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Learning Practical Research Skills Using An Academic Paper Framework – An Innovative, Integrated Approach

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Abstract

Background: There is a pressing need for effective education to help develop basic research and publication skills among clinicians in low and middle-income countries (LMIC). Learning from experience is important for achieving understanding of concepts and acquisition of skills rather than simply recall of facts.

Methods: An innovative research and academic writing skills course was run for 21 participants from two universities in the Philippines. The experientially-based workshop encouraged development of skills and understanding through active involvement. Interaction with tutors and other participants was integral to the process. The novel workshop design linked various phases of the research process to relevant sections of an academic paper, thus integrating activities usually regarded as separate.

This paper outlines the structure of the workshop and reports its evaluation through pre- and post-workshop surveys and post-workshop focus groups.

Results: Participants appreciated the integrated format of the workshop and felt more confident in their ability to plan, conduct and write up research.

Conclusion: Explicitly linking elements of an academic journal article to the components of developing a research project was successful in promoting learning and understanding of the research process and increased confidence in academic writing in this context and is likely transferable to similar contexts.

Keywords: Research skills; Writing skills; Integrated workshop; Learning

1. Introduction

The nature and effectiveness of research training including the place of generic skills development and academic writing, is currently much debated in high-income countries.[1,2] Less is known about research training in low and middle-income countries in Asia,

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including the Philippines[3] It is clear that universities in the Philippines are 'at a critical stage in their efforts to enhance research and improve research training'; this goes beyond funding issues to include 'required competence'[3] In common with many rapidly growing economies and young universities, there is enormous interest in and enthusiasm for conducting research and publishing in international journals. In the Philippines there is little or no experience in running trials or devising studies to answer important health-related questions or tackle the most challenging health issues. There is therefore a pressing need for effective education to help develop basic research skills.[4]

Research training workshops commonly comprise a series of lectures on research methods and teaching of critical appraisal of academic papers.[5] In this way learners are introduced to key concepts such as study design, recruitment strategies and presentation of results but less so to the practical realities, complexity and messiness of the research process. An increase in knowledge alone is not sufficient to enable effective planning and conducting of studies. Learning about the various skills involved, such as formulating appropriate research questions, designing and running methodologically sound studies, gaining ethics approval, collecting and analysing data, and sharing results is best done by being actively involved in the process.[6] Learning from the right kind of experience has long been recognised as important in achieving understanding of concepts rather than simply recall of facts.[6] Furthermore, focussing on critical appraisal of published papers may inadvertently reinforce the naïve view that research happens in the orderly fashion in which it is presented in the text.

Important amongst research skills is that of writing up the research. The 'globalisation and marketisation' of academia[7] has increased the pressure on scholars everywhere to publish in prestigious international journals, by and large published in English. However, as Flowerdew points out, the 'impenetrability of academic writing'[7] gives rise to 'immense' difficulties for non-native English speaking (NNES) scholars wishing to publish in English.[7] Numerous studies attest the disadvantage suffered by such scholars, including increased rejection rates.[8] Researchers in the Philippines may be better placed than many NNES researchers since they are exposed to English language instruction from primary school onwards and sometimes' experience English-language instruction at university, but they may still lack facility with the specialised text types required.

Research writing, as a subset of academic literacies, is rarely acknowledged in official reports or higher degree research skills guidelines or discussions; when it is, it is often subsumed under general communication skills.[9] Academic literacies are not commonly addressed in post-graduate education and where they are taught, this is often done outside disciplinary settings, for example by central units. However, there are cogent arguments both for formally teaching academic writing rather than relying on passive absorption through reading[10] and for integrating this with content and skills teaching. This flows from the understanding that academic literacy or communication is not a universal, context-independent, transferable skill. Rather, academic text types (genres), for example research articles, are very specific in their structure and language.[11] It is recommended that such integrated programs be delivered by an interdisciplinary team[12]: experts in the discipline and academics experienced in teaching Academic English programs. However, not many models exist for designing such integrated, team-delivered programs and even fewer address the research skills and writing development needs of medical and health researchers.

This paper reports on a workshop designed to develop research skills amongst academics in two universities in the Philippines in tandem with academic writing development. It describes the design of the workshop and reports on the results of a mixed methods study undertaken to evaluate the effectiveness and acceptability of this innovative approach in this specific context. The research sought to answer the question: '*How do participants evaluate a research capacity building workshop which integrates research skills development with academic writing development?*'.

2. Methods 1: design of the workshop

The three-day workshop was held at the request of the Philippines universities, building on a successful pilot of the writing component and on a series of research skills development workshops run in Vietnam over several years. It was supported by a University of Sydney Southeast Asia Centre Research Capacity Building Grant. It was run by two academics with significant experience in clinical research, one of whom has an educational as well as a clinical background, and a third academic experienced in teaching Academic English.

The fundamental premise of the workshop was that a publishable paper reports well planned, interesting, relevant research performed well. Its aims were:

- To build research capacity by encouraging participants to undertake feasible research projects in a group.
- To equip participants with skills to write a manuscript about their research for publication in a journal.
- To develop skills in research protocol writing.

The learning outcomes covered research methods and skills as well as writing skills. The design principles underpinning the workshop were that:

- The development of research skills and of writing skills would be tightly integrated.
- The workshop would involve the application of skills in practical activities throughout, rather than theoretical lectures alone.
- Participants would work in groups, emulating the collaborative and often interdisciplinary nature of research, and would collaboratively design a research project on a topic agreed within the group.
- Writing skills would be scaffolded by means of the genre teaching cycle (see paragraph 2 on page 8).

The workshop design (Fig. 1) is based on experiential and constructivist theories of learning where participants develop skills and understanding through being involved in practical activities. Interaction, not only with an expert tutor but with other participants, is integral to the process. Taking part in practical tasks in a small group encourages true engagement with the subject matter and increases conceptual understanding.[13]

The novel approach used in the workshop design was to link the various phases of the research process to the relevant sections of an academic paper in sequence, thus integrating what are often regarded as two separate activities. Note: this differs from the more common approach which addresses writing up after the research has been completed as recommended by Cargill and O'Connor.[14] It was anticipated that by being guided through this process, participants would achieve not only a better understanding of, and skill in, writing but also a

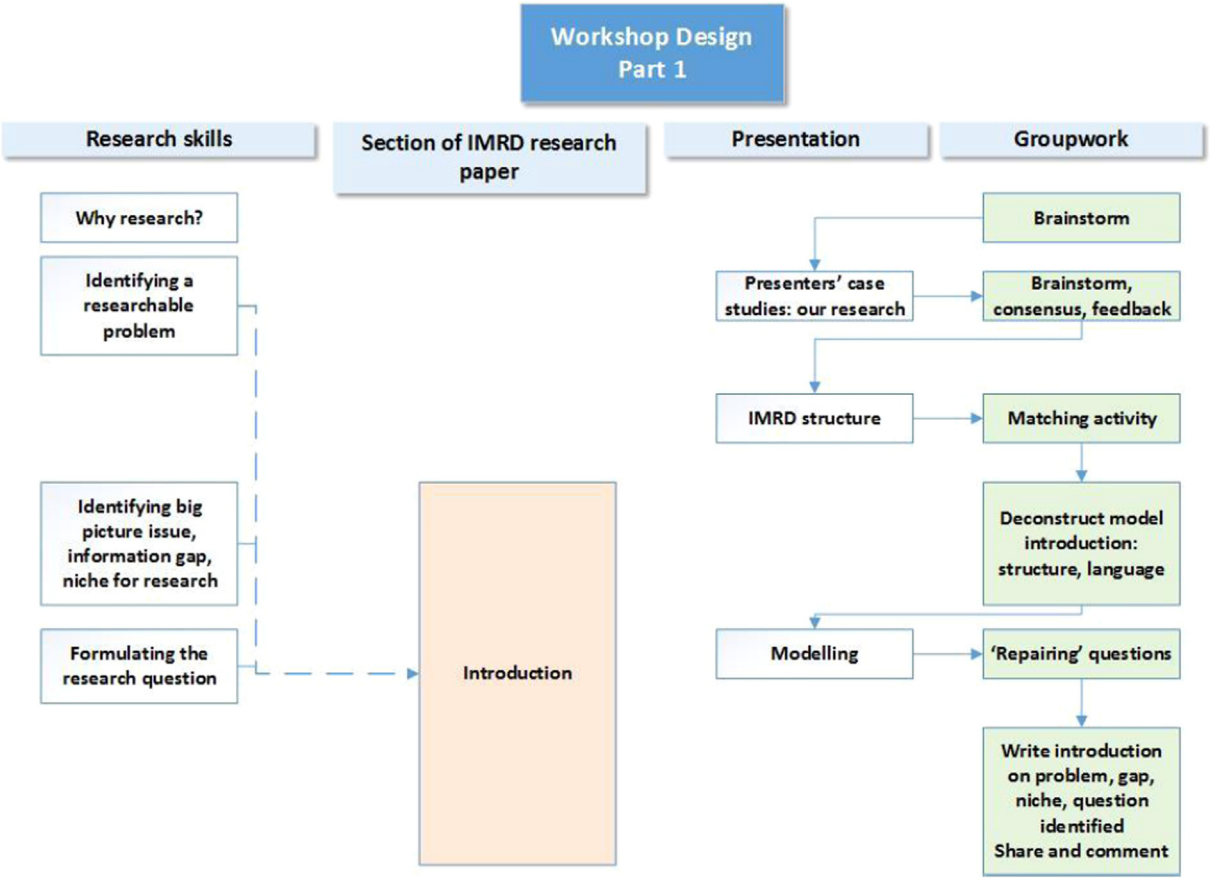

Fig. 1. Workshop design.

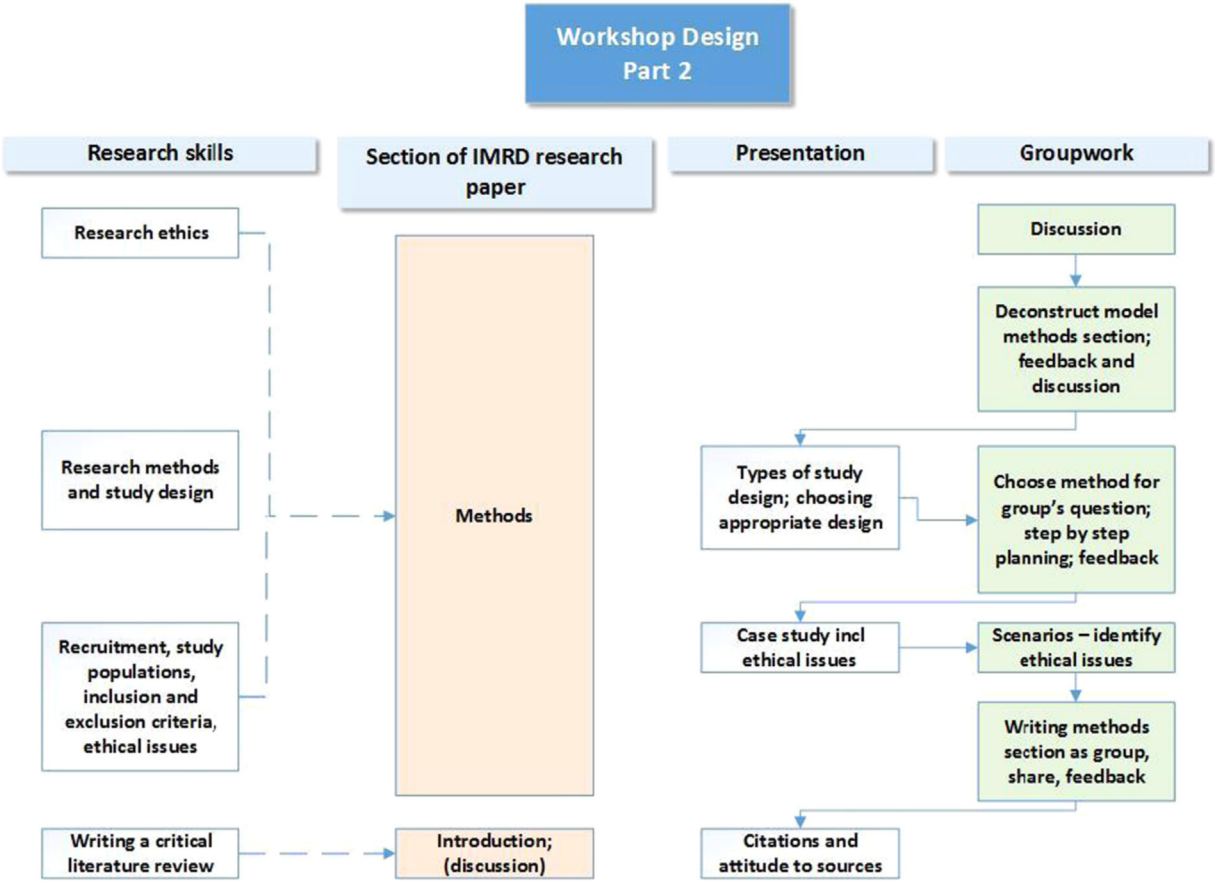

Fig. 1. (*continued*)

clear idea of each of the important stages of conceptualising, planning and implementing a research project. The standard (introduction/methods/results/discussion or IMRD) scientific paper format was chosen, based on the assumption that most of the workshop participants would be researching clinical or scientific questions. Writing a research protocol was covered inter alia.

The workshop was designed to be very practical, with the immediate application of skills and knowledge learnt. It was also designed to be group-based and collaborative, mirroring optimal research practice and giving participants the opportunity to pool knowledge and support each other. At the start of the workshop, participants were allocated to groups based on their institutional affiliation (those from the same institution were kept together) and research experience and interests (these were balanced within groups). A 'learning by doing' approach was taken with deliberate emphasis placed on the importance of having noteworthy content to write about in order to maximise the likelihood of publication. Groups first brainstormed important challenges in their work that they would like to see resolved. Then they discussed which issues were important, interesting and previously unexamined. Each group was asked to choose one problem to work on throughout the rest of the workshop. Over the three days they devised a range of answerable research questions related to the topic and discussed the most appropriate research methods to employ to answer the question. After presentations on methods and the provision of a protocol template they developed a suitable research protocol.

The pedagogical approach for the academic writing component made use of the genre teaching cycle methodology[15] which has been used extensively for academic (and other) literacies development over more than two decades.[16] This methodology suggests that writing development is best scaffolded by first discussing the context, purpose and audience for the text type, followed by deconstructing a model text, laying bare its structure and grammatical features[17] was chosen as the model paper, as it is well structured and well written,

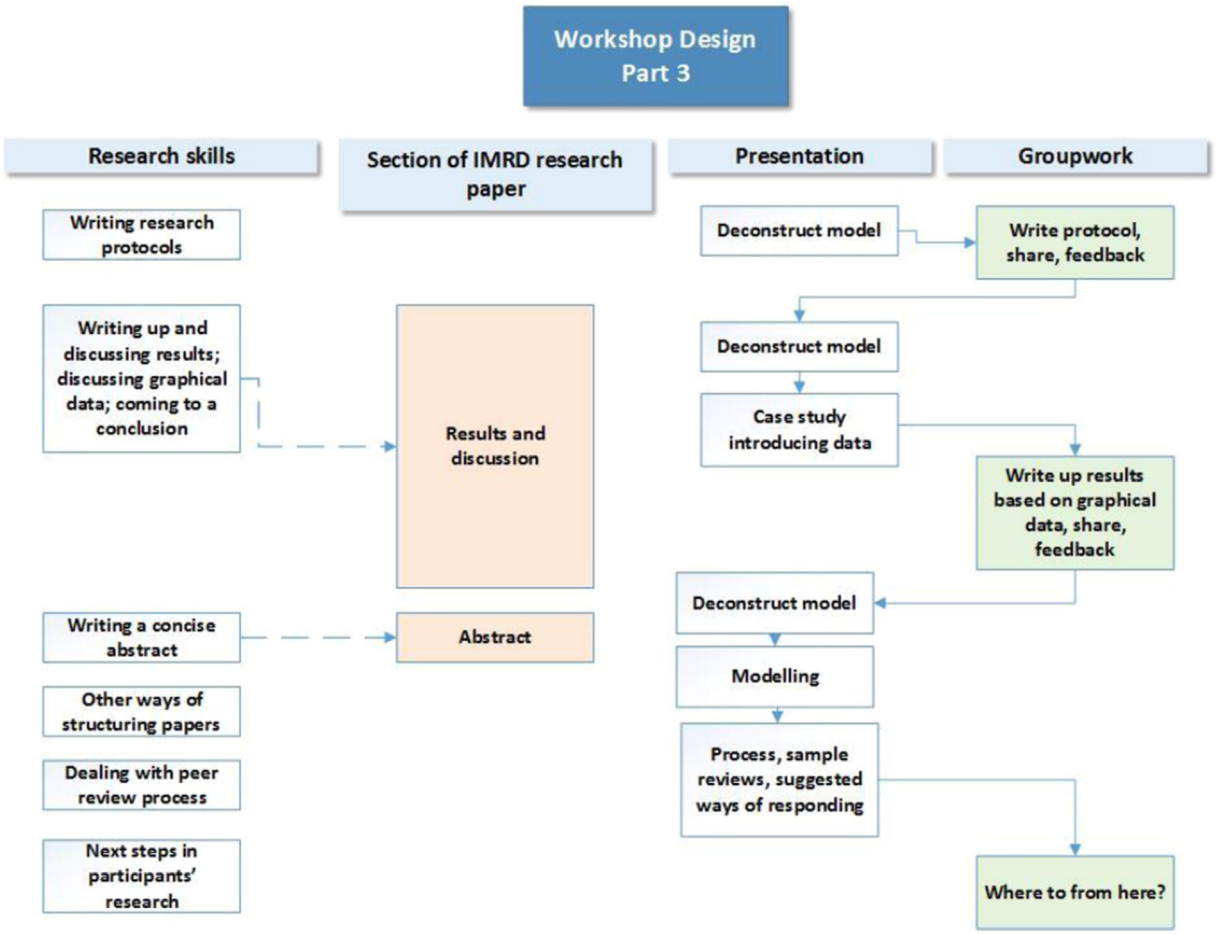

Fig. 1. (*continued*)

and covers a fairly general topic likely to be of broad interest, namely quality and safety in health care. The CARS model -'**C**reating **a** **R**esearch **S**pace'[18,19] and further research by Sheldon[20] were used as a basis for describing research article structure, with further adaptation for this workshop. The next phase involved collaborative reconstruction of a similar text, in this case the write up of the group's proposed study. The final phase typically involved individual construction of the text, although that was not appropriate in this workshop, which stressed the collaborative nature of research and thus writing. In this case it was not possible to collaboratively write the results, discussion and conclusion, since the research had not yet been undertaken, so proxies were used.

Participants received an extensive workshop guide containing sample texts; exercises; 'toolkits' to help them structure their paper and make appropriate language choices; templates; grammar activities; and activities to guide their research designs. Groups wrote their texts on large sheets of paper; these were displayed for reading and comment by the whole cohort.

3. Methods 2: evaluation of the workshop

Given the workshop was three days long and delivered in the Philippines, our study sought to explore the additional factors of the length (hence intensity) of the program and the extent to which local needs and factors were addressed.

Participants were recruited from among attendees at the workshop. Participants ranged in age from approximately 30 to 50+ years and were both male and female. Data were collected by means of:

- Pre-workshop and post-workshop surveys: these were identical and were designed to show whether participants' confidence in carrying out research as well as writing it up had increased and whether their knowledge of academic writing had improved.

Participants coded their own surveys with a unique identifier known only to themselves, allowing for matching (but not identification) of responses by the researchers.

- A post-workshop focus groups: this allowed for much greater depth and nuance in question and answer around features of the workshop, for example its design, intensity, integration of writing skills and appropriateness to the local context.

The surveys probed confidence in all aspects of planning, conducting and writing up research. Participants were asked to rate their level of confidence in each parameter on a five-point Likert scale where 1 meant 'not at all confident'; 2 meant 'not very confident'; 3 meant 'neither confident nor unconfident'; 4 meant 'somewhat confident'; and 5 meant 'very confident'. Paired data were analysed by the Wilcoxon signed-rank test using SPSS.

Data were analysed both quantitatively (measuring individual and group gains) and qualitatively (identifying themes in focus group discussions and free answers in surveys) by the authors. The two authors with qualitative experience (JL and KF) coded transcripts individually and identified themes; the results including any discrepancies were discussed with the third author.

4. Results

4.1. Matched surveys

Out of 21 participants, 19 consented to be involved in the research, giving a response rate of 90%. Following the workshop, participants felt more confident in being able to identify research problems at work; formulating research questions; identifying appropriate methods to research a problem; writing research proposals; addressing all ethical aspects of research; recruiting to their study; analysing data; drawing accurate conclusions; and identifying research limitations. There was also significant improvement in confidence related to all aspects of writing up research.

Regarding the research context there was also a significant increase in confidence following the workshop. In this category, confidence pre-workshop was particularly low with a mean of 2.63 (standard deviation = 1.012) for 'having enough time to do research in the workplace' and for 'working as part of a team doing research' and rose significantly to 3.68 (standard deviation = 0.946) following the workshop.

The final four questions of the survey were about getting published and in this case participants were asked to rate their level of agreement (1 = Strongly disagree; 2= Disagree; 3 = Undecided; 4 = Agree; and 5 = Strongly agree) with the four statements:

- My paper should be objective and descriptive.
- Academic writing involves using the passive voice wherever possible.
- The conclusion is the most important part of my paper in terms of getting published.
- Getting published in an English language journal is very competitive.

In this group of questions there was no significant difference in levels of agreement with the statements post-workshop compared with pre-workshop. For example, participants were aware of the highly competitive nature of publication acceptance in English language journals prior to the workshop (mean of 4.32 with a standard deviation of 0.820). After the workshop the mean remained 4.32 with a standard deviation of 1.108.

4.2. Focus groups

All 21 workshop participants were invited to take part in a focus groups on completion of the workshop. 19 agreed and two focus groups were held, one with ten participants and one with nine and each facilitated by a different researcher. The main positive themes which arose in the focus group discussions were collaboration, application of skills and the integrated format of the workshop. Representative quotes are provided below, without identifying participants individually, since similar comments were made by many participants. All focus group participants rated the workshop positively overall: '*loved it*'; '*I am just very thankful I was included in the group*'. Several themes emerged and are described in Section 4.2.1 below.

4.2.1. Themes

4.2.1.1. Collaboration. The frequent use of group-work and encouragement of participants to work together was appreciated and seen to align with research practice:

'…it's … practise what you preach, it's stressing that the research was collaborative … so we had an experience of that in the [workshop] format'

'it's very helpful for the research because teamwork is very important …work with people from other disciplines'

Participants welcomed the opportunity to work collaboratively, to have protected time to get to

know each other, break down barriers and use individual strengths:

'it was helpful because I was given the time and the actual opportunity to sit down with the different members of our university to talk about really how we do collaborative research and I actually had an opportunity to start collaborating'

Participants realised they learnt from each other:

'one of the things too that helped me was really being with people from other disciplines because it gave me a lot of perspectives on – I did not learn only from the speakers but I learnt also from the participants themselves'

Working in groups promoted confidence and reduced fear, especially with the passing of time. By Day 3, having been working in small groups, participants were also comfortable with the large group and there was

'*absolutely no fear of embarrassing yourself any more*'

One participant described observing others (legitimate peripheral participation[21] – *'just watching and seeing how people analyse'* as a *'learning experience for me'*.

Working together also gave *'confidence for action'*.

'especially I was paired with some of my bosses, so at first I was really a bit scared, the youngest, I think, …, but after working with them we felt like, oh, this is something that we shouldn't be scared of them because they're really willing to help us young people to really do it. And so it eliminated some of the fears and it eliminated the feeling of being tentative in doing it, so now we can feel – we felt like we can really do something'.

4.2.1.2. Opportunity to apply skills. Several participants mentioned the fact that the workshop was practical rather than theoretical:

'Hands on … based on the small quick discussions we had'

They contrasted this workshop positively with previous lecture-only versions:

'Practicality of activities, unlike the first one I attended which was all lectures … [this workshop] compelled me to practise the skills'

'… people will sneak out if it's lecture, lecture, lecture'.

'…if you did it from start to finish lecture, lecture, lecture, it would have been boring'.

The immediate application of skills was appreciated:

'… it's better to recall things if you get to apply it already'

4.2.1.3. The integrated format of the workshop. Responding to a specific question on this topic, many participants commented favourably on the integration of writing and research skills:

(research and writing) *'…go hand in hand… closer to what we do rather than learning everything from introduction to recommendations and then write everything from there …the burden was less'*

and contrasted this approach with previous educational experience

'other workshops I've attended, especially the lecture presentation … writing was not done'

For some, integrated writing was 'novel' and helped foster precision and concise writing:

'you need to be precise when you're writing. in an exercise of defining your problem, the fact we had to write them … lends itself to cutting things out. saying it in simpler terms…'

The scaffolded approach with text deconstruction preceding writing was appreciated:

'given us a structure in which we can organise our ideas when we write our research'.

4.2.1.4. Other themes. Less commonly mentioned but still considered positive aspects of the workshop were the motivational aspect (research seen as exciting) and the provision of a safe environment

'I'm not anymore that scared about these things'.

Participants gained *'different perspectives'* and were able to get away from traditional research norms – like starting with a title – and learnt the *'clear distinction between the research problem and the research question'*. The constant facilitation of groups was appreciated and some gained fresh insights on how to adapt their own research teaching. The participant guide *'helped structure the training'* and the toolkits and templates were found to be helpful by many.

4.3. Areas for improvement

Counterbalancing the positive assessment noted above, participants felt there were some areas which could be improved, notably the timing of the activities, the type of research featured and the public nature of the writing.

4.4. Timing

This topic was the one on which there was most disagreement amongst participants. Some felt more time was needed to decide on the areas and the specific research problem they wanted to address. An attempt was made to have participants consider pertinent research challenges prior to the workshop but this was unsuccessful. Some felt a bit rushed and wished for more '*time to process*', to work on objectives or to write. Others felt having limited time was '*helpful*', fearing that with more time '*more problems will emerge…more overthinking…in the group*'. Finally, some would have liked a longer discussion about how to resolve ethical issues.

4.5. Level and methodology

When planning a workshop for relatively unknown contexts and participants, it can be difficult to pitch it at the right level and ensure the content is not too technical. In the absence of data, we erred in assuming the healthcare-based participants would be conducting clinical or lab-based research. Although participants rated the skills and knowledge gained to be relevant to their research areas, some of the discipline-based examples were considered too clinical and technical; more general examples were preferred. Interestingly, the activities around developing appropriate methods saw a drift from quantitative to qualitative approaches. This was reflected in the focus groups: some participants wanted more qualitative research methods and a grounded theory approach, while others argued that a balance of these approaches was needed: '… *it probably could be balanced … so people could see the difference*'.

4.6. Others

An interesting concern was voiced by one participant: she found it hard to write in the public, collaborative group work context:

> when I write, I really want the environment right … it's really hard to write with that group

Minor requests were for *how to institute a research culture, sharing of best practice* and *success stories of collaborative research* to be included in the workshop.

There was consistency between the themes arising from the focus groups and from the free text in the end-of-workshop evaluation surveys (which were not part of this research).

5. Discussion

The underlying concept for the design of the workshop was to take participants through the process of research and writing about research in tandem so that they could see the link between the research process and the elements of an academic paper. Furthermore, it was hoped to motivate careful planning of robust research studies on pertinent topics in order to produce a paper likely to be accepted by an academic journal. This is highly innovative contrasting with other approaches which address writing skills and research skills separately. The use of a pedagogical framework based on the structure of an academic paper was intended to integrate the discussion and development of research skills with the practicalities of writing up the research.

The approach taken was feasible and acceptable to the participants as highlighted in survey and focus group data. The focus group comments suggest that group-based learning is not yet common in the participants' educational contexts, but they understood and appreciated the rationale and benefits of this pedagogy as well as becoming quite comfortable with it even in such a short time. The enthusiasm for the interactive methods is especially important in view of the increasing use of technology in learning in an effort to scale up capacity building in research skills.[22]

One difficulty with this approach was that, in the time available it was not possible to actually conduct the research or carry out a literature review. This meant that, while the introduction could be collaboratively constructed based on the problem identified by each group and the methods described retrospectively, as if they had been employed, the writing of the literature review and results and discussions sections were not possible. This was a limitation of the intention to 'learn by doing'.

One way to improve the structure of the workshop would be to split it and run it as two separate workshops with a long gap in between them. The

research question and protocol could be planned in the first workshop, the literature review and the actual research undertaken in the gap between workshops and the results and analysis worked through in the second workshop and those sections along with discussion and conclusion written. The research process is complex and aiming to work through it in entirety in a single workshop risks content overload and insufficient time for reflection and consolidation of learning. This is especially true if the participants are absolute beginners in research and academic writing. If participants were required to bring results to the second workshop, this may serve as an incentive; adding project management guidance to the first workshop might assist.

Other possible improvements include making a concerted effort to engage more with participants before the workshop regarding the schedule, their context and preferences and any preparatory work they need to do, for example determine one or more problems they wish to research. We need to guard against content which is too technical or related to only one discipline, and importantly need to balance qualitative and quantitative approaches. However, having separate workshops for quantitative and qualitative research methods would not be a solution, since there is benefit in exposing all parties to the two approaches; the importance of choosing methods appropriate to the research question; and to the possibilities of mixed method approaches. Finally, although the facilitators were keen to maintain an ongoing mentoring relationship with participants, their own work commitments have precluded them from taking a proactive role in this. The split workshop design could have inbuilt mentoring checkpoints, which a small resource allocation might support. Other researchers in low resource settings have found continuous intensive mentorship needed to be successful in helping participants become effective clinician researchers[23,24]; our experience would support this view.

A limitation to the study design is that it was conducted in only one group of participants and evaluated one workshop conducted in one site. We consider this as a pilot to assess feasibility of the model and to obtain participant feedback to inform refinement of the workshop. We have identified improvements that can be made and are keen to conduct a larger study in order to test the model more widely.

6. Conclusion

A hands-on, practical, interactive approach to developing research and academic writing skills in tandem was well received by academics and clinicians in the Philippines. The model of linking elements of an academic journal article to the components of developing a research protocol was helpful to participants in giving them confidence to develop research plans and in helping them to support and learn from each other. To achieve sustainable results a series of two or even three workshops giving time for participants to implement each stage of the research process to consolidate their learning between sessions is recommended. This would enable, for example; collecting actual data prior to teaching about data analysis so that a true 'learning by doing' model can be optimally effective.

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