

Effect of Interdisciplinary Team Teaching on Postgraduate Students' Beliefs and Confidence in Academic Writing

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Abstract

Writing confidence and beliefs are commonly viewed as important motivational factors to influence writers' performance. Closely correlated to writing motivation, Interdisciplinary Team Teaching (ITT) has been proposed as a pedagogical means to support postgraduates who face challenges in international writing and publishing. Based on investigations of 22 postgraduates attending a writing course named "Mastering Writing for Presentation and Publication" (MWPP), this study gained new insights into how ITT affected students' writing beliefs and confidence. Through a comparison between the subjects of MWPP and participants from a one-teacher writing course, our study reported a horizontal level of writing beliefs in two groups and higher writing and course confidence from MWPP participants. The pre/post-tests within the MWPP course showed significant improvements in students' confidence. In addition, the qualitative dataset revealed that ITT intervention significantly benefited students' writing motivation. Overall, our study showed that the ITT-supported MWPP course has produced positive influences on the formation and development of ESL postgraduates' writing beliefs and boosted their writing confidence.

Keywords

Interdisciplinary Team Teaching, Academic Writing, Postgraduate Research, Writing Beliefs, Writing Confidence, Motivation

1. Introduction

ESL (English as a second language) postgraduates are facing mounting pressure

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to write and publish in a discipline-based international academic arena (Lin & Morrison, 2021). Despite the urgent need to meet institutional requirements for their course credits and degrees, students take a long process to mature into experienced writers during their candidature. According to Limpo & Alves (2013), four elements can be proposed as keys to postgraduates' competence development as successful writers, i.e., motivation, discipline-based knowledge, writing strategy, and skills. Among these, motivation should assume a prominently vital role, given that writing in an academic context, as an arduous journey, calls for strong motivation to achieve (Bruning & Horn, 2000). Thus, understanding students writing motivations and scaffolding their writing processes have stimulated growing research in the past few decades. In the majority of the relevant studies, beliefs about writing are taken as a subscale to evaluate motivation with a list of literature recording how beliefs correlate with other factors to affect students' overall motivations (Hidi & Boscolo, 2006; MacArthur et al., 2016). Whereas, "writers' beliefs" have also been constantly and interchangeably used with "writing motivation" (Boscolo & Hidi, 2007; Latif, 2019; Pajares & Valiante, 2001) to evaluate students' writing engagement.

From a pedagogical perspective, faculty's intervention in the writing process at the postgraduate level has been a research focus. On one hand, the need and practice for supervisors' involvement in offering writing support to their postgraduates have been widely discussed (Aitchison & Pare, 2012; Kiley, 2011; Lee & Murray, 2015). On the other hand, a growing body of literature reveals evidence of language specialists, e.g., English teachers being the main force of courses aimed at developing ESL postgraduates' writing and publication skills (Cargill et al., 2018; Hanauer & Englander, 2013), and programs designed to enhance students' disciplinary writing or publication success (Flowerdew & Wang, 2016; Simpson et al., 2016). In addition to the discussion on sole-teaching patterns, co-teaching, or in more common senses, teaching collaboration is also pertinently promoted as an alternative to the mainstream curriculum as "placing students in English-medium mainstream classes is often beneficial, but not necessarily sufficient to provide optimal language learning opportunities" (Davison, 2015: p. 51). Hence, pedagogical needs have prevailed to see collaborations across disciplines, especially between content and language specialists (Crandall & Kaufman, 2002). According to Han & Wang (2010), such collaboration would enable post-level students to think outside the box and challenge their preconceived notions on writing by exploring ideas and concepts in more than one way and satisfy their needs during the writing process more professionally. In Iran, team taught sophomore groups majoring in business and management outperformed participants taught by one single teacher and showed a positive effect on students' ESP course concerning reading comprehension (Haghighi & Abdollahi, 2014). Such practice of interdisciplinary team teaching within higher education also supported students with a more positive attitude toward English learning and paper writing in the Asian context (Chien et al., 2008; Li et al., 2019).

Despite the constant qualitative observations and examinations pertaining to dynamics, benefits, and barriers under such collaboration, the main issue yet to be resolved is whether such collaboration can be viewed as an effective construct to stimulate ESL postgraduates' writing motivation and thus requires essentially further quantitative investigations.

The present study aims to evaluate whether students supported by interdisciplinary team teaching report different beliefs about academic writing from those in a traditional one-teacher classroom and whether they show confidence changes afterward in a Chinese ESL context.

By adopting a combination of quantitative and qualitative investigations, the overall goals of the study are to address the following two questions:

- 1) Do the students show higher or lower confidence in academic writing after taking the course supported by interdisciplinary team teaching (ITT)?
- 2) How do the ITT-sponsored students form and develop their motivational beliefs?

2. Literature Review

2.1. Interdisciplinary Collaboration in Teaching English for Academic Purposes

In the ESL context, challenges are often posed to students at various levels to acquire discipline-based content in the target language simultaneously. To meet the dual requirements, teaching collaboration across disciplines, i.e., interdisciplinary teaching collaboration (ITC) and/or interdisciplinary team teaching (ITT), have been long proposed as a practical mechanism for satisfying students' needs to master discipline-specific genres, especially in tertiary education (Davison, 2006; Harvey et al., 2016). For EAP (English for Academic Purposes) learners particularly, the fulfillment of their learning motivation calls for collaboration between L2 language specialists and content-area teachers. To study possible rationales for this partnership, a growing body of literature has investigated the cross-curricular planning and co-teaching between language specialists and content-area teachers (Atai & Fatahi-Majd, 2014; Kong, 2014) as well as their roles and dynamics in classrooms (Cargill et al., 2018; Li et al., 2019).

Nevertheless, intensive discussions on the teaching side of the mechanism reckoned without its potential impact on students as EAP practitioners. There are several pieces of literature proving the positive influence of ITT on students' academic literacy development (Fan & Lo, 2015; McWilliams & Allan, 2014). However, the extensive adoption of the pedagogy and its effectiveness in supporting students' writing development in a constant way has been largely undervalued. Given the pivotal role of writing literacy as a criterion for successful academic development at postgraduate level, how the double-pillar support functions at both language and content levels requires further investigation.

2.2. Motivation Theories Applied in Writing

Writing process proves its complex nature as involving intricate factors such as

psychological, environmental, and cognitive constructs. From the perspective of social cognitive theory, the complexity of writing brought about motivational challenges and thus prompted researchers to examine interactions among motivational writing variables such as beliefs, self-efficacy and writing performance (Bruning & Horn, 2000; Hayes, 2012; Hidi & Boscolo, 2006; Schunk & DiBenedetto, 2020). More recently, Ling et al. (2021) attempted to explore the critical associations between writing motivations and overall academic performance on 566 undergraduates from six US post-secondary institutions where motivational factors have evidenced roles in students' writing literacy development. The critically predictive role of writing motivation in shaping students' writing performance calls upon attention.

As an integral and pillar component of motivational constructs, self-efficacy has been predominantly studied to demonstrate its strong prediction to writing performance in many ways (Bandura, 1986; MacArthur et al., 2016; Pajares, 2003). Given the mainstream interpretation to self-efficacy as individual's perception on one's own ability to perform a particular task, writing confidence has been proposed as a subscale to measure such perception and widely acknowledged to have strong correlation with writing strategy adoption, especially in ESL settings (Golparvar & Khafi, 2021) and with individuals' writing performances (Sanders-Reio et al., 2014; Shell, Murphy, & Bruning, 1989). This group of studies argued that students with higher confidence reveal greater effort, perseverance and stronger resilience in facing their writing tasks, whereas less-motivated writers lack such inclinations, especially when the task is challenging (Bandura, 1997; Pajares, 1997). Studies have also found that ESL learners' self-efficacy is positively correlated with learning strategy adoption. For designated tasks, students with stronger confidence tend to be more optimistic and resilient in their handling process (Golparvar & Khafi, 2021; Stracke, 2016).

Despite the richness of relevant research issued to understand writers' beliefs and confidence in the writing process, few of them seemed to explore the impact of interventions of teaching on motivational perspectives, especially in the context of ESL academic writing. The small group of existing studies suggested that students' motivation can be enhanced through maximizing efforts to reallocate teaching resources and apply various teaching strategies (Corbacho et al., 2021; Dinther, Dochy, & Segers, 2011). However, these arguments zoomed on the qualitative side of the pedagogy with very few quantitative investigations on the potential effectiveness of the supportive teaching mode like ITT in a motivational context. Given the growing attention to ITT and its potential benefits to ESL graduate students' writing development, the study aims to investigate the influence of team teaching on postgraduates' writing beliefs and confidence and to survey how the teaching mode affects students' motivational issues.

2.3. Motivational Writing Beliefs of EAP Practitioners

Writer's perception of the complexity of writing tasks they face inevitably guides

the way they write. Certain implicit writing beliefs assume positive or negative motivational consequences and have been studied using multiple theoretical constructs from two-scale mechanisms covering transmission and transaction beliefs (Daly, 1985; Schraw & Bruning, 1999; White & Bruning, 2005) to a more recent four-factor structure with the addition of factors including recursion and audience orientation (Sanders-Reio et al., 2014) and five-factor structure adding elaboration (Zotzmann & Sheldrake, 2021). These findings have proved the correlational interactions between students' beliefs and their writing success, and thus more diversified pedagogies are required to investigate students' writing beliefs and promote their motivations more explicitly.

3. Methodology

3.1. Research Setting and Participants

Participants of the study were selected from an agriculture university in north-west China. As a national key university, the institute constantly pursues a higher international publication index to keep up with its top-ranking status. Therefore, international courses, i.e., English-medium courses, have consecutively opened to postgraduates since 2004 to facilitate their academic literacy development, especially writing proficiency and publishing success. In response to the call for innovative teaching paradigms and curriculum designs, a collaborative team-taught course titled 'Preparing to Write an International Scientific Article' (PWISA) was initially constructed in the year 2016. Supported by both English language specialists and content-area teachers in agronomy, the course produced an essential success in enhancing postgraduates' confidence in academic writing (Cargill et al., 2018). Echoing this effective workshop mode designed for English for research and publication purposes, the PWISA course was consecutively opened in 2018 and 2019 to postgraduates of agronomy, horticulture and plant protection, providing valuable experience for co-teaching collaborators to implement ITT instruction (Li et al., 2019). Proven to be an effective model for developing postgraduates' writing confidence and proficiency, the team-teaching practice was expanded to benefit students beyond agronomy.

A 24-hour course named 'Mastering Writing Publication and Presentation (MWPP)' run by an interdisciplinary teaching group was constructed for postgraduate students of social sciences. The group consists of an English language specialist from College of Languages and Culture, one professor of economics and one of finances from the College of Economics and Management. A total of 22 postgraduates (20 master's candidates and 2 Ph.D. candidates) in the College of Economics and Management were selected as the study subjects in the academic semester of Fall 2021.

To understand the effect of ITT on an individual's cognitive change, we also collected interview data from 10 participants of the class as a supplement. Meanwhile, the study set a control group of economics students to compare the possible differences between sole and interdisciplinary teaching modes on stu-

dents writing cognition. To eliminate the possible bias brought by disciplinary differences, participants of the control group were selected from a course named “Scientific Paper Writing in English” (SPWE) with 40 postgraduates (27 master’s candidates, 13 Ph.D. candidates). The course was charged by a professor of economics from the College of Economics and Management. We involved these participants in the academic semester of Fall 2021 as well to synchronize the teaching and learning activities with the MWPP course. Initial T-test on students’ cognition towards academic writing revealed non-significant difference between males and females in their writing beliefs ($p < 0.05$) but obvious discrepancy in confidence ($p = 0.12$).

The two courses were both parts of the host faculty’s (College of Economics and Management) programs to reform the graduate curriculum to enhance postgraduates’ publication success in international journals. The curriculum designs of the two courses share certain similarities and differences. The arrangements of the instructors and their identities, targets, and teaching subjects of the two courses are presented in **Table 1**.

In terms of pedagogical approaches, both MWPP and SPWE courses adopted genre-based discourse analysis (Li & Flowerdew, 2020) which typifies the analysis of IMRAD (Introduction, Materials and methods, Results, and Discussion) structure as well as linguistic features of research articles.

3.2. Instruments and Data Collection

3.2.1. Questionnaire Design

The quantitative section of the study was based on a questionnaire survey drawn from Zotzmann & Sheldrake (2021) and Pintrich (1991) to test both writing beliefs and confidence. The combined questionnaire contains an overall of 62 items

Table 1. Curriculum design of MWPP and SPWE courses.

	Focal Course—MWPP course	Parallel Course—SPWE course
Length (hours)	24	28
Instructor(s) and their Identity	Shi—professor of finance Wang—associate professor of applied linguistics Chen—associate professor of economics	Huo—professor of economics
Teaching Subjects (S1, S2...) and allocation	S1: Where to find and how to raise your research questions (instructed by Shi and Chen/4 hrs) S2: Basics to science writing—style and languages (instructed by Wang/2 hrs) S3: Writing of main body of research articles—Introduction, Methodology, Results and Discussion (instructed by Shi and Wang/10 hrs) S4: Writing of supplementary parts of research articles—titles, abstracts, tables and figures, references (instructed by Wang/4 hrs) S5: How to submit and publish your manuscript (instructed by Chen/4 hrs)	S1: Where to find and how to raise your research questions (instructed by Huo/7 hrs) S2: How to address your research questions and methodology (instructed by Huo/8 hrs) S3: Theoretical analysis (instructed by Huo/5 hrs) S4: Writing of main body of research articles—Introduction, Methodology, Results and Discussion (instructed by Huo/5 hrs) S5: Writing of supplementary parts of frontier scientific issues (instructed by Huo/3 hrs)

with 49 on writing beliefs, 10 on writing confidence and 3 on course confidence. Specifically, we drew upon A Manual for the Use of the Motivated Strategies for Learning Questionnaires (MLSQ 1991) (Pintrich, 1991) to construct the first 49 items of our questionnaire, considering MLSQ a well-proven instrument to evaluate motivational beliefs and individual's perceived value on the nature of writing. To further measure students' perceived abilities towards writing course achievement, we directly adopted established confidence items targeting ESL subjects from Zotzmann & Sheldrake (2021) (Confidence Questionnaire, i.e., CQ 2021) to form the confidence subscale for the next 13 items of our questionnaire.

Given the established validations of MLSQ 1991 and CQ 2021, certain "factors" or "constructs" in the questionnaire were summarized and a factor analysis employed to identify the validity of relevant items. Confirmatory factor analysis using Amos 24 showed that most items were aggregated into proven factors/variables and factor loading was basically above 0.4 (Appendix A), indicating good representativeness. Table 2 provided the overall scale factors of our questionnaire with high reliability (Cronbach's $\alpha > 0.7$).

3.2.2. Semi-Structured Interview

A semi-structured interview was designed to obtain course participants' personal views on ITT mode. Interview Questions 1 to 5 of the survey (see in Appendix B.) were drawn upon Writing Prompts (Anderson & Speck, 1998) to evaluate how team teaching influenced respondents' personalized learning process. Questions 6 to 9 covered motivational prompts on students' cognitive development in writing.

Table 2. Overall scale factors of the questionnaire.

Factor	Example items	Items	Reliability
Academic writing confidence	"I am confident I am able to write critically when writing academically in English."	10	0.931
Course confidence	"I usually do well in my MA course."	3	0.831
Writing: transmission	"It is important for me to include a lot of quotes from authorities in my writing."	10	0.706
Writing: transaction	"Understanding my thoughts and ideas clearer as I write and rewrite is very important to me."	10	0.761
Writing: recursion	"It is important for me to edit many times in writing."	9	0.859
Writing: audience orientation	"It is important for me to make complicated information clear or write logically and convincingly in writing."	12	0.790
Writing: elaboration	"It is my own fault if I do not combine and connect information from different sources in writing."	8	0.698

Notes: Negative wording items have been reversed in the analysis.

3.2.3. Data Collection

1) Collection of Paralleled Data

Research data were collected from the experimental group ($n = 22$) from the MWPP course supported by ITT and the control group ($n = 40$) from the SPWE course by sole-teaching. To compare students' writing beliefs and confidence under two teaching modes, we distributed the questionnaire to both groups at its last lecture. A seven-point Likert scale (Strongly Disagree, Disagree, Slightly Disagree, Neutral, Slightly Agree, Agree and Strongly Agree) was applied to each questionnaire item to test degrees of agreement/disagreement. Each respondent took 20 to 25 minutes to complete the questionnaire given in Chinese for the convenience of a follow-up data check. 40 questionnaires were collected from the control group and 22 from the experimental group.

2) Collection of Longitudinal Data from MWPP Course

At the initial session of the MWPP course, a pre-course questionnaire (pre-test) was distributed to all course participants prior to their exposure to the ITT mode and a post-course questionnaire (post-test) at the last session of the course with their full consent. We have to point out that the pre-course questionnaire covered no investigation of writing beliefs on the consideration that most students had very few ITT-supported course experiences and thus hardly recognized the intrinsic value of writing. Accordingly, the post-course questionnaire covers the full scope of our questionnaire investigation so as to track any improvement in students' writing confidence and formation of beliefs after taking the course. A total of 22 sets of valid questionnaires were collected.

3) Interviews

To further analyze the role of ITT, 10 participants from the MWPP course participated in a semi-structured face-to-face interview. Nine questions (see in **Appendix B**) were designed to investigate their evaluations of team teaching and motivational development on writing (writing beliefs and confidence specifically). The questionnaire was presented and the interviews conducted in the respondents' first language, i.e., Chinese. All respondents were informed that their personal views and honest attitudes were the focus; thus, any responses would not affect their grades. Students' responses were recorded and transcribed verbatim to identify any alterations related to the research questions.

3.3. Data Analysis

Statistical analysis was applied using SPSS 26. Firstly, the mean and SD were obtained through descriptive analyses to acquire the average responses of the survey sample. Secondly, Cohen's D values and significance were calculated to examine the possible discrepancy between the experimental and control groups, and the developmental changes for pre- and post-course tests. Finally, interview data were analyzed by reading and screening keywords triply with a joint effort to achieve consensus.

4. Results

4.1. Participants' Confidence Development in Pre- and Post-Course Tests

The pre- to post-course tests of students' cognitive developments were quantitatively measured. A total of 22 participants' responses before and after the MWPP course were calculated at both course-confidence and writing-confidence levels.

Notably, students reported both higher writing confidence and course confidence after the course (see in **Table 3**). Prior to MWPP course participation, students ($n = 22$) reported writing confidence ($M = 3.45$, $SD = 0.95$) lower than the mid-point of 4 and neutral course confidence ($M = 4.27$, $SD = 1.03$) in a 7-point Likert scale. Comparatively, the group reported both higher writing confidence ($M = 5.14$, $SD = 0.88$) and higher course confidence ($M = 5.20$, $SD = 0.86$) after the course. As shown in **Table 4**, 10 specific items adopted to evaluate

Table 3. Statistics on confidence from pre- to post-tests.

Factors	Pre-test		Post-test		Differences across pre-test and post-test	
	M	SD	M	SD	Cohen's D	Sig. (p)
Writing confidence	3.45	0.95	5.14	0.88	1.85	<0.001
Course confidence	4.27	1.03	5.20	0.86	0.98	<0.01

Table 4. Item-level detail on confidence from pre- to post-test.

Item	Writing confidence items	Pre-test		Post-test		Differences across pre-test and post-test	
		M	SD	M	SD	Cohen's D	Sig. (p)
1	Summarize and synthesize information from academic publications when writing academically in English	3.64	0.85	5.50	0.96	2.05	<0.001
2	Express my ideas clearly when writing academically in English	3.45	1.22	5.41	1.01	1.75	<0.001
3	Connect my own ideas to existing literature when writing academically in English	3.36	1.00	5.36	0.95	2.05	<0.001
4	Take the reader's perspective into account when writing academically in English	3.32	1.36	5.05	1.09	1.40	<0.001
5	Structure and organize my text clearly when writing academically in English	3.55	1.37	5.23	1.07	1.37	<0.001
6	Use a wide variety of sentence structures when writing academically in English	2.77	1.15	4.50	1.57	1.26	<0.001
7	Review and revise/improve my text when writing academically in English	3.73	1.49	5.18	1.10	1.11	<0.01
8	Build up a logical and coherent argument when writing academically in English	3.64	1.29	5.27	0.99	1.42	<0.001
9	Write persuasively when writing academically in English	3.55	1.14	5.05	1.13	1.32	<0.001
10	Write critically when writing academically in English	3.45	1.47	4.82	1.22	1.01	<0.01

Notes: Means (M) and standard deviation (SD), Cohen's D (small difference for $D > 0.2$; medium difference for $D > 0.5$; large difference for $D > 0.8$) and Sig. (p) in average responses are presented. Differences are highlighted in bold.

participants' writing confidence indicated that the subjects experienced an overall confidence growth with growth rates ranging from 40% to 60% pertaining to every subscale.

4.2. Comparisons on Writing Beliefs and Confidence between the Experimental and the Control Groups

Table 5 illustrated the combined results of confidence (factors 1 - 2) and beliefs (factors 3 - 7) based on our parallel studies between the MWPP course and the SPWE course. 62 subjects (22 from the MWPP course and 40 from the SPWE course) from two groups reported medium-advanced levels in terms of course confidence (4.92 points) and writing confidence (4.81 points) on a 7-point Likert scale.

In general, the MWPP group conveyed higher confidence in academic writing ($D = 0.57$, $p < 0.05$) and stronger faith for their course success ($D = 0.48$, $p = 0.08$) than the controlled SPWE group. **Table 6** revealed item-based evaluations of students' confidence concerning academic writing, and distinctive gaps could be observed between the MWPP group and the SPWE group. Specifically, students in the MWPP group reported stronger confidence when summarizing and synthesizing information from academic publications ($D = 0.74$, $p < 0.05$), expressing ideas clearly in writing ($D = 1.06$, $p < 0.001$), and connecting own ideas to existing literature ($D = 0.73$, $p < 0.01$). However, no significant discrepancy was observed in using a wide variety of sentence structures and improving own text between the two groups.

As for writing beliefs in their average responses, the whole sample ($n = 62$) presented positive writing beliefs as transmission, recursion, audience orientation and elaboration and medium-advanced belief as a transaction. The comparisons on the five-scale writing beliefs between the two groups, however, showed

Table 5. Students' responses in writing beliefs and confidence in group comparison.

Factors	All students		The experimental group (n = 22)		The control group (n = 40)		Differences across the two group	
	M	SD	M	SD	M	SD	Cohen's D	Sig. (p)
1) Confidence in academic writing	4.81	0.92	5.14	0.88	4.63	0.90	0.57	0.04
2) Course confidence	4.92	0.92	5.20	0.86	4.77	0.93	0.48	0.08
3) Writing as transmission	5.02	0.64	5.01	0.58	5.02	0.68	-0.01	0.96
4) Writing as transaction	4.92	0.70	4.80	0.54	4.99	0.77	-0.30	0.29
5) Writing as recursion	5.39	0.79	5.40	0.68	5.38	0.85	0.03	0.90
6) Writing as an audience orientation	5.20	0.61	5.27	0.57	5.16	0.64	0.18	0.52
7) Writing as elaboration	5.19	0.64	5.23	0.63	5.17	0.65	0.09	0.72

Notes: Means showed the average, and standard deviations (SD) showed the dispersion around its means. The Cohen's D (small difference for $D > 0.2$; medium difference for $D > 0.5$; large difference for $D > 0.8$) and significance of the difference (Sig. (p)) in average responses are presented. There exists difference when p is below 0.05. Differences are highlighted in bold.

Table 6. Item-based comparison of writing confidence between the two groups.

Item	Writing confidence items	The experimental group (n = 22)		The control group (n = 40)		Differences across the two groups	
		M	SD	M	SD	Cohen's D	Sig. (p)
1	Summarize and synthesize information from academic publications when writing academically in English	5.50	0.96	4.75	1.06	0.74	0.01
2	Express my ideas clearly when writing academically in English	5.41	1.01	4.35	1.00	1.06	0.00
3	Connect my own ideas to existing literature when writing academically in English	5.36	0.95	4.65	1.00	0.73	0.01
4	Take the reader's perspective into account when writing academically in English	5.05	1.09	4.53	1.15	0.46	0.09
5	Structure and organize my text clearly when writing academically in English	5.23	1.07	4.68	1.14	0.50	0.07
6	Use a wide variety of sentence structures when writing academically in English	4.50	1.57	4.35	1.46	0.10	0.71
7	Review and revise/improve my text when writing academically in English	5.18	1.10	5.00	1.36	0.15	0.59
8	Build up a logical and coherent argument when writing academically in English	5.27	0.99	4.90	1.08	0.36	0.19
9	Write persuasively when writing academically in English	5.05	1.13	4.70	1.09	0.31	0.24
10	Write critically when writing academically in English	4.82	1.22	4.40	1.13	0.36	0.18

Notes: Means (M) and standard deviation (SD), Cohen's D (small difference for $D > 0.2$; medium difference for $D > 0.5$; large difference for $D > 0.8$) and Sig. (p) in average responses are presented. Differences are highlighted in bold.

no distinct differences despite a minor one in transaction belief when the MWPP group reported a lower level ($D = -0.30$, $p = 0.29$) than the SPWE group.

4.3. Respondents' Feedback on Well-Instructed Writing Support from ITT

4.3.1. Positive Evaluation on MWPP Course

The overall statistics collected from 10 copies of questionnaire responses revealed participants' positive feedback on curriculum design, classroom interaction and teacher dynamics (see in **Table 7**). Responses to Questions 1 to 5 showed that respondents spoke high of the team-taught class in terms of complementarity, rich and comprehensive content, high level of engagement and novelty.

The course is beneficial and practical for English paper writing...the curriculum content was both practical and rich. (Xu's reflection)

The classroom atmosphere is active...and the interactions between teachers and students are frequent. (Li's reflection)

As economics and management students, they particularly benefited from

Table 7. Extracted core views on team teaching.

Core views extracted from course participants	Times students mentioned
A feeling of freshness/aspire to learn	4
Complementarity between teachers of different expertise	9
Practicality (more professional and targeted)	4
Rich and comprehensive nature of the content	7
Good interaction	3

Notes: A student may mention certain core views more than once, and the second mention by the same student does not count.

learning English writing principles in scholarly ways. The fact was typified by Xu's description as "*paper writing is multifaceted due not only to using English as a language but to the expert knowledge for article themes*".

In response to question 5, some respondents drew comparisons on their experiences between ITT and other sole-teaching pedagogies, indicating students' positive attitudes towards team teaching with respect to enriched teaching content and diversified in-class activities.

What is interesting to me is that teachers could access to resources from each other and present richer content. (Zhang's reflection)

4.3.2. Students' Reports on Individual Development of Writing Beliefs

Items 6 to 8 of the questionnaire were devised to examine respondents' alterations and development in writing beliefs. **Table 8** presented each of the 10 respondent's preferred and developed beliefs from their individual report.

Among the five-factor scale, it is worth noting that students' perception of transaction belief tended to diverge from its stereotypical role. Instead, some respondents reported their belief of writing as an objective way to convey thoughts than to express personal feelings.

...writing in an academic way merely revolves around presenting thoughts and ideas on problems to be solved and the possible solutions. (Lin's reflection)

In response to the 8th question, "Do you think whether the MWPP course has influenced your writing beliefs or not?" 7 out of 10 respondents reported significant changes in their belief-relevant development.

Among them, 5 participants confirmed that their writing beliefs (including transaction, recursion, audience orientation and elaboration) were reinforced after the MWPP course. Notably, 2 students reported their alterations in beliefs after the course. One reported no particular writing belief prior to the course and formed elaboration as her belief while taking the MWPP course. One respondent accounted for transaction as his writing belief prior to the course and converted to audience orientation afterward.

I used to hold writing as being transactional. However, ...I would take the audience into consideration now. The course taught me to be reader-oriented. (Lu's reflection)

Table 8. Participants' views on their writing beliefs.

Writing beliefs development	Writing beliefs
3 participants' established writing beliefs	Recursion
	Elaboration
	Elaboration
5 participants' development of established writing beliefs	Transaction
	Transaction and elaboration
	Transaction and recursion.
	Elaboration
	Elaboration and audience
2 participants' changes in writing beliefs	Change to elaboration
	Change to audience orientation
	(participant's original transactional belief was still attached importance)

4.3.3. Students' Changes in Writing Confidence

Consistent with our quantitative findings in participants' confidence growth, 9 out of 10 respondents recounted escalation in their confidence level. However, this paragraph aims to address a notable fact that one student reported lower confidence after taking the course.

My confidence as a writer was not as strong as it used to be after the course. I was repeatedly convinced by the instructors that I need higher level of professional knowledge as well as English proficiency to be a qualified writer, which convinced me that I am overconfident about my present competence and that there is a long way to go to be successful... (Wang's reflection)

5. Discussion

5.1. Participants' In-Course Growth and Inter-Course Comparison on Writing Confidence

In the longitudinal section of the study, participants reported higher levels of writing confidence and course confidence after the MWPP course. The findings are in line with previous studies that advocated ITT in writing confidence (Cargill et al., 2018; Fan & Lo, 2015; Kong, 2014). However, descriptive studies on collaborative teaching (Atai & Fatahi-Majd, 2014; Baeten & Simons, 2014) failed to establish the association between pedagogy and students' performance. Thus, the present study contributes to blending qualitative and quantitative works to examine the association between the paradigm and students' writing motivation in an ESL context.

Based on the comparative part of the study, subjects from the experimental group (MWPP course) reported both higher writing confidence and course confidence compared to participants of the control group (SPWE course), which vigorously addressed our first research question and were in compliance with

previous studies (Carpenter, Crawford, & Walden, 2007; Chien et al., 2008). For writing confidence, in particular, MWPP participants hold stronger confidence to summarize and synthesize information during writing and tend to be more faithful in expressing ideas effectively. As evidenced by Chien et al. (2008), team-taught students tend to hold strong motivation to strengthen their overall course performance.

5.2. Participants' In-Course Development and Inter-Course Comparison of Writing Beliefs

The comparative part of the study also aimed to investigate the possible discrepancies in postgraduates' writing beliefs. However, no major difference has been observed between the experimental group (MWPP course) and the control group (SPWE course) due possibly to the fact that motivational beliefs hold a developmental nature and require a gradually developing process (Sanders-Reio et al., 2014). Nevertheless, the experimental group supported by ITT reported a lower level of transactional belief ($M = 4.80$) compared to the control group ($M = 4.99$). In previous studies, transactional belief was advocated as a positive predictor of writing performance (Sanders-Reio et al., 2014; White & Brunning, 2005; Zotzmann & Sheldrake, 2021). Therefore, students who held a higher level of transactional belief were commonly believed to be more proficient writers (Baaijen, Galbraith, & Gloppe, 2014). Though the MWPP participants cannot be recognized as more successful writers than SPWE participants, there is no evidence contrariwise. Further, our survey data showed that three MWPP participants perceived transactional beliefs as an emotional-free means to convey others' ideas and thoughts instead of expressing personal emotions. This finding was partly in line with Zotzmann (2021)'s study where the transaction belief was measured in two dimensions. We argue that transactional belief was not necessarily a positive indicator of writers' performance. When students tended to believe writing is a process of transmitting information from other sources instead of expressing personal feelings, their proactive motivation could be mitigated.

Our second research question was discussed by participants' self-reported experience on the ITT paradigm and the formation or change of their views about the intrinsic value of writing. The interview data demonstrated that ITT led to participants' reinforced writing beliefs as transaction, recursion, audience orientation and elaboration. Evidenced by Sanders-Reio (2014), writing as transaction, recursion and audience orientation were adaptable beliefs for multi-perspective high-demanding scholarly writing, indicating the positive role of ITT in assisting students' writing process (Sanders-Reio et al., 2014; White & Brunning, 2005; Zotzmann & Sheldrake, 2021) and thus gained perspectives toward more adaptable and positive writing beliefs.

In light of the above findings, the paper yields insights into the impact of interdisciplinary team teaching (ITT) on academic writing beliefs and confidence of postgraduate-level economics students at a top-ranking agriculture university in China. The results of the work contributed to the significant associations be-

tween ITT and students' writing beliefs and confidence from a motivational perspective. Such findings enable us to realize how team teaching positively affects students' motivational and cognitive writing process in the long run. From a pedagogical perspective, addressing these explicitly positive connections encourages further investigations on effective teaching interventions targeting postgraduate students' academic writing development. The outcomes of the study endowed team teaching as an applicable approach to supporting academic writing, given the increasing demands of postgraduates to write for international publication. Nevertheless, the paper was not without limitations. Participants recruited from the MWPP course may be less representative considering the small sample. A larger and more diverse sample in the EFL context the future research should be explored for generalizability. Despite the limitations, addressing these explicitly positive connections encourages further investigations on teaching English academic writing in a disciplinary context as well as on the development of students' motivation to write in a broader ESL context.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix A. Questionnaire Scales in Detail

Writing: transmission

Item	Factor loading
It is my own fault if my writing doesn't accurately report what authorities think in writing.	0.484
Understanding proven formats and templates, and then filling in the important information is very important to me.	0.622
It is important for me to include a lot of quotes from authorities in my writing.	0.521
If I try hard enough, my article will report the information rather than add more of my own language in cases where I need to cite information in books and articles.	0.448
I'm confident I can do an excellent job on accurately reporting what authorities think.	0.395
I think views of authoritative authors on a subject does help with my thoughts and ideas in writing.	0.829
I think what authorities think about a subject is useful for me to write.	0.766
If I need to cite information from books or authorities, I would like to report the information rather than add my own words.	0.486
If I don't report what authorities think about a subject, it is because I didn't try hard enough.	0.218
When I take a writing piece I think about how poorly I am doing in reporting what authorities think about a subject compared with other students.	0.027

Writing: transaction

Item	Factor loading
Understanding my thoughts and ideas clearer as I write and rewrite is very important to me.	0.711
It is my own fault if I don't involve a lot of emotion in my writing.	0.357
When I take a writing piece I think about how poorly I am doing in the process involving a lot of emotion compared with other students.	0.181
I'm confident I can do an excellent job on understanding better what I'm thinking about in writing.	0.662
I'm certain I can involve a lot of emotion in my writing for this course.	0.29
If my thoughts and ideas don't become clearer to me as I write and rewrite in writing, it is because I didn't try hard enough.	0.522
It is important for me to involve emotional experience in writing.	0.232
I think the the complexity of ideas is useful for me to write.	0.465
I am very interested in what I am thinking about and new ideas emerging in the process of writing.	0.709
I like to immerse myself in my writing.	0.648

Writing: recursion

Item	Factor loading
When I take a writing piece, I think about how poorly I am doing in the process of reviewing, revising, and rethinking compared with other students.	0.212
Understanding the key to good writing is revision, a multi-stage process is very important to me.	0.678
I like revising my writing to make it better.	0.673
I am very interested in the process of reviewing, revising, and rethinking in writing of this course.	0.774
I think going back over writing to improve what has been written in this class is useful for me.	0.821
I'm confident I can do an excellent job on reviewing, revising, and rethinking.	0.801
It is important for me to edit many times in writing.	0.642
I'm certain I can go back over it to improve what has been written in writing for this course.	0.635
If I try hard enough, then I will review, revise, and rethink in writing.	0.722

Writing: audience orientation

Item	Factor loading
If I try hard enough, then I will support my points effectively in writing.	0.436
I expect to do well in keeping my audience in mind in writing.	0.495
If I don't select the words that suit my purpose, audience, and occasion in writing, it is because I didn't try hard enough.	0.397
Considering the difficulty of answering audience's questions, I think I will do well in writing.	0.535
I think adapting my message to my readers is useful for me to write.	0.665
It is important for me to make complicated information clear or present logically and convincingly in writing.	0.734
I like keeping audience in mind and being oriented toward my readers.	0.463
When I take a writing piece I think about how poorly I am doing in presenting complicated information clear compared with other students.	-0.03
I'm certain I can make complicated information clear in writing for this course.	0.647
If I try hard enough, then I will be reader-friendly.	0.549
I am very interested in explaining my opinions and findings in writing.	0.432
Selecting the words that suit my purpose, audience, and occasion is very important to me.	0.616

Writing: elaboration

Item	Factor loading
If I try hard enough, then I will connect my ideas to existing literature in writing.	0.756
If I don't extending ideas from existing literature in writing, it is because I didn't try hard enough.	0.538
I think combining and connecting information from different sources is useful for me to write.	0.781
Considering the difficulty of extending ideas from existing literature, I think I will do well in writing.	0.525
When I take a writing piece, I think about how poorly I am doing in combining and connecting information from different sources compared with other students.	0.009
I expect to do well in combining and connecting information from different sources in writing.	0.735
It is my own fault if I don't combine and connect information from different sources in writing.	0.509
I'm confident I can connecting my ideas to existing literature in writing.	0.434

Writing confidence

Item	Factor loading
I am confident I am able to summarize and synthesize information from academic publications when writing academically in English.	0.754
I am confident I am able to express my ideas clearly when writing academically in English.	0.819
I am confident I am able to connect my own ideas to existing literature when writing academically in English.	0.803
I am confident I am able to take the reader perspective into account when writing academically in English.	0.742
I am confident I am able to structure and organize my text clearly when writing academically in English.	0.769
I am confident I am able to use a wide variety of sentence structures when writing academically in English.	0.738
I am confident I am able to review and revise/improve my text when writing academically in English.	0.682
I am confident I am able to build up a logical and coherent argument when writing academically in English.	0.787
I am confident I am able to write persuasively when writing academically in English.	0.809
I am confident I am able to write critically when writing academically in English.	0.757

Course confidence

Item	Factor loading
I usually do well in my MA course.	0.766
In my course modules, I understand even the most difficult topics.	0.802
I learn material quickly on my course.	0.830

Appendix B. Semi-Structured Interview Questions

Number	Questions
1	How would you evaluate MWPP course? (Tips: you can demonstrated your opinions from multiple respects like teaching materials, teaching objectives, teaching processes, teaching methods, classroom atmosphere, interactions, etc., and select the aspects that impressed you)
2	What do you think are the advantages of interdisciplinary team teaching composed of Ms. Wang and Mr. Shi?
3	Please talk about your opinion about Ms. Wang. In the course teaching, what do you think Ms. Wang brought to you?
4	Please talk about your opinion about Mr. Shi. In the course, what do you think Mr. Shi brought to you in teaching?
5	How do you like the writing class would be different if it was taught by Ms. Wang or Mr. Shi alone?
6	<p>Different people hold different understandings about writing. The following items shows beliefs about writing:</p> <p>perceived values emphasizing that academic English writing should accurately convey the views of an authority on a topic;</p> <p>perceived values emphasizing that academic English writing is to convey writer's thoughts, opinions and feelings;</p> <p>perceived values emphasizing that academic English writing should be constantly revised and reflected upon;</p> <p>perceived values emphasizing that writing should present complex issues clearly to the readers;</p> <p>perceived values emphasizing that writing should contain information from different sources and extend their ideas from these existing literature;</p> <p>Which of the above beliefs about writing do you personally prefer in writing, or would you like to show your own opinion/perceived value concerning writing?</p>
7	Will you adjust your text according to beliefs you prefer when writing?
8	Do you think the MWPP course has influenced your beliefs about writing or not? If interdisciplinary team teaching mode has given you new writing experience, how has it affected your beliefs about writing specifically?
9	<p>In what ways did you feel more or less confident after the MWPP course?</p> <p>What advantages or disadvantages do you think you find compared to those who have not been exposed to a team-taught course?</p>