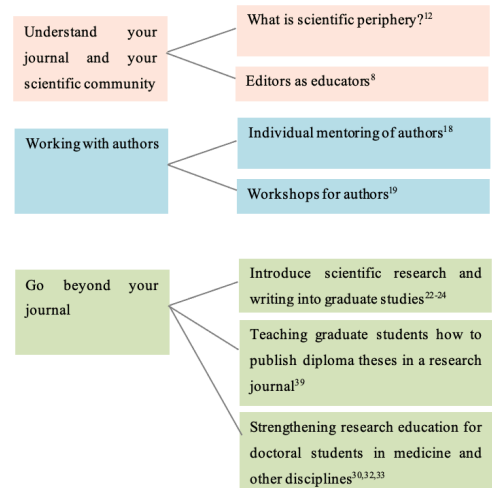


Figure 1. Helping authors from the scientific periphery. The steps are presented in chronological order based on our local experience in medicine. Each step is independent and can be used as a separate tool to help authors write good manuscripts or adapted to other research disciplines.

Croatian Medical Journal – how we started to work with authors?

Croatian Medical Journal (CMJ) started in 1991, coinciding not only with Croatia’s independence but also with the war provoked by the Yugoslav Federal Army and Serbia after the fall of Yugoslavia.³ Faced with the enormity of war aggression, we had to devote our efforts as editors to help collect and publish reports related to the medical aspect of the war.⁴ We contacted our colleagues who volunteered to the battlefronts, invited them to share with us their medical experiences and then worked with them on their manuscripts, helped them with revising the manuscripts after international review, and finally helped them with the final publication process. This started as a help from journal editors to their

colleagues and involved both the submissions to the *CMJ* and manuscripts sent to other journals.^{5,6} When the articles were submitted to the *CMJ*, we as editors were careful to seek fully international and independent peer review. Altogether, during and after the war, we helped our colleagues publish some 360 research articles in different journals, including the *CMJ* (about half of them), as well as some highly prominent journals, such as *The Lancet*, *BMJ*, and *JAMA*.

This attracted many authors to *CMJ*, and the journal published a number of good articles and got included in all relevant databases.⁷ We not only became aware that our authors did not have full set of skills to perform and publish high-quality research but also learned about the hidden and hitherto unused power of the editors to educate and train their authors in these skills.⁸

Our editorial work in the *CMJ* expanded into that of science educators. Moving on from collaboration with our colleagues on war-related articles, we realized that we have to broaden our effort to statistics in their articles and appointed a statistical editor in the journal.⁹ We also networked with authors and gave occasional short courses.^{10,11}

Science education is not about knowledge and skills but about the change of culture

While our war effort produced good results,¹² the effort of the work with individual authors grew too large to be handled by a small editorial team.^{13,14} We needed a more systematic approach in order to change the whole culture of writing and publishing research – for our journal and generally in our scientific community. The problem we faced with our authors was not primarily about the English language but inadequate knowledge of research planning and methodology.¹⁵ In other words, we needed ‘a change of culture of scientific work’.

This required systemic education, which included evidence-based medicine,¹⁶ as well as responsible publishing.¹⁷ Here we describe how we assessed each of the educational interventions we provided from the journal and beyond.

Work in the journal

Individual work with authors

During the work with our colleague doctors in the 1991–1995 war, we noticed that a number of those whom we helped to publish their war medicine experiences continued to publish articles independently from us. We tested this retrospectively by comparing the publication record and career achievements of those whom we had helped and their peers. The analysis included 47 journal authors who were individually tutored in scientific writing and data presentation by the editors of the *CMJ* during the 1991–1995 war years and 47 colleagues identified by the authors as their professional or academic peers at the time of tutoring. By 2003, tutored authors published more articles in MEDLINE-indexed journals than their academic peers, received more citations to these articles, and made a significantly greater academic advancement (score of their academic rank and research degree).¹⁸

Workshops for authors

From 2003 to 2011, we held a total of 17 workshops for authors on ‘planning and writing research’. The workshops lasted for 2 days (18 hours of direct teaching). The evaluation of the course ran as a prospective cohort study which included 243 workshop participants (68 men and 175 women) and 243 controls (78 men and 165 women) identified by participants as their professional peers. Workshop participants and their controls had similar publication output before the workshops. In the 11 years after the course, the workshop participants published significantly more scientific articles and had

higher citation rates and H-index. For the subgroup of authors who were all followed for full 11 years ($n = 398$), workshop attendance was a significant predictor of postworkshop publishing (odds ratio = 3.547, confidence interval = 2.320–5.423, $P < 0.001$), controlled for age, gender, and previous publications.¹⁹

Work with students

During the war, we worked with students to help them adapt to the changed teaching environment and contribute to the war effort.²⁰ After the war, we closely collaborated with students – as future practitioners, researchers, and authors – and engaged them in publishing topics relevant for them. This brought about establishing the Student CMJ. This was a section of the journal dedicated to articles by students or about topics relevant for students.²¹

Work beyond the journal

Our experience in working with the journal authors taught us that perhaps the best target for educational intervention should be at the student level, both graduate and postgraduate. We looked at our role as one with strong elements of public health, focusing on prevention rather than treatment of a problem. The conclusion from our work in the journal was that we should go back to our future authors, students, and teach them elements of research and critical thinking, so that they can grow into authors producing high-quality journal articles.

Introducing a graduate course on research methodology

Our experience with the journal convinced the leadership of the University of Zagreb School of Medicine to introduce a course on research methodology in 1996.^{22,23} The course was successful not only in providing skills for critical assessment of health evidence but also in increasing positive attitude towards

research as a part of medical profession.^{24,25} The course was soon integrated in other three medical schools in Croatia (Osijek, Rijeka, and Split) where, in general, they are called ‘Introduction to scientific research in medicine’.

At the University of Split School of Medicine, where we have been teaching since 2008,²⁶ we have had the opportunity to significantly influence the syllabus of the course and its implementation.²⁷ The course is named ‘Research in biomedicine and health’ and is a vertically integrated course covering the basics of research plan and design, statistics and informatics, scientific communication and reporting research, and evidence-based medicine.²⁸ The course had started as a vertical course through all 6 years of the medical curriculum but was finally reduced to a 3-year vertically integrated course, which prepares students in their preclinical curriculum year for the clinical part of the curriculum.

We continue to evaluate the course and its educational elements, trying different interventions to assess student’s knowledge about research and specifically about evidence-based medicine.²⁹

Improving a doctoral (postgraduate) program

Most postgraduate programs in medical schools contain course(s) on research methodology, but it is not clear what effect they have on the outcomes of doctoral studies, such as the number of defended theses. At the University of Split Medical School, we, as journal editors, partnered with the leaders of one of the doctoral programmes at the school to include more extensive research methodology training, in addition to other organizational changes. This resulted in increased rates of graduation.³⁰

Moving beyond medicine: Research education for the health professions and academic advancement of nurses

Following the recommendation of the World Health Organization on upgrading education of nurses and other medical professionals to a university level,³¹ and its implementation in Croatia,³² we helped to develop the curricula for the health professions³³ and teach research methodology and critical assessment at undergraduate and graduate levels. We also provided support for nurses to enrol into a doctoral programme. Publications of two nurses who since then obtained their doctoral degrees testify to the success of active support for research for health professionals.^{34,35}

Going beyond medicine and health

This case study aimed to document that education in research methodology and reporting is necessary in medicine. It is difficult to assess the impact of any educational intervention and the evidence that we presented is not of the highest methodological strength. However, the results are encouraging, as they show concrete effects of teaching interventions, even if they are as elusive as the number of published articles or attitude towards science. We may add that we have received hundreds of praises from our authors and students, albeit mostly a long time after our teaching. This means that many of them become aware of the importance of what we teach them only after they are mature professionals, regardless of whether they become researchers or practicing doctors. In any case, all what we experienced with our science teaching brought about many scientific articles which would not have been published otherwise, many friendships and collaborations, and, admittedly, some resistance from students, established doctors, and schools' administration. The latter, however, remains to be investigated separately.³⁶ In any case, we are strongly convinced that the 'delayed

gains and satisfaction' which our students experienced is worth all our effort, as well as disappointments.¹⁴ To make the long story short, we continue with all our models of science teaching,³⁷ widening it to issues of research integrity.³⁸

An especially ambitious project is the establishment of ST-OPEN overlay journal (<http://st-open.unist.hr/>) at the University of Split, Croatia, which aims to transform students' graduation theses into research articles in English journal.³⁹ This project is rather demanding,⁴⁰ especially because it covers all research fields. However, we are sure that our multidisciplinary team will be able, in several years' time, to report that the effort not only assisted inexperienced authors but also affected the research culture in the academic and research community.

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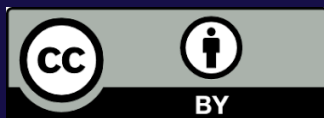
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