

Dr. Norbert Cheung's Lecture Series

Level 5 Topic no: 44

Scholarly Paper and Publication (part 2)

Contents

1. Target Scholarly Journals
2. Writing for Publication
3. Summary

Reference

Engineering Research: Design Methods and Publication, Herman Tang, Wiley, 2021.

1. Target Scholarly Journals

Overall Considerations

Selecting an appropriate journal is not a simple task, considering several factors. First, we need to know the publishers. Publishers of scholarly journals include for-profit companies and not-for-profit organizations. The former are normally academic publishers, while the latter are professional societies or associations. Some large universities have their own academic presses as well. Most publishers publish both books and journals.

Visiting the websites of candidate journals is a good way to know about the journals. We may consider a few factors at the beginning. For example, aim, scope, type of paper, and readership are the first filters to create a short list of candidate journals.

When selecting target journals, we may use Table 9.4 as a checklist. The factors in the checklist will be more discussed in the following subsections. Readers may scan and find three to five journal candidates and then use the checklist for evaluation and comparison. The rating for each journal in the checklist can be in three levels of scores: 2 (or $\sqrt{\quad}$) = Yes, 1 (or ?) = Maybe, or 0 (or \times) = No. Please bear in mind that the importance of these factors is case dependent.

Table 9.4 A checklist of journal selection.

Factor	Description	Journal 1	Journal 2	Journal 3
Relevance	Fitting aim, scope, readership, etc.			
Quality	Good reputation in the field, impact factor, etc.			
Accept rate	Appropriate (likelihood) rate			
Cost	APC reasonable, if applicable			
Sub-total (score) =				

Relevance

Every journal has its own aim and scope. We should know the criteria and expectations of a journal to identify its requirements and guidelines to ensure our paper a “good fit” with the journal. As suggested, we read already-published papers in the journal for a better understanding.

Example: Journals in Mechanical Design**Table 9.6** Some scholarly journals related to mechanical designs.

No.	Journal title	Publisher	Vol. (2018)
1	Journal of Materials: Design and Applications	Institution of Mechanical Engineers (UK)	232
2	Journal of Mechanical Design	American Society of Mechanical Engineering (US)	140
3	Materials & Design	Elsevier (US)	137
4	International Journal of Mechanical Sciences	Elsevier (US)	135-
5	Journal of Strain Analysis for Engineering Design	SAGE Publications (US)	53
6	Mechanics Based Design of Structures and Machines	Taylor & Francis (UK)	46
7	Journal of Engineering Design	Taylor & Francis (UK)	29
8	Chinese Journal of Engineering Design	Zhejiang University Press (China)	25
9	International Journal of Design Sciences & Technology	Europa (UK)	23
10	The Design Journal	Taylor & Francis (UK)	21
11	Journal of Engineering, Design and Technology	Emerald Publishing Limited (UK)	16
12	International Journal of Mechanics and Materials in Design	Springer (Germany)	14
13	Journal of Advanced Mechanical Design, Systems, and Manufacturing	Japan Society of Mechanical Engineers (Japan)	12
14	Journal of Advanced Design and Manufacturing Technology	Islamic Azad University (Iran)	11
15	Machine Design	University of Novi Sad (Serbia)	10
16	International Journal of Design Engineering	Inderscience (Switzerland)	7

Table 9.5 Some publisher's guides for journal selection.

Publisher	Title	Website
Elsevier	Find the perfect journal for your article	https://journalfinder.elsevier.com/
Wiley	Find the journal that's right for your research	https://journalfinder.elsevier.com/
Springer Nature	Journal Suggester	https://journalsuggester.springer.com/

5.44 Scholarly Paper and Publication -2 (last updated: May 2022)

Some journals focus on a type of research or methodology rather than a subject. For example, there are interdisciplinary journals dedicated to specific methodology, such as:

- *Qualitative Research Journal* (<https://www.emeraldinsight.com/journal/qrj>)
- *The Qualitative Report* (<https://nsuworks.nova.edu/tqr/>)
- *Journal of Mixed Methods Research* (<https://journals.sagepub.com/toc/MMR/current>)
- *Journal of Simulation* (<https://orsociety.tandfonline.com/toc/tjism20/current>)
- *Journal of Survey Statistics and Methodology* (<https://academic.oup.com/jssam>)

Quality Factors

As discussed, peer review is a key for publication quality. Another way to evaluate the quality of a journal is to check the editorial board of the journal. A publishing company and/or a professional association form an editorial team for a journal. The editorial team consists of domain experts in given subject areas, and managing staff. Their names and credentials should be published on the journal's website. The managing staff, including managing editor, editorial assistant, and IT support, who take care of routine work, can be employees of the publisher.

In addition, a journal's long history may indicate its quality and reputation. The journals listed in the above table are of good quality ones since they have high volumes of publication. However, a new journal is not necessarily a low quality, particularly for emerging subjects, such as AI and nanotechnology.

Cost

On a nontechnical note, we need to consider publication cost as well. Most high-ranked scholarly journals do not have page charges. However, many new journals do, particularly in the Open-Access (OA) publication model.

Discussed in Chapter 3 Literature Search and Review, OA publication is an increasingly popular option. In such a format, research outputs can be available online and free of cost to the public. OA publication may help us maximize our research impact and possibly achieve a higher citation rate for the first one or two years after publication. Table 9.7 lists four models of OA publications. There are other models, such as hybrid and black OAs.

Table 9.7 Variant models of OA publication.

Aspect	Gold	Bronze	Green	Diamond
Access	Free, immediately	Free after embargo period	Free, may have embargo period	Free, immediately
Cost	Author or funding	Subscription	Institute	Funding
Repository	Journal	Journal	Self-archiving	Journal

APC varies from \$50 to \$2000. For many cases, the cost is reimbursable from the author's organization.

(APC = Article Processing Charge)

Journal Quality Indicators

Citation-based impact metrics, as the average impact of all the articles in a journal, are often used as a proxy for the impact of a journal itself. Such main metrics include Journal Citation Reports (JCR) and CiteScore.

JCR Impact Factor

JCR is a resource tool published annually by Thomson Reuters. JCR evaluates and compares over 8600 scholarly journals of sciences and technology. JCR publishes the Impact factor (IF), which is an indicator of reference value of the papers published as a journal-level metric. IFs are calculated only for science and engineering journals indexed in the Science Citation Index Expanded (SCI) for the previous two years. For example, the IF score of a journal is calculated in 2018.

$$\text{IF} = \frac{\text{Cites in 2018 in items published in 2016 and 2017}}{\text{Number of items published in 2016 and 2017}} = \frac{326}{141} = 2.31$$

Other JCR metrics include a five-year IF (over the past five years), total cites (total number of citations to the reference year), and so on. In general, the higher the factor, the better the journal is.

CiteScore

Similarly, Elsevier has a measure reflecting the yearly average number of citations in a journal, called CiteScore. It is relatively new and considers the citations in three-year publications instead of two in IF. For example, the CiteScore of a journal in 2018 is calculated:

$$\begin{aligned}\text{CiteScore} &= \frac{\text{Cites in 2018 in items published in 2015 thru 2017}}{\text{Number of items published in 2015 thru 2017}} \\ &= \frac{889}{205} = 4.34\end{aligned}$$

Even though they are based on similar concepts, IF and CiteScore cannot be directly compared to each other due to different evaluation periods. In addition, these indicators are available only for the journals selected in their own database.

Other Indicators

One well-known indicator is SCImago Journal Rank (SJR) indicator, which expresses the average number of weighted citations by documents published in the journals selected in the three previous years. For example, in industry and manufacturing engineering fields, the top three scholarly journals are Journal of Operations Management (ISSN: 0272-6963), Production and Operations Management (ISSN: 1937-5956), and International Journal of Machine Tools & Manufacture (ISSN: 0890-6955). Their SJR indicators are 5.739, 3.379, and 2.700, respectively, for 2017.

Other indicators are also based on citations. For example, Eigenfactor Score shows the citations made to a journal over time, but the Eigenfactor Score gives more weight to highly ranked journals over other ones. In addition, Source Normalized Impact per Paper (SNIP) measures the contextual citation impact by weighing citations based on the total number of citations in a subject field.

2. Writing for Publication

Compared with writing a report, we need to do a little extra revision work for a publication. A research report may not be the best-written piece of literature. However, a scholarly paper needs to be the best we can write because it will be read by a much larger audience and serve as a reference for a longer period. In addition, there are some specific considerations for a revision to meet journal requirements.

The structure and organization of a scholarly paper are important since a paper needs to pass peer review for publication. We should organize an entire paper, proceeding smoothly and logically from one section to the next, and making main points clear to reviewers.

Elements of a Research Paper

A research paper normally has the following sections, similar to the sections of reports and thesis discussed in Chapter 8:

1. Title
2. Abstract
3. Introduction
4. Methods
5. Results
6. Discussion
7. Conclusions
8. Acknowledgements
9. References

Among these nine elements, the **I**ntroduction, **M**ethods, **R**esults, and **D**iscussion, sometimes called IMRaD (Sollaci and Pereira 2004), are considered essential. The IMRaD structure has been adopted and used in scientific publications by many researchers for recent years.

Some professionals depict academic writing structure IMRaD as an hourglass (see Figure 9.9). The hourglass model provides hints and guides for writers about specific content and scope of each section. The hourglass model shows that the Introduction and Discussion sections have a broad perspective while the Method and Results should be specific and focused.

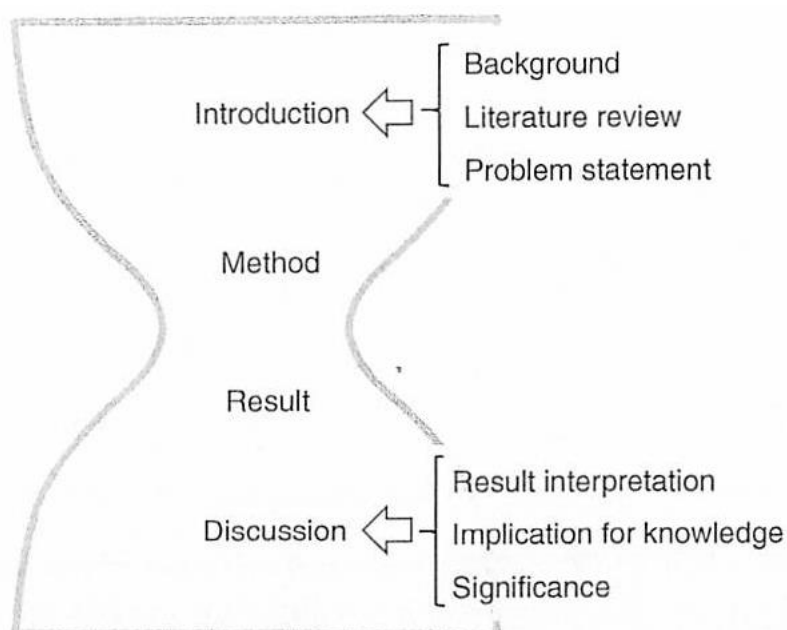


Figure 9.9 An hourglass model of technical writing.

Convert Thesis to Paper

Below are the essentials:

Table 9.8 Style differences between theses and papers.

Thesis and report	Paper
In chapters	In sections
Varied length	With word limit
Format and structure of Graduate School	Format of journal
Details in method, data, etc.	Simplified descriptions of method, data, etc.
All research findings	Selected findings
Long list of references	Selected references

English Writing

In Chapter 8, we discussed some writing considerations, such as word selection and writing style. These tips are applicable to paper writing as well.

In addition, for journals in English, non-native-English authors may get native English speakers to proofread and edit their manuscripts. It is extra work but normally worth doing. Some referees lose their patience due to poor English writing (grammar and word usage, etc.) and judge a paper as low quality, which is not necessarily true concerning its technical content. In other words, writing quality affects reviews and possibility for publication acceptance.

Paper Abstract

Abstracts are published in index databases. Almost all journals provide free access to the abstracts of published papers. Therefore, an abstract should be considered as an independent document, so that it does not rely upon any material in the main body of the manuscript.

General Requirements of an Abstract

A journal often specifies the length of an abstract. In most cases, it is one paragraph with 100–200 words. There is no standard for the structure of a paper abstract. It is a common practice that an abstract addresses three questions:

1. The objective and problem of research work (Why), in one sentence
2. The research work – method and process (How), in two sentences
3. The accomplishments and value (What), in two sentences

We begin by introducing the subject to let readers know what it is about, then introduce the work presented in the paper. If research is hypothesis based, the hypothesis should be briefly stated in the abstract.

Examples of Abstract

From the suggested three parts of an abstract, the structure and detail level has a significant deviation, given the nature and focus of research work. Here are four samples of abstracts, as shown in Figures 9.10–9.13. The lengths of the abstracts are 74, 147, 147, and 191 words, respectively. Readers can read these samples and evaluate how effectively the authors conveyed the key information in their abstract write-ups.

Example #1

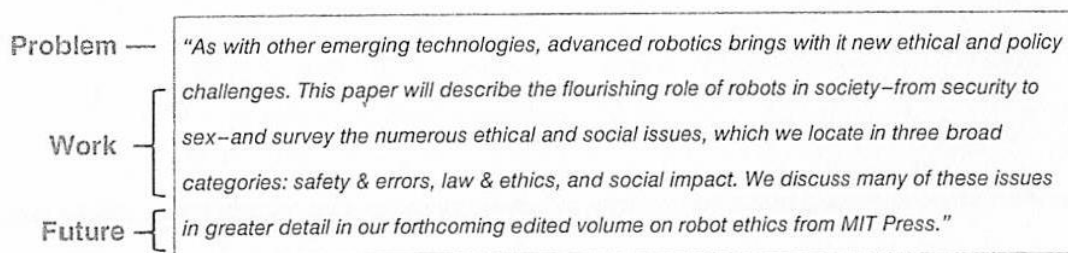


Figure 9.10 Abstract Example 1 (Lin et al. 2011).

Example #2

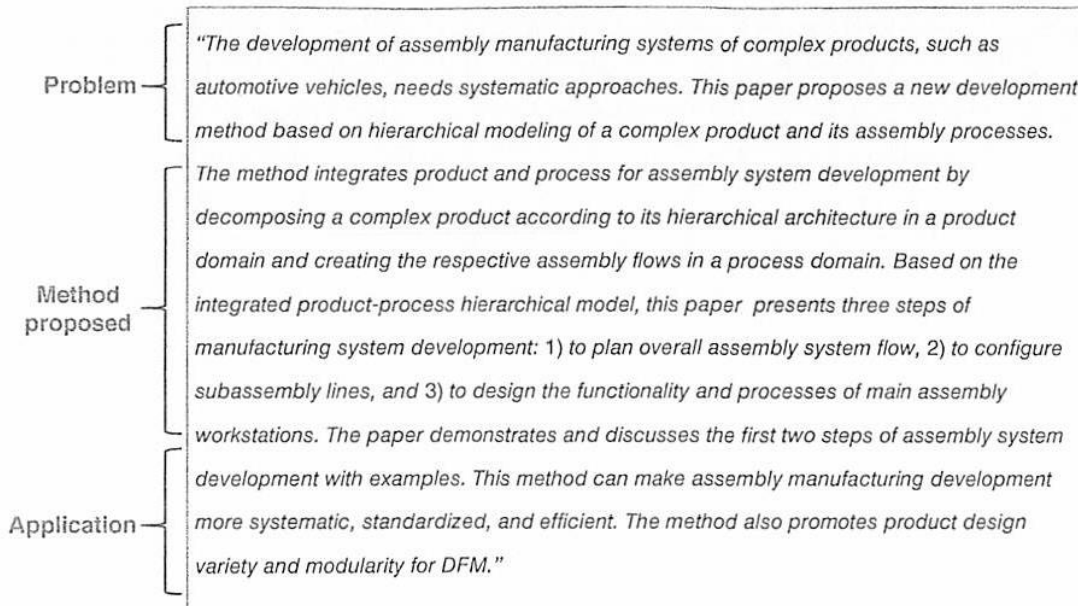


Figure 9.11 Abstract Example 2 (Tang 2018).

Example #3

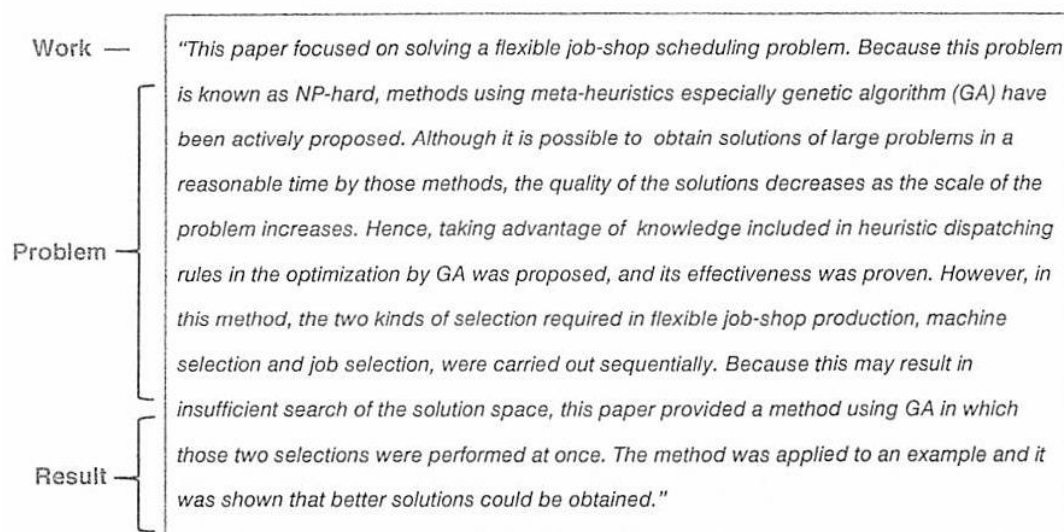


Figure 9.12 Abstract Example 3 (Morinaga et al. 2017).

Example #4

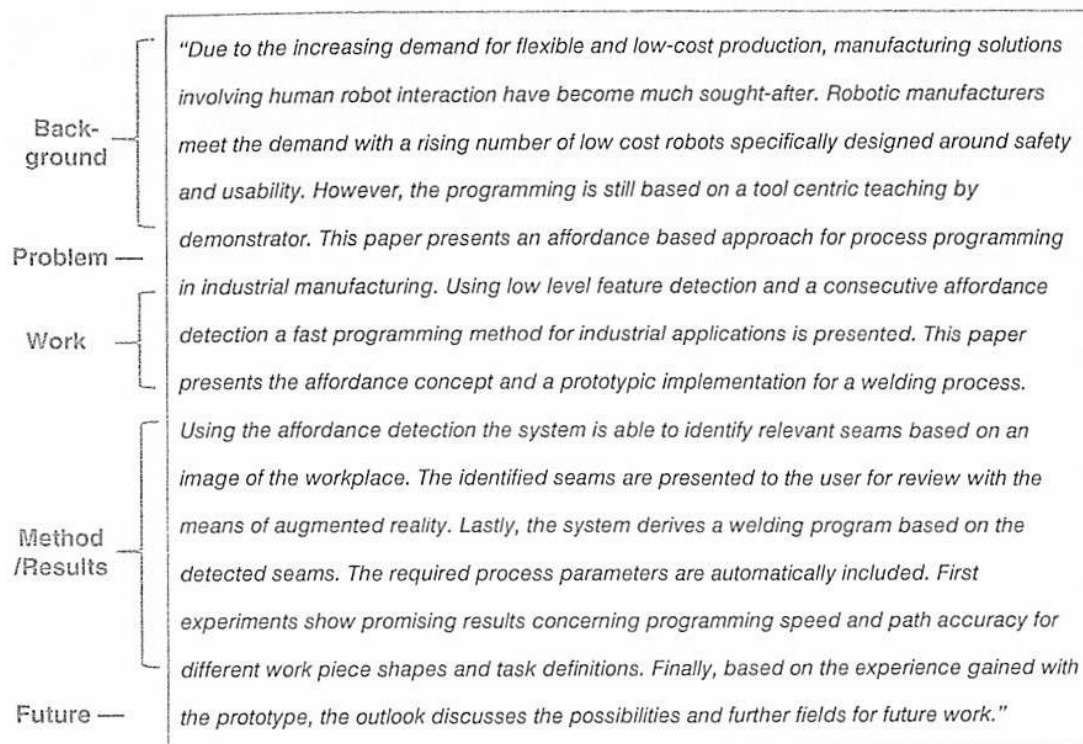


Figure 9.13 Abstract Example 4 (Heimann and Krüger 2018).

Structures of an Abstract

To be friendlier to editors and readers, some journals require abstracts in a structured format, containing a few labeled subsections to address the elements of research information in an abstract. For example, subsections of a structured abstract are:

1. Objectives
2. Method and/or Design
3. Results (Findings)
4. Conclusions/Practical Implications
5. Originality or Value
6. Research Limitations

Among these six subsections, the Objective, Method, Results, and Value are mostly requisites; others may be optional, depending on the journal's policy. Here is a published example (Kim et al. 2018):

“Objectives

To estimate the optimal bending angles in the running loop for mesial translation of a mandibular second molar using indirect skeletal anchorage and to clarify the mechanics of tipping and rotating the molar.

Methods

A three-dimensional finite element model was developed for predicting tooth movement, and a mechanical model based on the beam theory was constructed for clarifying the force systems.

Results

When using a running loop without bends, the molar tipped mesially 14.4° and lingually 0.6°, rotated counterclockwise 4.1°, and the incisors retracted 0.02 mm and intruded 0.05 mm. These angles were about the same as those estimated by the beam theory. When the amount of tip back and toe-in angles was 11.0°, mesial translation of the molar was achieved, and incisors retracted 0.10 mm and intruded 0.30 mm.

Conclusions

Mesial translation of a mandibular second molar without any significant movement of anterior teeth was achieved during protraction by controlling the tip back and toe-in angles and enhancing anterior anchorage with the combined use of a running loop and indirect skeletal anchorage.”

Keywords

Keywords are a kind of summary for an abstract, immediately following the abstract of a paper. A scholarly paper usually has three to six keywords or phrases. They should reflect the most important aspects of a paper in separated words or phrases.

Some keywords may be found in the title and abstract of a paper. As the title, abstract, and keywords serve different purposes, we recommend that they be designed differently to provide more information to readers thus granting the authors more power. Due to the function of keywords, we should pay close attention to choosing words. For example, when selecting keywords, we may imagine other people searching for our article in databases. The keywords should help searchers quickly locate our article. Some journals have a predefined keyword list. In that case, we have to select keywords from the list.

Introduction

As discussed in the last chapter, an introduction plays a supporting role to a report and paper. In this section, the first paragraph should get the reader's interest and giving an impression of our research background. Here is an example of the first paragraph of the introduction section (Libonati and Buehler 2017):

“Nature has evolved for billions of years, leading to sophisticated multifunctional materials with major structural functions, such as bone, shells, and wood. Wood has been widely used for engineering structural applications in the past, then, slowly replaced by synthetic man-made materials, providing better mechanical performance (e.g., strength, toughness). Nevertheless, many of these synthetic material shave always faced issues in satisfying both strength and toughness requirements.^[1,2] This has prompted engineers to give toughness a higher priority than strength, especially in the most critical applications (e.g., gas pipelines, endoprostheses), where safety is the first requirement and failure is unacceptable.”

After the first paragraph, subsequent ones can be the current status with literature review. As discussed in Chapter 3, a literature review investigates current knowledge, revealing our research need. For research papers, their literature review section on research status should be concise – one page may be appropriate in most cases. The last paragraph of the introduction section may be designed as a self-introduction or a road map to all subsequent sections in the paper.

Discussion

The discussion section of a paper is equally important to the research results and sometimes combined with the result section, discussed in Chapter 8. It is common that we start discussion with describing results. We may need several paragraphs, each one dedicated to one detailed result or research objective. If the work is hypothesis based, the discussion should use results to provide a logical argument to support or reject the null hypothesis.

Many manuscripts are returned by a journal for revision or rejection due to weak discussions. Peer reviewers may be dissatisfied if the discussion is simply a description of results. We should try to make the in-depth discussion correspond directly to the results.

<p>3. Results and discussion 3.1 <i>Grade quantification</i> 3.2. <i>Surface exposure quantification</i> 3.3. <i>Sampling and stereological effects</i> 3.4. <i>Preferential breakage</i> 3.5. <i>Mineralogy</i> </p> <p style="text-align: right;">[Reyes]</p>	<p>3. Results & discussion 3.1. Influences of OligoRNA hybridization on mRNA properties 3.2. Formation and characterization of mRNA-loaded polyplex micelles 3.3. Tolerability of PM-loaded mRNA hybridized with Chol(+)-IOligoRNA against nuclease 3.4. Tolerability of PM against polyion exchange reaction 3.5. Packaging state of mRNA in PM core 3.6. Translational efficiencies of mRNA-loaded PMs in cultured cells 3.7. In vivo mRNA administration into the mouse lung </p> <p style="text-align: right;">[Yoshinaga]</p>
--	---

Figure 9.14 Examples of result and discussion section.

Publication Ethics

#1 Appropriate Citation

Academic integrity is a foundation of research. Academic integrity is even more important for paper publications than for internal reports. There are several aspects of academic integrity. It is extremely important that a manuscript contain no plagiarism. Appropriately crediting the work, such as statements, data, graphics, or ideas, of other people and sources is discussed in earlier chapters.

Several Internet-based tools, for example, iThenticate (www.ithenticate.com/) for publishers, government, and organizations and TurnItIn (turnitin.com/en_us/) for students are available. These tools can check a manuscript based on millions of publications and other sources and report a “similarity” rate, which is a useful reference to publisher editors and faculty. Figure 9.15a,b show two examples of similarity check reports.

#2 Authorship

Authorship confers work credit and has significant academic, social, and financial implications. In addition, authorship also means responsibility and accountability for published works. Essentially, authors should have substantial contributions to a paper, the associated tasks, and/or writing effort.

A research team may agree on participation and authorship earlier, before writing starts, to avoid any potential internal conflict of interest (COI). In addition, a team should agree to the appropriate order of authorship when there are multiple authors. If some team members did routine work but were less innovative to the research project (such as supportive staff), they may or may not be listed as authors. If not, they should be acknowledged at the end of a paper.

Both adding people who did not contribute significantly to an author list and missing the person who did contribute significantly in an author list are research misconduct. Inappropriately handling authorship may damage future collaboration and ruin the reputation of main authors.

For student research, the student conducts their main effort under advisement of faculty. A common practice is that the student is the first author, while the adviser serves as the corresponding author and in most cases the second author. If a faculty member provides the main idea and method, while a student conducts the detailed work, then it can be fair for the faculty to be the first author. The same practice applies for large sponsored projects. The PI of a research project is often the corresponding author.

Example (below) of a Turnitin Report

ORIGINALITY REPORT			
8% SIMILARITY INDEX	3% INTERNET SOURCES	8% PUBLICATIONS	1% STUDENT PAPERS
PRIMARY SOURCES			
1	Höjer, Mattias, and Josefin Wangel. "Smart Sustainable Cities: Definition and Challenges", Advances in Intelligent Systems and Computing, 2015. Publication	4%	
2	Smarter as the New Urban Agenda, 2016. Publication	2%	
3	www.research.lancs.ac.uk Internet Source	1%	
4	digilib.itu.ee Internet Source	1%	
5	Transforming City Governments for Successful Smart Cities, 2015. Publication	1%	
Exclude quotes	On	Exclude matches	← 3 words
Exclude bibliography	On		

#3 Exclusive Submission

It is unethical to submit a manuscript to two or more journals in engineering and technology fields at the same time. The submitted work should have not been published elsewhere in any form or language. Though the authors may use their own work to expand or support new work, they should be careful to avoid concerns of text-recycling.

If a paper or the same work has been presented to a conference, the authors should state it when submitting the paper to a journal if no copyright conflict. A journal may accept conference papers as is or request extended work. In addition, a few journals also require declarations if a manuscript was previously submitted to another journal and the reason for rejection.

3. Summary

Considerations for Publication

1. The objectives of publications are to contribute to the ongoing body of knowledge and share latest information with others in the discipline.
2. The outcomes from engineering R&D may or may not be publishable.
3. Types of scholarly papers include original research, technical notes, case studies, systematic reviews, and expert viewpoints. Among them, the original research is the majority in journal papers.
4. The quality of papers can be viewed from different angles and measured in different ways.

Publication Process

5. There are several steps in the journal publication process. Among them, peer review is the core.
6. There are different policies and practices of copyright for published papers.
7. There are three types of peer reviews: double-blind, single-blind, and open review.
8. Authors must carefully review and respond to reviewers' comments.

Target Scholarly Journals

9. Selecting target journals involves several considerations, such as relevance, reputation, competitiveness, open access, cost, etc.
10. OA publishing normally requires a certain APC from authors.
11. There are a few journal quality indicators, e.g. IF and CiteScore.
12. Some journals are viewed "predatory" by some researchers.

Writing for Publication

13. The Hourglass model may be used for technical writing and paper preparation.
14. Additional effort is required to convert a research report to a scholarly paper.
15. The abstract of a paper states what, why, and how of the complete research in about 150 words.
16. The keywords of a paper normally have 3–6 words.
17. Appropriate citation and reference is critical to academic publishing.
18. Authorship of a paper should be handled appropriately.
19. COI and IRB are important to academic publishing in addition to research work as a whole.