

Publish or Perish: A Scientific Blueprint for a Journal Article

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Abstract—Contributions perish due to a lack of structure and clarity. The time for framing and market is low, or knowledge about a feasible structure is missing. This article aids a framework suggestion of structuring an article to provide writers a scientific blueprint for most contributions to the International Journal of Engineering Pedagogy (iJEP). Therefore, we investigated to write down our expertise and knowledge on contributions in practice over many years. We look at typical mistakes and present knowledge nuggets to avoid these. Besides, we shed light on the specific parts of an article to present editors' expectations and present a light weighted approach for authors to quickly dive into the writing theme. Writers can apply this blueprint to sort their minds, write the structure of the contribution publishable, and shorten the time to market.

Keywords—paper publishing, methodology, structure, writing

1 Motivation

As an editor or reviewer of an article or student work, we get many contributions presented. However, some articles have a lack of structure and clarity. This article provides aid to establish a framework suggestion that fits the majority of articles in the International Journal of Engineering Pedagogy (iJEP). It does not claim to be a complete mapping for all contributions, so it depends on several boundary conditions, such as the used method. There are articles about writing, structuring and processing a journal article [1-4] or specific methods [5, 6], but this article is geared specifically towards iJEP respectively its covered disciplines and hence provides additional insights and value to the audience. In addition, this article aids writers with a scientific blueprint to structure their article and to provide clarity to the readers.

2 Contribution structuring

Writing and structuring a journal article needs training. An article is merely divided into three areas: (i) figurehead, (ii) main body, and (iii) closing.

The figurehead contains four parts: (1) title, (2) authors and affiliations, (3) abstract, and (4) keywords. The figurehead, sometimes also applied as a cover page, is the elevator pitch to convince the scientific community to read the article or not.

The general structure of the main body consists of five parts: (1) introduction, (2) materials and methods, (3) results, (4) discussion, and (5) conclusion. In engineering pedagogy, the structure follows a certain logic. Deviations from the standard structure are permissible: The methodological approaches of the disciplines are too different. The structure is also the basis for scientific publications. Depending on the report's length, the building blocks will vary in length and be subdivided to various degrees. In extreme cases, the introduction consists of one sentence. It may also be possible to combine results and discussions or discussions and conclusions.

The closing contains three parts: (1) acknowledgment, (2) references, and (3) appendix.

Table 1 illustrates a possible standard design of an article.

Table 1. Standard design

Area	Content
Figurehead	<ul style="list-style-type: none">• Title• Authors and Affiliations• Abstract• Keywords
Main body	<ul style="list-style-type: none">• Introduction• Materials and methods• Results• Discussion• Conclusion
Closing	<ul style="list-style-type: none">• Acknowledgments• References• Appendix (optional)

There are possible deviations from the standard design. The combination of Results and Discussion is not recommended and should only be done in exceptional cases. Reason: The Discussion has more freedom and offers more flexibility to compare. In addition, many reviewers want to draw their own conclusions from the findings.

Moreover, beyond the design, the paper structure itself lacks clarity, e. g., the chapter numbering such as missing subsection(s). For example, section 2 should not only consist of one subsection 2.1. In addition, it is recommended that subsections are systematic, and complete. Therefore, it is good practice to omit, e.g., mixtures such as countries and states, and naming subsections Other because it is unclear what Other does include.

3 Figurehead

3.1 Title

The title catches the reader, not the author. Therefore, it provides orientation and reflects the core message. The title adequately describes the content of the article in a maximum of ten words. Care should be taken to ensure that the title is search engine optimized (SEO) to improve subsequent retrieval. Index and abstract depend on the precision of the title. In that case, a title comprises more than ten words; it is recommended to split the title into the main title and a subtitle.

We suggest that the essential words are in the main title and not in the subtitle. It is essential to include only words for a broader audience. A precise title does not contain general terms but specific ones. To avoid: Special characters and abbreviations; the only exceptions are commonly used abbreviations such as DNA.

3.2 Authors and affiliations

We have seen two possibilities of arranging the order of authors. First, ordered by the contributors starting with the one who has done the most significant work and ending with the one who contributed to the minority or the advisor, i. e., supporting an idea. Second, alphabetically indicating it was commonly written with no specific contributor. In engineering pedagogy, the applied and preferred one is the first one ordered by the contributor indicating the principal author.

Thus, before starting to write an article, the authors and their roles for the paper should be clear. For one thing, it is not very pleasant when authors disagree about who writes what on the post. On the other hand, it shows the editor that the work was not done properly in advance. The latter falls directly back on the quality of the contribution.

3.3 Abstract

The abstract, as a so-called elevator pitch, enables a short and information-packed rendition of the text. It presents the main results of the work and whets the appetite for more. An abstract claim to be comprehensible even without the article itself. In addition, an abstract contains key terms to improve retrieval.

A structured abstract contains about 150 to 250 words. It describes the situation and what is so complicated that this research solves it. Therefore, the abstract provides information about the aim and scope of the study. In addition, information about the applied method to make the study traceable. The resolution of the contribution with results and conclusion. The article finalizes with an outlook on the implications for practice and theory. The latter is the take-home message for the reader before he leaves the elevator [3, 4, 7].

3.4 Keywords

Keywords are used to find the article. Nevertheless, not every keyword is a ‘good’ one. In practice, it is about the reach and retrieval of the results by other researchers. Thus, on the one hand, they are necessary for a selected circle of experts to recognize the research. On the other hand, a general character is needed that carries the results beyond the community. Specifically, the researcher looks for findings that advance the theory, whether supporting or contradicting it. The approach resembles the principle of the funnel from the general to the specific. Keywords promote the work and are part of the figurehead.

4 Main body

4.1 Introduction

An introduction is generally written in the present and describes the known knowledge to the exploring challenge or issue. It contains related work as background information to let the reader estimate the value of the findings without reading all the referenced literature. The problem is addressed in general and not the problem of an author. In other words, the problem is relevant to the scientific community.

A paper referencing a structured state-of-the-art analysis indicates that the field’s research question is interesting to underline the introduction. For structuring and guiding a state-of-the-art analysis, e.g., Fettke or vom Brocke et al. [8, 9] present suitable concepts. Besides the overview, a state-of-the-art analysis might provide a research agenda such as [10].

A research question states the issue which the author(s) answer. In addition, the research question is properly and comprehensibly based on evaluating the pros and cons of this state-of-the-art. It states from a scientific point of view of the journal’s topic.

4.2 Materials and methods

The Materials and Methods section describes the research setup in such a way that an experienced employee can repeat the study. Thereby, the chosen methods have an association with the results. In addition, the given information gives the reader the possibility to grade the adequacy of the method.

Research methods serve two aspects of a systematic procedure: frameworks [11] and tracing of scientific work. Their characteristics differentiate them into quantitative and qualitative research. A comparison of quantitative and qualitative research enables a subsequent assignment of methods. Each approach has its advantages and disadvantages. To minimize these effects, the author(s) of some papers employ a mix of quantitative and qualitative methods. The order is irrelevant. This research approach is also referred to as mixed-method. For further details, collections of methods to aid writers exist [12].

One of the main issues in this section is passive writing. Peer-reviewers read it carefully to understand what and how the work was done, especially by the authors. In addition, methods are not followed strictly. Thus, it does not mean to adapt the method to the underlying research. However, when the method is adopted, it is necessary to clarify the reason and the impact.

4.3 Results

Results represent the findings without interpreting them. The readers' interests are the matter, the scope of the investigation, and how careful or imaginative the work is.

In this section, the findings of the authors' work is what is relevant, not that from others. Therefore, quotations are to be omitted here. In addition, data in figures, charts, or tables prove the success of the particular approach, such as students or faculty evaluation or students' performance indicators. The data verify the contribution of the extraordinary approach compared to the state-of-the-art. Again, without interpreting them.

Further, it answers the raised research question in the Introduction section.

4.4 Discussion

The Discussion is related to the prior theory presented in the Introduction section. While the introduction raises questions, the Discussion discusses the answers. Thus, it explains the relationship between the found and prior facts to the related work in the Introduction section. Additionally, the value-added compared to already existing solutions. We call it the scientific discourse. Thus, it presents the possible implications or applications of the findings. Besides, it adds a personal contribution to the community for researchers and practitioners.

In this section, common or differences are clearly described. It also illustrates limitations to the research. Limitations are factors that influence the findings or make the results invalid. Besides, it describes the need for future research to explain raised issues.

4.5 Conclusion

A conclusion is a significant part of the article, even though it is not part of the figurehead. This significance is since this part of the article usually comes immediately after the abstract in the reading order. We suggest that every article should contain a conclusion. It is advisable to support the reader's sense and lead him to the decisive results of the paper. Often the conclusions are a compilation of the Discussion. In no case do decisive or 'new' consequences occur here for the first time.

The summary additionally points out further research needs or open questions. Also, to whom the authors direct this research. Does the author(s) intend to conduct the research, or is this directed at the community?

Moreover, it is good practice to make the research data open access to other researchers, facilitate further research, and encourage reproducibility and comparability.

5 Closing

5.1 Acknowledgment

An acknowledgment contains information about people and supporters who are to be acknowledged. It thanks the supporters, for example, for technical, intellectual, financial, or material support. In some cases, the donor reserves the right to be named in the acknowledgment. In any case, it is good practice to get a permission for the planned acknowledgment to avoid misunderstandings. After all, a funder may feel that it is insufficiently or excessively mentioned. Thus, an acknowledgment is not always necessary.

5.2 References

The references indicate how carefully the domain overview was done. The author(s) wrote the articles for a specific community in a specific domain. Thus, it builds the theoretical knowledge on the previous research to do the next step. Also, it indicates the quality of work not only by the referenced literature but also by the accuracy of the referenced sources. Typical issues are different formatting. This formatting issue primarily occurs when sources are copied and pasted without revisiting. Typical errors are capitalization or missing pagination.

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7 References

- [1] V. Gewin, “How to Write a First-class Paper,” *Nature*, vol. 555, pp. 129-130, 2018. <https://doi.org/10.1038/d41586-018-02404-4>
- [2] M. J. Katz, *From Research to Manuscript: A Guide to Scientific Writing*: Springer Science & Business Media, 2009.
- [3] E. J. Buenz, “Essential Elements for High-impact Scientific Writing,” *Nature*, 2019. <https://doi.org/10.1038/d41586-019-00546-7>
- [4] M. Hochberg, *An Editor's Guide to Writing and Publishing Science*, Oxford: Oxford University Press, 2019. <https://doi.org/10.1093/oso/9780198804789.001.0001>
- [5] J. Webster, and R. T. Watson, “Analyzing the Past to Prepare for the Future: Writing a Literature Review,” *MIS Quarterly*, vol. 26, no. 2, pp. xiii-xxiii, June 2002, 2002.

- [6] S. Gregor, and A. R. Hevner, "Positioning and Presenting Design Science Research for Maximum Impact," *MIS Quarterly*, vol. 37, no. 2, pp. 337-356, 2013. <https://doi.org/10.25300/MISQ/2013/37.2.01>
- [7] emerald publishing. "How to ... Write an Article Abstract," 2021/10/07; <https://www.emeraldgrouppublishing.com/how-to/authoring-editing-reviewing/write-article-abstract>
- [8] P. Fettke, "State-Of-The-Art des State-Of-The-Art: Eine Untersuchung der Forschungsmethode "Review" Innerhalb der Wirtschaftsinformatik," *Wirtschaftsinformatik*, vol. 48, no. 4, pp. 257-266, 2006. <https://doi.org/10.1007/s11576-006-0057-3>
- [9] J. vom Brocke, A. Simons, B. Niehaves, K. Riemer, R. Plattfaut, and A. Clevn, "Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process." pp. 2206–2217.
- [10] M. Gottlieb, M. C. Utesch, and M. Böhm, "Beyond 2030 Challenges of Engineering Education in an Information Systems Driven World an Extraction based on Research Topics," 2019. <https://doi.org/10.1109/EDUCON.2019.8725245>
- [11] M. C. Utesch, "A Successful Approach to Study Skills: Go4C' s Projects Strengthen Teamwork," *International Journal of Engineering Pedagogy (iJEP)*, vol. 6, no. 1, pp. 35-43, 2016. <https://doi.org/10.3991/ijep.v6i1.5359>
- [12] M. Gottlieb. "GoITSystems," 2021/10/07; <https://www.goitsystems.de>

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