Article

Apprenticeship in Scholarly Publishing: A Student Perspective on Doctoral Supervisors' Roles

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Abstract: Although a large body of literature has suggested that doctoral supervisors play an important role in their students' attempts at scholarly publishing, few studies have focused specifically on what roles they play. This study sought to address this gap by zooming in on the various roles a group of Chinese doctoral students found their supervisors playing in their scholarly publishing endeavors. Our analysis revealed four important roles played by the supervisors: 'prey' searchers, managers, manuscript correctors and masters. The results showed that the supervisors not only facilitated the doctoral students' publishing output, but also fostered their apprenticeship in scholarly publishing and the academic community. However, the results also unveiled a general unavailability of sorely-needed detailed and specific guidance on students' early publishing attempts and some supervisors' limited ability to correct students' English manuscripts. These findings underscore the important contributions doctoral supervisors can make to their students' academic socialization. They also suggest a need for external editorial assistance with doctoral students' English manuscripts and ample opportunities for their scaffolded initiation into the tacit conventions and practices of scholarly publishing.

Keywords: apprenticeship; Chinese doctoral students; scholarly publishing; supervisor's role

1. Introduction

Over the past few decades, the increasingly commercialized higher education sector has ushered in an accountability and auditing culture that continually pushes for greater efficiency and better performance. This change of culture in higher education has propelled both institutions and individual academics to place an increased emphasis on various efficiency and performance indicators, such as graduation rates, the time to degree completion taken by doctoral students and the publication track records of faculty and students [1–5]. Meanwhile, the ever-entrenched knowledge economy has put a high premium on the production of both knowledge and knowledge workers [6]. This trend has also prompted higher education institutions to accelerate the dissemination of knowledge and the graduation of much-needed knowledge workers. These developments and changes in higher education are placing doctoral students under increasing pressures to publish earlier and more [7], in order to meet institutional graduation requirements [8–11], secure post-doctoral jobs upon graduation [12,13], increase their research capacities [6,14,15] and/or contribute knowledge to the field [14,15].

High-stakes scholarly publishing is, however, anything but an easy task for doctoral students [2,16,17]. Shah *et al.* ([18], p. 511), for example, characterize scholarly publishing as "a daunting task for novice researchers." Similarly, the doctoral students in Kamler's ([19], p. 290) study viewed scholarly publishing as "a site of anxiety" and a process of "tremendous effort and struggle." Specifically, doctoral students new to a field may encounter a multitude of difficulties or challenges, such as "insufficient understanding of the field of study" ([3], p. 62; see also [20]), "rather vague understandings of the whole process of academic publishing" ([21], p.174; see also [22]) and competing demands of thesis research and publishing [3,12,23]. In addition, English as an additional language (EAL) doctoral students (e.g., Chinese doctoral students) seeking to publish in international English journals may find themselves in "unique peripheral positions" ([24], p. 48) in that they need to not only navigate through the unfamiliar and complex process of scholarly publishing, but also overcome additional language difficulties [9,25–27].

Given the high stakes and the multitude of challenges of scholarly publishing for doctoral students, they should not be left to sink or float on their own [2,22,28]. As Kamler ([22], p.81) maintains, "[t]here is too much to learn and too much at stake for early career writers to do this work [the 'revise and resubmit' process in publishing] alone." The literature has suggested that supervisors can play an important role in guiding doctoral students through the complex process of scholarly publishing [2,25,29,30]. Indeed, supervisors have been recognized as important 'shapers' [31], 'literacy and academic brokers' [5] or 'publication brokers' [22] for doctoral students seeking to publish. More specifically, the literature has shown that supervisors can facilitate doctoral students' attempts at scholarly publishing in various ways. To begin, supervisors can bolster doctoral students' publication output by helping them improve the quality of their manuscripts [19,32,33] and enhance their self-confidence as emerging researchers [2,24,34]. For example, a survey study [2] of 139 doctoral students found that a much higher proportion of the students who received supervisors' encouragement or assistance published successfully than those who received no such support from their supervisors. Second, with more experience and greater expertise, supervisors can help doctoral students navigate through the complex, challenging and lengthy process of scholarly publishing, from choosing and conceptualizing publishable research topics [12,20,35] through collecting/analyzing data and writing up manuscripts, to

negotiating the review process [20,22] and dealing with rejections and harsh criticisms [19,33]. Third, for EAL doctoral students, supervisors may also provide support to alleviate language difficulties that they may encounter in writing up and revising their manuscripts [20,36,37]. Fourth, supervisors can help doctoral students manage their scholarly publishing strategically, both in itself and in relation to their thesis projects [12,20]. Finally, and perhaps most importantly, supervisors can socialize doctoral students into scholarly publishing and the academic community [13,14]. In a study of the challenges of publishing in English faced by four EAL doctoral students studying at U.S. universities, for example, Cho [24] found that supervisors' guidance and support played a critical role in the apprenticing of the students in their academic communities.

Despite the various ways in which supervisors can facilitate doctoral students' scholarly publishing efforts, there is also some evidence that they may fall short of doing that for various reasons [12,20,23,31,38]. First, supervisors may not think that it is their job to help doctoral students with their scholarly publishing activity or some aspects of that activity. For instance, several supervisors in Aitchison *et al.*'s ([6], p. 441) study "refused to help students with 'basic English skills'." Second, practical constraints may hamper supervisors from providing doctoral students with adequate and effective assistance. In a study of the publishing experiences of a Brazilian doctoral student studying at a U.S. university, Simpson [23] found that the "long-distance advisory relationship" (p.234) and the supervisor's "numerous roles and duties" (p. 244) impeded him from providing sufficient and effective assistance with the student's scholarly publishing endeavors. Third, the 'occluded' [12,20] or 'implicit' [38] nature of scholarly publishing may inhibit supervisors from giving doctoral students explicit and effective assistance with it. The indirect and implicit support provided by the supervisor in Blakeslee's [38] study, for example, failed to effectively scaffold the student's composing of a journal article. Finally, supervisors may lack the experience or expertise to help doctoral students with some aspects of their scholarly publishing activity. In a study on the shapers of English manuscripts for a group of Chinese doctoral students, Li and Flowerdew ([31], p. 107) found their supervisors "vary(ing) in their competence in making efficient corrections." Similarly, in Kwan's [12] study of instructional support for research publication in Hong Kong universities, some doctoral students reported their supervisors' inability or limited ability to provide assistance with their English publishing endeavors, because they did not publish in English themselves.

It can be seen from the above review that the extant literature has documented varying findings and somewhat diverging views about doctoral supervisors' roles in their students' attempts at scholarly publishing. One possible reason for these varying findings and diverging views might be that most of the extant studies did not focus specifically on supervisors' roles in their students' scholarly publishing endeavors, but on doctoral students' difficulties with scholarly publishing and their coping strategies. There is thus a need for more research that focuses on doctoral supervisors' specific roles in their students' attempts at scholarly publishing. This study sought to address this gap by delineating the roles that a group of Chinese doctoral students found their supervisors playing in their scholarly publishing endeavors.

2. Method

The participants for this study were 11 doctoral students from five disciplines and at different stages of their doctoral studies in mainland China. Table 1 presents a brief summary of their profiles. The selection of participants from different disciplines and at different stages of their studies was not motivated by generalizability considerations, but by the principle of maximum variation subject to the available resources and access to participants [39].

Table 1. Participant profiles.

Code	Discipline	Age	Gender	English Papers	Chinese Papers
MS1	Materials Science	Late 20s	Male	3	3
MS2	Materials Science	Early 30s	Male	3	1
MS3	Materials Science	Late 20s	Male	2	3
MS4	Materials Science	Late 20s	Female	2	0
MS5	Materials Science	Late 20s	Female	1	0
MS6	Materials Science	Mid 30s	Male	8	4
MS7	Materials Science	Mid 30s	Male	15	2
LM1	Laboratory Medicine	Mid 30s	Female	3	3
CS1	Computer Science	Late 20s	Male	2	12
EE1	Electrical Engineering	Mid 30s	Male	8	5
PH1	Physics	Late 30s	Male	10	1

While Materials Science students 1–7 (MS1–7) were drawn from a research-intensive technological university and all majored in materials science, the remaining four (*i.e.*, Laboratory Medicine 1 (LM1), Computer Science 1 (CS1), Electrical Engineering 1 (EE1) and Physics 1 (PH1)) each majored in a different discipline and came from a different research-intensive university. At the time of the interviews, MS4 and MS5 were one year and a half into their doctoral studies; MS1, MS3 and LM1 were in the third year of their doctoral studies; MS2 and CS1 were in their fourth year of studies; and MS6, MS7, EE1 and PH1 had completed their doctoral studies. MS1–7 came from the same department. While MS1, MS2 and MS6 belonged to a research lab headed by their supervisor, MS3, MS4, MS5 and MS7 worked in another research lab headed by two other professors. The remaining students were each attached to a research team headed by their supervisors. As Table 1 shows, the participants had published varying numbers of papers. As is common in the science and engineering disciplines, all of their papers were coauthored, in most cases, with their supervisors, as well as other members of their research teams [19,28,40]. All of the participants had published in both English and Chinese, with the only exceptions being MS4 and MS5, who had not published in Chinese. All of them had to meet institutional publication requirements before they could graduate. The publishing requirements varied according to institution and supervisor. The minimum institutional requirement was one Science Citation Index (SCI) journal article (LM1, PH1). In addition to one SCI journal article, CS1 and EE1 were required to publish at least two more Engineering Index (EI) journal articles. MS1–7 were required to publish at least three SCI journal articles before they were allowed to graduate. While most supervisors did not have extra publishing requirements, apart from the institutional ones, some (e.g., PH1's supervisor) had higher requirements than did the institutions. As

PH1 noted, "my supervisor is extremely successful in our field. So, understandably, he has higher standards [about publishing] than the university, though he would also take his students' abilities into account."

Data were collected through semi-structured interviews with the doctoral students. Specifically, one (MS1–7, PH1) or two (CS1, EE1 and LM1) interviews were conducted with each participant to explore their experiences and practices of scholarly publishing, which was the overarching purpose of a larger project of which the present study was part. The interviews followed a semi-structured interview guide, which covered a wide range of issues pertinent to participants' experiences and practices of scholarly publishing. Interview questions most relevant to the focus of the present study concerned supervisors' roles in and (types of) assistance with the participants' publishing endeavors, e.g.: "What roles did your supervisor play in your publishing efforts?" "What types of assistance did your supervisor provide you in your publishing efforts?" "Was there any type of assistance you wanted from your supervisor, but did not receive?" The first author conducted all of the interviews in Mandarin Chinese, the common mother tongue shared by the participants and himself. The interviews lasted from 28 to 58 min and were digitally recorded. They were later transcribed verbatim by the first author and analyzed by both authors in the original Mandarin Chinese, the preferred way of transcribing and analyzing qualitative data in need of translation between languages [41,42].

In our initial analysis of the data, we read the interview transcripts repeatedly and coded them with reference to the interview questions [43]. At this stage of coding, we used the participants' wording as much as possible to retain their perspectives [39]. The initial analysis yielded two overarching categories, each with several subcategories: (1) roles of supervisors (1A, supervisors as 'prey' searchers; 1B, supervisors as managers; 1C, supervisors as masters); and (2) assistance from supervisors (2A, research topic selection; 2B, strategic direction; 2C, detailed guidance for early attempts at publishing; 2D, structure/logic; 2E, expression; 2F, grammar). With this tentative coding scheme, we reanalyzed the data and, in the process, modified the coding scheme by integrating some categories into others (e.g., incorporating 2A into 1A) and combining some categories into a new one (e.g., combining 2D, 2E and 2F into manuscript correctors). This phase of analysis led to a categorization of the supervisors' roles into 'prey' searchers, managers, manuscript correctors and masters. As will be shown in the Results Section, a supervisor could play multiple roles, and the boundaries between some roles were thus inherently fuzzy to some extent, although each role had its own unique characteristics and was reported by at least three participants. Therefore, these categories served as descriptors rather than a watertight classification of the supervisors' roles. We coded and tabulated the data using these descriptors. Following this, the first author translated the most relevant interview excerpts into English, which was checked by the second author. To ensure the trustworthiness of our representation and interpretation of the data, we contacted the participants for clarification or confirmation if something unclear or ambiguous arose during data transcription and analysis. For example, LM1 characterized one type of assistance from her supervisor as "strategic direction" (*zhanlue gaodu de zhidao*, literally "strategic level direction"), which we inferred from other participants' interview data and the context of her interview data might cover both research direction (*i.e.*, the role of 'prey' searchers) and research planning (*i.e.*, the role of managers). We contacted her for clarification during data analysis. She elaborated on what she meant by "strategic direction" and

associated it more with the procedural or managerial than with the topical aspects of research (see Section 3.2).

3. Results

A qualitative analysis of the interview data revealed four major roles played by the supervisors in the doctoral students' publishing endeavors, namely 'prey' searchers, managers, manuscript correctors and masters. As will be shown in the following, in these roles, the supervisors contribute not only to their doctoral students' publishing output, but also to the latter's apprenticeship in the enterprise of scholarly publishing and initiation into the academic community.

3.1. Supervisors as 'Prey' Searchers

The characterization of supervisors as 'prey' searchers underscores their roles in finding promising and publishable research topics for their students (*i.e.*, searching for 'preys') and, thus, in facilitating their participation in the conversations of the discipline [44,45]. Three participants (*i.e.*, EE1, LM1 and PH1) explicitly spoke of supervisors' role in selecting publishable research topics for their students. As noted by EE1, "supervisors are prey searchers, and doctoral students are prey capturers. They search for preys, and then we doctoral students work to capture them." In this role, supervisors identify and assign publishable research topics to their students or direct the latter's attention to areas of research that they think have the potential to lead to publications. PH1, for example, observed that "in general, the supervisor would tell you about a research direction and probably share a few key research articles related to that line of research." Similarly, LM1 noted that:

> He [the supervisor] directed me to a topic and encouraged me to follow its latest developments in both the domestic and international literature. Then, he suggested that I work on one or several problems related to the topic, on which we might have breakthroughs. Following that, I focused on the problems and tried my best to find solutions to them. (LM1)

LM1's supervisor explicitly guided her to connect her research topic strategically with the disciplinary frontiers by following the latest disciplinary literature and to join the disciplinary conversations by working on problems that have the potential to contribute to the discipline ("breakthroughs"). This role may seem managerial and trivial, especially for supervisors with well-established research teams and programs. However, unlike supervisors as managers (see the next section) who are concerned primarily with the managerial (e.g., assigning research projects) and procedural (e.g., planning and procedures) aspects of research projects, supervisors as 'prey' searchers focus on searching for research topics that are part of the ongoing disciplinary conversations and, thus, have the potential to lead to current publications. The importance of this role is therefore not to be underestimated. Indeed, several participants (EE1, LM1 and PH1) talked at length about the importance of supervisors' strategic direction in doctoral students' choosing of promising and publishable research topics. The following excerpt is illustrative of the importance that some students attached to this kind of support.

> That instinct [to be able to search for 'preys', *i.e.*, promising and publishable topics] takes a long time to acquire. Not everyone can do that. You need to accumulate profound knowledge of the whole field and years of research experience to develop that kind of (research) acumen. (EE1)

EE1's account highlights the value of supervisors' expertise and experience in identifying research topics that are well grounded in the disciplinary conversations and, thus, publishable. By contrast, doctoral students as newcomers to the field often lack the necessary knowledge and experience to select a current and productive research topic to work on. In this sense, acting as 'prey' searchers, supervisors not only facilitate their doctoral students' publishing output, but also initiate the latter's participation in ongoing disciplinary conversations [44,45].

3.2. Supervisors as Managers

Supervisors as managers, as the appellation suggests, manage research projects and, in doing so, facilitate students' research and publishing endeavors. Four participants (*i.e.*, CS1, EE1, LM1 and MS6) talked explicitly about supervisors' role as managers. As EE1 put it, "he [the supervisor] is the manager, and we are 'the managed'." According to the doctoral students interviewed in the present study, their supervisors often assigned them to a research project or part of a project, a common practice in many science and engineering disciplines [12,20,35]. CS1, for example, noted that:

> Your supervisor may have research projects from the National Natural Science Research Foundation of China or industry. In a sense, your supervisor needs to manage these research projects by assigning students to different projects or different components of a project and planning for the production of publications or industrial products. (CS1)

By assigning students to research projects, the supervisors attached their students to their research labs or teams, which has been shown to facilitate not only doctoral students' integration into their departments and consequently successful completion of their doctoral studies [40,46], but also their success in scholarly publishing [20,21].

In addition to assigning their doctoral students to their research projects, the supervisors as managers were also involved in the planning and monitoring of doctoral students' research and publishing efforts. EE1, for example, reported that his supervisor mapped out a research plan for him, outlining how many components his project could be divided into, what he was supposed to do in each component and what problems he was expected to work on in each component. Aside from overall research plans, some supervisors also helped their students navigate through the processes or procedures of research and publishing, as noted by LM1 in the following excerpt.

> My supervisor offered guidance that was of a strategic nature. That's what I expected from my supervisor. He provided me with guidance in the direction of my research, the designing and planning of my research and the framing and structuring of my manuscripts. (LM1)

LM1 characterized her supervisor's role in planning and monitoring her research and publishing efforts as being "of a strategic nature," suggesting the high value she placed on it. Similarly, EE1

ascribed his "relative success" and many of his research teammates' similar or even greater success in publishing partly to his supervisor being "a good manager," who not only helped them plan their research and publishing, but also checked their progress regularly. This suggests that supervisors as managers can bolster students' progress and output in research and publishing.

In their managerial capacity, therefore, supervisors assume the administrative role of managing research projects [47,48]. In doing so, they ease their students' integration into the department, which may, in turn, facilitate their successful degree completion [40,46] and scholarly publishing [20,21]. Additionally, supervisors may also take on the role of planning and monitoring students' research and publishing endeavors and, in so doing, manage their progress and output in research and publishing.

3.3. Supervisors as Manuscript Correctors

The portrayal of supervisors as manuscript correctors brings to the fore their roles in helping students check and correct their manuscripts intended for publication. All of the students reported that they would almost always ask their supervisors or senior PhD students to check their manuscripts, especially English ones, before they submitted them to journals. MS6, for example, said that "in case others may have difficulty understanding my writing, I always ask my supervisor to check it for me." Likewise, PH1 observed that "if I feel there is something I may not have expressed clearly, I will seek my supervisor's help." The supervisors' checking covered various aspects of writing, ranging from "structure, word choice and grammar" (MS4) to "the structure of the manuscripts" (CS1) and "the logic and the flow of the manuscripts" (MS6).

Despite the importance and diverse kinds of supervisory assistance with manuscript checking, there were reservations about some supervisors' ability to correct English manuscripts. MS1, for example, reported that:

> I ask my supervisor for help with my Chinese manuscripts most of the time. As for English manuscripts, I also seek his advice and suggestions, but more often, I turn to one of my seniors [a senior PhD student in his research team] for help, because he probably has published more English journal articles (than my supervisor). (MS1)

Similarly, MS2 confided that "it's fine to ask my supervisor to help me with my Chinese manuscripts. But he is not so good at English and he has never published any English journal articles himself." These accounts suggest that despite the perceived value of manuscript correcting, some supervisors seemed to fall short of fulfilling their role as English manuscript correctors.

3.4. Supervisors as Masters

Finally, to characterize supervisors as masters (*shi fu*) gives prominence to their critical role in apprenticing their doctoral students in competencies in scholarly publishing and the practices of the (international) academic community. PH1, for example, remarked that "doctoral students are supervisors' disciples." Similarly, EE1 noted that "your supervisor teaches you research skills and techniques, how to think about and approach problems and find new solutions. So, that's a master-disciple relationship, a relationship of apprenticeship." While only EE1 and PH1 explicitly referred to supervisors as *shi fu*, all of the participants highlighted supervisors' role in improving

graduate students' scholarly publishing abilities, increasing their research capacities and/or turning them into increasingly independent researchers. In this role, therefore, the supervisors committed themselves not only to increasing their students' research output, but also to apprenticing them in the 'trade skills' for researching and publishing, that is preparing and developing them for independent functioning as full-fledged members of the academic community [47,49]. This distinct role was well captured by EE1:

> This [the master-apprentice relationship] is definitely different from teacher-student relationships in undergraduate or even master's studies. At this stage, your supervisor teaches you how to analyze problems and helps you develop your ability and skills to solve problems. In this way, you become an increasingly independent researcher. (EE1)

In order to mentor him to become an independent researcher, EE1 further noted that his supervisor deliberately assigned him tasks and activities (e.g., taking certain courses, learning to use certain software and writing research grant proposals and journal articles) intended to develop his scholarly abilities systematically.

Like EE1, the other students also attached great importance to this mentoring role, as clearly evidenced by their (repeatedly) reported desire and need for their supervisors' detailed and specific guidance on their early attempts at scholarly publishing. Specifically, all of the participants reported that they had encountered great difficulty publishing their first one or two journal articles, in both Chinese and English. This difficulty was succinctly summarized by LM1: "All things are difficult before they are easy" (*wan shi kaitou nan*). Specifically, "having no idea where to start" (*wu cong xia shou*) appeared to be a common challenge for the doctoral students in their early publishing attempts, with both EE1 and MS3 using exactly the same phrase to express their frustration at the challenge. In the face of this challenge, detailed and specific guidance on the core aspects of publishing was deemed extremely helpful by virtually all of the participants in this study. CS1, for example, observed that:

> Learning English academic writing takes time. When I first started to write English journal articles, I could barely hold an article together or express my ideas clearly. But luckily, one of my supervisors gave me very detailed guidance for my first two articles, from the very beginning of generating ideas and conceptualizing the manuscript to the very end of copy editing. I think I made a lot of progress through working with him on the two articles. Ever since, I've no longer had much difficulty publishing articles in EI journals. (CS1)

As indicated in this excerpt, CS1 attributed his successful apprenticeship in scholarly publishing and the publishing of his first two articles largely to his supervisor's step-by-step guidance on his attempts to publish them. PH1 also reported that his supervisor's "detailed and specific guidance" on publishing his first article had a formative influence on his initiation into scholarly publishing. He went on to add that as he gained more experience, his supervisor provided him increasingly less guidance in the belief that "only in that way can students make real progress." He said that he appreciated not only his supervisor's detailed guidance for his first publication, but also the strategies his supervisor capitalized on to foster the students' autonomy and independence in their publishing endeavors. These supervisory strategies might in part account for PH1's success in scholarly publishing (see Table 1).

Despite the great challenges faced by the doctoral students in their early publishing attempts and the usefulness of detailed and specific guidance for dealing with those challenges, however, only CS1 and PH1 reported having received that kind of guidance. By contrast, the other participants reported having gone through "a particularly long and painful process" of publishing their first one or two journal articles, as typified by MS2, who recalled that his first paper failed to pass many journals' initial technical checks and was "rejected outright numerous times." This highlights the need for supervisors' detailed and specific guidance in students' apprenticeship in scholarly publishing.

4. Discussion and Recommendations

The study reported in this article examined the roles played by supervisors in a group of Chinese doctoral students' publishing endeavors. The findings unveil four important roles played by the supervisors in the doctoral students' publishing endeavors: 'prey' searchers, managers, manuscript correctors and masters. The results also indicate that a supervisor can play multiple roles. For example, EE1's supervisor played all four roles, and CS1's supervisor played the roles of manager, manuscript corrector and master. This suggests the multifaceted nature of doctoral supervisors' roles in their students' scholarly publishing endeavors. Further, the findings show that while only three and four students explicitly mentioned supervisors' roles as 'prey' searchers and managers, respectively, all of the students acknowledged in some way supervisors' roles as manuscript correctors and masters. The doctoral students were relatively satisfied with their supervisors' roles as 'prey' searchers and managers, though some of them found their supervisors' roles as English manuscript correctors and masters less than satisfactory. That fewer doctoral students mentioned the roles of 'prey' searchers and managers does not necessarily mean that these roles were less common among the doctoral students' supervisors. Rather, it may well mean that some students had taken them for granted and were thus no longer consciously aware of them, because they and most of their fellow students were assigned to their supervisors' research projects. Likewise, the fact that some doctoral students found their supervisors' roles as English manuscript correctors and masters less than satisfactory does not necessarily mean that they held negative attitudes towards these roles. It may well mean that these roles were deemed by the students as important and necessary, but unfulfilled or inadequately fulfilled. These results suggest that doctoral supervisors can impinge upon their students' scholarly publishing in various ways and that measures need to be taken to enable supervisors to fulfill the less well-enacted roles. In what follows, we discuss the four roles one by one and recommend measures to complement and enhance the less well-enacted roles.

First, the results show that doctoral supervisors as 'prey' searchers help their students select publishable research topics and, hence, participate successfully in the disciplinary conversation. This finding is inconsistent with the results of Kwan's ([12], p.65) study, in which the doctoral students at universities in Hong Kong reported receiving little explicit guidance "on how to select a publishable topic." The discrepant findings might have to do with differing institutional policies on graduate publishing between universities in mainland China and Hong Kong. While publishing is not a compulsory graduation requirement for doctoral students at universities in Hong Kong [12,20], all of the participants in this study had to meet the institutional publishing requirements before they could graduate. The "publish or no degree" pressure at universities in mainland China [9–11] might have

compelled the supervisors to help their students select publishable research topics, so that they could meet the institutional graduation requirements within a very tight timeframe. However, as Bazerman ([44], p. 66) notes, "[e]ach newcomer to a field must come to understand, cope with and place himself or herself within the evolving conversation" to be able to have his/her research published. Newcomers to a field may not have the knowledge and experience needed to join and engage in the ongoing disciplinary conversation. Therefore, supervisors have an indispensable role to play in this regard, because they typically have profound knowledge of the field and extensive research experience.

Second, the results of this study also reveal that by managing their students' research and publishing projects and making the latter work on their own research projects [47,48], supervisors can facilitate their students' publishing efforts. This finding may have to do with the nature of the disciplines, from which the doctoral students in this study were drawn. Specifically, doctoral students in the science, medicine and engineering disciplines are often attached to research labs or teams through their supervisors' research projects [19,28]. Being members of research labs or teams and engaging in a research project early on can, in turn, facilitate not only doctoral students' integration into their departments and successful completion of their doctoral studies [40,46], but also their success in scholarly publishing [20,21]. Additionally, as is the case with supervisors' role as 'prey' searchers, institutional pressures may also have a bearing on supervisors' role as managers. As Lee ([48], p. 267) observes, "pragmatic issues, like time, workload pressures and the need to ensure quality assurance mechanisms are satisfied, may push supervisors more into the functional approach." In this role, therefore, supervisors fulfill not only the administrative role of managing research projects, but also the institutional role of boosting their own and their students' progress and output in research and publishing.

Third, the results of this study indicate that while all of the participants saw great value in such editorial assistance as manuscript correcting, some of them raised concerns about some supervisors' limited ability to edit English manuscripts. This finding is consistent with the results of previous studies. For example, Li and Flowerdew ([31], p. 107) found the Chinese doctoral supervisors in their study "vary(ing) in their competence in making efficient corrections." Similarly, some doctoral supervisors in Kwan's [12] study were reported to be unable to provide editorial assistance with their students' English publishing endeavors. A possible reason for these findings might be that some supervisors are engaged mostly in local publishing efforts, as both the students in this study and in Kwan's study reported. Further, some supervisors' limited abilities to serve as English manuscript correctors reported in this study might also be related to their science, medicine and engineering backgrounds, which tend to place less emphasis on language ability than other disciplines (e.g., art and design, the social sciences) do [20,50]. One supervisor in Strauss, Walton and Madsen's [50] study of 18 supervisors' views and practices of supervising EAL students' thesis writing at a New Zealand university, for example, noted that "lecturers in the science and engineering areas were less able to cope with the language difficulties faced by their students than their peers in disciplines where language ability was seen as more crucial" (p.7). These findings suggest a need for external editorial assistance with EAL doctoral students' English manuscripts. In this regard, Li and Flowerdew [31] suggest three useful sources of help: editorial support offered by both web-based editorial service providers and publishing houses, collaboration between content specialists and language professionals and journal mentoring programs (see [31] for more about these sources of help).

Finally, our results reveal that in the role of masters, supervisors are engaged in moving doctoral students towards increasingly fuller participation in the activities of the academic community and, thus, increasingly fuller membership of the academic community [51,52]. The great challenges faced by the students in their early attempts at scholarly publishing and the strong desire they expressed for detailed and specific guidance on their early publishing attempts pointed to the importance of guided participation [53] or legitimate peripheral participation [51] for doctoral students in their early publishing attempts. As Florence and Yore ([28], p. 643) have noted, "[s]elf-initiation into an expert community is a difficult and rare event since an isolated individual has no way to discover the undocumented knowledge, traditions, conventions, and practices of the community and since the individual has no sponsor to advocate her or his membership." This is understandable given their novice status and unfamiliarity with the rules of scholarly publishing in their field of study. However, despite their desire and need for detailed and specific guidance for their early publishing efforts, only two participants reported having received such guidance from their supervisors. This might be accounted for by the supervisors' inclination to concern themselves with general, rather than specific issues in research, publishing and supervision [14,28]. Alternatively, the supervisors may not have known what guidance their students needed, because what is difficult for doctoral students new to a field may have become tacit to their supervisors [20,38]. This suggests a need for supervisors to reflect upon the tacit conventions and practices involved in scholarly publishing in their field. Meanwhile, it would also be useful for supervisors to work closely with their students to understand their challenges and difficulties in their early publishing efforts. These together may lead to more effective apprenticeship of doctoral students in scholarly publishing.

5. Conclusions

The results of this study show that doctoral supervisors can play several important roles in their students' publishing endeavors. These roles not only contribute to students' publishing output, but also foster their legitimate participation in the conversations of the discipline and their initiation into the academic community. However, some students also raised concerns about the lack of detailed and specific advice from their supervisors to guide their early attempts at publishing and about some supervisors' limited ability to correct English manuscripts. These results underscore the important roles that supervisors can play in doctoral students' growth into full-fledged members of their disciplinary community. They also suggest a need for external editorial assistance with EAL doctoral students' English manuscripts and the importance of ample opportunities for their scaffolded initiation into the tacit conventions and practices of scholarly publishing.

This study has several limitations that warrant attention in future research. First, the overwhelmingly positive portraits of the supervisors' roles in this study might have to do with its purpose. This study set out to examine the supervisors' roles (and assistance) in their students' scholarly publishing efforts. This purpose and its associated interview questions might have predisposed the doctoral students to focus predominantly on the positive roles played by their supervisors. A related possibility might be that some students were simply less forthcoming about their negative views of their supervisors [54]. Future research should frame its aim and related interview questions more neutrally, so that less positive or negative supervisory roles, if they do exist, can also

be revealed. Second, the general lack of negative views of the supervisor-student relationship in this study may also have to do with the nature of the specific sample that we worked with. Our participants had been largely successful in scholarly publishing, as evidenced by the numbers of their publications (see Table 1). This might also have led to more positive characterizations of their supervisors' roles than might otherwise have been. Therefore, future research needs to involve less successful doctoral students, as well. Such research has the potential to uncover what might not have been revealed in this study about doctoral supervisors' roles in their students' scholarly publishing. Third, this study examined only student perspectives on supervisors' roles in doctoral students' scholarly publishing. Future research should also explore supervisor perspectives and, better still, the perspectives of doctoral student-supervisor pairs, because research has found differences in their perspectives on supervisory relationships in general [55,56]. The results of this research can reveal possible gaps between supervisor and student perspectives and their potential impacts and provide implications for bridging those gaps and better facilitating doctoral students' scholarly publishing.

Author Contributions

Jun Lei and Guangwei Hu conceived the study; Jun Lei collected the data; Jun Lei and Guangwei Hu analysed the data; Jun Lei drafted the manuscript and Guangwei Hu revised it.

Conflicts of Interest

The authors declare no conflict of interest.

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