

An empirical study on the effects of co-operative learning on Chinese college engineering students' English writing self-efficacy

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ABSTRACT: Writing self-efficacy has been identified as a crucial affective factor in foreign language learning. This empirical study aims to investigate the effects of co-operative learning in enhancing Chinese college engineering students' English writing self-efficacy through employing both qualitative and quantitative methods. The findings of a questionnaire survey before the experiment indicated that the students' English writing self-efficacy was at a moderate level, which called for pedagogical measures to enhance it. Through data analysis of the experiment of integrating co-operative learning into English writing teaching, it was found that co-operative learning exerts a significant effect on the enhancement of engineering students' English writing self-efficacy, with its positive effect on writing task self-efficacy being very significant, and the effect on writing skills self-efficacy not significant. It is suggested that when implementing a co-operative learning model, teachers should consider the logical grouping of students, positive peer feedback and teacher mediation to boost students' confidence and enhance their writing self-efficacy.

INTRODUCTION

In China, academic writing in English is a significant language skill. However, academic writing in English as a foreign language is complicated, with many cognitive, as well as affective factors involved [1]. It is essential to identify the factors, which influence the development of writing competence and, then, take measures to optimise these factors to cultivate English language writing skills.

Writing self-efficacy defined as the writer's confidence in his/her ability to accomplish a certain writing task was put forward by Bandura [2] and is considered an important predictive factor of writing performance [3]. Moreover, writing efficacy is deemed to influence the writer in many other aspects of writing, e.g. diligence, persistence and anxiety, especially, when confronted with difficulties. A high level of writing self-efficacy has been shown to help the learner accomplish a writing task, because it enables him or here to increase their interest in writing, inspire them to work persistently and reduce their writing anxiety [4].

Co-operative learning is a pedagogic theory developed in the early 1980s in America. Co-operative learning can help a learner achieve the maximum effect of academic study and attain learning goals through joint efforts with other learners. Co-operative learning consists of five interrelated factors, i.e. positive interdependence, face-to-face facilitative interaction, individual responsibility, interpersonal and small-group skills, and group activities [5].

Co-operative learning has been introduced into second/foreign language teaching and learning for decades. Linguists and educators have conducted a series of empirical studies to examine the effects of this learning model on language learning. It has been found that co-operative learning can exert a dramatically positive effect on almost all the factors related to language acquisition and learning [6].

In China, since the late 1980s, scholars have introduced co-operative learning into courses of foreign language education and investigated the effects of co-operative learning on academic performance. The results reveal that co-operative learning outperforms traditional language teaching models in the cultivation of students' listening and speaking skills. Co-operative learning also has been applied to the teaching of English academic writing and was found to significantly enhance students' ability to use such writing strategies as planning and drafting, as well as promoting the quality of students' compositions and their writing proficiency.

Moreover, when co-operative learning is integrated into the teaching of writing, students' interest in English writing will be aroused, their motivation for English writing will be strengthened, and their writing anxiety will be greatly reduced. Students' classroom participation has been found to significantly increase due to the application of co-operative learning, and the learners tend to take a positive attitude when using this learning model [7].

Although the relationship between co-operative learning and language acquisition has been investigated from various perspectives, writing self-efficacy is a new concept in the field of education and its relationship to co-operative learning has been seldom researched. Based on the verified positive effect of co-operative learning on language acquisition in previous studies, this study examined the effect of co-operative learning on the teaching of English writing and its effect on writing self-efficacy. This was expected to provide further empirical evidence for the positive role of co-operative learning in the teaching of foreign language writing.

METHODOLOGY

Research Questions

This study aims to answer the following research questions:

1. Can co-operative learning significantly enhance students' English writing self-efficacy?
2. What attitude do the students take toward co-operative learning and their English writing self-efficacy?

Research Subjects

Since the implementation of the *Excellent Engineer Education and Training Program* in 2010, college and university engineering education has been assigned great importance in China [8].

To meet the requirement for qualified quality engineers, college and university engineering students' English writing skills should be cultivated. This study took 224 college engineering freshmen from four classes as subjects; 110 students from two classes were the experimental group, and the other 114 students from the other two classes were the control group. In the term final examination of college English before the implementation of this teaching experiment, the score means of the experimental and control group were 75.4 and 75.6, respectively; the differences of English proficiency and writing competence between the two groups was not statistically significant.

Research Instruments

The research instruments adopted in the present study were questionnaires and interviews.

The questionnaire was intended to measure the level of English writing self-efficacy of Chinese college engineering students. The questionnaire design is based on previous studies concerning second/foreign language writing self-efficacy and the characteristics of English writing at a tertiary level in Chinese education.

According to the study conducted by Tang and Xu, writing self-efficacy has two components, i.e. self-efficacy of writing skills and self-efficacy of the writing task [9]. The questionnaire had 14 items; nine to measure self-efficacy of writing skills and five to measure self-efficacy of the writing task. All the items are measured on a five-point Likert scale, from 1 indicating that the statement is completely or almost completely untrue, to 5 indicating that the statement is completely or almost completely true.

Interviews were conducted to gain a deeper understanding of students' attitude toward co-operative learning and its effect on writing self-efficacy. The researchers randomly selected 10 students from the experimental group (five from each class) to carry out interviews. The interviews were conducted after class in a relaxed environment, with approximately 15 minutes assigned to each interview. The interview was focused on the student's opinion of co-operative learning in English writing and their feelings during the teaching experiment.

Teaching Experiment Procedures

A totally different pedagogic approach to English writing was adopted for the experimental and control group. The experimental group was taught/guided by the principles of co-operative learning; the control group was taught in the traditional way. The teaching experiment lasted for a semester.

Teaching methods under the framework of co-operative learning employed in the experimental group included learning together (LT), academic controversy (AC), co-operative integrated reading and composition (CIRC), think-pair-share (TPS) and teams-assisted-individualisation (TAI). Subjects in the experimental group were divided into teams of three, who were comparable in gender, personality traits, English proficiency and learning ability. Each member of a co-operative learning team was assigned a responsibility.

The most proficient in English acted as team leader and took charge of the co-operative learning activities; one student was responsible for recording their discussions; and the third student searched for topic information. The teacher regularly released the ratings of the co-operative teams promoting competition between teams and encouraging students to be interdependent to attain their common goals through joint efforts. Co-operative learning activities were organised in accordance with the three writing stages, i.e. pre-writing, writing and post-writing.

In the pre-writing phase, the teacher guided the students to brainstorm and discuss the writing topic in the team. In the writing phase, peer exchange was encouraged between team members to offer help to the students embarked on first draft writing. After the first draft was finished, peer evaluation of the first draft was carried out within the team, focusing on the content and structure of the composition. After that, the teacher presented a model essay to the students, who, then, produced a second draft, during which communication between team members was encouraged for mutual support. The second draft was peer reviewed to point out the pros and cons of the compositions, with the focus on language expression. Then, came the final draft, when the teacher gave feedback from the perspective of content, organisation and language. The students used the feedback from their teacher and peers to revise their compositions. In the post-writing phase, the students were asked to reflect on their co-operative learning experience and ponder how to improve the effect of co-operative learning.

As for the control group, the teacher assigned the writing task to the students, who then wrote the compositions. The teacher evaluated the compositions and gave written feedback. The teacher commented on their writing in the next lesson and imparted knowledge on English writing from various perspectives, such as content, organisation and language. Good compositions were selected to present in the classroom. The experimental group and control group had the same amount of time for the English writing lectures. Other factors, including textbooks and writing task, were the same for the two groups.

RESULTS AND DISCUSSION

Effects of Co-operative Learning on English Writing Self-efficacy

In order to investigate the influence of co-operative learning on writing self-efficacy, the students' writing self-efficacy before the experiment was determined. Before the teaching experiment, a questionnaire survey was carried out to determine the writing self-efficacy of all the participants from the experimental and control group.

Table 1 shows self-efficacy of writing skills and self-efficacy of the writing task for the groups. Note that *mean* is the mean for *number of items*, e.g in the first row $29.88 (\text{mean}) = 9 (\text{number of items}) \times 3.32 (\text{item mean})$ and *SD* in row 1 is the standard deviation for the nine items of the questionnaire referring to writing skill. *Global* refers to the results for all 14 questionnaire items.

Table 1: Pre-test English writing self-efficacy of Chinese college engineering students.

	Number of items	Item mean	Mean	SD	Maximum score	Minimum score
Self-efficacy of writing skill	9	3.32	29.88	6.23	43	9
Self-efficacy of writing task	5	3.04	15.20	3.78	25	5
Global writing self-efficacy	14	3.22	45.08	8.52	64	20

According to Table 1, before the teaching experiment, the mean global writing self-efficacy was 45.08, and the mean for each item 3.22. Hence, college students' writing self-efficacy was moderate. The subjects in this study tend to have a slightly lower level of English writing self-efficacy than the subjects surveyed by Tang and Xu [9], which may be due to the subjects in the previous study being from a more prominent university and, therefore, likely to be more proficient in English language skills and more competent at English academic writing, so they tend to be more confident about their writing skills and their ability to accomplish writing tasks.

As it is, the results obtained in the present study and previous studies clearly reveal that the level of English writing self-efficacy for college students in mainland China is not high. From the perspective of second language acquisition, Chinese college students' lack of confidence about their English writing skills and their competence to accomplish writing tasks can be accounted for by several factors.

First, the considerable differences between the English and Chinese languages pose great challenges for English learners in China to produce written output. Therefore, Chinese students at the tertiary level are confronted with great difficulties when engaged in writing tasks. As a result, their English writing learning process is more frustrating than rewarding, and their confidence about English writing could be undermined by repeated failures.

Second, traditional Chinese English education has attached great importance to the language skills of listening and reading, while English writing has never been paid due attention. Take the current college English curriculum as an example: English writing is not listed individually as a compulsory course for non-English majors. Therefore, Chinese students' English writing skills are not properly cultivated, and when assigned a specific writing task, they often feel at a loss. Because of such a pedagogic situation, Chinese college students' English academic writing

self-efficacy has long been at a moderate or even lower level. Self-efficacy is an indispensable internal factor for Chinese English learners, which is affected by a series of influencing factors, such as gender, family background, English proficiency, previous learning experience, outside evaluation, learning success and failure, as well as emotion.

The Chinese educational system provides a far from authentic context for English communication, and the complex influencing factors create a relatively disadvantageous environment for learners, in which to develop positive affective mechanisms. Thus, students tend to have a low self-evaluation of their English skills and competence to undertake specific language tasks, among which writing long has been considered to be the most awkward. So, it is unsurprising that Chinese college students' English writing self-efficacy has remained at a moderate, and even lower, level.

Moreover, from Table 1, it also can be seen that the subjects have a slightly higher level of confidence in applying their English writing skills (item mean 3.32) than in accomplishing specific writing tasks (item mean 3.04). Such a result is consistent with the previous study of Tang and Xu [9]. The result that students have a higher level of writing skill self-efficacy than writing task self-efficacy can be explained by the characteristics of English learning. After approximately 10 years of English education, Chinese college students have accumulated an adequate knowledge of the English language. Most have a good understanding of how to apply their English knowledge to English academic writing.

To be specific: first, college students generally know the spelling rules of English words and seldom make spelling mistakes in English academic writing. Second, most are quite clear on the part of speech to which a certain word belongs and the grammatical function that word serves in a sentence. Third, college students' knowledge of grammar enables them to organise a cluster of words into a simple sentence, and use linking words or conjunctions to combine two or several simple sentences to make complex, compound or even compound-complex sentences. Furthermore, most college students know how to organise several sentences into a paragraph to clearly express an intended theme. Finally, most of the learners are equipped with the knowledge of putting several paragraphs together to create a complete passage to illustrate some viewpoint.

Owing to students' adequate knowledge of English, they usually have enough confidence to correctly conduct academic writing at the level of word, sentence, paragraph and passage. However, in terms of specific English writing tasks, the students usually find them more of a challenge and have less confidence. When asked to fill in an application form or write a résumé, email, invitation letter or describe personal experience, past events, a place, a person, a story, a film or express such emotions as pleasure, anger, sorrow and joy, many college students feel at a loss and do not know how to fulfil the tasks successfully. Therefore, college students tend to be more confident about their writing skills than their competence to undertake a specific writing task.

After a semester of the teaching experiment, the researcher handed out the questionnaire again to all the participants from the experimental and control groups, and based on the data collected, used a paired sample *t*-test to examine the effect of co-operative learning on writing self-efficacy. All the questionnaire papers collected were valid. Table 2 shows the results of the paired sample *t*-test for the control group's pre-test and post-test writing self-efficacy.

Table 2: Paired sample *t*-test for the control group's pre-test and post-test writing self-efficacy.

		N	Mean	SD	<i>t</i>	<i>p</i>
Self-efficacy of writing skill	Pre-test	114	29.96	6.45	-0.154	0.258
	Post-test	114	30.05	6.21		
Self-efficacy of writing task	Pre-test	114	15.25	3.82	-0.201	0.312
	Post-test	114	15.29	3.91		
Global writing self-efficacy	Pre-test	114	45.21	8.63	-0.376	0.194
	Post-test	114	45.34	8.76		

Note: **p* < 0.05 ***p* < 0.01

According to Table 2, it can be seen there are no significant differences for the two factors of global writing self-efficacy for the control group between pre-test and post-test at a significance level of *p* > 0.05. The paired sample *t*-test results reveal that, though the traditional approach to learning English academic writing can enrich a learner's writing experience, it does not play a notably positive role in raising students' English writing self-efficacy. College students still only have a moderate level of confidence about their English academic writing and their competence to accomplish specific writing tasks. English academic writing self-efficacy is a complicated affective factor for Chinese college students, and is affected by the external surroundings and learners' internal cognitive and emotional mechanisms.

Without explicit pedagogical measures to enhance students' confidence about their own writing skills and their confidence in accomplishing specific writing tasks, students would not spontaneously develop their writing self-efficacy even if their writing proficiency improves. In previous studies, scholars put forward pedagogical suggestions to enhance Chinese students' English writing self-efficacy, such as integration of metacognitive training into English writing teaching, implementation of a blended English writing teaching model and optimisation of the evaluation system. In this study, co-operative learning was adopted in the teaching of English academic writing for the experimental group. Table 3 reports the paired sample *t*-test results for the experimental group's pre-test and post-test writing self-efficacy.

Table 3: Paired sample *t*-test for the experimental group's pre-test and post-test writing self-efficacy.

		N	Mean	SD	<i>t</i>	<i>p</i>
Self-efficacy of writing skill	Pre-test	110	29.80	6.13	-0.627	0.089
	Post-test	110	30.42	6.58		
Self-efficacy of writing task	Pre-test	110	15.15	3.64	-2.158**	0.007
	Post-test	110	17.43	3.59		
Global writing self-efficacy	Pre-test	110	44.95	8.46	-1.203*	0.032
	Post-test	110	47.55	8.57		

Note: * $p < 0.05$ ** $p < 0.01$

According to Table 3, there are statistically significant differences in the experimental group's global English writing self-efficacy before and after the teaching experiment ($p < 0.05$). The model of co-operative learning in English writing teaching emphasises the dominant role of learners, making academic writing a process of active learning for students. When students become more motivated autonomous learners, they tend to be more determined to conquer the difficulties and gradually accumulate greater confidence about English writing. Moreover, students in the experimental group had team discussions about the topic of the writing task, exchanged views and gave peer evaluation on their writing drafts. Reciprocal support, help and encouragement in co-operative learning can help create a relatively relaxing, comfortable and democratic learning atmosphere, in which students can reduce their writing anxiety and boost their confidence about English academic writing.

From Table 3, it is also revealed that statistically there are very significant differences in the experimental group's self-efficacy of the writing task before and after the teaching experiment ($p < 0.01$). In other words, the students from the experimental group have significantly enhanced their confidence about their competence in fulfilling specific English writing tasks. Before the teaching experiment, students' self-efficacy of the English writing task was at a moderately low level, compared with their self-efficacy of writing skills, but co-operative learning has enabled the students to co-operatively have discussions, negotiations and sharing ideas concerning specific writing tasks, such as emails, notes, application forms, personal statements and invitation letters.

Moreover, students would mutually comment and evaluate their group members' drafts, as well as give feedback and suggestions for the revision of drafts. Because of such pedagogical measures, students would enlarge their knowledge about the format of such writing tasks and the corresponding language features required, gradually deepening their understanding on how to undertake such writing tasks successfully, with a lower level of writing anxiety. It is quite clear that, by integrating co-operative learning into the English academic writing classroom, students can greatly increase their confidence to accomplish specific English writing tasks and enhance the level of English writing task self-efficacy.

Meanwhile, it is also demonstrated in Table 3 that there are no significant statistical differences in the level of college students' English writing skills self-efficacy before and after the teaching experiment. From Table 3, the experimental group's self-efficacy of English writing skills has risen, from 29.80 to 30.42, but the improvement is not statistically significant ($p = 0.089$). In other words, in spite of co-operative learning characterised by discussion, idea-sharing, peer feedback, reciprocal evaluation and social support during the process of English writing learning, college students still have great difficulties in enhancing their confidence about their English academic writing skills. The result may be explained by the following.

First, in co-operative learning, peer feedback is emphasised and students are encouraged to give comments and evaluate others about their English writing products, in which they usually focus on whether their peers can apply properly into academic writing, linguistic knowledge that includes such aspects as spelling, punctuation, word, sentence, paragraph and passage. As a result, students can gain a better insight into the application of linguistic knowledge and meanwhile, they may develop a deeper perception of the shortcomings in the written output. Second, co-operative learning places great emphasis on the joint efforts of a group and, it is undeniable that the positive interdependence of peers can promote their learning autonomy and foreign language learning [10]; but students are still EFL (English as a Foreign Language) learners, so the peer feedback given to each other during the process of English writing can be inaccurate and misleading. Thus, students sometimes feel doubtful about the accuracy of the evaluation by their peers. In this sense, students' retain some uncertainty about their language application in writing.

Finally, compared with English writing task self-efficacy, English writing skills self-efficacy is much more difficult to develop. Co-operative learning enables students to acquire a deep knowledge on the formats and language features of different writing tasks and helps them build up their confidence to fulfil different writing tasks, but this does not cultivate English writing skills self-efficacy.

After approximately 10 years of English language education, students' language skills are almost fixed and are undergoing *fossilisation* as a second language. Because of the lack of an authentic language learning context, students in China often find it difficult to develop the accuracy and fluency of their language use in English academic writing, regardless of painstaking efforts. This leads to frustration in English writing learning for many Chinese college students.

Therefore, Chinese college students' self-efficacy of English writing skills tends to remain at a stably moderate level, even if co-operative learning is adopted in the pedagogy.

Students' Attitude toward Co-operative Learning to Enhance English Writing Self-efficacy

Through the analysis of the results obtained from the interview survey on the students' attitude toward co-operative learning and its effects on writing self-efficacy, it was found that co-operative learning has won universal positive recognition among the students from the experimental group. They all agree that the experience of integrating co-operative learning into English writing pedagogy is pleasant and delightful, and also beneficial and rewarding. In terms of the advantages of this model in a general sense, the interviewees mainly mentioned the following effects of co-operative learning.

Co-operative learning helps create a more relaxed atmosphere for learning English writing, which has long been considered most tedious. Also, co-operative learning enables the students to co-operate with each other and develop their team spirit. Co-operative learning provides many opportunities for students to interact in the target language, i.e. English, enabling them to be exposed to more input and produce more output, so this model is beneficial for students' improvement of listening and speaking skills. Finally, co-operative learning helps students to develop a positive attitude toward English academic writing. Owing to co-operative learning, students feel less anxious when engaged in writing tasks, and thus, they become more enthusiastic about English writing.

As to the relationship between co-operative learning and English writing self-efficacy, among the 10 interviewees, six students thought that co-operative learning can play a significant role in enhancing writing self-efficacy; three students hold that co-operative learning can help enhance writing self-efficacy to some extent; the other two students maintain that the effect of co-operative learning on improvement of writing self-efficacy is not significant. Students who claim that co-operative learning helps enhance writing self-efficacy illustrate their position from the following two perspectives.

The first perspective is that when co-operative learning is used in English writing pedagogy, students can obtain useful information concerning linguistic knowledge and writing strategy knowledge from their peers by means of discussion, negotiation and idea-sharing. Hence, their knowledge of English academic writing can be considerably expanded by co-operative learning which, then, helps enhance the students' self-efficacy of English writing. The second perspective is that almost all the students agree that unlike the traditional English writing teaching model, co-operative learning provides a setting for the students to work together and provide mutual support, help and encouragement, establishing a harmonious relationship of positive interdependence in English writing learning.

English writing in the context of co-operative learning becomes more relaxed and interesting. The level of anxiety that students experience in academic writing has been greatly reduced in such a pleasant learning atmosphere and their confidence about English academic writing has been gradually built up. However, there were also two students doubtful of the positive effect of co-operative learning in enhancing their self-efficacy of English writing. According to them, though co-operative learning provides opportunities for them to give peer comments and suggestions, the feedback from their peers is not authoritative and reliable, which often makes them more confused and anxious. Moreover, when some proficient peers give feedback, they tend to be very harsh and critical, and their classmates' confidence about English writing is seriously damaged.

In general, the interview survey revealed that students take a positive attitude toward the model of integrating co-operative learning into English writing pedagogy. Most of them approve of the effects of co-operative learning on the enhancement of English writing self-efficacy, in spite of some demerits.

CONCLUSIONS AND SUGGESTIONS

Combining qualitative and quantitative research methods, such as questionnaires and interview surveys, as well as a teaching experiment, the present study investigated the effects of co-operative learning on Chinese college engineering students' English writing self-efficacy. The findings indicate that most Chinese college engineering students have a moderate level of English writing self-efficacy. Accordingly, effective pedagogical measures should be undertaken urgently to boost their confidence about English academic writing and, eventually, help attain the goal of cultivating students' English writing ability.

Integrating the co-operative learning model into the English writing classroom proved to be effective and it was found that students engaged in co-operative learning have significantly boosted their English writing self-efficacy. The enhancement of the subjects' English writing task self-efficacy is especially highly significant, while their improvement in English writing skills self-efficacy is not significant. Therefore, the model of co-operative learning is strongly recommended to be applied in English academic writing instruction, to help learners relieve their writing anxiety and enhance their confidence about English academic writing. When co-operative learning is implemented to boost students' English academic writing self-efficacy, the following pedagogical factors need to be taken into consideration.

First, a logical grouping of students is an essential prerequisite to effective co-operative learning of English writing. The division of students in a class into several groups should be governed by the principle of *heterogeneity within group, homogeneity between groups* [11]. For example, an ideal group of three members should be made up of one proficient writer, one critical thinker and one good resource explorer. In this way, the team can bring into full play every member's strengths and every student can tap their potential to the utmost to improve their writing ability in different aspects, including content, structure and language of compositions. With the development of their writing skills, students will become more confident about their writing and their English writing self-efficacy will be enhanced.

Second, it is necessary for teachers to conduct training on peer evaluation strategies for students and it is imperative to guide students on giving positive feedback during peer evaluation in English writing learning. Chinese students tend to mistake peer evaluation as intended to find faults with their peers' compositions, and they are especially keen on identifying such problems as spelling and grammatical errors. When evaluating group members' writing drafts, the feedback mainly is negative which, to some extent, dampens their confidence about English writing. It is undeniable that negative feedback enables students to pay attention to the problems existing at the level of language expression. However, positive peer feedback is indispensable as it can help develop students' awareness of their own merits and encourage them to carry forward these advantages in future English writing. Besides, positive feedback is undoubtedly helpful to students in building up their confidence about English writing.

Third, teacher support and mediation should be strengthened in co-operative learning. The emphasis of students' dominant role in co-operative learning does not mean that students can conduct all the group activities of co-operative learning without the involvement of teachers. Instead, teachers should assign time for each group to participate in their co-operative learning activities and give students timely assistance. Students tend to consider teachers' feedback as authoritative and reliable. When they get praise and recognition from teachers, they will be more motivated for English writing and their confidence about writing will be greatly enhanced. When they get encouragement from teachers, they will feel less anxious about writing and they will have greater incentive to overcome difficulties. Teachers' academic and personal support plays a positive role in enhancing students' English writing self-efficacy.

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