

Research Ready: a student-initiated workshop model for developing foundational research skills

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ABSTRACT Travel restrictions, pandemics, economic downturn, and increasing costs in organizing workshops all impact on face-to-face training of undergraduates planning to undertake research. The inability to obtain basic, first-hand information regarding research in practice causes undue stress for students and leads to unrealistic expectations regarding research projects. Here, we describe how a student initiated online workshop, co-designed by a group of undergraduate leaders in conjunction with a panel of international academic researchers, and enabled the delivery of an introductory workshop on research training to meet student needs. Post-workshop, over 80%–95% of the participants rated their understanding of different aspects of research in practice as either being good or excellent. The design of this workshop provides an innovative template, in particular for resource-restricted countries, on how student-initiated workshops with multi-institutional academic collaboration could enhance training in research practice.

KEYWORDS online workshop, student-academic curriculum co-design, multi-institutional collaboration, research in practice

The recent COVID-19 pandemic and resulting economic crisis have affected the tertiary education sector (in the context of this manuscript, we refer to tertiary education as education received at a post-secondary level at universities) and exacerbated learning (1–3), particularly in resource-restricted countries. University students hoping to undertake research projects in their final year of undergraduate studies have been significantly impacted. Access to research training during the formative years of undergraduate study is critical to conduct a research project. These research projects are often considered an important stepping-stone in pursuit of graduate education.

Conventional one-on-one mentoring methods in research (mentored research) may not be adequate to address the growing need to train research (4). “Manitham” is an undergraduate-run volunteer organization based on a regional university in Sri Lanka. To overcome some of the negative impacts that the pandemic has had, Manitham Workshop Organizing Committee (MWOC) reached out for international support to co-design an introductory workshop for those interested to conduct research in future years. Here, we describe how the pre-workshop preparation, identification of appropriate content, co-design and development of workshop handbook, delivery, and post-workshop assessments were conducted (Fig. 1). Although this workshop emerged as a necessity during the COVID-19 pandemic, this strategy can be employed in the post-pandemic era, as a foundation to prepare students to undertake more advanced course-based research experience (4, 5). The template developed and described here has the advantage of being able to be conducted online, allowing for broader participation.

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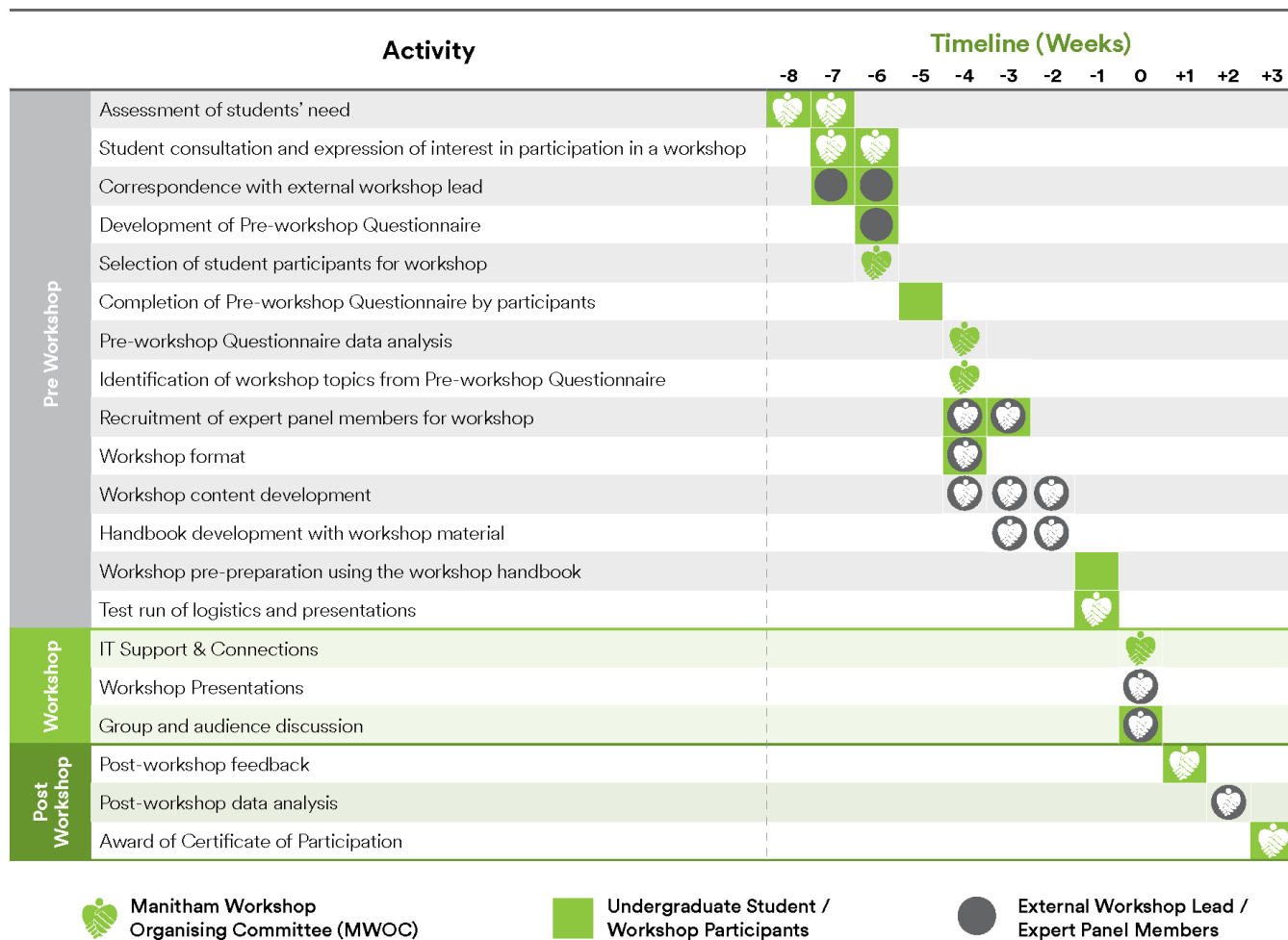


FIG 1 The time line of co-design and development of student-initiated workshop to enhance understanding of research in practice. To enable optimal benefit to the students, the workshop had to be meticulously pre-planned 8 weeks (–8) prior to the workshop (0). The Manitham Workshop Organising Committee (MWOC) closely worked with students to identify the content of the workshop (weeks –8 to –4) and with the External Workshop Lead and Expert Panel Members to develop the workshop material (weeks –4 to –1) to maximize learning outcomes.

PROCEDURE

During the co-design process, MWOC requested a workshop that would explain basic concepts in research practice, relevant to students preparing to undertake an undergraduate research project as part of their professional development.

Identification of participants and their needs

The MWOC, through its student network, consulted with undergraduate students enrolled in Biological Sciences at the University of Jaffna to identify gaps in knowledge that prevents conducting research. Of more than 200 students who expressed interest to participate, 47 were selected based on their academic achievements (students with grade point average (GPA) of 3.5 or above out of 4.0). In consultation with the External Workshop Lead, pre-workshop questionnaires (Supplemental Material 1) were shared with prospective participants using a freely available online platform (<https://www.google.com.au/forms/about/>). Pre-workshop questionnaires were appropriately designed enabling participants to provide Manitham, informed consent to use deidentified data from survey questionnaires for reporting and publishing purposes. Although 65% expressed a strong desire to continue graduate research, the pre-workshop questionnaire revealed that 94% had a less than average understanding of research. The majority

of the potential participants identified the following areas as being the most important aspects that needed to be addressed in an introductory workshop:

- Long-term impact of research training and career options
- How to initiate a research project
- Research project design
- Ethical considerations and certification
- Importance of presentation skills and preparing a scientific presentation
- Communicating research findings—manuscripts to journals and multimedia
- Preparing a *Curriculum Vitae* and writing applications for graduate scholarships
- Writing project grant applications

Recruitment of resource personnel, co-design, and development of workshop material

Based on the needs identified, Content Experts from different institutions with expertise in microbiology and immunology ($n = 6$), biology ($n = 2$), and science communication ($n = 2$) from Australia, Canada, and Sri Lanka were invited to contribute to the workshop. The content and weighting of different sections were based on the feedback from the pre-workshop questionnaire (Supplementary Material 1) and refined with input of members of MWOC (an outline of the co-designed program and workbook material is provided as Supplementary Material 2).

Content Experts developed a comprehensive workbook with appropriate material and MWOC members who were current students or recent graduates of the University of Jaffna provided feedback on workshop material, enabling the refinement to make the content relevant to the needs of the local participants (Supplementary Material 2). An electronic copy of the workbook which included tips on how students could create their own research portfolios (Supplementary Material 2) was distributed to all participants a week prior to the workshop (Fig. 1).

Delivery of the workshop, post-workshop assessment, and reflection

A full-day weekend workshop was found to be the most convenient due to the content providers who were located in different institutions in different countries. Of the 10 Content Experts and Facilitators, four were based on countries other than in Sri Lanka, and the other six were from three different institution within Sri Lanka. Although the 47 participants were in Sri Lanka in a single time zone, they participated from different locations. The 8-hour workshop was conducted synchronously and commenced at 9.15 a.m. Sri Lankan time.

The workshop was delivered via Zoom. The MWOC coordinated logistics, including providing IT support to Content Experts and participants. Although, at first, students were hesitant to interact, when presenters shared their own undergraduate experiences, the participants were eager to engage. The panel discussion was designed as an interactive discussion, where participants were able to ask questions from the Content Experts (Supplementary Material 2). Following the workshop, all participants completed a post-workshop questionnaire (Supplementary Material 3), and the responses were collated by the MWOC (Fig. 2).

The co-design process (6) of the workshop was invaluable as the MWOC members were well aware of the problems faced by the student participants. The features inbuilt into the workshop organization were useful to overcome poor internet connectivity, and during interruption, the participants were able to continue to listen to the workshop using their smart phones. Furthermore, the MWOC members acted as the cohosts for the

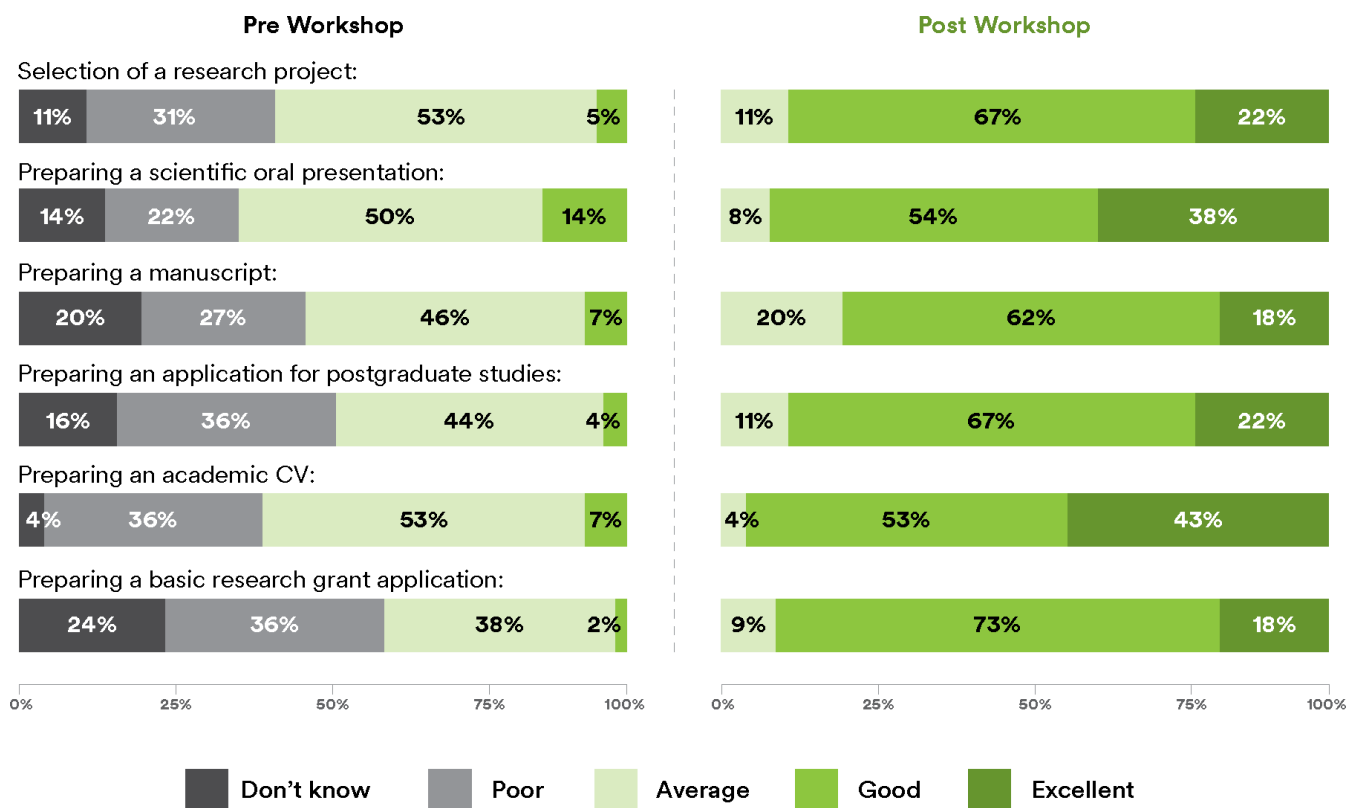


FIG 2 In a survey administered pre- and post-workshop, students were asked to rank (five-point Likert scale) how well they understood different aspects of research methodology and practice. There were significant increases in the level of understanding among participants post-workshop compared to their level of understanding prior to participation.

sessions and were able to continue to share presentations with all participants regardless of interruption to connections.

CONCLUSION

Post-workshop, an overwhelming majority of participants (80%–96%; Fig. 2) rated their understanding of selection of research projects, preparation of oral presentations, manuscript preparation, compiling a curriculum vitae, and writing applications for graduate studies and research grants as being either good or excellent. The significant improvements in basic understanding of research in practice self-reported by the participants were further emphasized by all participants recommending a similar workshop to be conducted for professional development on an annual basis. Our experience strongly supports the view that such a co-designed intensive 1-day workshop enhances basic understanding of research practice that may assist undergraduates build confidence to undertake graduate-level research degrees.

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ADDITIONAL FILES

The following material is available [online](#).

Supplemental Material

Supplemental Material 1 (jmbe00091-23-s0001.pdf). Pre-workshop questionnaire.

Supplemental Material 2 (jmbe00091-23-s0002.pdf). Outline of workbook.

Supplemental Material 3 (jmbe00091-23-s0003.pdf). Post-workshop questionnaire.

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