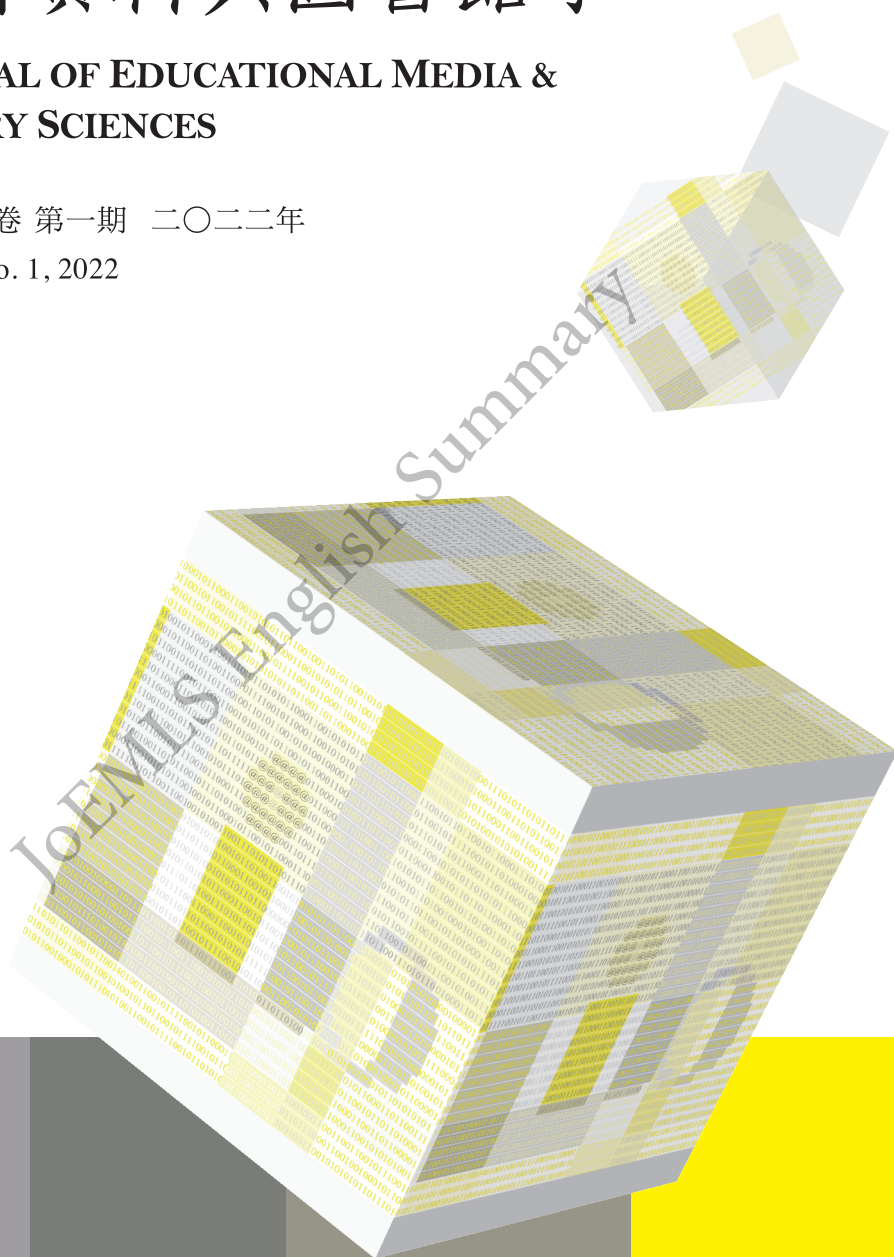


# 教育資料與圖書館學

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教育資料與圖書館學，始於1970年3月創刊之教育資料科學月刊，其間於1980年9月更名為教育資料科學，並改以季刊發行。自1982年9月起易今名。另自2016年11月起，改以一年出版三期（3月、7月、11月）。現由淡江大學出版中心出版，淡江大學資訊與圖書館學系和覺生紀念圖書館合作策劃編輯。本刊為國際學術期刊，2008年獲國科會學術期刊評比為第一級，2015年獲科技部人文社會科學研究中心評定為教育學門專業類一級期刊。並廣為海內外知名資料庫所收錄(如下英文所列)。

**The JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES (JoEMLS)**, published by the Tamkang University Press and co-published with the Department of Information & Library Science (DILS) and Chueh Sheng Memorial Library, was formerly the **Bulletin of Educational Media Science** (March 1970 – June 1980) and the **Journal of Educational Media Science** (September 1980 – June 1982). In 2015, The JoEMLS is acknowledged as the first class scholarly journal in Taiwan by Ministry of Science and Technology (MOST). Since November 2016, the JoEMLS has been changed from quarterly to a tri-annual journal, published in March, July, and November.

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## EDITORIAL

# Be an Academic Gardener that Incorporates Practice and Research

Although the role of scholarly journal editors is critical in the entire scholarly communication chain, professional training for journal editorship has not been emphasized or studied in Taiwan. In addition to complying with international academic publication ethics, e.g., Committee on Publication Ethics (COPE), journal editors must be familiar with the review mechanisms of various major academic databases and journal reviews, for instance, Web of Science (WoS), Scopus, Directory of Open Access Journals (DOAJ), Taiwan Social Science Citation Index (TSSCI), and Taiwan Humanities Citation Index (THCI), etc. Moreover, they should have a thorough understanding of the criteria and meaning of each review. With the development of digital technology, journal editors have to relearn and reconstruct a new form of process that is different from traditional publishing when they perform the editing, proofreading, publishing, and distribution methods and use various publishing and dissemination platforms. However, there is no denying that this provides an opportunity for journals to expand.

Journal editors in Taiwan's scholarly publishing field are rarely professionally trained or accredited, and there is no literature outlining the essential competences of journal editors. Even though some scholars have investigated the audit and evaluation of the non-citation-bibliometric study in scholarly journals, and some studies have examined the impact of the current scholarly journal evaluation system on journal editors' practical work and scholars' willingness to submit manuscripts, it still shows that there is a high degree of uncertainty in the work of editors of scholarly journals in Taiwan. In addition, the role of journal editors in scholarly communication is still somewhat ambiguous, and there is even a discrepancy between the name and the authority, and more profound and detailed research is still expected on issues such as the specifications of editorship or editor's job functions.

The editorial team of *Journal of Education Media & Library Sciences* (JoEMLS) has always been composed of many scholars who are passionate about scholarly communication and journal publishing research. We often hope to devote more energy to research on various related topics in addition to our practical work. For example, exploring the functions of editors of academic journals and gaining an in-depth understanding of the work content and practical

division of labor of the editorial team of scholarly journals in Taiwan at this stage; also, collecting and analyzing the general application scenarios of editorial ethics in scholarly publishing. The purpose of such a study is to understand the newer development trend and environment so as to discuss and recommend policies and plans for scholarly journals in the larger context, and to provide input to *JoEMLS* in the smaller context.

In this volume, 18 manuscripts were processed, and only three of them were accepted, while the other 15 articles were not accepted for publication, with a reject rate of 83.33%. Some of these rejected manuscripts were lacking in form, interest, and content, but often, they were the result of a double-blind review system.

The manuscripts included in this volume are “Medical Librarians Participating in Systematic Reviews: Perspectives of Citation Analysis” by Shan-Shan Wang and Wen-Yau Cathy Lin; “The Publication Ethics of Preprints and Preprints’ Influence on Knowledge Dissemination during the COVID-19 Pandemic” by Sophia Jui-An Pan and “Thesis by Publication: Definition, Regulations and Issues for Consideration” by Chien Chou respectively.

These contributions are a timely selection, and we look forward to more discussions and sharing with our academic peers in the future. However, all contributing authors are our esteemed academic peers, and *JoEMLS* expects contributors, editors, and reviewers to continue to work with each other in a tireless spirit to share their research experiences and results. Each of us is a gardener who carefully cultivates the fruits in the academic garden. Perhaps there is a difference in seasonal ripeness between our duties and the fruits, but we cherish every part of the process and the harvest, and we hope to share them with others.

Jeong-Yeou Chiu  
*JoEMLS* Chief Editor



# Medical Librarians Participating in Systematic Reviews: Perspectives of Citation Analysis<sup>ψ</sup>

Shan-Shan Wang<sup>a</sup> Wen-Yau Cathy Lin<sup>b\*</sup>

## Abstract

*This study adopts a bibliometric approach to explore a focus on the general state of SRs worldwide, and analyzes the differences between SR writings with and without medical librarian involvement in terms of the differences in the number of authors, the country of institutional affiliation of the main author, the number of citing, and the number of times cited. The research objects were 22 journals that are included in the MEDLINE database were obtained a total of 9,030 SR articles published between 2014 and 2017. The results of the study revealed the following: A steady increase in the number of SR articles with librarians involved over the years. In terms of the characteristics of SR authors, the number of authors largely fell between three and seven regardless. A dominant proportion of institutional affiliations of the main authors for SR articles with librarians involved were located in the United States, exhibited librarians in highly developed countries had a higher rate of participation in SR. In terms of SR article citations, according to the t-test results, there was no significant difference in the number of citing between the presence and absence of librarian involvement, but a significant difference in the number of times cited between two. Suggestions of this study are as follows: Collaboration between clinical personnel and librarians in writing SRs should be encouraged, the state should enact SR relevant policies, and draw on SR-related services initiated by other libraries.*

**Keywords:** Medical library, Medical librarian, Systematic reviews, Citation analysis

<sup>ψ</sup> This article is based on the first author Shan-Shan Wang's master thesis "Medical Librarians Participating in Systematic Reviews: Perspectives of Citation Analysis and In-depth Interview", and the original research idea is inspired by her advisor Wen-Yau Cathy Lin.

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## **SUMMARY**

### **Introduction**

Systematic Reviews (SR) in medicine refer to literature studies developed on the basis of evidence-based medicine (EBM). An SR article is structured to comprehensively collect relevant EBM research, critically appraise, synthesize, and interpret results on a specific research question. Such articles may serve as a reference for clinical personnel in decision-making. A solid SR should develop in detail its research question and implementation procedures, and record the complete search process, whereby the results can be retrieved and reviewed repeatedly. How to retrieve appropriate and quality literature from numerous data is deemed to entail the professionalism of librarians.

To establish uniform format specifications for SRs and enhance the quality of SR articles, SR-related organizations have introduced criteria successively and recommended that authors should consult librarians or information professionals for assistance with information search when writing SRs. Librarians' roles in SRs range from someone providing basic guidance on search strategies to a co-author and instructor in research report writing. As such, libraries have also begun to offer a diversity of services, and proposed that participating librarians should be listed as co-authors or that their contributions should be mentioned in the acknowledgments. Topics discussed in previous studies on medical librarians and SRs include the new roles of medical librarians, the correlations of librarian involvement and literature search with the quality of articles, and the challenges confronting librarians in the process of SR participation and corresponding solutions. However, no research to date has been found to explore the differences in article influence between the presence and absence of librarian involvement from a bibliometric perspective of literature citations. Therefore, the present study intends to investigate the following research questions:

1. What is the general state of global SR development?
2. What are the respective characteristics of authors in SR writings with and without the involvement of medical librarians?
3. Are there any differences in citations between SR writings with and without the involvement of medical librarians?

### **Research Methods**

This study, with a focus on the general state of SRs worldwide, adopts a bibliometric approach to explore the differences between SR writings with and without medical librarian involvement in terms of two aspects: the characteristics of article authors and the citations. Specifically, the differences in the number of authors, the country of institutional affiliation of the main author, the number



of citing, and the number of times cited are discussed. Further, a *t*-test was conducted to examine the results.

SRs and relevant citation data are gathered through PubMed and Scopus. Journals publishing seven or more SR articles with librarians involved are selected as the scope of this study. Ultimately, 22 journals that are included in the MEDLINE database were obtained; among a total of 9,030 SR articles published between 2014 and 2017, 438 have librarians involved and 8,592 do not.

## Research Results

The general state of global SR articles shows little variation in the total number of SR articles across different years, but exhibits a steady increase in the number of SR articles with librarians involved over the years. This phenomenon indicates an upward trend in the rate of librarian involvement in SRs. *Cochrane Database of Systematic Reviews* published the greatest number of SR articles with librarians involved, accounting for 33.33% of the total number of the same examined in this study.

In terms of the characteristics of SR authors, the number of authors largely fell between three and seven regardless of the presence or absence of librarian involvement, with both types of articles showing similar distributions. However, some articles were found to include more than 20 authors, a reason for which is that SRs cover a broad range of topics. Articles with a large number of authors may be collaborative efforts across borders, states, or domains. A dominant proportion of institutional affiliations of the main authors for SR articles with librarians involved were located in the United States. The number of SR articles for the top three countries combined exceeded 60% of the total. On the other hand, the United Kingdom had the largest number of institutional affiliations of the lead authors for SR articles without librarians involved. Two points are worthy of particular note. First, librarians in highly developed countries showed a higher rate of involvement in SRs. Possible reasons, by inference, are the relatively advanced development in medicine and the advocacy efforts of Cochrane and multiple other professional organizations in these countries. Second, SRs whose institutional affiliations of the main authors were located in China were mostly ones without the involvement of librarians. This phenomenon reveals that China has devoted increased attention to the development in the field of medicine over recent years, yet had a relatively low rate of librarian involvement.

Regarding the differences in SR citations, SR articles with librarians involved presented a slightly higher mean number of citing than those without librarians involved, with a *t*-test result of .577 ( $p = .282$ ), indicating no significant difference in the number of citing between the presence and absence of librarian

involvement. SR articles without librarians involved showed a slightly higher mean number of times cited than those with librarians involved, with a *t*-test result of  $-2.031$  ( $p = .021$ ), indicating a significant difference between the two.

### Suggestions and Future Research

Based on the results of this study, the following suggestions are proposed. First, collaboration between clinical personnel and librarians in writing SRs should be encouraged to improve the quality and influence of SR articles. Second, the state should enact relevant policies to motivate clinical personnel to write SRs. Third, medical libraries may draw on SR-related services initiated by other libraries to formulate relevant supporting measures as a reference for researchers in cooperating with librarians, thereby increasing the intention of librarians to engage in SRs and enhancing the value of their existence.

Future research may advance along with the following directions. First, researchers may compare the quality of articles between different editions of *Cochrane Database of Systematic Reviews*, and explore in-depth the degree of librarian involvement, the number of articles included in analyses, and the frequency of article updates in different editions. Second, researchers may investigate the correlation between librarian involvement and SR literature search results based on the number of literature articles obtained after SR literature search collection and screening. Third, future studies may provide a summary of SR topics, and explore whether popular SR topics have an effect on the number of times cited for a given article. Fourth, questionnaire surveys or interviews may be conducted to inquire the authors of published SR articles directly for an understanding of whether librarian involvement would affect the quality of SRs.

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# The Publication Ethics of Preprints and Preprints' Influence on Knowledge Dissemination during the COVID-19 Pandemic

Sophia Jui-An Pan

## Abstract

*Preprints are a crucial vehicle for knowledge dissemination in modern times. The vigorous development of the preprint industry demonstrates the significance of open science and represents a significant change in the manner research results are disseminated. This study explores preprints through literature analysis. Specifically, publication ethics issues related to preprints and their role in knowledge dissemination during the COVID-19 pandemic are discussed. First, this study examines the history and characteristics of preprints, investigating their functions and features in academic research and knowledge dissemination. Further, three issues related to publication ethics resulting from the knowledge dissemination model of preprints are presented. The study also sheds light on preprints in the context of the COVID-19 pandemic, including the quantity and quality of preprints. In addition, the positive impact of preprints on knowledge dissemination during the COVID-19 pandemic and some latent problems are also discussed. Finally, the author of this study proposes suggestions for institutions and individuals serving different roles in the academic community regarding the aspects in which they can help promote the publication ethics and rightful knowledge dissemination of preprints.*

**Keywords:** COVID-19, Knowledge dissemination, Publication ethics, Preprint, Preprint server

## SUMMARY

### Introduction & Method

This study investigated and analyzed publication ethics concerning preprints and preprints' influence on knowledge dissemination during the COVID-19 outbreak. The study focused on two research questions:

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**RQ1:** What is the focus of academia in its concern for publication ethics generated by preprints?

**RQ2:** During the COVID-19 pandemic, what influence have preprints had on knowledge dissemination?

## Results

### 1. RQ1: Publication Ethics of Preprints

The publication ethics recently generated by preprints involve three dimensions. First, the principle-based regulations for publication ethics related to preprints remain imperfect. Currently, the mechanism for the publication of preprints has gradually trended toward the form of journal publication, which has increasingly blurred the boundary between preprints and peer-reviewed articles. Although the practice of publishing preprints has been gaining popularity, there is an absence of principle-based regulations to achieve publication ethics.

In addition, numerous aspects of enhancing the accountability and transparency of scholarly publishing require considerable effort on the part of both authors and preprint servers. For example, no common mechanism has been established in practice to maintain transparency in the time sequence of publication between preprints and subsequent peer-reviewed journal articles. Further, unlike peer-reviewed journals, which have peer-review and editorial teams that can help uphold the quality of research, most preprint servers operate without teams that have expertise in different disciplines. Preprint operating mechanisms therefore depend on the self-discipline of the authors to ensure high transparency and quality in scientific research, as heteronomous mechanisms remain immature.

Second, doubt has been cast over the possibility of duplicate submission in the practice of authors releasing their preprints. From the perspective of modern publication ethics, academia is inclined not to consider preprint servers as a formal channel for scholarly publishing. Therefore, preprints uploaded to servers are not considered formal publications. Thus, unless the publication policies of peer-reviewed journals expressly prohibit the submission of preprints, such an action, in general, is not considered duplicate submission.

The fact that peer-reviewed journals are increasingly accepting submissions of preprints indicates that they have gradually given up the principle of the uniqueness of scholarly communication. This reveals that these journals have become more willing to accept the circulation of different versions of research manuscripts within the academic circle. However, although this seems to have resolved the doubt about repeated submissions by authors to preprint servers and peer-reviewed journals, it leads to the surfacing of another kind of duplicate submission: authors uploading the same preprint on multiple servers. As for

whether such practices violate publican ethics or even raise the issue of duplicate submission, no sufficient discussion in academia exists. Nevertheless, this phenomenon has resulted in repeated literature counts in bibliometric studies, particularly those of preprints.

Third, repeated scholarly literature on the Internet appears to have contributed to the overloading of digital repositories. Through preprint servers and peer-reviewed journals, many authors have released and published similar or identical research manuscripts, which has resulted in the phenomena of “information overlap” and “information overload” (Chiarelli et al., 2019). From the viewpoint of sustainable development, integrating the digital repositories of both preprint servers and journal publishers is imperative. This includes designing scholarly literature retrieval mechanisms that can more effectively use literature resources and economize on the costs of system development and operation maintenance. Alternatively, it could include investigating the possibility of archiving or deleting duplicate scholarly literature. This way, version control and accuracy in knowledge dissemination could also be better ensured.

## **2. RQ2: Influence of Preprints on Knowledge Dissemination during the COVID-19 Pandemic**

According to Fraser et al.'s (2021) bibliometric study, at the early stage of the COVID-19 pandemic from January 2020 to April 2020, more than 19,000 manuscripts on COVID-19 were published worldwide. Among them, 6,710 were in the form of preprints, accounting for about 35% of the total. Citations of research articles on the pandemic rose rapidly shortly after the initial wave of publishing (Heidary & Gharebaghi, 2021).

Notwithstanding the considerable number of papers on COVID-19, which seem to have facilitated an understanding of this new disease for various sectors, the quality of these research papers has varied greatly (Gopalakrishna, 2021; Tjink et al., 2020; Watson, 2022). At a time when the whole world has been facing a public health emergency, it is necessary for scholarly publishers and preprint servers to develop a new review procedure for preprints. In particular, the review of scientific content should be more meticulous and rigorous. Preprint servers should also lay down criteria for selecting articles suitable for release to ensure that different sectors can use objective and correct knowledge to cope with the epidemic.

Since the onset of the pandemic, both the scientific community and the public have been eager to learn about COVID-19. Preprints that adopt open access publishing shorten the distance between the public and scientific research, enabling everyone to obtain the latest scientific knowledge instantly. However, the public might not necessarily understand the role and limitations of preprints in knowledge dissemination. They may misuse the information or even place

too much faith in the research results. Recently, Fleerackers et al. (2021) demonstrated that digital media do cite preprint research in their reports while often neglecting to emphasize the nature of preprints (that is, that they are not peer-reviewed) and the high uncertainty of the research results. Therefore, scientists should shoulder more responsibility in assisting the media to develop the principles, language, and vocabulary that should be used when citing preprints.

## **Discussion**

The author of this study proposes suggestions for actions that institutions and individuals in academia can undertake to promote the publication ethics of preprints and the dissemination of knowledge.

### **1. Leading Organizations of Scientific Research and Scholarly Publishing**

Leading organizations of scientific research and scholarly publishing should set the tone for the stance on preprints. They should also formulate specialized principles of publication ethics for conduct regarding releasing and using preprints to serve as references for scholarly publishers and preprint servers when drawing up their publication policies.

### **2. Peer-Reviewed Journals and Journal Editors**

All peer-reviewed journals and journal editors have the responsibility to decide whether they accept submissions of preprints and should clearly announce their decision on the web pages of their journals. If they agree to accept submissions of preprints, they should formulate guidelines for such submissions for authors to follow. Further, as there is likely no way to prevent the publication of preprints from affecting the impartiality in double-blind peer reviewing (Committee on Publication Ethics, 2018), peer-reviewed journals and journal editors need to ideate ways to overcome this limitation to maintain anonymity in double-blind peer reviewing.

### **3. Scholarly Publishers and Preprint Servers**

Scholarly publishers and preprint servers inevitably need increased cooperation to jointly design operating principles and mechanisms that can enhance the transparency of the publishing process and manuscript version control.

### **4. Research Institutions and Research Funding Agencies**

With the release of preprints is becoming a trend, research institutions and research funding agencies are encouraging researchers to list their preprints on their publication resume. However, these institutions and agencies should first perfect their respective policies and guidelines concerning releasing preprints and expressly convey the policies to researchers. Further, when these institutions and agencies recognize preprints as an expression of individuals' research performance, they should bear more responsibility for evaluating research quality and value (Berg et al., 2016; Bourne et al., 2017; Watson, 2022). Therefore, it is necessary for these institutions and agencies to develop more explicit and

objective guidelines for the performance evaluation of preprints and require reviewers (such as grant reviewers) to adhere to them to maintain fairness and impartiality in research reviewing.

Besides, the high production and citation rates of epidemic-related articles might be destroying the traditional reward and evaluation system of academia or even giving researchers who wish to cut corners an opportunity of which they can take advantage (Heidary & Gharebaghi, 2021). Therefore, research institutions and research funding agencies, in evaluating the performance of researchers engaged in epidemic-related studies, should hold a more conservative attitude than they did in the past. Before drawing any conclusions, they should include the COVID-19 pandemic's impacts on scholarly publishing in their consideration (Else, 2020).

### 5. Researchers and Authors

Researchers and authors must play a more active role in promoting the publication ethics of preprints. They should be responsible for revealing to readers and the public the advantages and limitations of preprints in knowledge dissemination (Brierley, 2021; Gopalakrishna, 2021; Tjldink et al., 2020). If authors wish to draw on the advantage of preprints to accelerate knowledge dissemination and expand its scope, they are duty-bound not only to improve their ability in scientific communication but also to educate the public and media to equip them with the ability to correctly interpret preprints.

Most importantly, abiding by scientific ethics is a principle that no researchers or authors should ever sacrifice under any circumstances. Since preprints have generally been regarded by academia as an important channel to present research, researchers and authors undoubtedly should comply with ethical and legal norms in the process of conducting research.

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# Thesis by Publication: Definition, Regulations and Issues for Consideration

Chien Chou

## Abstract

*In Taiwan, writing a thesis or dissertation is a basic need for graduate students to fulfill their requirement for graduation. The traditional thesis or dissertation usually refers to a monograph written and formatted by required order after completing a single research. Only students from a few departments may use their certificates of achievement with written reports or technical reports as substitutes for their theses or dissertations and apply for graduation. In recent years, the thesis by publication (TBP) approach has begun to appear. Foreign universities have their own policies and regulations for including published works as part of final thesis submission, and there are also a number of related research papers in the academic field. In Taiwan, some university departments have already adopted the TBP approach for years, but it seems that no local university has a clear school policy or brings up relevant perspectives to the authorities for discussion. To address the issue of TBP, this study uses document analysis method, analyzing public documents on the Internet and aims to portrait the TBP approach from literature. Firstly, the author inspects school regulations of Australian, UK, and Japanese universities; secondly, research papers are reviewed and the definition of TBP along with topics for consideration are listed. The recast of capability for independent research and practical practices are also discussed and presented, in the hope that this study will serve as a reference for policy makers in Taiwan's higher education.*

**Keywords:** Thesis by publication, Publishing during candidature, Ph.D. by prior publication, Graduate student, Higher education

## SUMMARY

### Introduction

In Taiwan, nearly all graduate and Ph.D. students are required to submit their theses or dissertations in support of their academic candidature. According to the Degree Conferral Act (2018) enacted by the Ministry of Education, only

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students taking degree programs in arts, applied science and technology or sports are eligible to submit their proofs of achievement or professional/technical reports instead of their degree theses. Most of the other students in Taiwan still need to present and successfully defend their thesis studies, which embody their research results and competence.

A traditional thesis-by-monograph (TBM; Liardét & Thompson, 2020) usually indicates the completion of a single study, and the writing follows the IMRAD structure: Introduction, Methods, Results, and Discussion (Gastel & Day, 2017; Sollaci & Pereira, 2004). In addition to this format, an alternative type of degree thesis, namely, thesis by publication (TBP), has been introduced in higher education and is now listed as one type of graduation thesis approved by some universities. A TBP includes a collection of the degree candidate's published works, and this type of Ph.D. degree is currently available in Northern European and Australian universities. In Taiwan, however, there seems to be no local school policy on such an issue or relevant discussions brought up by authorities. Therefore, the current study uses documentary research and seeks to discuss TBP in detail, including its definition and types, school regulations/policies, and issues for consideration, such as advantages and disadvantages for students, disciplinary differences, and qualifications for those who wish to undertake their degree by TBP. The results of this review study could serve as a reference for policy makers in Taiwan's higher education.

### **Definition and Types of TBP**

The most well-known definition of TBP is a thesis that includes a collection of one's published works during candidature. According to the document by the Committee on Publication Ethics (2017), a TBP includes at least one or part of a published journal paper. However, several universities broaden the inclusion of published papers into book chapters and conference papers. Some universities even approve the inclusion of accepted papers or ready-to-submit manuscripts in a TBP. A variety of names regarding TBP are used in universities. "Thesis with publications (TWP)", "a thesis incorporating publications (TIP)", or "including published work in a thesis" can be seen in university policies and regulations.

The Ph.D. by Prior Publication originated in the United Kingdom in 1966 is another type of TBP. Currently, some universities in Northern Europe, Australia and Japan have regulations regarding this type of Ph.D. The candidates who are eligible to apply for admission are individuals who have already published their works with both good quality and quantity.

In Japan, the degree of "Dissertation Ph.D." is regulated by the Degree Conferral Act of Japan (revised in 2016) compared to the degree of "Curriculum

Ph.D.” Although there are no detailed school policies or regulations, once universities recognize the academic competence of candidates, such a degree can be conferred.

### **Requirements and Regulations for TBP**

How many published papers should be included to qualify as a TBP? Australian and New Zealand universities differ in these numbers and types. Generally, two to eight papers are required for a Ph.D. thesis. Authorship is another requirement. The candidates need to be the principal or leading authors of some papers or at least the co-authors of all included papers, depending on the respective universities' regulations.

Regarding the format of TBP, almost all Australian universities do not allow just a matter of binding the papers together. Instead, the candidates need to reorganize all included papers into cohesive, integrated, and sustained work in a logical way with an emphasis on its significance. Some universities have detailed format requirements, such as a newly written overview, statement of respective papers' contribution to the theses, or candidates' contributions to each paper.

Copyright is usually a major concern for TBP. Generally, candidates need to provide some type of authorship contribution statement or co-authorship form to demonstrate that all authors of the papers are informed and give their consent. Candidates are suggested to re-typeset the published papers into the format of degree theses. As long as the published papers are nonexclusively licensed to journal publishers, there should be no legal concerns.

Upon the completion of a TBP, an oral defense needs to be held. Some universities have stated that a TBP is not a guarantee for passing because the review emphasizes the coherence and total quality of the thesis. Generally, candidates are expected to answer all questions for any part of the thesis, regardless of whether she or he is responsible for this part.

### **Issues for Consideration**

#### **Advantages and Disadvantages for Students**

Research has shown that there are some advantages for Ph.D. students who wish to undertake their degree by TBP. The major advantage is that students can learn earlier about how to be involved in research projects, collaborate with other researchers, execute the research procedures, report the results, and practice academic publishing. The accumulation of research experiences and a portfolio of published work can also enhance the competitiveness of Ph.D. graduates in the job market. However, students may also face the strict challenges of journal paper writing, harsh critiques, and callous rejections. Moreover, the engagement and commitment of thesis advisors in TBP-related research work may deeply

influence the success of TBP. Finally, TBP is sometimes questioned because the “capability of doing independent research,” which is usually required for Ph.D. graduates, may not be fully demonstrated. The assurance can be checked in a rigorous oral defense. Nevertheless, the present author suggests redefining this term, especially in the age in which cross-disciplinary, large-scale, collaborative research is highly encouraged.

### **Disciplinary Differences**

Past research has indicated that not all disciplines accept TBP. Generally, the disciplines of science, technology, engineering and medicine adopt TBP more than those of humanities and social sciences. In addition to disciplinary differences, individual thesis advisors’ personal preferences and experiences may affect the adoption of TBP. Therefore, most Australian universities suggest that Ph.D. students consult their advisors about their type of thesis as early as possible. Once TBP is adopted, the oral defense committee members should also be on the same page.

### **Student Skills and Attributes**

Students’ personal attributes and expectations may also contribute to the decision on their chosen type of degree theses. Regardless of the type, i.e., TBP or traditional, the pursuit of a Ph.D. is a long, challenging and stressful journey. Merga et al. (2019) conclude that the needed attributes for Ph.D. students include resilience/patience, determination/focus/passion, independence/assertiveness, and introspection/adaptability/openness to self-improvement. However, their study recommended that TBP candidates have more collaboration/interpersonal skills, abilities in addressing peer review and feedback, and organization/planning/time management and be equipped with information technology proficiency.

### **Implications for Taiwanese Higher Education**

The rise and adoption of TBP somewhat reflects the recent changes in higher education. For university and individual researchers, performance-based evaluation that counts journal papers has become mainstream. Therefore, advisors and graduate students form a team that undertakes research work together to generate more research outputs. The papers included in TBP can thus be counted as performance indicators of both students and advisors.

In Taiwan, TBP has already been adopted by some disciplines and individual advisors, but there seems to be no government-level (such as those from the Ministry of Education) or university-level policies. The present study suggests that Taiwanese universities take into account the establishment of relevant, general regulations (i.e., the recognition of TBP, a co-author agreement statement, etc.) and that individual college, department, or graduate program have detailed

requirements (i.e., the paper number, paper type, authorship, format, and oral defense information). Universities should also oblige colleges, departments or graduate programs to redefine the “capability of doing independent research”, control the quality of theses, require advisors to be more responsible in supervising candidates, and remove the concerns of duplicate publication. For students, universities should urge them to clarify the authorship and copyright issues of papers to be included and provide them with more survival skills and learning and consultancy resources for their academic success.

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範例2－參考文獻(References)  
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