

From Concept to Publication: A Beginner's Roadmap to Scientific Writing

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Abstract- Many early-career researchers encounter significant challenges in crafting scientific manuscripts, often due to a lack of formal training in the articulation of research findings in written form. Despite these hurdles, publishing is crucial for career advancement, securing research funding, and achieving academic credentials. This guide delineates the fundamental steps for composing a scientific article, including the essential sections a typical manuscript should contain, the key components of each section, and strategies to enhance the manuscript's appeal and suitability for publication

Index Terms- Scientific Writing, Research Publication, Academic Writing Training, Article Structuring, Publishing Tips

I. INTRODUCTION

Every researcher has faced the daunting challenge of a blank page at some point in their career, unsure of where to begin and what to write first. Conveying one's research in a clear and publication-worthy format is no easy feat. The significant investment of time, energy, and often money into research creates a deep and emotional connection to the work. This connection naturally leads to a strong belief in the research's value and its significance to the scientific community. However, this deep involvement can make it difficult to maintain objectivity and clearly present the research in an accessible manner for others, especially those who may not be experts in the field, to understand and appreciate the importance of the findings.

The old adage "publish or perish" is still relevant today. Many young researchers are under pressure to produce scientific publications to advance their careers, support funding requests, justify previous funding, or fulfill requirements for university qualifications like a Master's degree or doctoral thesis. However, many young researchers receive

little to no training in the art of writing a scientific article.

For clinicians, the demanding clinical workload often relegates research and scientific writing to secondary activities that are not immediate priorities. Consequently, they can only dedicate small, irregular amounts of time to these tasks.

However, given the fierce competition among high-quality papers submitted to journals, it is essential to get the fundamentals right for your paper to succeed. Don't you think your work should be judged on its scientific merit rather than being rejected due to poor writing or a disorganized and confusing presentation of data?

With this in mind, we offer a step-by-step guide to writing a scientific article, applicable to most medical disciplines, not just geriatrics or gerontology. We will begin by outlining the main sections of the article and then delve into the key elements that should be included in each section. Additionally, we will provide tips for crafting the abstract and title. This guide is designed to help young researchers with little writing experience create a solid first draft of their work, which can then be reviewed by co-authors and senior mentors for further refinement, ultimately aiming for publication in a scientific journal. While not exhaustive, this guide complements many excellent resources available in the existing literature (Branson 2004, Guyatt and Haynes 2006, Keen 2007, Powell 2010, Driscoll and Aquilina 2011, El-Serag 2012, Whitehouse 2013, Abishag, Betsy et al. 2019) and online (Whitehouse 2013).

II. GETTING STARTED: THINGS TO DO BEFORE YOU WRITE A WORD

Before you begin writing your article, it's important to complete a certain amount of preparatory work. This background work should typically be done before you reach the writing stage, as it also provides essential context for the research project you are documenting. The time you spend preparing the protocol for your project is an investment that pays off when it comes time to write the article based on that project. Therefore, you likely conducted a thorough literature review to understand the current state of knowledge and ensure the originality of your research while developing the protocol. This review can be directly utilized in your paper.

While reviewing the literature, it's beneficial to take notes on key points or phrases you plan to include in your article, along with their relevant references. Using reference management software—whether free or commercially available—can be very helpful in organizing the large volume of references you review and in sorting out the most important information.

Typically, you will have completed the statistical analysis of your data by this stage, which will form the foundation of your results section. Some of the graphical representations of these results will be used as figures in your article. It's helpful to highlight the most significant findings as you review the results to ensure you don't overlook any crucial details.

Before you start writing, you should identify the target journal for your research submission. This choice will affect not only the formatting but also the orientation of your writing style, as it needs to be tailored to the intended readership. For instance, are you aiming for a specialist journal where readers are experts in your field, or a general medicine journal where the audience may come from various disciplines? This will determine the level and type of detail you need to include. Additionally, consider the editorial policy of the target journal. Some journals may prefer papers focused on basic research, while others prioritize clinical studies. While selecting the right journal involves multiple factors, at a minimum, ensure that your paper aligns with the journal's scope and focus.

III. WHAT ARE THE ESSENTIAL COMPONENTS OF A SCIENTIFIC ARTICLE?

Most scientific journals adhere to the "IMRAD" format, which stands for Introduction, Methods, Results, and Discussion. While there are some exceptions, you should always review the journal's author guidelines to confirm this is the preferred format. For this guide, we will focus on the IMRAD format, as it is the most commonly used structure.

Your article should include the following sections in order: an Introduction, Methods, Results, and Discussion. Additionally, it will have an Abstract that summarizes these main sections and a Title. At the end of the article, you should provide a list of bibliographic references, tables, and figure legends. There may also be optional sections such as Acknowledgements, Conflicts of Interest, and Authors' Contributions.

Below, we will examine each of these sections in detail, highlighting the key considerations for writing them effectively.

3.1. Introduction.

The introduction is crucial for capturing the reader's interest (see Table 1). During the review process, it must engage the reviewer, prompting them to think, "Why didn't I think of this?" In this section, you should explain the rationale behind your study, its objectives, and how it contributes meaningfully to the existing body of knowledge on the topic.

To begin, provide a brief overview of existing knowledge on the subject, supported by relevant references. Next, narrow the focus to highlight areas of uncertainty, including any previous or conflicting data if applicable. This should naturally lead to identifying a specific knowledge gap that your study aims to address, which is crucial for justifying the significance of your research. After establishing how your study will offer new and valuable insights, clearly state your working hypothesis, outline your objectives, and briefly describe the approach taken to achieve these goals (see Table 1).

In the background section, you should clearly convey the reasons behind your research, supported by the current state of scientific knowledge and appropriate references. You don't need to cite every article on the topic; instead, select the most relevant publications. Avoid stating overly simplistic or universally obvious truths. Aim for a balance between providing essential background information and avoiding excessive detail. Consider your target audience, which will depend on the readership profile of the journal you're submitting to. If you're writing for a specialty journal, you can include more detailed and technical background; for a broader audience, keep the information more general and accessible.

The introduction should smoothly lead to identifying the knowledge gap your study aims to address. This is your opportunity to highlight the value of your research and the new insights it will provide. Consider whether your results might impact clinical practice, contribute to a consensus on a controversial topic, or offer substantial evidence in a specific direction. Use this section to effectively "sell" your article, presenting its significance in a compelling but appropriate manner.

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|--|---|
| existing data, especially conflicting data that indicate uncertainty | effect of... There are few data to quantify... The effect of... on... remains unclear... |
| Objective (working hypothesis) | We hypothesized that the administration of... would reduce/increase... in the context of... |
| Cite the exact parameter you plan to measure | We aimed to identify/assess/evaluate/investigate... |
| Cite the type of patient population or clinical context | Through a prospective, single-/multicenter, observational/interventional... study |
| Cite any secondary objectives | (This would typically include any additional hypotheses or exploratory goals not covered under the primary objective, specific to the study context.) |

Table 1: Outline of the main features of the Introduction section, with examples.

| Feature | Example |
|---|---|
| Background describing what is known on the subject | Percutaneous coronary intervention is the cornerstone of therapy for acute coronary syndromes but may be associated with procedure-related complications. |
| What is not known? What elements are still subject to controversy? | It remains unknown whether... |
| What is the exact gap in the knowledge that your study hopes to fill? | To date, it has not been proven... |
| Cite any | No study to date has investigated the |

Concentrating unwaveringly on the topic and ensuring that each sentence fulfills a distinct purpose are imperative practices for the composition of a scientific manuscript. Numerous academic journals establish constraints on the extent of the introductory section, delineated either by word count or page length. It is imperative to consult the specific author guidelines provided by the target journal to ascertain these parameters. In the absence of explicit directives, a customary heuristic suggests that the introductory segment should encompass approximately one to one and a half pages. The articulation of the research objective is a critical component of the manuscript and requires rigorous scrutiny. It is paramount to explicitly state the research objective, delineating the precise variables under investigation and the methodologies employed for assessment. The objectives presented within the manuscript must correspond seamlessly with those outlined in the research protocol—a document that should be meticulously prepared prior to the commencement of the research project. This alignment ensures that the intent and scope of the

investigation are clear and consistent throughout the manuscript.

Employing a uniform phrasing for the research objective across the entire manuscript, including the introduction, results, discussion, abstract, and even partially within the title, is highly advantageous. Such repetition, far from being redundant, serves to reinforce the coherence and clarity of the presentation. It underscores the researcher's comprehensive understanding of the topic and aids in preventing ambiguity, thereby facilitating a clearer communication of the research's scope and findings to the audience. The scrupulous specification of the research objective is not merely a procedural formality but a foundational element of scientific communication. It necessitates precise identification of the parameters to be evaluated and the methodologies to be applied, ensuring that every aspect of the study is aligned with the initially established research protocol. This consistency in articulating the research objective throughout the document not only enhances the readability and clarity of the manuscript but also emphasizes the methodological rigor and scientific acumen of the researcher. Such detailed attention to the objective reinforces the integrity and scientific merit of the research, thereby augmenting its contribution to the existing body of knowledge and enhancing its utility for further scientific inquiry and application.

3.2. Methods

The objective of the methods section is to detail precisely what you did and how you did it, in enough detail so that any average reader with the same resources could reproduce your study. There must be a method described for every result you plan to present in your results section—meaning you cannot present the results of a test or analysis that was not mentioned in the methods. Conversely, if the details of any or all procedures have been previously published elsewhere, a brief summary will suffice, accompanied by a reference to the relevant publication.

You should begin by specifying the design of the study (prospective/retrospective, randomized or non-randomized, double-blind or open-label, controlled, crossover, factorial, etc.). Any choices of unusual

methodology for the study design should be justified, either with appropriate references or guidelines or an explanation of the specific context necessitating your particular approach. Next, describe whom or what you studied, i.e., the study population (animals, human subjects, cells, etc.). For most clinicians, the study population will consist of human subjects, so the inclusion and non-inclusion criteria should be detailed. Additionally, outline the procedures for identifying eligible patients (consultations, new admissions, daily rounds, staff meetings, case review meetings, etc.).

After describing the study population, proceed to detail all the methods used to measure the major parameters recorded in your study. You must specify the primary and secondary endpoints, along with the methods used to measure them. This is absolutely fundamental, as the choice of the primary endpoint is critical to the success of the study. It is the sole criterion that allows you to draw formal conclusions about the outcome of the study and thus must be carefully selected. This point should have been thoroughly considered during the planning phase. This underscores once again how the writing of your article is greatly facilitated by proper discussion and reflection at the planning stage of your research project.

It should be noted that for retrospective studies, the methods should begin with a description of the source data for the study, including the inclusion and non-inclusion criteria and the final number of case records and/or patients selected. However, for prospective studies, the methods should describe the inclusion and non-inclusion criteria, but the final number of patients included is considered a result and should therefore be indicated in the results section, not in the methods.

Returning to the methods, for e.g.: every blood test, intervention, operation, questionnaire, imaging technique, etc., should be detailed. Where necessary, provide the manufacturer's details (manufacturer's name, city, and country of the company) for any specific equipment or tests used. Short sentences may be employed to explain why each measurement was taken. Subtitles can also be useful to separate the methods section into relevant subsections, such as

demographic data, angiographic measures, treatment, and so on.

A short note regarding ethical considerations must be included in the methods section, briefly stating that ethics committee approval was obtained for the study (or explaining why it was not, if applicable). You must also confirm that written informed consent was obtained from all subjects, or from their next of kin or surrogate, where appropriate. In the case of randomized clinical trials, it is also advisable to indicate that the study has been registered with an approved clinical trial database (e.g., www.clinicaltrials.gov), citing the registration number (Califf, Zarin et al. 2012). Most journals request that the name of the ethics committee and the date of approval be specified, and some may even require the file number to be given. There may also be varying recommendations about where to include all this information. Refer to the instructions for authors of your target journal for guidance.

A brief note on ethical considerations must be included in the methods section, stating that ethics committee approval was obtained for the study (or providing an explanation if it was not). You should also confirm that written informed consent was obtained from all participants, or from their next of kin or surrogate when appropriate. For randomized clinical trials, it is advisable to mention that the study has been registered with an approved clinical trial database (e.g., www.clinicaltrials.gov), and provide the registration number. Most journals require specifying the name of the ethics committee and the date of approval, with some even requesting the file number. Check the instructions for authors of your target journal for specific guidance on where to include this information.

The final paragraph of the methods section should outline the statistical analysis. Begin with standard statements about how data will be presented; for instance, quantitative data that follow a normal distribution should be shown as means with standard deviation, or medians with interquartile ranges for non-normally distributed data, while qualitative data should be presented as counts and percentages. Next, specify the statistical methods used, including which tests were applied to which variables, the type of

multivariate analysis conducted, and the variables involved, and the methods used for survival analysis. Include a justification for the sample size, detailing the working hypothesis regarding the frequency of the outcome, its variance, the expected difference, and the alpha and beta risks used in the calculations. Also, state the significance level for the analyses and the software utilized. Any planned subgroup analyses should be described here to avoid criticisms about post hoc studies in non-predefined subgroups. Planned subgroup analyses impact sample size calculations, and multiple analyses may require Bonferroni's correction to prevent inflating the alpha risk (Mead-Harvey 2019). These considerations, which should have been determined during project development, must be thoroughly detailed in the statistical analysis section.

Table 2: Suggestions for the tense to use when writing your introduction section

| Aim | Tense | Example |
|--|------------------------------------|--|
| To describe the current state of knowledge | Present | The integration of digital tools in classrooms continues to revolutionize education. |
| To describe observations previously published by others | Past | Smith et al. demonstrated that interactive learning significantly improves student engagement. |
| To describe a process that began at some unspecified time in the past, and is not yet complete | Present perfect | Numerous studies have explored the effectiveness of online learning platforms in education. |
| To describe something that has not happened yet | Present perfect | The full impact of virtual reality in education remains unclear. |
| To formulate your hypothesis | Past tense for first verb, Present | We hypothesized that incorporating gamification enhances student |

| | | |
|-----------------------------|-----------------------|--|
| | tense for second verb | learning outcomes. |
| To formulate your objective | Past | We aimed to assess the effectiveness of peer tutoring in improving academic performance. |

If you are well-versed in methodology and statistics, crafting this section should be straightforward. However, if you are not as comfortable with statistics, it is likely that your project had support from a qualified methodologist and/or statistician. In such cases, it would be prudent to seek their input for this section of the manuscript to ensure both accuracy and thoroughness.

A typical paragraph in the results section should initiate by specifying the type of analysis conducted—for instance, "Regression Analysis (RA) indicated that..." This should be followed by a detailed presentation of the observed results while referencing the relevant tables or figures. For example, "The student performance scores were significantly higher in the interactive learning group compared to the traditional lecture group, as shown in Table 2." In keeping with the style of the methods section, the results should be narrated in the past tense, exemplified by statements like, "Test scores were found to be correlated with study hours, as depicted in Table 2." This approach ensures clarity and precision in reporting scientific findings.

3.3. The results section

The purpose of the results section is to present your observations without any commentary or discussion. There is no need to describe the methods again, as this has already been covered in the methods section; simply report the results. Readers who have reviewed the methods section attentively will remember the methods used. Avoid making comments or interpretations, so terms like "surprisingly" or "interestingly" are generally inappropriate for this section. Ensure that you report a result for every method described in the methods section, and to enhance clarity, present the results in the same order

as the methods. Using subtitles—matching those used in the methods section—can also help to organize the results into easy-to-follow sections.

Table 3 provides a recommended list of items to include in the methods section for both retrospective and prospective studies. This ensures comprehensive and systematic documentation of the research methodology, facilitating reproducibility and transparency. For retrospective studies, the methods section should include details about the subjects involved, specifying their demographics and relevant characteristics. Inclusion and non-inclusion criteria are crucial to delineate the parameters that defined the study cohort, ensuring that the selection process is transparent and reproducible. Ethical considerations must be clearly stated, including the approval by an ethics committee, the name of the committee, the date and file number, and the process of obtaining informed consent from participants. The primary endpoint, which is the main outcome measure of the study, should be explicitly defined, along with secondary endpoints that provide additional insights. Statistical analysis methods should be described in detail to clarify how data were processed and interpreted. The data recorded during the study must be meticulously documented, highlighting key findings and observations. Sources of study data should be identified, ensuring that the origin and reliability of the data are clear. Any subgroups analysed within the study should be specified, and the number of subjects or samples included should be reported to give context to the study's scale and scope.

Table 3: Suggested list of items to be included in the methods section for retrospective and prospective studies.

| Retrospective study | Prospective study |
|---|-------------------|
| Subjects | - |
| Inclusion and non-inclusion criteria | - |
| Ethical considerations (ethics committee approval, name of committee, date and file number, informed consent) | - |
| Primary endpoint | - |
| Secondary endpoints | - |

| | |
|----------------------------|-----------------------------------|
| Statistical analysis | - |
| Data recorded | Study registration, if randomized |
| Source(s) of study data | Sample size calculation |
| Subgroups (if any) | Randomization procedure |
| Number of subjects/samples | Interventions |

A common question for researchers when writing the results section is whether to present the results in the text or through tables or figures. While there are no strict rules, generally, results that can be described succinctly in one or two lines should be included in the text. Tables are useful for presenting data such as baseline characteristics, outcomes, and treatments, especially when comparing two or more groups. Tables should highlight the most significant results and should be clear enough to convey your findings independently. Figures are ideal for representing complex data or trends that are difficult to describe textually. They are particularly useful for illustrating relationships and patterns. Be aware of any limits on the number of illustrations (tables and figures) imposed by your target journal and refer to their guidelines to avoid including too many. Additionally, avoid repeating data in the text that is already presented in a table or figure to maintain clarity and interest.

3.4. Discussion

The discussion section serves to interpret and place your results within the wider framework of existing research on the subject. Start by summarizing the main findings of your study, ensuring you use terminology consistent with the primary objective and endpoint described earlier in the introduction and methods sections, respectively. It's crucial to analyze your results thoughtfully, aiming for objectivity in presentation rather than narrative embellishment or excessive extrapolation. For example, if the findings indicate that "after implementing a new educational technology, 20 out of 25 students improved their math test scores," it would be misleading to claim in the discussion that "80% of students will improve their math scores with this technology." A more nuanced and accurate interpretation would be, "the

results suggest that the new educational technology could have a positive impact on math test scores among students." This approach avoids overgeneralization and highlights the specific context and conditions under which the results were obtained. Contextualizing your results with other studies is a crucial aspect of the discussion. Compare your findings with those reported in the existing literature. If your results differ, offer plausible explanations for these discrepancies. Consider possible differences in circumstances, populations, or methodologies that might account for the variations in findings. Discuss any particularly surprising or noteworthy results and propose potential explanations for them. Evaluate whether your findings can be applied to other contexts or populations, and if not, explain why. If you conducted multiple analyses or interventions, provide an overall interpretation of the results, considering all tests or analyses together rather than focusing on individual outcomes.

In comparing your findings to those of other authors, it's important to be diplomatic when critiquing their work. Instead of directly pointing out weaknesses, focus on highlighting the strengths of your own study, which will subtly convey any limitations of others' work. For instance, rather than stating "Smith's study was underpowered," consider a gentler approach such as "Smith's study may have been underpowered," or better yet, "Our study had sufficient statistical power to detect...". This phrasing will imply that Smith's study might not have had enough power, without explicitly criticizing it.

When paraphrasing, especially for readers whose first language is not English, be cautious to maintain the original emphasis and intent of the sentence. Changing the order or wording may shift the emphasis away from what the original author intended. Having co-authors, senior mentors, or members of your publications department review your work can help avoid these issues.

What new insights does your study offer? Emphasizing how your findings contribute fresh evidence or advance current understanding will highlight the importance of your paper and its value to the field, setting it apart from other studies on established topics. Consider whether your paper has

effectively addressed the "gap in knowledge" that you outlined in the introduction.

Don't hesitate to write an article presenting negative results. A well-executed study that does not produce positive outcomes is still a valuable addition to the existing body of evidence. You can discuss the implications of these findings, such as challenging widely accepted ideas, questioning previous results, or reinforcing a small but conflicting body of data that might have been considered merely "anecdotal." As long as your study is well-designed and conducted properly, your negative findings are just as valid and significant.

In practical terms, discuss how your results might affect practice or contribute to the state of knowledge. For example, will your findings alter prevailing opinions or practices? Also, suggest possible future research directions, particularly any new hypotheses that emerged from secondary objectives. Conclude with a summary of the strengths and limitations of your study. Addressing limitations is beneficial because it shows reviewers that you recognize the study's shortcomings and provides an opportunity to explain why these limitations might not be as significant as they appear.

3.5. The abstract

The abstract is a brief summary of the article, typically divided into sections such as background, methods, results, and conclusion. It serves as an independent summary for referencing in online bibliographic databases like Scopus, Web of Science, etc. and should be clear and comprehensible on its own, without requiring access to the full text. Often, it is the first part a potential reviewer sees when invited to review your paper for a journal. Therefore, the abstract must be concise, informative, and engaging to provide a snapshot of the main findings and entice readers to explore the full paper. As a key marketing tool for your research, it is important to dedicate time and careful thought to crafting it.

When preparing the abstract, remember that space is limited, so it must be concise. The key points for crafting the abstract are summarized in Table 4. If you've dedicated adequate time and effort to your project and article, creating the abstract should be straightforward. You can often reuse sentences from the introduction (with some condensation) and directly extract results from the results section of your article. The conclusion should be framed as the main takeaway from your work. Often, the most challenging aspect of writing the abstract is condensing it to fit the word limit of your target journal.

Table 4: Main points to keep in mind when writing the abstract.

| Partic ulars | Notes |
|-----------------|--|
| Back ground | A brief reminder of the context and a brief statement of the main objective. Should be short and to the point. Two to three sentences are generally sufficient. Identify the gap in knowledge that you hope to fill. |
| Methods | The main methods should be outlined: - The main inclusion criteria to define the study population (e.g., undergraduate students, high school teachers) - Define the study groups, if any (e.g., control group, experimental group) - Describe (very briefly) the main interventions or instructional methods (e.g., online learning, flipped classroom) - State the primary endpoint (e.g., improvement in test scores, student engagement). You will not have room to explain all the methods in detail, so stick to the overall defining criteria (e.g., students enrolled in an introductory biology course). |
| Re | List the main results, with means, standard deviations, p-values, etc., for each group. List the result of the |

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|------------|---|
| Results | primary endpoint first, followed by secondary outcomes. Ensure that you have given a result for every method you mentioned in the methods section. There should be enough detail to back up your conclusion. |
| Conclusion | A one-line conclusion summarizing your main finding is sufficient, with perhaps a short sentence with the implications for future research, if you have enough space. The conclusion should be directly related to the main objective and endpoint. |
| References | There should be no references in an abstract. |
| Discussion | There should be no discussion, or no judgmental statements in the abstract (i.e., remarks such as "Interestingly, we observed..."). |
| Figures | There should be no figures, tables, or other illustrations in an abstract. |

3.6. The title

Last but certainly not least is the title of your article. It should include key terms that reflect the main issues addressed in your work. Additionally, it should capture the reader's interest and encourage them to read the full article. Since people often search for publications using online databases like Scopus, Web of Science, etc. Your title must include relevant keywords to ensure it can be easily found in searches. A poorly crafted title may prevent your work from being easily identified and cited. Therefore, your title should stand out among numerous papers on similar topics by clearly indicating how your article contributes to the literature or addresses a specific gap in knowledge.

Although it might seem challenging to create an effective title, it's not as difficult as it appears. Some tips for crafting the title are provided in Table 5. Reviewing titles from well-regarded educational research journals, including both general education and top specialty journals in your field, can offer valuable insights and examples of effective titles. Remember that your target journal may have restrictions on the length of the title, such as a word or character limit. Crafting a concise title can be more challenging than creating a longer one.

Table 5: The main elements to be included in a successful title.

| Pointer | Example |
|---|---|
| Cite the main factors studied | State the name of the educational intervention or teaching method |
| Cite the population/educational context studied | In high school students/undergraduate science courses/remote learning environments |
| Cite the design | Randomized controlled trial/quasi-experimental study/cross-sectional survey/longitudinal study |
| Cite the main finding | Enhances/improves/increases/reduces student engagement or performance |
| Put the most important aspect first | If the focus is on the intervention or teaching method, start the title with its name (e.g., "Flipped Classroom Approach Enhances Student Engagement...") |
| Avoid imprecise formulations that serve no specific purpose | Avoid terms such as "a study of..." or "the impact of...". If there are impacts, state what they are (e.g., "Increases Student Motivation") |
| Use clear and specific terms for educational interventions | Use common names for interventions (e.g., "Project-Based Learning," "Blended Learning") and avoid jargon or overly technical terms |
| Subtitles should be used sparingly | Reserve subtitles for specific study details or to clarify the study group (e.g., "A Study in Undergraduate Biology Courses") |

3.7. References

The reference section details all the sources that informed your hypothesis and research. It is both an ethical and professional duty to document your work thoroughly and provide complete transparency in citing your sources. Properly citing the sources upon which your hypotheses are based is crucial to demonstrate their validity. References not only support your work by situating it within the broader context of existing studies but also guide readers who wish to explore the topic further.

Many young researchers find it hard to judge when it is necessary to cite a reference. Basically, any idea or fact that emanates from another source (other than yourself) needs to be supported by a reference. However, universal truths or facts that are widely established do not need to be referenced (e.g., active learning enhances student engagement, or technology integration is transforming education). However, ideas, or more particularly phrases or names that were coined by someone else do need to be referenced (e.g., the "Zone of Proximal Development" – The paper by Vygotsky describing this concept should be cited here. Or students were assessed using the Bloom's Taxonomy framework – the paper describing Bloom's Taxonomy should be cited here).

When citing references, prioritize articles published in English-language, peer-reviewed journals. While citing sections from published books is also acceptable, you must be very specific. Include the exact names and titles of the chapters, page numbers, and the names of the authors and/or editors, along with the publication details of the book as illustrated in Table 6.

Table 6: Summary of basic guidelines regarding the items to include in each section of a scientific manuscript.

| Section | Details |
|---------|--|
| Title | "Impact of Blended Learning on Mathematics Achievement in Middle School: A Case Study." Use subtitles sparingly for study group names like "Control vs. Intervention". |

| | |
|--------------|---|
| Abstract | Comprehensible by itself. Includes sections for Introduction, Methods, Results, Conclusion. Explains how blended learning influences math performance. |
| Introduction | - Review the current state of educational technology with references to recent studies. - Identify the gap in knowledge regarding blended learning effectiveness. - Outline objectives: to assess the impact of blended learning on student math achievement (primary) and student engagement (secondary). |
| Methods | - Describe the mixed-method approach incorporating both quantitative tests and qualitative interviews. - Detail the selection criteria for participating middle schools. - Describe intervention processes, pre- and post-intervention testing, and interview techniques. - Define primary outcomes (math scores) and secondary outcomes (engagement levels). - Discuss ethical considerations like informed consent from parents. - Statistical analysis methods, including regression analysis to assess impact, detailed in a specific paragraph. |
| Results | - Present the findings from pre- and post-test comparisons. - Avoid interpreting the results within this section. - Quantitative results show improvement in math scores; qualitative results indicate higher engagement. - Include visual data representations such as bar graphs and thematic maps. |
| Discussion | - Recap the main finding: Blended learning positively affects math achievement. - Compare these results with other educational studies and situational contexts. - Discuss the significance and implications for educational practices. - Critically assess the study's limitations and strengths. |
| References | - List all educational research and methodology sources referenced. - |

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|--|
| Ensure the accuracy of references, particularly those from educational journals and books. |
|--|

Avoid citing internet sites, personal communications, and unpublished data whenever possible. When selecting references, prefer the most recent or the one published in the most reputable journal. Prioritize original research articles over reviews. If you want to cite an idea from a paper that itself cites another source, go back to the original article to verify the accuracy and cite the original authors rather than the secondary paper. It is your responsibility to ensure the accuracy of all cited references and to provide enough detail for readers to locate them. Always verify the accuracy of every reference yourself, including those taken from other papers. Your chosen target journal will not format your references or verify their accuracy.

The formatting style for references will vary depending on the journal to which you are submitting your paper. It is crucial to adhere to the journal's specific instructions for authors to avoid the risk of rejection. The process of collecting, storing, and formatting references has been greatly simplified by bibliographic management software, which comes in both free and commercial versions. If you have access to such software, make use of it. As you prepare your study protocol and article introduction, keep track of useful references by noting down relevant phrases or ideas along with their complete reference details. Although you may think you'll remember where you found specific information, reviewing numerous papers can cause you to forget details, leading to wasted time searching for references later.

CONCLUSION

Writing an article from scratch may seem intimidating to many young researchers, but the process can be greatly eased with thorough preparation and a systematic approach to writing, following these simple guidelines for each section (refer to the summary in Table 6). Investing time to prepare your article properly is worthwhile, as seeing it published is a rewarding achievement. Sharing

your knowledge, contributing to the evidence base on a specific topic, and advancing your research through publication all play a crucial role in your career success. So, take up your pen and start writing—your work deserves it!

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