# Chapter 7
# From a Research Project to a Journal Article

**Abstract** Very few dissertations make a successful transition to an article or book, even though degree recipients are encouraged by their committee members to pursue publication. From an editor's perspective, the problem here is that the authors of these lengthy documents do not know how to distill a work to its very essence or how to revise it for a readership beyond the dissertation committee. Although this problem has been discussed in the literature, practical guidance has been lacking. This chapter explains how to plan a study, collect the data, and fashion it into a research article. The chapter offers a widely accepted structure (IMRaD) that guides the writing of a research report and supports publication from the outset. It clearly explains how to write the title, abstract, and each section of a research report. In addition, it offers a checklist for self-evaluation of a research manuscript and a series of steps necessary to prepare the work for publication. The many activities included have value both for inexperienced and experienced writers.

Of all the contributions that scholars can make to the literature, original research is widely regarded as the most prestigious because it is advances thinking and uses the scientific method. Consider the situation of a professor who has gathered survey data for six semesters from the students enrolled in various sections of a course that he teaches regularly. A colleague suggests, "Why don't you try to publish this?" so he attempts to heed that advice. The response from reviewers, however, is disappointing.

The editor's decision is "major revisions are required", but the professor abandons the project instead. What is worse is that he decides he "just isn't a researcher" and secretly worries that he will not have enough published scholarship to be awarded tenure. What went wrong here, exactly? There are several things.

First of all, the author seeking publication failed to think back to doctoral dissertation days when he was required to develop a theoretical framework, complete the institutional review board process, and write about the limitations of the research. Even though the dissertation is a sort of "dress rehearsal" for writing research, he did not transfer and apply that learning to writing a journal article. Second, he did not do his homework on the journal. If he had studied several published examples of survey research, he would have known that discussion of survey design and development was included, as was the IRB approval process. Third, the professor did not understand the process of manuscript development. If he did, he would have



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asked knowledgeable and trusted colleagues to review the work prior to submission; he also would know that a request for revisions is the most common decision from an editor. Fourth, the professor allowed himself to become overwhelmed by the comments rather than taking a step back and considering how he might address each one. Yes, it would take additional work but he had received clear direction on what would be necessary to earn the acceptance of the reviewers.

## Criteria for Quality in Quantitative Research

Published quantitative research makes an original contribution to knowledge, theory, and practice; it also disseminates research findings in a way that researchers can use and replicate. Research also serves as a ballast and a guide for future research. However, conducting and writing an empirical study in a publishable format can be challenging and intimidating not only to novice researchers but also to experienced researchers. This feeling can be reduced when they use a practical and systematic approach (Cunningham, 2004). Davie (2012) suggests that, prior to writing the research study, researchers need to evaluate the quality of the study using the checklist in Activity 7.1 As you read through these questions, it becomes even more apparent that the professor in the example that introduced this chapter faltered at this initial step.

**Activity 7.1: Checklist to Evaluate a Quantitative Study**

Use the following questions to evaluate a quantitative study—one that you have written or that is in development. What flaws have you identified?

| Yes | No | |
|---|---|---|
| _____ | _____ | Does the study have an appropriate research design? |
| _____ | _____ | Were rigorous and realistic techniques used? |
| _____ | _____ | Were the researchers qualified to conduct the study? |
| _____ | _____ | Is the title informative? |
| _____ | _____ | Is the study based on a scholarly and pertinent background and rationale that is supported by related previous studies? |
| _____ | _____ | Does the study have an appropriate sample, including size? |
| _____ | _____ | Did the study use appropriate methods of measurement and manipulation? |
| _____ | _____ | Did the study control for quality? |
| _____ | _____ | Did the study address ethical issues? |

Success in publishing a quantitative research article requires attention to three interrelated elements: (1) the complete concept, (2) the achievement of the study, and (3) the description of the study. Although the three major elements are important, the guidelines presented below primarily address the third component, because a study that is well written but has a weak research design is just as likely to be rejected as a study that is well-designed study but poorly written. The following

guidelines can help researchers publish their research manuscript. A published research article is usually some type of study that was carried out and is reported in a structured format that is presented in a logical sequence.

## Structured Format and Content

In developing a manuscript for a research publication, researchers need to use the traditional format, language, and style that researchers use in reporting their study. The manuscript needs to briefly and clearly describe the study. It needs to follow a set of principles in a logically and efficient way that includes a title, an abstract, and four sections that consist of introduction, methodology, results, and discussion (IMRaD). In 1979 the American National Standards Institute adopted Standard Z39, which established IMRaD as the official standard for presenting scientific information that is in common use. Figure 7.1 explains the IMRaD format (Annesley, 2010c).

**Activity 7.2: Applying the IMRaD Structure**

Select a quantitative manuscript in development, one that has been rejected, or a publisher journal article. Use the questions Fig. 7.1 to evaluate its adherence to the IMRaD structure. What strengths and weaknesses did you identify?

**Online Tool** Richard Jewell has advice on writing papers using the IMRaD structure and several sample papers in Chapter 50, posted at: www.tc.umn.edu/~jewel001/CollegeWriting/home.htm.

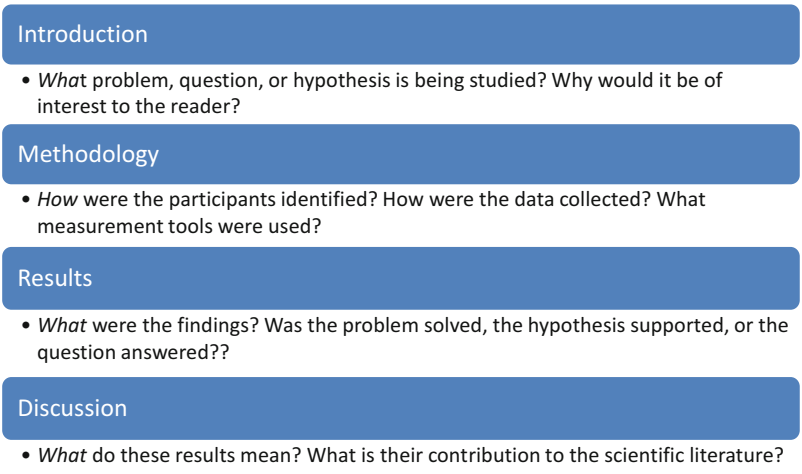


**Fig. 7.1** IMRaD structure for a quantitative report

**Table 7.1** General components of quantitative research article

| Component | Description/purpose |
|---|---|
| Title | Would readers understand the nature of the research study and determine if they wish to read it from the title? |
| Abstract | Would readers know what the study was about from a brief description of the study? |
| | Would readers understand the study from a summary that ranges between 200 and 300 words? |
| | Would readers identify the relevance in the study based on the key words that are used for indexing purposes and on-line searches of databases? |
| Introduction | Do the brief descriptions of previous related studies support the current research? |
| | Does the theoretical framework justify the need for the current research study? |
| | Does the introduction conclude with the hypotheses or research questions and the purpose of the study? |
| Methodology | Does it include a description of everything that is needed to replicate the study? |
| | Does it explain and justify the methodology that was used? |
| | Does it describe procedures, materials, measures, analyses, and subjects that are used (including ethics and consent)? |
| | Does it describe and justify the sample size calculation? |
| | Does it describe and justify the statistics used to analyze the data? |
| Results | Do they describe all findings (including significant, negative, and non-significant results)? |
| | Do they complement the description of the outcomes with appropriate tables, graphs, and figures? |
| Discussion | Does it emphasize the major findings and compares them with findings from previous related studies? |
| | Does it discuss any limitations of the study? |
| | Does it provide recommendations for future research and practice? |
| References | Do they provide complete references that were cited in the text? |
| | Do they use the current edition of the APA manual to cite references in text and to list them in the references' section? |

The IMRaD format is generally used to report original quantitative research. It offers an appropriate and systematic interpretation of a research study to help readers identify *what* is known, *what* is not known, and *why* the study was conducted (Introduction); *who* the subjects were, *what* materials/instruments and procedures were used, *how* the determined using the materials/instruments and procedures (Methodology); *what* was learned (Results), and *what* significance and meaning of the study has (Discussion) (Todorovic, 2003). To address each of these questions, a research manuscript needs several components, which are found in Table 7.1.

# Guidelines on Writing Each Section of the Quantitative Manuscript

Quantitative researchers sometimes make the mistake of thinking that successful publication of an empirical research article is all about the statistical design and data. As important as these things are, it is equally important to present the material effectively.

## *Developing a Title*

The proverb, "You don't get a second chance to make a first impression," (Annesley, 2010i, p. 359) can be applied to the title. It too provides the first impression of the manuscript to readers, reviewers, and/or editors. The words in the title need to describe the content in a clear, brief, informative, and relevant way that is appropriate to the target audience (Annesley). The title has accurate information to help readers determine the relevance of the study to their research and to guide electronic indexing services to rely on the description in the title to guide readers in searching for any literature related to their research. An appropriate title has "… the fewest possible words that adequately describe the contents of the paper" (Day & Sakaduski, 2011, p. 9). The American Psychological Association's (APA, 2010) style manual sets a limit of 12 words on a title (not counting articles and prepositions). Titles need to be balanced; that is, they are not too long or too short. Lengthy titles generally have an unnecessary number of wasted words such as those that begin with "Investigations on …". In contrast, short titles are extremely vague such as the title, "Writing Reports" gives the reader no information about the article. Consequently, each word in the title needs to be methodically selected, be related to other words, and properly placed in the title. Effective titles (a) define the manuscript's main problem; (b) initiate its topic; (c) are specific, clear, precise, and complete; (d) avoid using abbreviations; and (e) are of interest to readers (Peat, Elliott, Baur, & Keena, 2002). Annesley proposes several guidelines in developing a title for a quantitative study:

- **Be Concise**. A title should include keywords that describe the content of the research report and be fewer than 12 words. Avoid words such as "a study of," "investigation of," "development of," or "observations on" because they usually are unnecessary. Also avoid using terms such as "new," "improved," "novel," "validated," and "innovative" because they cause readers to think, "I'll be the judge of that."
- **Use titles that suggest the type of study**. For example, the word "relationships" suggests a correlational study, the word "effects" suggests an experimental or quasi-experimental study, and the word "factors" implies factor analysis.

- **Be Informative**. Titles need to provide sufficient information to briefly describe the research report. They should include the independent variable, the dependent variable, the observed effect, and the population studied.
- **Use Keywords and Terms Wisely**. Key words and terms need to focus on the content of the study to attract the readers' interest. These are used throughout the article and will be used for indexing purposes as well. As you select keywords, consider the terminology that other scholars might use to search the literature rather than using terminology that is unfamiliar to most researchers.
- **Focus on the Journal and Target Audience**. Journals provide specific instructions on the number of words or characters in a title and the use of subtitles. Review back issues of the intended outlet to get a feel for the way that titles typically are written.
- **Avoid Abbreviations**. Abbreviations that are not well known may confuse readers and result in less effective dissemination of the work.

Readers usually read the title first, because it represents all of the sections of the study. Annesley (2010i) states that the title is "the face of the paper—the descriptor, the advertisement, the pitch. Like a billboard, it is your 10 s opportunity to connect with the passerby (the reader)" (p. 357). Many times, a working title that was used during the development of the research needs to be revisited and revised to be more precise after the research has been completed. Be certain to do this and to develop a clear, concise, and precise title that is your research "in a nutshell".

## *Writing an Abstract*

Abstracts summarize the study in a word count that typically ranges between 200 and 300 words. The abstract persuades readers to read the complete study. Usually researchers depend on the abstract to identify studies that are related to their research. Therefore, the abstract provides a brief and comprehensive summary that matches the text of the manuscript (Sharp, 2002). Since abstracts summarize the whole study in one paragraph, it is important that the abstract is well-written, which means that the abstract needs to briefly describe all of the sections in the study. Use the information in Activity 7.3 to evaluate an abstract that you have written or to guide you in preparing one.

**Activity 7.3: Self-Assessment of the Quantitative Research Abstract**

Look at an abstract that you have written or are developing and use these questions to evaluate it (Koopman, 1997). Does the abstract:

- build **motivation** to read on? state the importance of the study, the problems in this area, and the contributions to the field?
- identify the **problem** and its **scope**?
- clarify the **approach**? Include the critical variables and the procedures used in the study?

- share the **key findings**? provide answers to the research questions with quantitative data?
- mention **conclusions and implications**? Describe the nature of the contribution made?

An abstract is self-sufficient and independent of the manuscript. It should assist researchers to immediately determine its relevance to their research. Hence, abstracts offer a concise but complete summary about the study in a well-organized, well-written, and clear style. They summarize the study by communicating its purpose, methodology, major results, and conclusions (Selvanathan, Udani, Udani, & Haylett, 2006).

**Key words** that define or identify topics in the study are included in the manuscript's title page (Sharp, 2002); journals typically include them below the abstract. Readers use these key words to determine if the study is related to their research. Remember that the keywords are used for indexing purposes also, so you will want to use terminology that would be used by others when conducting an online search of the literature to make your work more accessible and increase your "academic digital footprint" (Croce, 2013).

## Writing the Introduction for a Quantitative Study

The introduction provides the reader with background information on the research topic. In several sentences it describes what is known about the topic, gaps to be filled, and its importance. From the outset, the introduction asserts the importance of the study clear through a concise statement of purpose (Milardo, 2015). The introduction establishes the foundation for the study (Annesley, 2010d) and helps readers to understand it. It critically reviews and analyzes the outcomes of published studies to justify the researcher's study, develop a theoretical framework, and validate the study's questions/hypotheses and methodology. The introduction has four components:

1. a statement of the study's purpose
2. the research questions or hypotheses and how these will be addressed
3. the projected results
4. the rationale (including the theoretical framework) that contributed to the conceptualization of the project
5. the anticipated contribution to the field (Udani, Selvanathan, Udani, & Haylett, 2007)

Figure 7.2 identifies three stages in writing the introduction (Derntl, 2014).

Generally speaking, the introduction should be fewer than two double-spaced pages (El-Serag, 2006). Make it concise by crafting a well-defined rationale that focuses on the purpose of the study and the research questions/hypotheses, as this is

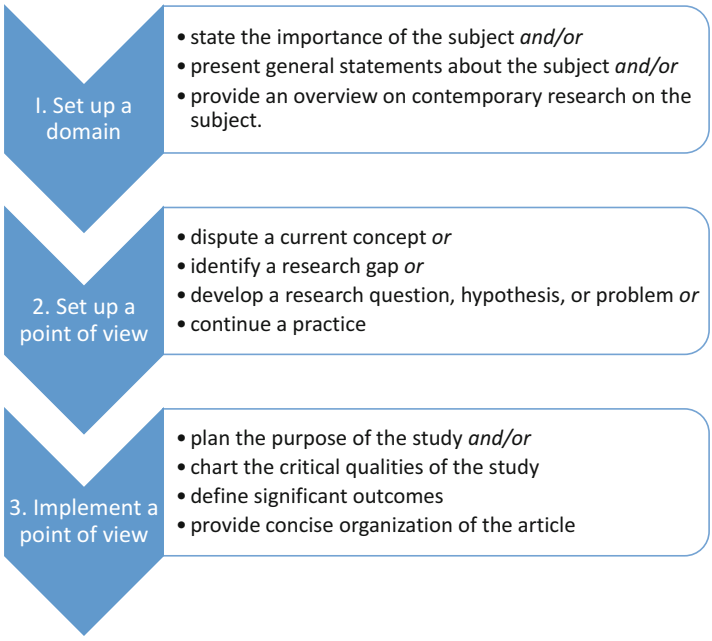


**Fig. 7.2** Three stages in writing the introduction for a quantitative study

the best way to "walk readers through" your reasoning. A "script" for generating the first draft of an introduction to a quantitative research article is:

- We hypothesized that …
- We tested the hypothesis that …
- We asked whether …
- To answer this question, …
- This prompted us to investigate whether …
- To resolve this apparent difference …
- We solved this problem by …
- The purpose of our study was … (Annesley (2010d, p. 708).

Note that this is a way to get started; you'll need to rewrite the introduction so that it flows and does not sound formulaic.

**Activity 7.4: Evaluating the Introduction to a Quantitative Manuscript**

Use these questions to evaluate the introduction section of a quantitative manuscript:

- Is there is a clear and unambiguous question or problem statement?
- Is there a brief summary of what is already known on the topic?
- Are key terms defined, using authoritative sources?
- Is there a clear and unambiguous thesis statement (main message)
- Has the importance of the paper been made clear (relevance or significance)? (Fahy, 2008, p. 115).

## *Writing the Methodology Section*

Ideally, the methodology section provides sufficient information to guide other researchers to replicate the study, assess the outcomes, and compare the findings with other studies. It includes a description of the:

procedures that were used to address the research questions/hypothesis
subjects, materials, and assessment measures
selection of the subjects (including ethical treatment of human subjects)
collection of the data
analyses of the data, including the statistical methodology and software package that were used (El-Serag, 2006).

The methodology section assists readers in understanding (a) how and why the experiments were conducted; (b) the relationship between the experiments and the other sections (e.g., results, conclusions); (c) how to successfully replicate the study; and (d) how to validate the results and conclusions based on the strength of the procedures, research design, and statistical analyses. Any procedures and measures that were used and modified based on those found in published studies are also described and justified (Udani et al., 2007). All of these details are written in several subcategories with appropriate subheadings to organize the information. To determine if all critical details are included, consider following a "who/what/when/where/how/why" format (Annesley (2010j) as described in Table 7.2.

The methodology section describes the (a) scientific procedures; (b) subjects, measures, materials and equipment; (c) procedures; (e) evidence; and analyses of the data that were used in the study (Maloy, 2001). It is important to include the details for specific experiments. Specifically, it should discuss the sources of evidence and the analyses of the data. In addition, the methodology section should reflect the information that is found in all of the other sections.

**Sources of Evidence** The research site, group, subjects, events, data, measures, and units in the study are considered to be sources of evidence, because they were used to address the research questions or hypotheses in relation to the research problem. The characteristics, procedures, selection, and justification for these sources of evidence are described (Saracho, 2013). Data are sources of evidence typically include participant and nonparticipant observations; unstructured or semi-structured interviews; documents and other artifacts; audio- or video-recordings; and standardized measures including surveys, tests, structured interview protocols, and categorical demographic information that were used to gather data across cases or units of research analyses (American Educational Research Association, 2006). Raw data are not reported but are saved and made available to those who request it. Sometimes interested researchers (e.g., journal editors, reviewers, readers) request to examine the raw data (Sharp, 2002).

**Table 7.2** Questions to draft the methodology section

| | |
|---|---|
| Who | Who recruited the subjects; kept the files; and collected, examined, and analyzed the data? |
| What | What criteria were used for selecting the subjects? |
| | What materials, procedures, and measures were used? |
| | What kind of study was it? |
| | What interventions were used? |
| | What variables were measured? |
| | What statistical analyses and software package were used? |
| | What validation and reliability estimates were used? |
| When | When was the beginning of the study? |
| | When were the data collected? |
| | When were the data analyzed? |
| | When were the findings determined? |
| | When was the study completed? |
| Where | Where were the files stored? |
| | Where were the subjects registered? |
| | Where was the study conducted? |
| | Where were the analyses conducted? |
| How | How were the subjects recruited and selected? |
| | How was the size of the sample determined? |
| | How were the groups defined and determined? |
| | How were subjects assigned to groups? |
| | How many treatments were conducted? |
| | How were the data collected, recorded, analyzed, and saved? |
| | How were the data measured and reported? |
| Why | Why were the specified subjects selected? |
| | Why were the procedures selected? |
| | Why was a selected treatment performed? |
| | Why were procedures conducted in a specific sequence? |

Adapted from Annesley (2010j)

## *Data Analyses*

A doctoral candidate is planning her dissertation and, although she has completed four required research courses, she is unsure of which statistical tests to use. She fears exposing her ignorance by asking one of her instructors but is equally fearful of making a mistake if she chooses statistical tests without some expert guidance. Fortunately, there is a research lab staffed by statistics majors where she can inquire about the appropriate statistical test. However, their rule is that they are not permitted to simply tell students what to use; the student has to arrive with some possibilities in mind and, even this causes her to procrastinate about using the university's

support services. As this situation illustrates, one of the biggest challenges is "what to use when" to analyze the data. Particularly for inexperienced researchers, determining the correct statistical tests to use with a data set can be confusing. A basic concept in quantitative research in parsimony; this means that it is appropriate to select, not the most elaborate or mathematically sophisticated analysis, but the simplest one that matches the data set. While it is common to ask for second, third or more opinions about this, it also is helpful to use a decision tree or chart first.

**Online Tool** When planning your quantitative study, try using the decision tree from Muhlenberg College posted at: http://www.muhlenberg.edu/pdf/main/academics/psychology/stats_decision.pdf.

Since the use of a statistical test depends on the nature of the data, this selection needs to be explained and justified. Fortunately, there are many online tools that follow help with selecting the appropriate statistical tests and support you in justifying your decision.

**Online Tool** The Institute for Digital Research and Education provides a very helpful chart that answers the question, What statistical analysis should I use with these data? http://www.ats.ucla.edu/stat/mult_pkg/whatstat/.

Some researchers gather more data than they need. For their statistical analyses (e.g., analyses of variance, factor analyses, regression analyses), the focus is on data that relate to their research questions or hypotheses. The statistical analyses that are used to analyze are described and justified in detail to inform other researchers and an informative way to assist researchers to understand their research. The analyses and report of the results focus on the research questions/hypotheses and lead to the conclusions that emanate from the research (American Educational Research Association, 2006).

**Online Tool** This YouTube video https://www.youtube.com/watch?v=rulIUAN0U3w from the Statistics Learning Centre, watch "Choosing Which Statistical Test to Use—Statistics Help" guides you through the seven most commonly used methods of quantitative analysis. There are others in the series as well.

**Table 7.3** Methodology section for a quantitative study

| Outline of the study design |
|---|
| Subjects |
| Method of sampling and recruitment; |
| Number of subjects; and |
| Justification of sample size |
| Inclusion, exclusion and withdrawal criteria; |
| Method of allocation to study groups |
| Variables |
| Independent, dependent, extraneous, controlled |
| Pilot studies |
| Outcome of any pilot studies which led to modifications to the main study |
| Materials |
| Equipment, instruments or measurement tools (include model number and manufacturer) |
| Procedures |
| Detailed description, in chronological order, of exactly what was done and by whom |
| Major ethical considerations |
| Institutional review board approval, compliance with principles of informed consent and ethical treatment of human subjects |
| Possible conflicts of interest |
| Data reduction/statistical analyses |
| Method of calculating derived variables, dealing with outlying values and missing data |
| Methods used to summarize data (present verb tense) |
| Statistical software (name, version or release number) |
| Statistical tests (cite a reference for less commonly used tests) and what was compared |
| Statistical significance |

From Jenkins (1995, p. 287)

## *Statistics*

The statistical procedures in analyzing the data are described and justified. In addition, the computer statistics software program (such as SAS, SPSS) that is used to analyze the data needs to be identified. Measures used to summarize the data are presented such as mean (SD), median (range), or median. Tests used in significance testing should be described, including the underlying P value used to establish significance (Boyd, Rifai, & Annesley, 2009).

Jenkins (1995) suggests a checklist that can be used in developing the methodology section (see Table 7.3).

## *Reporting Results in a Quantitative Study*

The results section needs to be brief but thorough. Begin with a sentence or two about the study and discuss only those findings that relate to the hypotheses/research questions based on the data (Maloy, 2001) and the purpose of the study. First the

subject's characteristics (such as sex and age distribution, initial and final numbers in each group, and dropouts) and outcomes for each group (treatment vs control groups) are discussed. When multiple groups of subjects are provided with several interventions, outcomes are presented from general to specific. Then related findings are combined into topics and discussed to offer a clear-cut description of the outcomes.

**Activity 7.5: Analyzing the Results Section of a Quantitative Manuscript**

Use your own manuscript, identify a published journal article that has earned an award or, use Google Scholar to locate a research article of interest that has been cited extensively. Review the methodology section of the manuscript using the outline in Table 7.3.

Researchers use tables and figures with scattergrams and graphs to communicate their results. These provide a visual description that assists readers to grasp, comprehend, and remember information. Tables, graphs, and figures should be simple, clear, and relatively self-explanatory (Cunningham, 2004). Effective visuals enable readers to see trends, relationships, outcomes, categories, or general experimental parameters (Annesley, 2010e) but they also need to be referred to in the body of the manuscript. They also should be used judiciously and formatted as required by the specific outlet (e.g., APA Style). Tables and figures are included only if they (1) will save a large amount of text and (2) distinctly assist readers to understand the outcomes. In studies with a few significant results, it may suffice to discuss them in the text of the manuscript without any visuals. On the other hand, major outcomes that use multiple data points are better understood when they are presented in tables, graphs, and/or figures. Many times authors make the mistake of using a table when a single sentence would suffice, submit more than seven tables for a short article, or include everything that was generated by the statistical software package rather than the pertinent information. Be thorough, but be concise.

**Activity 7.6: Writing an Effective Results Section**

To draft a results section, try the following: (1) Briefly describe an experiment without detail of Methods section (a sentence or two). (2) Report main result(s), supported by selected data (e.g., representative/most common, best case/example of ideal or exception. (3) Order multiple results logically (e.g., from most to least important or from simple to complex). (4) Use the past tense to describe what happened.

**Online Tool** Vanderbilt University offers a very helpful resource on how to design visual arrays of data, "Reporting Quantitative Results" at: http://virg.vanderbilt.edu/AssessmentPlans/Results/Reporting_Results_Quantitative.aspx.

## *Discussion*

Researchers use the discussion section to interpret the meaning of the outcomes. The discussion guides readers to understand the study and its significance to the field (Hess, 2004). Researchers critically analyze, compare, and discuss their results based on the stated problem, research questions/hypotheses, and methods. The discussion section also is a place where writers revisit the literature review. They compare the outcomes of their study with those from previous published studies to justify their study's outcomes, limitations, and conflicts with other studies. Before drawing conclusions, writers need to discuss and evaluate their study's agreement with, contradictions of, and/or relevance to extant knowledge in the field (Maloy, 2001). After establishing this, writers can then move to a discussion of their study's contribution to scientific knowledge, the implications for practice, and possible directions for future research (Booth, Columb, & Williams, 2008). A well written discussion provides an effective completion to a scientific manuscript paper, because it ascribes meaning to the outcomes in the study (Annesley, 2010h).

The discussion section needs to be carefully structured, because it is frequently the weakest component of the manuscript (Skelton & Edwards, 2000). A common error in the discussion section is to use "rhetoric", overstate findings, and generate assertions that go beyond what is supported by the data (Docherty & Smith, 1999; Hess, 2004). Conversely, some authors "undersell" their work and fail to make the contributions clear.

Writers of quantitative research can improve the discussion section of their manuscripts by using the following questions as a guide:

**Did the author/researcher:**

- State the study's major findings?
- Explain the meaning and importance of the findings?
- Relate the findings to those of similar studies?
- Consider alternative explanations of the findings?
- State the relevance of the findings?
- Acknowledge the study's limitations?
- Make suggestions for further research? (Hess, 2004, p. 1239).

## *Citations and References*

In preparation for conducting and writing the study, you will read many previously published articles that directly or indirectly relate to your research. This information helps to "situate" the present study in the body of knowledge (BoK). For instance, studies that (a) helped researchers define their topic and identify the knowledge gaps that need to be filled are cited in the introduction; (b) described measures, materials, and methods that were used in the study are cited in the methodology

section; and (c) helped support and interpret the study's outcomes are cited in the discussion section. Therefore, the accuracy and value of the citations and references become very important (Annesley, 2011).

Rigor in searching for and accuracy in documenting these sources is just as important as statistical precision. In addition to acknowledging others' contributions, citation of sources reveals other work that influence the present study, aids in drawing conclusions and interpreting the findings, assists editors in identifying suitable peer reviewers, and supports peer reviewers in evaluating the work. To illustrate the importance of accuracy in citing sources, a journal article was sent out for anonymous peer review to several people who were leading authorities and whose names appeared in the reference list. However, not only did the author spell one of the reviewer's names incorrectly, he also attributed the results of a study to the wrong person. As you can imagine, this did not yield positive reviews and it was not because the reviewers took it personally. Errors of this type call into question, not only the author's attention to detail but also how conversant she or he is with the subject matter. It is important to check and double-check details to avoid embarrassing errors such as this. References should be accurate, original source documents that have been read and validated by the researcher (Annesley, 2011).

While there are different referencing styles, the one most commonly used with research is the American Psychological Association (APA) style. In APA style, references are cited in the text and are listed in alphabetical order at the end of the manuscript (Derntl, 2014). Each citation that is inserted in the text indicates that the information needs to be credited to a researcher's previously published and related study. The citation has the name of the author, comma, and the publication date of the cited study. When a citation in a text refers to several authors' research, these are cited in alphabetical order. These citations are listed alphabetically in the reference section to help other researchers and readers access these published studies (Annesley, 2011). Authors must follow these guidelines for the references section, citing the researchers' work in the text, and formatting the manuscript. Be aware, however, that each publisher has a "house style" that may deviate slightly from the style manual in use. For example, Springer does not use the comma for in-text citations even though that is APA Style. So, if citing a work by Smith published in 2017, APA would have it as (Smith, 2017) while Springer's house style is (Smith, 2017).

## Appendices

Appendices are supplementary information at the end of the manuscript that are usually used to describe materials, procedures, or statistical analyses that were used in the text. They provide information that helps researchers and readers get a clear understanding about the study's procedures and results. Appendices may or may not be published in the print journal. In the interest of conserving space and paper, they might be available in the online version of a publication (only) as a supplemental item.

## Acknowledgements

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*We wish to thank Professor Ringgold for his statistical assistance in analyzing the results.*

Acknowledgements also are used to credit others who contributed to the work but did not write the manuscript, for example:

*The authors wish to acknowledge ___ and ___, the research assistants who served as additional raters of the data to establish interrater reliability estimates.*

Some researchers are provided with financial support to help them conduct the study and/or develop the manuscript. A sample acknowledgement is:

*This research was supported by a Faculty Research Grant at XYZ University. The opinions expressed in this article do not reflect the positions, policy, or endorsement of the University.*

## Overall Evaluation of a Quantitative Study

Credibility of the study is based on the researcher's ability to effectively design, execute, and describe the project. Therefore, it is important that researchers evaluate the presentation of their study before submitting it to a journal. Quantitative studies need to be evaluated to determine their contribution to the field. The evaluation process needs to objectively assess the strengths and the weaknesses of a report. Researchers need to consider if the strengths of the study are better than its weaknesses, the results influence practice, and the results suggest future research directions. Evaluating the quantitative research report may initially seem like an overwhelming chore but using a systematic approach can help researchers be more at ease and capable of evaluating their quantitative research reports (Russell, 2005). What if you could get a "report card" on your quantitative study prior to submitting it? Authors are sometimes unaware that there are many such self-evaluative tools in existence. One that we found helpful is in Table 7.4. Going through a set of questions such as these is especially useful if you are writing a quantitative research report with a team and different people are writing various sections of the manuscript.

**Table 7.4** Tool for self-evaluation of quantitative research

| |
|---|
| **Introduction and review of the literature** |
| _____Is the problem introduced? |
| _____Does the problem establish the importance of the study? |
| _____Is there a discussion on how the study will advance knowledge in the field? |
| _____Are research questions and research hypotheses well stated? |
| _____Are relevant theories described? |
| _____Is there background information about the problem? |
| _____Is the next step essential to research a problem identified? |
| _____Is the purpose of the study described based on previous research? |
| _____Is there a flows from one topic to another? |
| _____Are headings and subheadings helpful to readers in understanding the major points? |
| _____Is there a critical analysis of previous research (strengths vs weaknesses)? |
| _____Is the cited research current and appropriate? |
| _____Are primary sources mainly cited? |
| _____Are gaps in the literature identified? |
| **Methods and subjects** |
| _____Was random sampling used? |
| _____Was stratified random sampling used? |
| *If random sampling wasn't used:* |
| _____Were subjects selected from the target group? |
| _____Were subjects from diverse sources included? |
| _____Were the limitations addressed? |
| _____Were the subjects well described? |
| _____Were demographics of the sample discussed? |
| _____Was an adequate sample size used? |
| _____Were the guidelines of informed consent followed? |
| **Instruments** |
| _____Were examples of test questions provided? |
| _____Was the item-response format (e.g., Likert, multiple-choice) specified? |
| _____Were the testing environment and testing limitations described? |
| _____Was the selection of the instruments justified? |
| _____Was information provided on how to obtain the instruments? |
| _____Was the evidence of instrument reliability and validity described? |
| **Data collection procedures** |
| _____Were subjects randomly assigned to groups? |
| *If random assignment was not used:* |
| _____Was evidence provided that showed the similarity in the groups? |
| _____Were the procedures in collecting the data well describe? |
| _____Was a natural setting provided for the experiment? |

(continued)

**Table 7.4** (continued)

| **Results** |
|---|
| _____Were the statistical procedures clearly described? |
| _____Were the appropriate statistical procedures used? |
| _____Were the results that were statistically significant described? |
| _____Was the statistical information described in relation to the research hypothesis and research question? |
| _____Were related statistics presented in a table with highlights discussed in the results? |
| **Discussion** |
| _____Were readers reminded of the study's major purpose and results? |
| _____Was information provided about the significant results? |
| _____Were the interpretation of the results of the study described in detail? |
| _____Were recommendations provided for future research? |
| _____Were recommendations provided for practitioners? |
| _____Were limitations discussed in relation to the study? |
| _____Were the consistencies of the results from previous studies discussed? |
| _____Was the information gap from previous studies addressed? |

Adapted from Pyrczak (2012) and Hittleman & Simon (2006)

The process of evaluating a research study consists of an in-depth assessment of each stage of the research process. The purpose of evaluating research is to emphasize both strengths and weaknesses. Some researchers are doubtful of their interpretations. These are normal concerns, which can be resolved by reading and discussing research reports. If they practice using the criteria to evaluate research reports, they can improve their critiquing skills (Coughian, Cronin, & Ryan, 2007). Many novice and inexperienced research are unable to understand the concepts and terminology related to research and research critique. When you think about it, quantitative research is like learning another language: it uses words (e.g., vocabulary, key concepts), has specific ways of structuring sentences (e.g., syntax or grammar), and is used to convey meaning (communication). Mastering the "language of science" is every bit as challenging as becoming fluent in a language other than your native tongue. Being able to critically analyze and read research advances a field by promoting evidence-based professional practice (Russell, 2005).

## Preparing the Manuscript for Submission

For many scholars seeking to publish their work, the evaluation process for research articles can seem like the proverbial "black box" in a mechanical or electronic device that performs a single task but remains complex or secretive. Authors are sometimes reluctant to subject their work into the so-called black box of editing due to misgivings about how they will fare and an aura of mystery about how the process operates (Baruch, Konrad, Aguinis & Starbuck, 2008; Stolerman, 2009).

Nevertheless, many academics feel pressured to publish in scholarly, peer-reviewed journals. At universities that are known to be major research institutions, faculty may even get a short list of the journals that will count towards tenure and promotion. Unfortunately, the overwhelming majority of manuscripts submitted fail to make it through the journal review processes. To increase your chances of success, use every tool in this chapter first. Then plan to submit a manuscript that:

- is written for the readership of the journal
- conforms to the writing style of the outlet
- is representative of the journal's quality
- convinces the editors and reviewers the study is important
- advances knowledge in the field
- uses a methodology that is systematic and rigorous
- selects appropriate measurement tools
- analyzes data accurately
- explains empirical findings
- articulates the nature of the contribution made and its impact on the field (Ortinau, 2011).

Reflect also on the researcher's role. The sixth edition of the *Publication Manual of the American Psychological Association* (APA, 2010) indicates that researchers are responsible for: preparing the manuscript; assuming organizational and ethical responsibilities; fulfilling the journal's policy prerequisites; and collaborating with the journal editor, editorial staff, and publisher. Such obligations involve key issues, such as using an accurate research design to accept or reject the hypotheses, theoretical framework that supports the research hypotheses, data analyses, interpretation of the results, and required formatting of the manuscript as well as a well-written study. Clearly, researchers need to assume numerous responsibilities and demonstrate a constellation of skills to develop and submit an appropriate manuscript to a scholarly research journal.

## *Choosing Suitable Outlets*

Far too often, authors orchestrate failure by neglecting to carefully select a suitable outlet for their work. The same manuscript that will be rejected without review by one journal can be warmly received by another. For example, consider this description from *The Journal of Research in Childhood Education:*

> The *Journal of Research in Childhood Education*, a publication of the Association for Childhood Education International, features articles that advance knowledge and theory of the education of children, infancy through early adolescence. Consideration is given to reports of empirical research, theoretical articles, ethnographic and case studies, participant observation studies, and studies deriving data collected from naturalistic settings. The journal includes cross-cultural studies and those addressing international concerns.

> Important to the purpose of this journal is interest in research designs that are integral to the research questions posed, as well as research designs endorsed by the scientific community. Further, the Journal seeks to stimulate the exchange of research ideas by publication of small-scale studies carried out in a variety of settings (homes, centers, classrooms, hospitals, and other community environments), and whose results are reported where appropriate with the inclusion of effect size information.

First of all, you know that they will consider quantitative research. Secondly, you know that they have an international audience. Finally, it is clear that their emphasis is on the education of children. So, not matter how wonderful your study of graduate students in your state might be, it will not be considered.

Before submitting a manuscript to a journal, try the following strategy:

- confirm that their manuscript is appropriate for the selected journal
- review the journal website to learn more about the outlet's mission, readership, and requirements
- study the journal's guidelines for submission
- peruse manuscripts previously published in the outlet
- proofread the manuscript to make sure that the journal is appropriate for the manuscript and meets the journal's expectations.

An editor asked a group of authors "What would you guess as the top reasons for manuscript rejection?" The audience mentioned several possibilities, all having to do with writing quality. "Actually, it is simpler than that. First, I read the title. If it is outside the scope of our publication, it is rejected. For example, the journal focuses on leadership, specifically the leadership of school principals. If the title has nothing to do with that, we're not interested. The second thing that I look at is the length. I will not impose on my all-volunteer reviewers by sending them a fifty page manuscript to review. If the author has not followed the guidelines, the manuscript is returned to them—either as 'revise before review' or as an outright rejection." The journal's website offers researchers manuscript specifications, requirements, and guidelines (Albers, Floyd, Fuhrmann, & Martínez, 2011; Floyd et al., 2011; Nihalani & Mayrath, 2008a, 2008b), which are also found in the hard copy of the journal in a section titled, "Instructions for Authors." These instructions offer authors guidelines to follow in preparing their manuscript. For instance, it indicates the length in words, main parts, referencing style, and how to set up tables, figures, and other illustrations. Authors who disregard the journal's guidelines dramatically decrease their chances for acceptance of the manuscript (Dixon, 2011). One journal editor estimated that she receives, on average, 15 manuscripts every week of the year. With this number of submissions, it is easy to see why those that do not conform to the guidelines would be rejected.

**Manuscript Submission** Authors can also use the journal's website to electronically submit their manuscripts. They follow the directions for submission that are prompted in its website. Most journals also require authors to submit a cover letter that verifies that the manuscript is the author's own work and that it is only being submitted to the selected journal. Manuscripts are submitted to one journal at a time

and can only be submitted to another journal when the journal editor where the manuscript was first submitted declines to publish it.

When authors submit a manuscript to a journal, the editor or editorial assistant acknowledges the receipt of the manuscript, assigns it a number, and checks to see if the manuscript is appropriate for the journal. The editors may determine that the manuscript is unsuitable and reject it without sending it out for review. Another common decision is "revise before review". This means that the author must modify the manuscript before the editor will send it out to reviewers (Albers et al., 2011; Floyd et al., 2011).

**Peer-Review Process** For more than two centuries peer review has been used, because it is considered the seal of reliable science. Editors use the peer review process to select the best papers for their journal. Since experts lack expertise in all areas, reviewers with the appropriate knowledge assist editors in identifying the appropriateness of the manuscript for their journal. Basically, the review process is about a community of researchers who assess the value of the manuscript and provide useful and constructive comments to improve the manuscript (Udani et al., 2007).

The submission of a manuscript to a journal starts the peer-review process to determine the quality of the manuscript, its contribution to the field, and its applicability to the journal (APA, 2010). After the editors decide that the manuscript is suitable for the journal, they assign it to an editor to send a blind copy (no author identification to make it anonymous review) to reviewers (typically three) who know the area to assess the manuscript. When the peer-review process is completed, which usually takes approximately 2–4 months, the editor decides the manuscript's disposition (Floyd et al., 2011), summarizes the reviewers' commentaries with recommendations, communicates the information to the author, and lets the author know the decision to "accept, revise and resubmit," or "reject" the manuscript. Authors who revise and resubmit a manuscript write to the action editor a letter addressing the revisions based on the reviewers' comments. The editor's reasons for rejecting a manuscript can be to modify the manuscript and submit it to a different but appropriate journal (Martínez, Floyd, & Erichsen 2011). The peer-review process can be discouraging, annoying, irritating, and time-consuming, but it is thought to be a valid and scientific practice (Albers et al., 2011). The peer-review process is a cooperative undertaking, because an intelligent and forthcoming review can considerably enhance the clarity of the submitted manuscript, which makes it essential to scientific publications.

Ultimately, the decisions that a researcher makes about all of the issues in this chapter will expand or limit opportunities to share work with others and make an enduring contribution to the field. A very common mistake is to assume that the truly important part of quantitative research is all about statistics and that "writing it up" is just a formality. Nothing could be further from the truth. The way the work is presented is just as important as the work itself. If the ideas are muddled, the writing is awkward, or the requirements of the journal are flagrantly disregarded, all of the work invested in conducting a rigorous research project will go unrecognized.

Stated bluntly, research outcomes become meaningful when they are published. Benjamin Franklin once observed that there is no higher honor than to have one's work "respectfully cited" by respected peers and this is no less true in higher education. In fact, peer review is a cornerstone of Academia and earning the approval of fellow experts is an important part of the scholar's life. While the increase in the number of researchers within various disciplines has enhanced scholarly publications and communication among scientists, it also has intensified competition for the few available slots for publication of quantitative research. As one small illustration, a quarterly research journal publishes, on average, ten manuscripts per issue. This means that, all year long, just 40 manuscripts from among those submitted will be accepted and disseminated. The editor estimates that over 400 manuscripts are submitted each year, which means that about 10 % find a place of publication in this outlet. Understanding this common scenario suggests several important takeaway messages from this chapter on quantitative manuscripts.

## Conclusion

A team of researchers consisting of two Educational Psychology professors, one Curriculum and Instruction professor, a school administrator and a program director worked together on a project for an entire school year. One professor and the school personnel were the program developers; they implemented the program and collected the data. One member of the team was a statistician; he analyzed the data. Another was a prolific author on the subject; she wrote the literature review. The literature review was revised significantly 17 times before sharing it with the team and the statistician said, "It would have taken me months to write that—and it probably would not have been that good." The statistician analyzed data gathered on the experimental and control groups; he returned to the data set several times to get different "cuts" of the data and to complete a post hoc test. Proud of their work, they submitted it to the premier journal in the field and, 12 weeks later, the decision was "revise and resubmit". Instead of balking at the outcome, they corresponded back and forth and make every effort to address each recommendation. The editor responded with a few minor suggestions that required additional attention. After those were completed, the work was accepted. The entire process, from project to print, took 2 years but, when the final revision was filed and accepted, the editor wrote, "I understand your study well now and we are pleased to be publishing it in the journal." Contrast this experience with the expectations of some authors who, feeling pressured to publish in time for a fall review, begin sending out e-mails in May to editors asking if it is possible to get something published by October. Given that each round of reviews takes 8–12 weeks and that leading journals often are planned 1 or 2 years in advance of actual publication, such inquiries only serve to annoy editors and expose ignorance of scholarly publishing processes. When it comes to peer-reviewed academic writing, abandon all hope of immediate publication, uncritical acceptance, and bulging bank accounts. Replace it with the

expectation that it will take time that revision will be necessary, and that rewards are many times intangible. To bring expectations back down to earth, remember three things. First, developing research manuscripts is just as difficult as designing and conducting the study. Researchers—both inexperienced and experienced—need to revise the manuscript many, many times; they also need to revisit the work based on feedback from colleagues who are both familiar and unfamiliar with the area of study. Secondly, manuscripts need to be clear, straightforward, and understandable. However, if you carefully follow the very structured formats outlined in this chapter to generate their first drafts, you will be well on your way to producing a better research manuscript. Third, part of the responsibility of a quantitative researcher is to clearly communicate the purpose of the study, research questions, and expected outcomes; accurately describe the methodologies (e.g., subjects, measures, treatment); and appropriately present the results to assist the editors and reviewers to determine the quality and the importance of the manuscript that is submitted for publication. By adhering to the guidelines offered here, quantitative researchers will significantly improve their chances of getting a manuscript accepted for publication as an article, book chapter, or even a book.