

ORIGINAL ARTICLE

Online course in conjunction with face-to-face workshops to improve writing skills leading towards more publications in peer reviewed journals

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Abstract

Background: Researchers in the developing countries often have inadequate scientific writing skills to publish their research in international peer reviewed journals.

Objectives: To improve the research-and proposal-writing skills of researchers and to evaluate the impact of this intervention.

Methods: An off-the-shelf online course (AuthorAID, developed by INASP) was embedded in the Tanzania Fisheries Research Institute's (TAFIRI) website and offered to the institute researchers in Tanzania. The 8-week course was followed by a 2-day face-to-face workshop that used the course material contextualized to local conditions, and the combination was repeated one more time.

Results: A total of 47 participants completed the course and attended the workshop: 21 (54%) completed the course in 2016 and 26 (67%) in 2017. The number of papers published annually by TAFIRI staff more than tripled between 2016 and 2019 after the AuthorAID intervention, most of them (114, or 91%) by researchers who had undergone the training.

Conclusion: Embedding and contextualizing proven learning materials, such as the AuthorAID online course, can be an economical and effective approach to improving the writing skills of scientists in developing countries.

Keywords: Academic and research institutions, AuthorAID, developing countries, INASP, research skills, workshop, writing skills

Introduction

Conducting well-designed research projects and communicating the research findings are pre-requisites for the advancement of knowledge. However, most researchers in the developing countries including those in Africa, and Tanzania in particular, have inadequate research and writing skills to enable them to publish their findings in reputable peer-reviewed journals.¹⁻⁴ The poor representation of such researchers in these journals and the increasing number of articles published by them in predatory and questionable journals testify to this fact.⁵ Researchers, including early career researchers (ECRs), in the developing countries have insufficient access to literature, limited funding for research, few mentorship opportunities, and inadequate guidance, especially from experienced senior scholars^{3,4,6} and generally lack proper training in writing about their research, especially writing research papers.^{1,3,4} These inadequacies pose particular challenges for ECRs. In the absence of dedicated writing courses at most academic institutions in the developing countries, newly recruited researchers acquire writing skills later in their professional life, either informally or formally, but on an ad

hoc basis.⁷ In contrast, training in research writing and access to university writing centres tend to be more common in the developed countries.⁷

Furthermore, the 'publish or perish' culture is alive in developing-country institutions. Researchers in institutions of higher education and research in Africa, in Tanzania in particular, are required to conduct research and publish its findings in reputable journals in order to be promoted.³ Failure to meet the expected publication standards demoralizes researchers,¹ who may end up resorting to plagiarism or approaching questionable journals.

Efforts to help developing-country researchers to become competent writers of research articles and to publish in peer-reviewed journals have been spearheaded by the International Network for Advancing Science and Policy (INASP, www.inasp.info/en/). This is an international development charity based in Oxford, UK. INASP, through its AuthorAID project (www.authoraid.info) established in 2007, works with a global network of partners to improve access to, and production and use of, research information and knowledge. The AuthorAID team at INASP organizes face-to-face workshops and online

courses in research writing including massive open online courses, or MOOC, to help developing-country researchers to publish their research findings in peer-reviewed journals.^{2,8} INASP also provides pedagogical, financial, and technical support to institutions in the developing countries to conduct local training activities in research communication.^{2,6} By 2017, INASP had provided such support to 10 institutions across four countries: Ghana, Sri Lanka, Tanzania, and Vietnam.⁹

The Tanzania Fisheries Research institute (TAFIRI), a publicly-funded fisheries and aquaculture research institution, aspires to become a centre of excellence in fisheries and aquaculture research in Eastern and Southern Africa. However, TAFIRI researchers, especially ECRs, like many others in Africa and other developing countries, have generally lacked reliable research funding, training in research-and proposal-writing skills, and sustained mentorship from senior experienced researchers.⁴ Moreover, TAFIRI, like many other research institutions in Africa, has inadequate research facilities such as equipment, chemicals, reagents and consumables.⁴ The government, through its Commission for Science and Technology (COSTECH), pledged to allocate 1% of the country's GDP for research. However, this funding is inadequate to support all types of research. The allocated funding is awarded competitively and in most cases the government sets research priorities, which may not necessarily include fisheries and aquaculture. It is therefore a requirement for researchers to write fundable research proposals for conducting research.

To be able to prepare fundable research proposals, researchers, especially ECRs, need to be equipped with sufficient research and proposal-writing skills. Writing journal articles is important, both for sharing research and for demonstrating one's research productivity and thus qualifying for further funding. It is against this background that online and blended courses, particularly those offered by INASP through AuthorAID, were seen as an important opportunity for meeting these challenges and enabling TAFIRI to attain its vision.

In 2015, TAFIRI received assistance from INASP to 'embed' the AuthorAID online course. The word 'embed' (in the context of INASP) meant (1) taking the original course (which includes materials with open license) and hosting it on TAFIRI's online learning platform, (2) offering the course to our ECRs with facilitation provided by senior TAFIRI researchers, and (3) adapting or contextualizing the course materials and facilitation techniques as needed. The aim of this locally offered course was to equip TAFIRI researchers with appropriate research- and proposal-writing skills. At the end of the course the impact of the training was measured by counting the number of grants received and scientific articles published in peer-reviewed journals by TAFIRI researchers. The present paper reports on the online and blended training methods and the outcomes of the training.

Methods

Setting

TAFIRI (<https://www.tafiri.go.tz/about.php?id=1?>) is a government research institution with a mandate to conduct research on fisheries and aquaculture in mainland Tanzania. In collaboration with INASP, we used a blended training model

to improve the research-and proposal-writing skills of TAFIRI scientists. The model consisted of the AuthorAID online course in research writing, hosted and run by TAFIRI, followed by face-to-face workshops at TAFIRI centres.

Participants

TAFIRI has five research centres, which are located close to all major water bodies in Tanzania. The participants were drawn from all the five centres.

Needs-assessment survey

A needs-assessment survey was conducted before the training, which enabled senior researchers at TAFIRI to prepare for their role as training facilitators. The survey contained a total of 13 questions, 11 closed ended and 2 open ended. In the closed-ended questions, the participants were asked whether they required training on proposal writing, research writing, or both. They were also asked to indicate the number of research proposals written and scientific articles published in peer-reviewed journals. Finally, open-ended questions that allowed participants to provide free-form answers were used to identify specific areas of interest. This survey questionnaire was created and hosted on TAFIRI's online learning platform. The number of proposals and publications reported from the survey was confirmed by consulting TAFIRI's database.

Development of TAFIRI Moodle

Moodle is a widely used open-source application (<http://moodle.org>) to develop online learning environments.² The Information and Communication Technology (ICT) team at TAFIRI, with INASP support, downloaded Moodle and hosted it on TAFIRI's server. The AuthorAID course materials developed by INASP were then hosted on the TAFIRI Moodle. The technical infrastructure and the costs for hosting the Moodle are shown in Table 1.

Table 1. Technical infrastructure and costs for hosting Moodle on TAFIRI's server

Infrastructure	Cost (£)
Moodle installation and website hosting	510.78
Internet charges for two years at £64.81 a month	1555.33
Yearly renewal of Moodle site and hosting charges	79.81
Total	2145.93

Online courses

Two online courses were conducted using AuthorAID course materials. The course facilitators were senior scientists at TAFIRI, who had previously attended a training-of-trainers workshop conducted by INASP. Four senior researchers with experience in writing project proposals and publishing scientific articles in peer-reviewed journals facilitated the course. Each facilitator spent about an hour a day familiarizing the participants with the course content and activities, checking the course discussion forums and participants' activities, initiating discussions, responding to posts, etc. Each course lasted for 8 weekdays, making a total of 40 teaching hours per facilitator and 160 hours for all facilitators. The main topics in the online course were literature review, research

and publication ethics, identifying a suitable target journal, proposal writing, and writing and publishing journal articles. The course was asynchronous, with no live sessions. There was a start date and an end date, and there was a schedule for each week. Participants could work on the course in their own time, and they were asked to set aside 3 to 4 hours a week for the course. The instructional materials were mainly text based with questions interspersed to encourage engagement. Multiple-choice questions were included for assessment, and the writing activities included a peer-feedback phase.

In addition to instructional content, quizzes, and writing activities, the courses contained forums for announcements, discussion forums, social interaction, and technical queries. Facilitators made regular announcements about the weekly topic, responded to queries, guided the discussion forums, and reminded the participants about deadlines. At the end, the participants were required to provide feedback on the course. The first online course was conducted from September to October 2016 and the second, from July to September 2017. During the online phase of instruction, the facilitators and participants also identified and prioritized topics to be covered during the face-to-face research-writing workshops to follow.

Face-to-face workshops

After each online course, a face-to-face writing workshop was organized to reinforce the concepts and skills introduced during the online course. The face-to-face writing workshop following the first course was held at a single location on 15–16 March 2017 whereas three such workshops followed the second course, each at a different TAFIRI research centre, held between 10 November and 5 December 2017. Each workshop lasted for two days, 7.5 teaching hours a day, making a total of 15 teaching hours. Workshop participants were those who had completed at least one of the two writing activities in the online course. The first workshop was facilitated by the senior scientists who had facilitated the online course and a guest facilitator from the Open University of Tanzania. The second series of workshops was facilitated by researchers from within each centre who had attended the first face-to-face workshop.

The materials used during the face-to-face training workshops were adapted from presentations given at AuthorAID workshops by Barbara Gastel of Texas A&M University. The materials are freely available at <https://www.authoraid.info/en/resources/>.¹¹ The following topics were covered during the workshops: writing style, research ethics,

accessing scientific articles, identifying suitable journals, dealing with peer reviewers' comments, writing clubs, and avoiding plagiarism. The workshops included writing activities and plenary discussions.

Assessing the impact of the courses

The impact of these AuthorAID courses on the writing skills of TAFIRI researchers was measured by counting the number of grants received and scientific articles published in peer reviewed journals by TAFIRI researchers. This information was retrieved from TAFIRI database.

Statistical analysis

The median and 25–75 percentiles of the number of grants received and scientific articles published in reputable peer-reviewed journals were determined. The output of researchers who completed the course and those who did not were compared by using the test for proportions. Likewise, the total numbers of publications from researchers who attended the course and those who did not were compared using the *T*-test for independent samples. Data on the outcomes of these training programmes were analysed using Microsoft Excel. All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) ver. 20 (SPSS, Inc., IBM, Armonk, New York, USA) for Windows. Significant differences were judged at a probability level of $p < 0.05$.¹²

Results

Needs-assessment survey

A total of 55 scientists, 35 men and 20 women, participated in the needs-assessment survey in 2016 before the commencement of the online courses; 52 (98%) of them expressed a need for training on proposal-and research-writing. The survey also indicated that 45 (82%) of the respondents had written or participated in writing a proposal and 40 (73%) had written or participated in writing a scientific article. Further, the needs assessment revealed that the median number of proposals that the respondents had written or participated in writing was 1 (interquartile range: 0–3) and that of scientific articles was 2 (interquartile range: 0–5) (Table 2). Responses to the open-ended questions showed that 46 (84%) of respondents sought training on specific topics such as problem statements, logical frameworks, statistical analyses, interpreting results, and monitoring, evaluation, and planning of research projects.

Table 2. Number of research proposals and scientific articles produced by TAFIRI researchers before 2016

Type of written contribution	N	Mean	Median	Std Dev.	Min.	Max.	Percentiles		
							25	50	75
Research proposals	55	1.7	1.0	2.3	0	12	0.0	1.0	3.0
Scientific articles	55	3.7	2.0	5.2	0	20	0.0	2.0	5.0

Online courses

In 2016, TAFIRI had 59 researchers of whom 24 (41%) were women. In total, 39 (66%) researchers registered for the first online course and 21 (54%) of them completed it. The completion rate was 57% (12 of 21) for women and 43% (9 of

21) for men. A total of 39 researchers registered for the second online course, with six new participants (researchers who did not participate in the first course), and 26 (67%) of them completed the course: the completion rate was 36% (9 of 26) for women and 64% (17 of 26) for men. Altogether, 29 researchers

completed the online course: 21 in the first round, 6 in the second round, and 2 who participated in both but completed only the second round. Only one researcher participated in and completed both rounds.

Forum interactions during online courses

A total of 21 participants introduced themselves in the introductions forum; 14 (67%) either initiated or responded to a post in the main discussion forum; 8 posted in the technical queries forum, and 16 (40%) participants completed the post-assessment quiz.

Feedback on online courses

In total, 23 participants provided feedback on the course, and all but one said they had benefitted from it because they learnt something new, particularly research ethics. Nearly all (n = 19, or 83%) agreed that the course content was clear, relevant, motivating, and easy to understand. Also, the participants were comfortable with how the online course was administered. They suggested organizing another course to let those who could not complete the course for various reasons do so. They also suggested making all learning materials open and downloadable to allow participants with limited time to attempt the quizzes and assignments at their convenience. The topics suggested for the face-to-face workshops were as follows (with the number of participants suggesting the topic given in

parentheses): grant proposals (11) and research paper writing (8), identifying funding sources (7), formulating research questions (5), accessing research papers (2), selecting suitable journals (2), avoiding plagiarism (2), and addressing peer reviewers' comments (2).

Face-to-face workshops

The number of researchers who attended the face-to-face workshop in Dar es Salaam and at the three research centres is given in Table 3: 12 attended the first face-to-face workshop and 44 attended the second, making a total of 56. All (56) participants said they appreciated the workshops. Feedback from the first workshop showed that majority of the participants (n = 9, or 75%) strongly agreed that the objectives of the workshop had been clearly covered and that the course materials were relevant, well organized, interactive, and easy to follow. All participants strongly agreed that the training would help them in their research careers. The number of participants who strongly agreed that the trainers were knowledgeable about the training topics was 20 (>50%). Regarding the time allotted for training, 17 (45%) agreed that it was adequate, 10 (25%) said it was not, and 12 (30%) neither agreed nor disagreed. The evaluation scores of the embedding activities at research centres showed that 14 (35%) participants agreed, and 25 (65%) agreed strongly, that the training objectives were clearly defined, participatory, relevant, well organized, and easy to follow.

Table 3. Distribution of participants who attended the first and second face-to-face workshops

Location	First workshop			Second workshop		
	Men	Women	Total	Men	Women	Total
Dar es Salaam (headquarters)	5	7	12	12 (60%)	8 (40%)	20
Mwanza centre	—	—	—	8 (53%)	7 (47%)	15
Kigoma centre	—	—	—	6 (67%)	3 (33%)	9
Total	5 (41.7%)	7 (58.3%)	12	26 (59.1%)	18 (40.9%)	44

Increase in number of proposals and research papers

Between 2016 and 2019, TAFIRI researchers received a total 27 research grants. The writing of these proposals was led by TAFIRI researchers who had attended the embedded course. The number of articles in international peer-reviewed journals increased substantially following the course. For example, a total 56 articles were published in international peer-reviewed journals before 2010, and an average of 10 articles per year was published in those journals between 2010 and 2016, at the start of the AuthorAID intervention. It is noteworthy that the

average more than tripled, to reach 31, between 2016 and 2019 after the AuthorAID intervention (Table 4). Researchers who had attended the course published more articles (114, or 91% of the total) than those who did not (11, or 9% of the total, $X^2(1, N = 125) = 49.152, p < 0.0001$). By 2019, eight policy briefs and three booklets had been written, whereas not even one had been written in 2014. Moreover, the number of capable facilitators of research writing training grew from 2 in 2016 to 13 in 2019. These were senior researchers who had scored the highest grade during the training.

Table 4. Increase in the number of publications from TAFIRI researchers following AuthorAID embedded activities

Year or duration	Published articles in peer reviewed journals (n)
Total: 1983–2010	56
2010	9
2011	9
2012	10
2013	10
2014	9
2015	12
Total: 1983–2015	115
2016	21
2017	32
2018	35
2019	37
Total: 2016–2019	125

As a result of the participation of TAFIRI scientists in the AuthorAID courses, four TAFIRI scientists served as guest facilitators in two AuthorAID MOOCs offered by INASP.² Two scientists made presentations at the *Research Grants Conference: Building Skills for Science in Africa* organized by the Third World Academy of Sciences and held in Dar es Salaam, Tanzania, from 28 to 31 August 2018.⁵ One TAFIRI scientist is working as an academic editor in an international peer-reviewed journal.⁶ Two scientists are members of the editorial boards of local and international journals.⁷ Thirteen TAFIRI scientists are peer reviewers for different journals. TAFIRI scientists are also working as supervisors and external examiners in regional institutions of higher learning.

Discussion

At the start of the training initiative, the needs-assessment survey showed a relatively low number of publications by TAFIRI scientists, which is common among researchers in developing countries.¹

We successfully ran two online courses at TAFIRI with completion rates exceeding 50%, which is encouraging, considering the low completion rates reported in many other online courses.^{2,13,14} The relatively high completion rates in the present study may reflect not only the quality of instructional materials, which had been refined by INASP over the years, but also the determination of the participants to improve their writing skills. Several participants continued using the materials on the TAFIRI Moodle site months after the course, which attests to their enthusiasm and commitment. We believe that because of these courses, peer-reviewed publications from TAFIRI increased to a total of 125 publications during 2016–2019, exceeding the initial target of 120 publications by 2020. Those who attended the courses published more articles than those who did not, which shows that the training intervention had been successful. Some of these differences might be because those researchers who participated in the course were more motivated overall. Moreover, the fact that the majority of TAFIRI researchers are interested in science may have inspired them to attend the course.

The participants have also seen other career benefits.¹⁵ As indicated, they participated as co-facilitators in MOOCs and research- and proposal-writing workshops and some also serve as academic editors, editorial board members, external examiners, and peer reviewers in international journals.

Although the online courses succeeded on the whole, participation and completion rates were limited by other responsibilities of the researchers (fieldwork, for example), limited access to internet, and reluctance of some research technicians (because for them, publishing is not a criterion for promotion) to enrol. The fact that this was the first online course facilitated by TAFIRI researchers was a challenge in itself, especially because TAFIRI facilitators were learning by doing, although guided by the INASP team. Also, most TAFIRI researchers had not taken any online course before; usually learners find it difficult to undertake online courses the first time.^{1,16}

All participants who posted at least one comment on the forums completed the course, which corroborates the findings of earlier studies.^{1,2} Social interactions through participating in forums can play an important role in developing a sense of community,^{2,16} which may promote continued engagement with the course. Also, it is possible that participation in a forum was a sign of commitment to the course. Scientists who attended the first face-to-face workshop helped to facilitate the second online course, thus augmenting the capacity-building aspect of the overall programme.

Generally, feedback from the participants was positive, as with other AuthorAID-embedded courses in a developing-country context.² Online courses can be a useful tool for academics and other researchers in developing countries who may not have taken classroom courses on research writing.¹ From our experience, embedded courses such as this one can be offered to researchers by training experienced researchers first, who, in turn, can train others.

The present findings indicate that the implementation and local contextualization of the AuthorAID online course in research writing at TAFIRI were a success and contributed greatly to increasing the number of research papers published by TAFIRI researchers. Thus, research institutions elsewhere may also benefit from introducing such online courses, particularly in conjunction with face-to-face workshops.

Authors' contributions

AP Shoko and IA Kimirei conceived, designed, and conducted the study; collected and analyzed data, and drafted the manuscript. BC Sekadende, MA Kishe, and IE Sailale conducted the study; collected and analyzed data; and drafted the manuscript. All authors read and approved the final version and agreed to be accountable for all aspects of the work.

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Competing interests

The authors declare that they have no competing interests.

References

- 1 Murugesan R. Promising outcomes of an online course in research writing at a Rwandan university. *European Science Editing*, 2012; **38**(3): 60–64.
- 2 Murugesan R, Nobes A, Wild J. A MOOC approach for training researchers in developing countries. *Open Praxis*, 2017; **9**(1): 45–57.
- 3 Shinkafi TS. Challenges experienced by early career researchers in Africa. *Future Science OA*, 2020; **6**(5): FSO469. DOI: 10.2144/fsoa-2020-0012
- 4 Kumwenda S, Niang EHA, Orondo PW, et al. Challenges facing young African scientists in their research careers: A qualitative exploratory study. *Malawi Medical Journal: the Journal of Medical Association of Malawi*, 2017; **29**(1): 1–4. doi: 10.4314/mmj.v29i1.1
- 5 Cobey KD, Grudniewicz A, Lalu MM, et al. Knowledge and motivations of researchers publishing in presumed predatory journals: a survey. *BMJ Open*, 2019; **9**: e026516. doi:10.1136/bmjopen-2018-026516
- 6 Nchinda TC. Research capacity strengthening in the South. *Social Science and Medicine*, 2002; **54**(11): 1699–1711.
- 7 Sumathipala A, Siribaddana S, Patel V. Under-representation of developing countries in the research literature: ethical issues arising from a survey of five leading medical journals. *BMC Medical Ethics*, 2004; **5**(5); doi: 10.1186/1472-6939-5-5.
- 8 Nobes A. *AuthorAID* – supporting early career researchers in developing countries. *Biochemical Society*, 2016; 39–41.
- 9 INASP. Embedding online research-writing training in Africa and Asia. <https://www.inasp.info/publications/embedding-online-research-writing-training-africa-and-asia>. 2017
- 10 How to Support “Embedding Learning” in the Workplace: <https://www.panopto.com/blog/how-to-support-embedded-learning-in-the-workplace>
- 11 Gastel B and Day RA. *How to Write and Publish a Scientific Paper*. 8th ed. Greenwood, Santa Barbara, California, USA. 2016; 326.
12. Zar JH. *Biostatistical Analysis*. Prentice Hall Inc., New Jersey, USA. 2010
- 13 Hollands FM and Tirthali D. MOOCs: Expectations and Reality. Full report. Center for Benefit-Cost Studies of Education, Teachers College, Columbia University, NY. 2014; 210. http://cbcse.org/wordpress/wpcontent/uploads/2014/05/MOOCs_Expectations_and_Reality.pdf.
- 14 Schaeffer CE and Konetes, GD. Impact of learner engagement on attrition rates and student success in online learning. *International Journal of Instructional Technology and Distance Learning*, 2010; **7**(5): 3–9.
- 15 Breslow L, Pritchard DE, Deboer J, et al. Studying learning in the worldwide classroom: Research into edX’s first MOOC. *Research and Practice in Assessment*, 2013; **8**: 13–25.
- 16 Hostetter C and Busch M. Community matters: Social presence and learning outcomes. *Journal of Scholarship of Teaching and Learning*, 2013; **13**(1): 11–86.