Writing about Learning and Teaching

in Higher Education

Creating and Contributing to Scholarly Conversations across a Range of Genres

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CHAPTER 12

ANALYZING AND REPORTING DATA

Empirical Research Articles

> *The data in a scientific article aims to illustrate the story. . . . We verify, analyse, and display data to share, build and legitimize new knowledge. (Cargill and O'Connor 2013, 25)*

> *To fully understand the ways in which race and racism shape educational institutions and maintain various forms of discrimination, we must look to the lived experiences of students of color . . . as valid, appropriate, and necessary forms of data. (Yosso et al. 2004, 15)*

Empirical research articles are perhaps the most common genre of writing about learning and teaching and are considered by many to be the most prestigious genre as they are historically assumed to be the basis for advancing knowledge and understanding, as well as confirming or challenging previous research. As the first quote above captures, Margaret Cargill and Patrick O'Connor recommend analyzing and reporting data through constructing a story. In the second quote, Tara Yosso and colleagues offer an essential reminder that whose and which stories get told depends on what counts as data.

It is difficult to generalize about writing empirical research articles, as what is appropriate depends on your theoretical and methodological approach, the audience you are addressing, and your purpose. Some aspects of these topics may be covered in the guide for authors produced by the journal, book publisher, or other outlet to which you are submitting, but others are for you to clarify and decide.

Analysis of what editors and reviewers say they are looking for, and the weaknesses they identify in papers that they reject or return for substantial revision, can help writers self-evaluate their articles before submission (see chapters 8 and 28). In this chapter, we present a flexible framework to guide the organization and composition of empirical research articles. We also include a discussion of the benefits and complexities of writing such articles, but with the caveat that there is no single right way.

Preparing Empirical Research Articles for Publication

There are many excellent books written about undertaking scholarship of teaching and learning (SoTL) and researching learning and teaching in higher education (e.g., Cleaver, Lintern, and McLinden 2018; Cousin 2009; Daniel and Harland 2017; McKinney 2007; Norton 2009). These texts discuss the wide variety of methodological and theoretical foundations needed to engage in this research. Which of these approaches you adopt can have a significant impact on how you write your article, as is well illustrated in the discussion of increasing the likelihood of publishing qualitative (Rocco and Plakhotnik 2011), quantitative (Newman and Newman 2011) and mixed-methods (Newman, Newman, and Newman 2011) manuscripts in *The Handbook of Scholarly Writing and Publishing* (Rocco and Hatcher 2011). A key theme that emerges from these chapters is the effect of the theoretical and methodological approach adopted on the appropriate structure of the article (Miller-Young and Yeo 2015). For example, the aims and scope section of the journal *Critical Studies in Education* states that it:

> rejects the positivist view that social reality is "out there" waiting to be "found" and that researchers are able to maintain an objective distance from research subjects. Instead, the journal takes the view that researchers generate data rather than find them and that the representation of data is a form of analysis. For these reasons, we do not publish articles that separate "findings" from "discussion,"

whether they have discrete sections named in this way or not. (*Critical Studies in Education*, "Aims and Scope")

Hence, if you are considering submitting an article to *Critical Studies in Education*, you will need to write your article differently from the approach you might take for many other educational journals. Similarly, other journals have expectations—often outlined in their contributor guidelines—that should guide your writing.

What to Look Out for in Writing an Empirical Research Article about Learning and Teaching

An empirical research article, whether published in a journal or as a book chapter, should provide a clear rationale for the study and its contribution to the existing literature, justification for the research methodology used, an analysis of findings, and a discussion of those findings and their implications for the field of study. For learning and teaching journals, the focus of the discussion section is often the implications for enhancing the quality of student learning. Simply describing the educational practice and reporting data are insufficient for this genre, which requires interpretation of data placed within a theoretical or conceptual framework with broader implications linked to the learning and teaching literature. In other words, empirical research articles have to acknowledge the current conversation and extend it through the presentation of primary research, or start a new conversation drawing on compelling new data. As Katarina Mårtensson makes clear in Reflection 12.1, writing an empirical article can be a messy process of drafting, reading, interpreting, translating, and, for some, walking. She signals the time, thought, joy, and frustration that go into writing, which is clearly a more complex process than simply "writing up the research."

Reflection 12.1

The experience of writing empirical articles

Getting started is frustrating. Every time I write an empirical article, I have to think a lot about its content, structure, and main arguments before I actually get to open a new Word doc on my laptop. As if I need to prepare mentally for a long time. It is stimulating and stressful. I start with the structure, titles of sections, and bullet points under headings. This is joyful, as I sense something actually growing in front of me. One source of frustration is the literature review needed to frame my article. I browse other relevant publications. Usually I find a lot. I discover things I hadn't previously read. It is a joy to read it but then, suddenly, I reach a point where I think everything is already written. In a more sophisticated language than what I can produce (I am not a native English-speaking person, and yet I usually publish in English). I have to force myself to believe that I can contribute. At best, I set aside full days of writing, going back and forth between sections of my article. I go back into my empirical data. I enjoy this iterative process. I take long walks, and meanwhile process my writing so that I can revise and improve when I come back. Another joy of my writing is that I usually co-write. So, I send a draft to my colleague/s, and we bounce it back and forth until we are satisfied.

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When you write an empirical research article, your argument will unfold across your introduction, literature review, methods, findings, discussion, implications, and conclusion. Your introduction presents your argument in a clear and simple form. Your literature review provides context and traces the strands of conversations in progress that inform your argument. The methods section explains and justifies how you went about gathering data to substantiate your argument, and your findings section presents what your methods yielded. The discussion is the most interpretive section of a research article. It is in this section that you marshal your evidence, make sense of your findings, and present them in a way that endeavors to offer new understandings and convince readers of their importance. The implications section builds on your argument to point to future explorations or practices that follow, according to your argument, from what you have found. One author's experience of developing an argument in an empirical article is presented in Reflection 12.2.

Reflection 12.2

The experience of developing an argument in an empirical article

To me the argument of a paper functions as the soul of the manuscript. It serves as the foundation on which the entire paper is built in terms of literature review, methodology, discussion, and conclusion. In my case, the issues I would want to argue about in a paper are actually identified at the moment I conceptualise a study or inquiry. However, articulating that argument while writing a paper is the most arduous task for me. I have experienced that more than half of my effort in writing a manuscript is spent on building an argument. Most often, in empirical articles, I present my argument in the first part of the manuscript and in subsequent sections I use empirical evidence and my data to substantiate those arguments. While building an argument, I would normally go about discussing what is known and what needs to be known and why it should be known. I try to write the "why it needs to be known" section in a slightly persuasive tone to establish the rationale of the study. I also find it important to weave my argument throughout the manuscript to keep the issue alive and establish a clearer alignment with the other sections of the manuscript.

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"Guiding Questions for Planning, Revising, and Refining an Empirical Research Article" presents a series of questions to support the writing of empirical research articles about learning and teaching in higher education. A copy of this resource with only the questions included is available in the online resources. You may find it helpful in planning your empirical research article.

Guiding Questions for Planning, Revising, and Refining an Empirical Research Article*

1. **Why is this topic important in learning and teaching research, to whom is it important, and why at this time?** Give a clear rationale for your paper and situate it within a broader conversation. For example:

> A gap often exists, however, between the high value teaching centers place on the scholarship of teaching and learning (SoTL) and the support those centers provide for such work. . . . Several models have emerged of teaching and learning centers supporting SoTL on diverse campuses. . . . Such excellent programs model effective ways for teaching and learning centers to ease faculty entry into SoTL. However, these approaches focus so intently on the inquiry process that they may not sufficiently support faculty in the final essential step of scholarship, what Lee Shulman (2004) calls "going public" to make work available for peer review. . . . Faculty active in SoTL often do not see their projects through to publication. This finding is troubling. (Felten, Moore, and Strickland 2009, 40–41)

2. **What previous research has been undertaken on this topic? What is your contribution to the literature and the learning and teaching conversation?** Identify how your paper fits within the existing literature and what you are adding to existing knowledge and understanding. For instance, the first sentence of the abstract of this article clearly sets the paper in the context of the literature:

> Although academic identity has received attention in the literature, there have been few attempts to understand the influence on identity from engagement with the Scholarship of Teaching and Learning (SoTL). (Simmons et al. 2013, 9)

3. **What is your argument or stance? What questions are you addressing?**
   Being explicit about your argument and the issues you are addressing (and, equally important, what you are not covering) is critical to convincing reviewers that your paper is worth publishing and colleagues that it is worth reading (see chapter 25). Sometimes a single question can summarize the focus of your paper:

   > To what extent do developers consider their prior disciplinary training influences or aligns with their current work? (Little, Green, and Hoption 2018, 325)

4. **What is your underlying conceptual or theoretical framework? If appropriate, what are your hypotheses?**
   Make your conceptual or theoretical framework explicit and, if you are following a positivist framework, clearly state your hypotheses. The authors of one paper state:

   > [We] draw on Meyer and Land's (2005) notion of liminality to apply to SoTL identity development. We describe how navigating among conflicting identities can lead us into a troublesome but deeply reflective liminal space, prompting profound realizations and the reconstruction of our academic identities. (Simmons et al. 2013, 10)

5. **What are your research methods, and what is the rationale for your approach?**
   a. What data have you collected, and how?
   b. Who are your participants?
   c. What is the context (e.g., discipline, institution, nation)?
   It is difficult to generalize outcomes of research in learning and teaching because contexts vary so much (Healey and Healey 2018). Give the reader sufficient contextual information to help them interpret your findings. For example:

   > The data presented in this paper derive from an international online survey entitled "Educational developers' academic backgrounds." It was distributed via the

> member networks of the International Consortium for Educational Development. . . . In total, 1156 developers accessed the survey. . . . For this paper, we focus on the 878 respondents with highest degrees in four discipline clusters: Education, Humanities, Social Sciences, and STEM fields. (Little, Green, and Hoption 2018, 326)

6. **How have you analyzed the data?**
Detail the analysis you undertook. If you have adopted a quantitative approach, tell the reader which statistical techniques you used. If you adopted a qualitative approach, be explicit about how, for example, you identified themes and what checks you made for consistency of interpretation. For example, one Dutch study reported that:

> Pearson's correlation coefficients were applied to determine relationships between all scales, including the Intention to Show Research-Related Behaviour scale. Considering the multiple analyses, we applied $p < .01$ to compensate for the family-wise error rate (Tabachnick and Fidell 2007). For interpretation, we used the following criteria: $r < .30$ = weak correlation, $.30 < r < .50$ = moderate correlation, and $r > .50$ = strong correlation. (Griffioen 2019, 167)

7. **What are your findings and how do they contribute to the ongoing learning and teaching conversation or create an important new conversation?**
Ensure that you not only present your findings but also discuss how they contribute to, extend, or move beyond the broader conversation you identified in response to questions 1 and 2. One study of using a structured writing group found that:

> Participants especially valued the discipline of weekly sessions and peer feedback. They reported increased skills and confidence in their writing, greater knowledge of the publication process, and intention to continue writing.

> Although five papers were published, a 12-month follow-up revealed that original writing intentions were not sustained. . . . In summary, our key recommendations for an effective SoTL writing program are:
>
> (1) The relevant senior management must support both the program and ongoing time allocations for research and writing.
>
> (2) Ensure participants are ready, motivated, and have the time to devote to the program (easier said than done).
>
> (3) Agreed regular progress is essential, so everyone is at the same stage to get the most from the peer-feedback opportunities.
>
> (4) Recognition of the outcomes by management will reinforce motivation for both program graduates and future participants.
>
> (Weaver, Robbie, and Radloff 2014, 212, 223)

8. **How do your findings compare with previous research?** Compare your findings with those reported by others in similar and different contexts. Which confirm and which challenge previous research? Which are new? For instance, in an analysis of self-directed learning (SDL) among geography students undertaking problem-based learning (PBL), the authors state:

> The findings of this study support Srikuman Chakravarthi and Priya Vijayan's (2010) recommendation that support and guidance must be provided to students early in a PBL environment and then facilitate increasing independence in the later years of the students' study. . . . It is important to reflect on possible reasons for the geography students' drastic drop in average SDL scores at the beginning of the second-year PBL experience. This is in contrast to other studies where the decrease in students' SDL scores occurred at the end of the first

> PBL experience (Litzinger, Wise, Lee, & Bjorklund 2003; Reio and Davis 2005). (Golightly 2018, 473)

9. **How do you handle and present unexpected findings?** Research is often moved forward by unexpected findings. Hence it is important to discuss how they are unexpected and the implications for future research. For example, an early Australian study of the effects of participation in new learning environments highlighted an unexpected finding:

> It was the approach to the design of and induction into the learning environment, rather than the approach to content-focused teaching per se, that was centrally important to learning opportunities and the resulting outcomes in terms of challenges to, and the development of, these students' epistemic beliefs. (Taylor, Pillay, and Clarke 2004, x)

10. **How does the context influence your findings? What are the implications for others in different contexts?** Discuss the impact of your context on your findings and the relevance of your findings to others in different contexts (Healey and Healey 2018). For example, a study of how students engaged with threshold concepts in three seminars in three liberal arts institutions in the United States concluded:

> The perspectives of students in three seminars likely will not (and should not) reframe the literature on threshold concepts. Still, scholars and teachers should take seriously the experiences and insights of students as learners (Cook-Sather et al., 2014; Healey et al., 2014). (Felten 2016, 7)

11. **What are the limitations of your research? What unanswered questions remain? What other questions follow for future learning and teaching research?** Add any caveats you have about the limitations of your findings and identify unanswered and new questions that need to be

addressed. For example, Deandra Little, David Green, and Colette Hoption (2018, 334-6) warn that:

> As with any study at the level of discipline clusters, caution is advised. Disciplines are not monolithic, but dynamic. . . . In this study, contrasts emerge not just within discipline clusters, but *within specific fields* in those clusters. . . . Our data specifically look at *research approaches*, and do not speak to how developers' training might influence other aspects of their educational development practice. We do not recommend extrapolating from these data to other domains of their work. . . . Our study explores socialization and imprinting among developers . . . raising several questions for future projects: Which features of prior fields endure most in other aspects of developers' work? Does imprinting differ if our migration into educational development is voluntary or forced? To what extent do developers' assertions of disciplinary distinctiveness denote genuine differences versus an exaggeration of disciplinary identity in an unfamiliar, transdisciplinary field?

**As with other sets of guiding questions in this book, select those questions that are relevant to your context, add others as appropriate, and decide the order in which you will address them to communicate effectively with your audience. The questions are based on those in Healey, Matthews, and Cook-Sather (2019, 36-37).*

Structuring Your Article: The Importance of Headings and Sub-headings

As Thomson and Kamler write, "Headings are an important tool in the journal article toolkit" (2013, 111). Some indication of possible headings and sub-headings that you might use may have occurred to you in reading our Guiding Questions. A common structure is: Introduction, Methods, Report, and Discuss (IMRaD), but these generic headings give the reader no indication of the subject matter or argument of the article. A good test is this: if you read the title, abstract, and the headings and subheadings of an article, do you obtain a clear idea of what it is about? If not, this may be because the author is only using generic headings, and many readers may give up at this stage, as they are not persuaded that there is something interesting for them to pursue. Here are the headings used in "Demystifying the Publication Process–A Structured Writing Program to Facilitate Dissemination of Teaching and Learning Scholarship" (Weaver, Robbie, and Radloff 2014):

Background
Writing program
    Writing program principles
    Local context
    Selection of participants
Program evaluation
    Aim
    Instruments
Findings
    Personal insights–the self as writer
    Understanding writing and feedback
    Strategies in producing an academic paper
    Submission outcomes
    Feedback on writing program
    Future writing plans
    Lessons for academic development
Conclusions

You will see that although some of the headings are generic, in most cases they make the content explicit with the phrasing of the sub-headings. Similarly, in the article "Conflicts and Configurations in a Liminal Space: SoTL Scholars' Identity Development" (Simmons et al. 2013) the authors use colons to distinguish generic and specific headings:

SoTL scholars' identity: Introduction
Academic identity: Disciplined SoTL scholar versus disciplinary scholar

Troublesome knowledge and liminality
Exploring our SoTL identities: Method
Liminal identities
Doubt and insecurity: Intrapersonal conflicts
Developing SoTL identity: Intrapersonal configurations
The role of SoTL community in building an alternative identity: Interpersonal configurations
Swimming in the liminal sea
Further thoughts
Liminal scholars

The appropriate structure also varies according to the theoretical and methodological approach, as discussed earlier. Thus, for example, the authors' instructions for *Critical Studies in Education* states:

> Apart from "Introduction" and "Conclusion," the Journal rejects generic headings for article sections (e.g., literature review, methodology, findings, discussion). Instead we look for articles with section headings that reflect the substantive contribution of the section to the specific issue at hand (i.e. headings that reflect the article's unfolding argument or its steps in logic). We also prefer to see methodological issues discussed within an article's introduction rather than as a discrete section, although we recognize that sometimes it is more appropriate to deal with methodology separately. (*Critical Studies in Education*, "Instructions for Authors")

Over to You

Empirical research, whether published as journal articles or as book chapters, is key to providing the evidence that underpins informed conversations about learning and teaching in higher education. Developing the skills to write such pieces will maximize the likelihood that editors will accept your work for publication and that potentially interested readers will be drawn to read and cite that work. Questions to ask about writing empirical research articles include:

- Are you sitting on some empirical research about learning and teaching in higher education that you have not found time to write about?
- Which of our Guiding Questions do you think you need to answer to write your article? What other questions are important for you to tackle?
- Which outlets would you consider writing your research article for (see chapter 8)?