

行政院國家科學委員會專題研究計畫 成果報告

建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同(第3年) 研究成果報告(完整版)

計畫類別：個別型
計畫編號：NSC 98-2511-S-216-003-MY3
執行期間：100年08月01日至101年07月31日
執行單位：中華大學資訊管理學系

計畫主持人：羅家駿
共同主持人：葉修文

報告附件：出席國際會議研究心得報告及發表論文

公開資訊：本計畫可公開查詢

中華民國 101 年 10 月 23 日

中文摘要：對寫作教學而言，使學生明瞭閱讀與寫作為彼此連結相互影響的程序，是一件重要的事情。閱讀他人的文章，能有效地幫助學生探索寫作決策程序。協同寫作可發揮集思廣益，激發每個人的創意與思考，匯集更多的知識。基於對閱讀與寫作能力之發展具有相互增進影響特性之信念，並促進群體寫作模式的學習，本研究提出一個三年期的計畫，建構英文閱讀寫作鷹架輔助環境，從閱讀輔助開始到寫作輔助，從個人閱讀寫作輔助開始到同步協同寫作輔助。同時聚焦於閱讀與寫作之學習上，藉由在鷹架學習輔助環境中系統化的程序來引導學生，提供英文閱讀與寫作輔助工具。第一年，本研究修改本人過去開發之線上註記系統，來幫助學生藉由判斷各段落主題句、控制概念與支持細節等關鍵要素，來分析文章基本結構。進而開發一個程序導向之英文閱讀鷹架學習輔助系統，來幫助學生學習如何根據各段落之關鍵要素來，逐步地分析閱讀不同文體之文章。在第二年中，本研究應用鷹架輔助理論開發一個程序導向之英文寫作學習輔助系統，來幫助學生學習如何逐步地建立不同文體文章之結構，並確立各段落之關鍵要素，逐步地協助學生撰寫不同文體之文章。在第三年中，本研究將腦力激盪機制融入於第二年研究中開發之英文寫作學習輔助系統，透過腦力激盪機制，有效的達成討論共識，提高協同寫作的效率與品質。在每一年之研究中，除了進行英文閱讀/寫作學習輔助系統之開發建置外，並對每一系統實施實證研究以評量其效果。實驗結果顯示本研究在開發的系統能有效地提升學生的英文閱讀理解與寫作能力。

中文關鍵詞：電腦輔助語言學習(CALL)、閱讀策略、寫作教學、程序導向、協同寫作、腦力激盪

英文摘要：In this research, it is expected to provide students with the tools necessary to function successfully in English reading and writing by leading them through a systematic process under a scaffolding support environment. Moreover, with the advent of computer technology, researchers and instructors are attempting to devise computer support for effective collaborative technical writing to take the advantages of collected intelligences. To this end, a three-year research is proposed to develop a scaffolding support environment for English reading and writing, from reading to writing and from individual to synchronous collaboration.

In the first year, this research provided students a three-phased English essay reading scaffolding support system by leading them through a systematic process. By integrating the online annotation system, the system can help students know how to enhance their reading abilities. This reading support system helps students visual interactively to analyze basic structure of essays by identifying key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements of each paragraph, a process-oriented structure-based scaffolding support environment is developed to help students know how to read essays with various rhetorical forms step-by-step by analyzing the essay organizations. In the second year, this research developed a scaffolding environment to enhance English writing instruction that provides process-oriented writing supports for variety of rhetorical essays. It enhances students' experiences in writing planning and translating processes by helping students realize step-by-step nature of technical English writing. The scaffolding support, based on the topic, will guide students to write essays step-by-step. In the third year, we integrated the brainstorming mechanism into the writing support system developed in the second year. With the synchronous brainstorming mechanism, teams of students can reach consensus efficiently and effectively so that the quality of collaborative writing can be enhanced. In addition to develop English reading/writing support systems, in each year, empirical evaluations were also conducted. The experimental results showed that the developed systems can effectively enhance students' reading/writing competences.

英文關鍵詞： CALL, reading strategy, writing instruction, process-oriented, collaborative writing, brainstorming

行政院國家科學委員會補助專題研究計畫

期中進度報告
期末報告

建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同

計畫類別：個別型計畫 整合型計畫

計畫編號：NSC 98-2511-S-216-003-MY3

執行期間：98年8月1日至101年7月31日

執行機構及系所：中華大學資訊管理學系

計畫主持人：羅家駿

共同主持人：葉修文

計畫參與人員：宋昭賢、黃世堂、張然舜

本計畫除繳交成果報告外，另含下列出國報告，共 7 份：

移地研究心得報告

出席國際學術會議心得報告

國際合作研究計畫國外研究報告

處理方式：除列管計畫及下列情形者外，得立即公開查詢

涉及專利或其他智慧財產權，一年二年後可公開查詢

中 華 民 國 101 年 10 月 31 日

摘要

對寫作教學而言，使學生明瞭閱讀與寫作為彼此連結相互影響的程序，是一件重要的事情。閱讀他人的文章，能有效地幫助學生探索寫作決策程序。協同寫作可發揮集思廣益，激發每個人的創意與思考，匯集更多的知識。基於對閱讀與寫作能力之發展具有相互增進影響特性之信念，並促進群體寫作模式的學習，本研究提出一個三年期的計畫，建構英文閱讀寫作鷹架輔助環境，從閱讀輔助開始到寫作輔助，從個人閱讀寫作輔助開始到同步協同寫作輔助。同時聚焦於閱讀與寫作之學習上，藉由在鷹架學習輔助環境中系統化的程序來引導學生，提供英文閱讀與寫作輔助工具。第一年，本研究修改本人過去開發之線上註記系統，來幫助學生藉由判斷各段落主題句、控制概念與支持細節等關鍵要素，來分析文章基本結構。進而開發一個程序導向之英文閱讀鷹架學習輔助系統，來幫助學生學習如何根據各段落之關鍵要素來，逐步地分析閱讀不同文體之文章。在第二年中，本研究應用鷹架輔助理論開發一個程序導向之英文寫作學習輔助系統，來幫助學生學習如何逐步地建立不同文體文章之結構，並確立各段落之關鍵要素，逐步地協助學生撰寫不同文體之文章。在第三年中，本研究將腦力激盪機制融入於第二年研究中開發之英文寫作學習輔助系統，透過腦力激盪機制，有效的達成討論共識，提高協同寫作的效率與品質。在每一年之研究中，除了進行英文閱讀/寫作學習輔助系統之開發建置外，並對每一系統實施實證研究以評量其效果。實驗結果顯示本研究在開發的系統能有效地提升學生的英文閱讀理解與寫作能力。

關鍵詞：電腦輔助語言學習(CALL)、閱讀策略、寫作教學、程序導向、協同寫作、腦力激盪

Abstract

In this research, it is expected to provide students with the tools necessary to function successfully in English reading and writing by leading them through a systematic process under a scaffolding support environment. Moreover, with the advent of computer technology, researchers and instructors are attempting to devise computer support for effective collaborative technical writing to take the advantages of collected intelligences. To this end, a three-year research is proposed to develop a scaffolding support environment for English reading and writing, from reading to writing and from individual to synchronous collaboration.

In the first year, this research provided students a three-phased English essay reading scaffolding support system by leading them through a systematic process. By integrating the online annotation system, the system can help students know how to enhance their reading abilities. This reading support system helps students visual interactively to analyze basic structure of essays by identifying key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements of each paragraph, a process-oriented structure-based scaffolding support environment is developed to help students know how to read essays with various rhetorical forms step-by-step by analyzing the essay organizations. In the second year, this research developed a scaffolding environment to enhance English writing instruction that provides process-oriented writing supports for variety of rhetorical essays. It enhances students' experiences in writing planning and translating processes by helping students realize step-by-step nature of technical English writing. The scaffolding support, based on the topic, will guide students to write essays step-by-step. In the third year, we integrated the brainstorming mechanism into the writing support system developed in the second year. With the synchronous brainstorming mechanism, teams of students can reach consensus efficiently and effectively so that the quality of collaborative writing can be enhanced. In addition to develop English reading/writing support systems, in each year, empirical evaluations were also conducted. The experimental results showed that the developed systems can effectively enhance students' reading/writing competences.

Keywords: CALL, reading strategy, writing instruction, process-oriented, collaborative writing, brainstorming

1. Introduction

Writing to communicate is an essential academic and professional skill, and a university education should help prepare students for the kinds of writing common in the workplace and professional life. Technical writing deals with precise information that often presented in a sequential format and is designed to satisfy an audience's understanding, particularly regarding how things work (Kelly, 2003). However, the teaching of technical writing might encounter some challenges. Firstly, it is the step-by-step nature or processes of technical writing that is particularly demanding for novice writers (Kelly, 2003), especially for EFL (English as a Foreign Language) learners. Secondly, technical writing classrooms cannot accurately simulate professional writing situations for all disciplines (Nagelhout, 1999). As explained by Carter et al. (2003) (p.101), "technical writing instruction often operates in isolation from other components of students' communication education". Thirdly, in the globally linked world, computer literacy is a necessity for success in every academic and professional environment, and collaborating on a computer network is a type of communicative process that can be especially valuable for technical writers (Semones, 2001). Therefore, as Nagelhout (1999) claimed, students need to feel comfortable in multi-task, multi-user environments and should see the Internet as a valued resource for potential material. Finally, in the age of information, technical writers need to be "highly skilled in information manipulation and abstraction, critical and much sought-after in an age where information overtakes industry in terms of social and economic value" (Johnson-Eilola, 1996) (p.253). It is obvious that technical writing instruction needs to scaffold students to work within and across information spaces.

It is generally agreed that making students aware that reading and writing are connected and interrelated processes is important for writing instruction (Gillie et al., 2001). To be a good writer, one must be a good reader. Reading other people's writing can benefit students to explore their writing decision processes (Gillie et al., 2001; Lannon, 1998). On the other hand, a good writer needs to know how and why his/her audience read the article. Therefore, in this study, the dual focus on reading and writing is based on the belief that developing students' skills in one area will improve their skills in the other. It is expected to provide students with the tools necessary to function successfully in technical English reading and writing by leading them through a systematic process under a scaffolding support environment (Gillie et al., 2001). Therefore, to enhance students' writing abilities, in this research, scaffolding reading support system was firstly developed in the first year to help students know how to read articles with various rhetorical forms step-by-step. It helped students realize that reading and writing are connected and interrelated processes. As suggested by Duke and Pearson (2002), teaching students to summarize what they read can effectively improve their overall reading comprehension of text. Online annotation techniques have been developed to highlight texts within web documents and used to provide visual representation of summaries of key ideas of articles (Chen, 2005; Du, 2004; Fan, 2008; Lo, Tsao, and Yeh, 2005). Therefore, the first-year research developed the scaffolding support environment for reading by integrating the online annotation system. After getting familiar with the reading processes, students shall be prepared to learn writing. As suggested by Flower and Hayes (1981), the writing processes include planning, translating, and reviewing. Planning refers to the generation of information relevant to the task, organizing information, and setting goals. Translating then turns the plans

and ideas into text to meet the goals. Reviewing, the final writing process, combines evaluating the text and editing either the text or the goals and ideas. In the second year, a scaffolding writing support system to enhance English writing instruction for the first two writing processes, planning and translating, was developed. It provided process-oriented writing supports and practices for articles with various rhetorical forms. In the third year, a synchronous brainstorming mechanism for collaborative writing planning, was developed to enhance English writing instruction. Together with the scaffolding support environment developed in the second year, the students can have a more thorough understanding of the writing processes. With the brainstorming support, teams of students can reach consensus efficiently and effectively so that the quality of collaborative writing can be enhanced.

2. Scaffolding Support for Reading (First Year)

2.1 The Reading Support System

The scaffolding support system for English essay reading developed in the first year is based on the essay organizations and writing processes suggested by Gillie et al. (2001). The process-oriented structure-based scaffolding reading support begins with helping students identify key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements of each paragraph, then, the proposed system then guides students to summarize paragraph outlines and read essays with various rhetorical forms step-by-step so that students can realize the processes as well as skills and elements to read essays.

As suggested by Gillie et al. (2001), *comparison and contrast*, *cause and effect*, *narration*, *description*, and *biography* are the usually used rhetorical forms. Each rhetorical form essay has its own structures and writing processes. The scaffolding reading support mechanism includes three phases. Phase I reading support helps students identify key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements identified in Phase I, in Phases II reading support, the student input the key elements and summarizes the outline of each paragraph. Phases I and II have the same scaffolding supporting processes for all rhetorical forms. Phase III, on the other hand, provides different scaffolding support processes for analyzing essay organizations with various rhetorical forms in that each rhetorical form has its own structure and writing processes. Figure 1 illustrates the interface of the proposed scaffolding reading support environment. The interface contains two components: Reading annotator (the upper window) and Reading process scaffolding supporter (the lower window). Reading annotator provides a convenient visual interactive environment for Phase I reading support to help students identify key elements of each paragraph (Lo et al., 2009). Reading process scaffolding supporter provides a process-oriented step-by-step scaffolding reading support for Phases II and III (Lo et al., 2010). In Phase II reading supports, the student input the key elements and summarizes the outline of each paragraph and a summary table that summarizes the key elements and outline of all paragraphs is shown (Figure 2). The Phase III scaffolding reading support begins with selecting the rhetorical form of the essay. Then it guides the student to select organizational style of the essay (Figure 3). Once an organizational style is selected, the corresponding essay structure table is demonstrated for the student to input the corresponding ingredients based on the key

elements and outline of each paragraph summarized in Phase II.

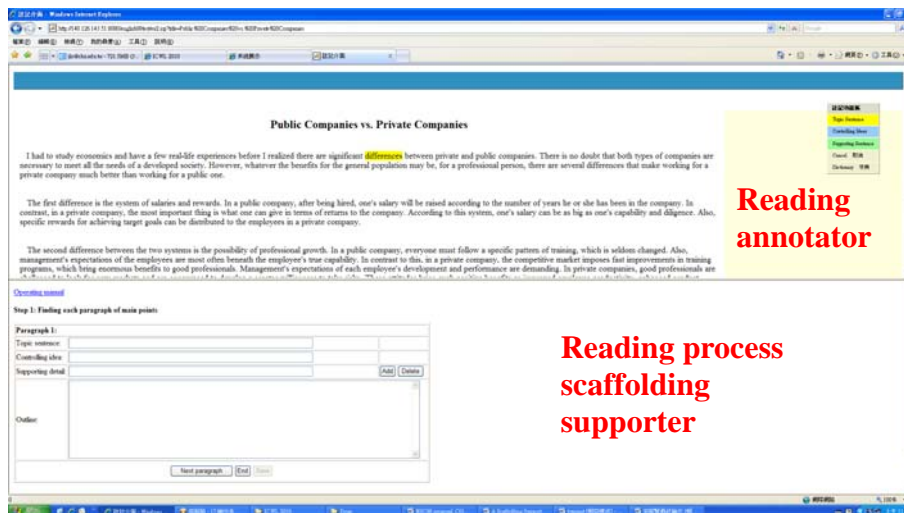


Figure 1: Illustration of the scaffolding support environment for English essay reading

Paragraph	Topic sentence	Controlling idea	Support	Outline
1	I know that may seem strange to someone who has never had a Japanese bath, but when I get homesick and stressed out from living in this new country and culture, I think about my bath.	I think about my bathtub.	when I get homesick and stressed out from living in this new country and culture, I think about my bath.	The author think about her country. first think about her family and the wonderful meals her mother used to cook. Then, she think about her bathtub.
2	Japanese and Americans use their bathtubs for different purposes, and as a result, their bathrooms are quite different.	Japanese and Americans use their bathtubs for different purposes	The American bathtub is used primarily to get one's body clean. Japanese people, on the other hand, like to use their bathtubs as a place for relaxation. ;	Japanese and Americans use their bathtubs for different purposes.

Figure 2: Phase II reading support: Summaries of key elements and outline of each paragraph

Selecting the rhetorical form of the article: Comparison and Contrast

Subject A: Japanese Baths

Subject B: American Baths

Selecting organizational style: All A, All B AB/AB/AB

Introduction: Japanese and Americans use their bathtubs for different purposes

Subject A: American bathtubs are long and shallow.

Subject A: the same room as the toilet, and there is usually a shower above the bathtub.

Subject B: athtubs are very deep and can be made from many different types of materials.

Subject B: Japanese wash themselves off before they enter the bathtub.

Conclusion: rican baths are very different in the way they look and the ways they are used.

Figure 3: Phase III reading support for *Comparison and Contrast* essays (*All A/All B* style)

2.2 Evaluation of the Reading Support System

Two experiments were conducted to evaluate the developed reading support system. Firstly, two classes of Freshmen English (each with thirty-two students) taught by the same instructor were used to evaluate Reading annotator (Phase I reading support). During the experiment, Class I comprised the experimental group and Class II the control Group. The control variable was the provision of online annotation tools (with online annotation tools or without the online annotation tools). The experiment involved a reading phase and a testing phase. The experiment took one class hour (50 minutes), for both groups. Students took thirty minutes

to read the essay. The testing phase immediately followed the reading phase. A cued recall test and a free recall test were used to assess students' comprehension. An attitude questionnaire was also administered to students in the experimental group, to assess their attitudes to the system. The results showed that the experimental group performed significantly better than the control group in both the cued recall test and the free recall test. Results of the attitude questionnaire revealed that the experimental group had a positive attitude to Reading annotator, with respect to perceived ease of use, perceived usefulness, attitude to use, and intention to use.

Secondly, an experiment was conducted in Fall, 2009 to investigate the effectiveness of Reading process scaffolding supporter (Phase II and Phase III reading supports). Participants in this experiment consisted of thirty freshmen in a university in northern Taiwan. The participants studied Applied Foreign Languages in the same department and were in the same *English Writing* class. Before the experiment, the *Michigan Test of English Language Proficiency (MTELP)* was used as the pretest instrument to assess participants' overall English proficiency. Based on the *MTELP* scores, the participants were evenly assigned to two groups. Each group included fifteen students. Students in the experimental group read an essay with both Reading annotator and Reading process scaffolding supporter (Phases I, II, and III supports). On the other hand, students in the control group read the same essay only with Reading annotator (Phase I support). The experiment took three weeks. There were two class meetings for each week. The first class meeting was an orientation and a piloting session to familiarize students with systems for both groups. The following class meeting was the actual experiment session with exactly the same procedure in the orientation session. In each week, students were asked to read an essay. Cued recall tests and free recall tests were used to evaluate the reading comprehension performance of immediate written recall for both groups. The results indicated that participants in the experimental group had significantly better performance in both cued and free recall test scores. It verified the effectiveness of the process-oriented structural based Reading process scaffolding supporter on reading comprehension for EFL students.

3. Scaffolding Support for Writing (Second Year)

3.1 The Writing Support System

Basically, writing is a process of encoding writer's thoughts into texts and reading is the reverse process of decoding the texts back to the writer's thoughts. Therefore, in this research, scaffolding writing support is implemented by constructing step-by-step mechanisms which are adopted from the reversed reading support processes developed in the first year.

The writing processes include planning, translating, and reviewing (Flower & Hayes, 1981). In the second year, this research developed a process-oriented scaffolding support for writing planning and translating. Similar to the reading support system developed in the first year, the scaffolding support for essays with different rhetorical forms is based on the structures suggested by Gillie et al. (2001). The process-oriented scaffolding writing support system starts with helping students define an appropriate topic. Based on the topic, then, the system guides students to write essays with various rhetorical forms step-by-step so that students can realize the processes as well as skills and elements to write essays. Similar to the first year

research, an empirical study will be conducted to evaluate the effectiveness of the proposed model.

The “step-by-step” scaffolding writing support system includes five steps for each rhetorical form. Step 1 helps the student to specify a topic and essential features of the essay (Figure 4). Step 2 guides the student to select an appropriate organizational structure (Figure 5). Step 3 helps the student to specify outlines of each paragraph (Figure 6). Step 4 guides the student to define key elements of each paragraph (Figure 7). Finally, Step 5 provides an online editing interface to students for writing the essay (Figure 8). The information specified in each step can serve as the basis for the following steps and students can go backwards to revise the essay planning. From Step 2 to Step 4, the information specified in the previous steps is shown in the same page. However, to reduce cognitive load of the learner, in Step 5, the previously specified information is shown subject to request by the student. In the system, Steps 1 and 2, provide different scaffolding support processes for specifying essay organizations with various rhetorical forms in that each rhetorical form has its own structure and writing processes. On the other hand, Steps 3, 4, and 5 have the same scaffolding supporting processes for all rhetorical forms.

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5

Title : Stress

Summary of "Causes and Effects":

Cause	Effect		
life is getting too stressful.	you must hurry everywhere you go.	Add	Delete
have too much stress in your life.	suffer from stomach problems, heada	Add	Delete

Next

Figure 4: Step 1 writing support for *Cause and Effect* essays

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5

Organizational style:

1. Cause → Effect 2. Effect → Cause 3. Cause → Effect 4. Cause → Effect

Previous Next

Jump to : [Step 1](#)

Step 1

Title : Stress

Cause	Effect
life is getting too stressful.	you must hurry everywhere you go.
have too much stress in your life.	suffer from stomach problems, headaches, or neck and shoulder pain.

Go Top

Figure 5: Step 2 writing support for *Cause and Effect* essays

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5

Paragraph outline:

1.	Introduction	Add	Delete
2.	when your life is getting too stressful	Add	Delete
3.	Conclusion	Add	Delete

Previous Next

Jump to : [Step2](#) [Step1](#)

Step2

Cause and Effect

Cause→Effect
Cause→Effect
Cause→Effect

Go Top

Step1

Title : Stress

Cause	Effect
life is getting too stressful.	you must hurry everywhere you go.
have too much stress in your life.	suffer from stomach problems, headaches, or neck and shoulder pain.

Go Top

Figure 6: Step 3 writing support for *Cause and Effect* essays

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5

Paragraph elements:

1. Introduction [Modify](#)

Controlling idea: All people have some stress int their lives.

Topic sentence: too much stress can be unhealthy

Supporting detail: Describe A little stress makes life interesting [Add](#) [Delete](#)

2. when your life is getting too stressful [Modify](#)

Controlling idea: How can you tel when your life is getting too stress

Topic sentence: it can rob you of your excitement for life.

Supporting detail: Describe Too much stress can also make you feel depressed o [Add](#) [Delete](#)

3. Conclusion [Modify](#)

Controlling idea: One of the best ways to deal with stress is to take c

Topic sentence: Keep mentally healthy

Supporting detail: Explain the good things in your life each day. [Add](#) [Delete](#)

Previous Next

Jump to : [Step3](#) [Step2](#) [Step1](#)

Step3

Paragraph outline

1	Introduction
2	when your life is getting too stressful
3	Conclusion

Go Top

Step2

Cause and Effect

Cause→Effect
Cause→Effect
Cause→Effect

Go Top

Step1

Title : Stress

Cause	Effect
life is getting too stressful.	you must hurry everywhere you go.
have too much stress in your life.	suffer from stomach problems, headaches, or neck and shoulder pain.

Go Top

Figure 7: Step 4 writing support for *Cause and Effect* essays

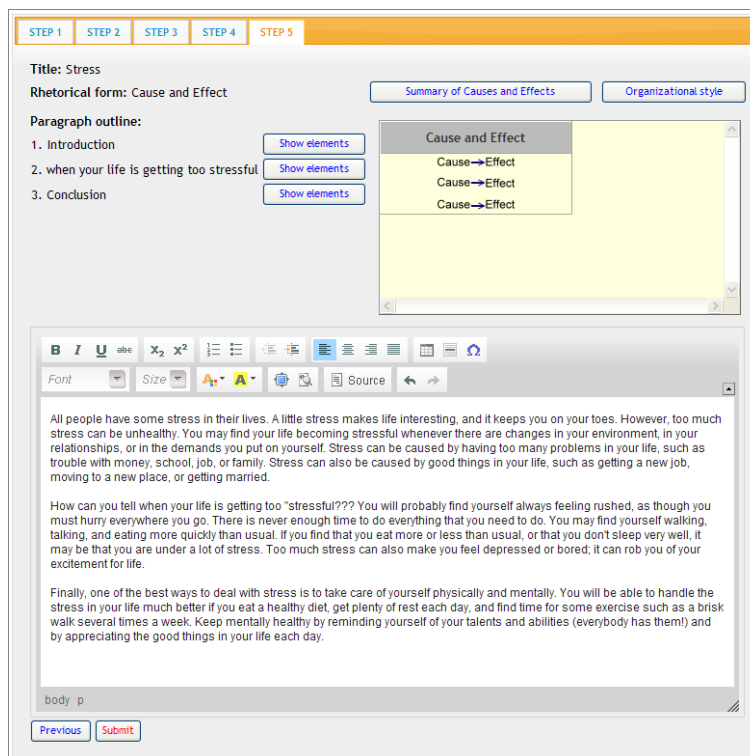


Figure 8: Step 5 writing support for *Cause and Effect* essays

3.2 Evaluation of the Writing Support System

An in-class empirical study to evaluate the developed writing support system was conducted in a university in northern Taiwan in Spring, 2010. Three English writing classes, with totally fifty-three students, taught by the same teacher were used. These classes were an optional course for non-English majored junior or senior college and master students. There were three class meetings for each week. The flowchart of this experiment is illustrated as Figure 9. In the beginning of the semester, students took a writing test. This test was used as the pretest to realize students' writing competences before the class. Students freely chose the topic and content of the writing test. Students were trained to use the developed system before the experiment started. The experiment consisted of three writing practices with different rhetorical forms. For each writing practice, the teacher firstly gave instruction about the writing of the corresponding rhetorical form. Then the students were asked to write an essay with the taught rhetorical form (Table 1).

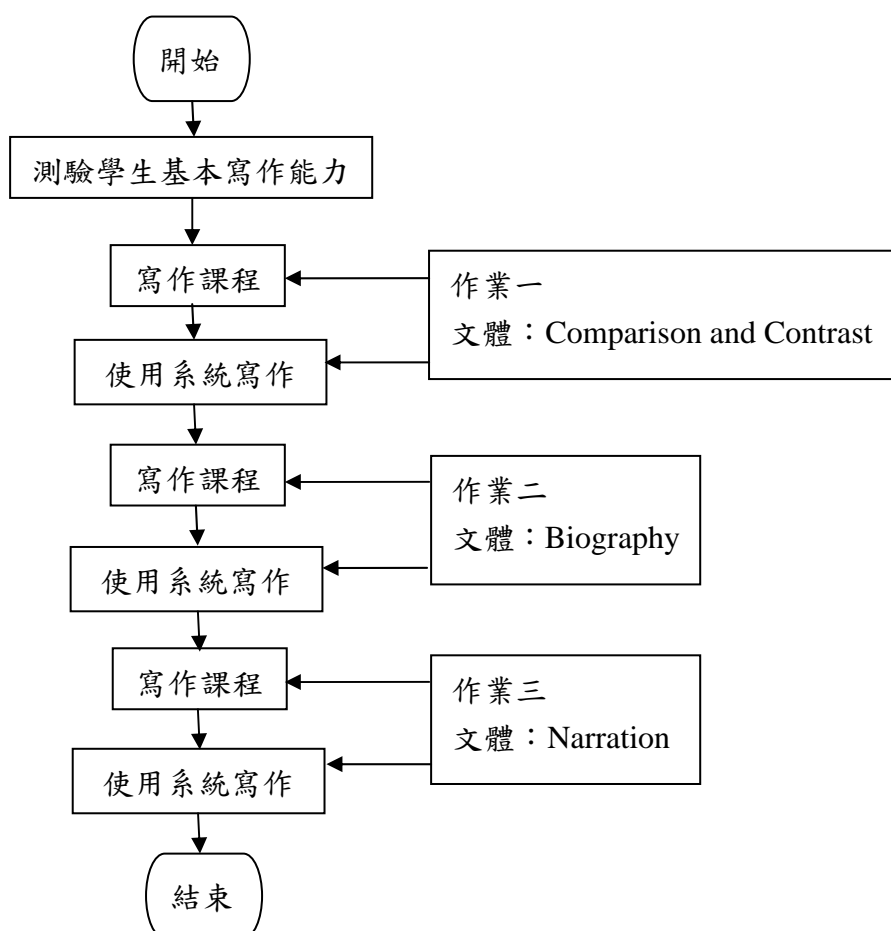


Figure 9: Flowchart of the experiment of the second year research

Table 1: List of writing practices in the experiment of the second year research

Writing practice	Topic	Rhetorical form	Writing duration
Practice 1	(Not assigned)	Comparison and Contrast	30 minutes in class; freely practice after class
Practice 2	Autobiography	Biography	30 minutes in class; freely practice after class
Practice 3	The xxx moment	Narration	30 minutes in class

Though there were fifty-three students enrolled in these three classes, only forty-one students participated in all these three writing practices. Based on the writing performances measured from the pretest, the forty-one valid participants were evenly classified into three groups, high, middle, and low writing competence level. There were fourteen students in the high level group, thirteen students in the middle level group, and fourteen students in the low level group. Written essay qualities of pretest and each writing practice were compared. The results revealed that the developed writing support system can effectively enhance students' writing competences for both middle and low level groups and eliminate the gap among students with different writing competence levels.

4. Collaborative Writing Support with Brainstorming (Third Year)

4.1 The Collaborative Writing Support System

In the third year, a synchronous collaborating writing support system was developed by integrating a brainstorming mechanism into the writing support system developed in the second year. With the synchronous brainstorming mechanism, teams of students can reach consensus efficiently and effectively so that the quality of collaborative writing can be enhanced. The developed collaborative writing support system was based on a client/server framework (Figure 10). The server side includes two database modules – message database and essay database. The client side includes components such as chat room, brainstorming, homework setup, essay writing, and essay record query. The essay writing follows the process-oriented scaffolding writing support system developed in the second year. The process and the interface of the synchronous collaborative writing is illustrated as Figure 11 and Figure 12 respectively.

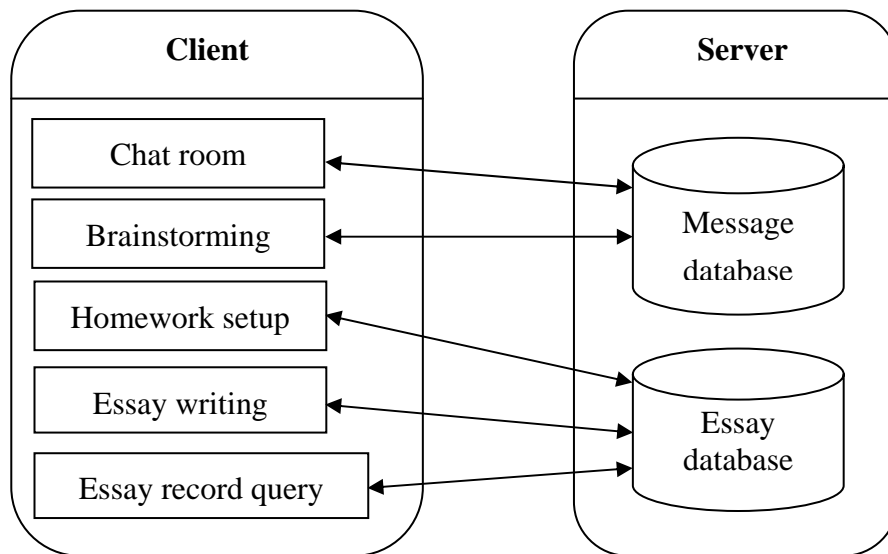


Figure 10: System structure of the collaborative writing support system

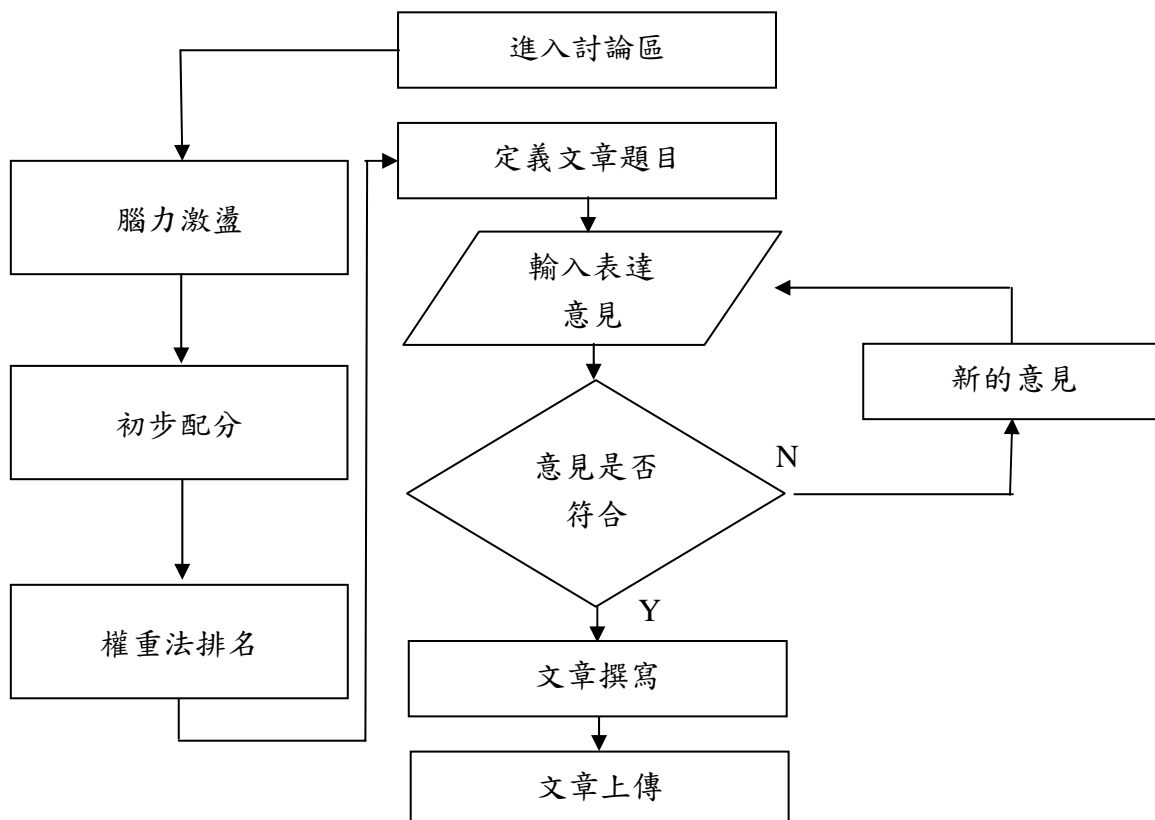


Figure 11: The collaborative writing process



Figure 12: Illustration of the collaborative writing process interface with brainstorming support

4.2 Evaluation of the Collaborative Writing System

An empirical study to evaluate the developed collaborative writing support system was conducted in a university in northern Taiwan in Spring 2011. Seventeen master students were recruited and divided into groups with three or four students. Two collaborative writing support models were compared with the control variable whether having the brainstorming support. The system with the brainstorming support, which was the developed system, was the experimental system (Figure 12) and the system without the brainstorming support was the control system (Figure 13). The purpose of the experiment was to evaluate the participants' subjective impression of the brainstorming support. Participants in all groups used both systems to communicate to reach a census of components of an essay. Before the experiment, all groups practiced to use both systems to write description essays so that they can get acquainted with the systems. The formal experiment asked groups to complete planning the components of cause and effect essays with both systems. The reason only the planning phase was completed was the limitation of experimental duration.



Figure 13: Illustration of the collaborative writing process interface without brainstorming support (control system)

The experimental results showed that the experimental system can help participants reach agreements to write essays more efficiently. It can be also verified with the fewer conversation of the experimental system to complete planning writing an essay. The participants expressed significant appraisal on easy to use, usefulness, attitude to use, and intention to use for the experimental system.

5. Conclusions

Based on the *comparison and contrast*, *cause and effect*, *narration*, *description*, and *biography* essay organizations and writing processes suggested by Gillie et al. (2001), in the past three years, this research developed scaffolding support systems for English essay reading and writing. The process-oriented scaffolding reading support mechanism includes three phases. Phase I reading support helps students identify key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements identified in Phase I, in Phases II reading support, the student input the key elements and summarizes the outline of each paragraph. Phases I and II have the same scaffolding supporting processes for all rhetorical forms. Phase III, on the other hand, provides different scaffolding support processes for analyzing essay organizations with various rhetorical forms in that each rhetorical form has its own structure and writing processes. In the second year, the scaffolding writing support was implemented by constructing step-by-step mechanisms which were adopted from the reversed reading support processes developed in the first year. The “step-by-step” scaffolding writing support system includes five steps for each rhetorical form. Step 1 helps the student to specify a topic and essential features of the essay. Step 2 guides the student to select an appropriate organizational structure. Step 3 helps the student to specify outlines of each paragraph.

Step 4 guides the student to define key elements of each paragraph. Finally, Step 5 provides an online editing interface to students for writing the essay. In the third year, we integrated the brainstorming mechanism into the process-oriented writing support system developed in the second year. With the synchronous brainstorming mechanism, teams of students can reach consensus efficiently and effectively so that the quality of collaborative writing can be enhanced. In addition to develop English reading/writing support systems, in each year, empirical evaluations were also conducted. The experimental results showed that the developed systems can effectively enhance students' reading/writing competences.

6. References

- [1] Carter, M., Anson, C.M., & Miller, C.: Assessing Technical Writing in Institutional Contexts: Using Outcomes-Based Assessment for Programmatic Thinking. *Technical Communication Quarterly*, Vol. 12, No. 1, (2003) 101-114.
- [2] Duke, N. K. and Pearson, P. D.: Effective practice for developing reading comprehension. In A. E. Farstrup, & S. J. Samuels (Eds.) *What research has to say about reading instruction*. Newark, DE: International Reading Association, (2002) 205-242.
- [3] Flower, L. and Hayes, J.R.: A Cognitive Process of Writing. *College Composition and Communication*, Vol. 32, No. 4, (1981) 365-387.
- [4] Gillie, J.W., Ingle, S., and Mumford, H.: *Read to Write: An Integrated Course for Nonnative Speakers of English*. New York: McGraw-Hill, (2001).
- [5] Johnson-Eilola, J.: Relocating the value of work: technical communication in a post-industrial age. *Technical Communication Quarterly*, Vol. 5, No. 3, (1996), 245-270.
- [6] Kelly, J.: What's with the musty, old tent?" Using technical writing to promote peer- and self-evaluation. *Reading and Writing Quarterly*, Vol. 19, No. 4, (2003) 363-376.
- [7] Lannon, J.M.: *The Writing Process: A Concise Rhetoric*, 6th ed. Addison-Wesley Educational Publishers Inc. (1998).
- [8] Lo, J.-J., Sung, C.-S., and Yeh, S.-W.: Reading Annotator: A Web-based Annotation System for Reading Support. *The 17th International Conference on Computers in Education (ICCE 2009)*, Hong Kong, pp. 940--944 (2009)
- [9] Lo, J.-J., Sung, Yeh, S.-W., and C.-S., 2010, 12/8-12/10, A Scaffolding Support System for English Essay Reading, *The 9th International Conference on Web-based Learning (ICWL 2010) (LNCS 6483)*, Shanghai, pp. 180-189. (EI)
- [10] Nagelhout, E.: Pre-professional practices in the technical writing classroom: promoting multiple literacies through research. *Technical Communication Quarterly*, Vol. 8, No. 3, (1999) 285-299.
- [11] Semones, L.: Collaboration, computer mediation, and the foreign language writer. *Clearing House*, Vol. 74, No. 6, (2001) 308-312.

7. Published and Working Papers

Based on the support of this research funding, three papers have been presented in well-known

international conferences in the past two years:

[1] Lo, J.-J., Sung, Yeh, S.-W., and C.-S., 2010, 12/8-12/10, A Scaffolding Support System for English Essay Reading, *The 9th International Conference on Web-based Learning (ICWL 2010) (LNCS 6483)*, Shanghai, pp. 180-189. (EI)

[2] Lo, J.-J., Sung, C.-S., and Yeh, S.-W., 2009, 11/30-12/4, Reading Annotator: A Web-based Annotation System for Reading Support, *The 17th International Conference on Computers in Education (ICCE 2009)*, Hong Kong, pp. 940-944.

[3] Lo, J.-J., Chen, Y.-R., and Yeh, S.-W., 2009, 12/11-12/13, Scaffolding Support Mechanism for Writing Cause and Effect Essays, *The 2nd International Conference on Information Technology in Education (CITE 2009)*, Wuhan, China. (EI)

Other than papers presented in international conferences, working papers are planned to be submitted to well-known e-learning related SSCI international journal and international conferences.

國科會補助專題研究計畫出席國際學術會議心得報告(1)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	98年11月30日至 98年12月4日	會議地點	Hong Kong
會議名稱	(中文) (英文) The 17th International Conference on Computers in Education (ICCE 2009)		
發表題目	(中文) (英文) Reading Annotator: A Web-based Annotation System for Reading Support		

一、參加會議經過

ICCE 2009 由 Asia-Pacific Society for Computers in Education 與香港教育學院(Hong Kong Institute of Education)主辦，於 2009 年 11 月 30 日至 12 月 4 日在香港教育學院舉行，有來自世界各地之學者專家與會。本會議包含六個子會議：C1: Artificial Intelligence in Education/Intelligent Tutoring System (AIED/ITS) and Adaptive Learning；C2: Computer-supported Collaborative Learning (CSCL) and Learning Sciences；C3: Advanced Learning Technologies, Open Contents, and Standards；C4: Classroom, Ubiquitous, and Mobile Technologies Enhanced Learning (CUMTEL)；C5: Digital Game and Intelligent Toy Enhanced Learning (DIGITEL)；C6: Technology, Pedagogy and Education。本人報告之論文屬於 C6: Technology, Pedagogy and Education，被安排在 12/4 下午，獲得數位來自不同國家學者之熱烈回響。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議中尚邀請來自全球不同國家享有盛名之學者進行演講，讓本人獲益良多。有多位學者專家對本人之研究深表興趣，在本人論文發表中提出許多寶貴意見。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。

三、攜回資料名稱及內容

會議論文集光碟、論文摘要集與議程手冊紙本、會議活動照片。

四、論文摘要

By integrating the online annotation system, Reading Annotator, a web-based annotation system for reading support, is developed to help students know how to read to enhance their reading abilities. Reading Annotator is expected to efficiently and effectively help students visual interactively make summaries to guide students analyze text structure by highlighting key elements of articles. Three different color highlight buttons, *Topic sentence*, *Controlling idea*, and *Supporting detail*, are developed to help students identify key elements of each paragraph so that students can get the gist of the text more easily and achieve better understanding toward the article. In addition to the three different color highlight buttons which are developed to help students identify key elements of each paragraph, the system also includes a supportive reading strategy button, *Dictionary*. By highlighting unknown words and click *Dictionary* button, students can look up these unknown words with the Yahoo online dictionary. Reading Annotator accommodates not only text structure, visual representations, and summarization reading comprehension strategies but also “reading to summarize”. Moreover, by using the reading support to guide students to analyze article organizations by highlighting key elements so that “reading to analyze” can be accomplished.

(本論文為此國科會計畫研究成果)

國科會補助專題研究計畫出席國際學術會議心得報告(2)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	98年12月11日至 98年12月13日	會議地點	Wuhan, China
會議名稱	(中文) (英文) The 2nd International Conference on Information Technology in Education (CITE 2009)		
發表題目	(中文) (英文) Scaffolding Support Mechanism for Writing Cause and Effect Essays		

一、參加會議經過

CITE 2009 與 CiSE 2009 (The 2009 International Conference on Computational Intelligence and Software Engineering)研討會共同舉行，會議由 IEEE Wuhan Section, Wuhan University, China, James Madison University, USA, University of Wisconsin at La Crosse, USA, Microsoft Research Asia 主辦。論文集由 IEEE eXpress Conference Publishing 出版，被列為 EI 之一，為相關領域之世界性重要研討會，吸引全球之學者投稿參加，本次研討會錄取率約為 30%，本人投稿之論文得以被錄取發表，可見本人在相關領域之研究，已獲得國際之肯定。本人報告之論文被安排在 12/13 上午，獲得數位來自不同國家學者之熱烈回響。

二、與會心得

本次研討會除了一般論文之報告討論外，同時也邀請來自全球不同國家享有盛名之學者進行 Keynote speech，讓本人獲益良多。參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。

三、攜回資料名稱及內容

會議論文集光碟、議程手冊紙本、會議活動照片。

四、論文摘要

This research develops a scaffolding environment to enhance English writing instruction that provides process-oriented writing supports for cause and effect essays. It enhances students' experiences

in writing planning and translating processes by helping students realize step-by-step nature of technical English writing. The scaffolding support, based on the topic, will guide students to write essays step-by-step. The “step-by-step” writing process scaffolding support mechanism for “cause and effect” essays is divided into two phases. Phase I support guides the student to define the essay structure. Phase II support guides the student to define key elements of each paragraph. By examining and managing the writing processes, students shall be able to understand the act of writing cause and effect essays.

(本論文為此國科會計畫研究成果)

國科會補助專題研究計畫出席國際學術會議心得報告(3)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	99年8月16日至 99年8月18日	會議地點	Changchun, China
會議名稱	(中文) (英文) The 5th International Conference on E-learning and Games (Edutainment 2010)		
發表題目	(中文) (英文) Developing an Online History Educational System to Present the Progression of Spatial Regions		

一、參加會議經過

Edutainment 2010 論文集為 Springer 出版之 LNCS (Lecture Notes in Computer Science) 系列之一 (LNCS 6249)，被列為 EI，為相關領域之世界性重要研討會，吸引全球之學者投稿參加，本研討會之水準堪稱一流，有來自全球 27 個國家之 222 篇論文投稿，錄取 94 篇論文，錄取率約 42%。本人投稿之論文得以被錄取發表，可見本人在相關領域之研究，已獲得國際之肯定。在研討會期間，本人與多位包括來自台灣的各國學者進行學術與生活文化上之交流。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議邀請享有盛名之學者，如來自德國之 Dr. Bodo Urban，來自中國大陸之 Dr. Guangzheng Fei，來自日本之 Dr. Yoichiri Kawaguchi 等進行 Invited talk，讓本人獲益良多。本人報告之論文被分別安排在 8/17 上午，獲得數位來自不同國家學者之熱烈回響。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。

三、考察參觀活動

在此研討會中，大會在會場外，安排展示了由東北師大理想軟件公司所開發之各類數位學習軟體，內容包括教與學支援軟體、教學資源與管理軟體、教師培訓資源與支援軟體、虛擬實境實驗室、辦公管理與業務支援軟體等。

四、攜回資料名稱及內容

會議論文集與議程手冊紙本、會議活動照片、東北師大理想軟件公司數位學習軟體光碟。

五、論文摘要

This research developed an online history educational System, named HES-SPATO2. It is unique in that it integrates the indispensable elements of history events such as person, space, and time for increasing the understandability of complicated history learning materials. HES-SPATO2 employed GIS concept of information layers and web-based technology to help students acquire skills for historical thinking. In HES-SPATO2, history learning objects can be formed by integrating the elements of history events to specify “who” initiated the history event, “whom” the event influenced, “what” they did, “when” the event happened, and “where” the event happened. HES-SPATO2 applied temporal logic to reason the temporal relationships between history events. HES-SPATO2 also applied spatial logic to reason the spatial relationships between regions. Combining temporal logic and spatial logic makes it possible to present not only movements of persons and explanation texts but also the progression of spatial regions along the history events in animation defined in each SPATO (Spatial, Person, Action/Attribute, and Temporal Object) and therefore makes the learning material more understandable. This system not only brings us the obvious advantage of anywhere-anytime learning, it also provides ways to revitalize the teaching and learning of history.

(本論文為本人前一國科會計畫研究成果，計畫編號：NSC 95-2520-S-216 -002-MY3)

國科會補助專題研究計畫出席國際學術會議心得報告(4)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	99年12月7日至 99年12月10日	會議地點	Shanghai, China
會議名稱	(中文) (英文) The 9th International Conference on Web-based Learning (ICWL 2010)		
發表題目	(中文) (英文) A Scaffolding Support System for English Essay Reading		

一、參加會議經過

ICWL 2010 論文集為 Springer 出版之 LNCS (Lecture Notes in Computer Science) 系列之一 (LNCS 6483)，被列為 EI，為相關領域之世界性重要研討會，吸引全球之學者投稿參加，本研討會之水準堪稱一流，有來自全球之 206 篇論文投稿 (192 篇為合格論文)，錄取 36 篇長篇論文與 9 篇短篇論文，錄取率約 23%。本人投稿之論文得以被錄取為長篇論文發表，可見本人在相關領域之研究，已獲得國際之肯定。在研討會期間，本人與多位包括來自各國學者進行學術與生活文化上之交流。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議邀請享有盛名之學者，如 Dr. Xingdong Wu, Dr. Kamalakar Karlapalem, Dr. David Liu, Dr. Wanlei Zhou 等進行 Keynote talks。本人報告之論文被分別安排在 12/9 下午，獲得數位來自不同國家學者之熱烈回響。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。在此次研討會中，甚少來自台灣的學者參加並發表論文，希望能多鼓勵國內學者投稿參加。

三、攜回資料名稱及內容

會議論文集與議程手冊紙本、會議活動照片。

四、論文摘要

This research provides students a three-phased English essay reading scaffolding support system by leading them through a systematic process. By integrating Reading annotator, a web-based annotation system for reading support, the system can help students know how to enhance their reading abilities. Reading annotator helps students visual interactively to analyze basic structure of essays by identifying key elements of each paragraph such as topic sentence, controlling idea, and supporting details. Based on the key elements of each paragraph, a process-oriented structure-based scaffolding support environment is developed to help students know how to read essays with various rhetorical forms step-by-step by analyzing the essay

organizations. The system applies not only text structure, visual representations, summarization, and questions reading strategies but also reading to summarize and reading to analyze reading levels. Moreover, the proposed system accommodates the scaffolding strategies such as providing procedural facilitator, guided learning, using external representational scaffolds, helping the student focus thinking on only those items that were important for the task.

(本論文為此國科會計畫研究成果)

國科會補助專題研究計畫出席國際學術會議心得報告(5)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	100年5月29日至 100年5月31日	會議地點	Hangzhou, China
會議名稱	(中文) 第十五屆全球華人電腦教育應用大會 (GCCCE 2011) (英文) The 15th Global Chinese Conference on Computers in Education (GCCCE 2011)		
發表題目	(中文) (英文) A Bingo Game for English Vocabulary Learning		

一、參加會議經過

GCCCE 是由全球華人電腦教育應用學會(Global Chinese Society for Computers in Education, GCSCE)主辦之常年國際學術會議，旨在彙聚世界各地教育政策制定者、學者、教育工作者、校長及一線教師，分享有關資訊教育應用的實踐方法及成功經驗，以推動教育電腦化的發展，促進教育創新。如今，GCCCE 大會已成為一個資訊教育應用領域內的全球學者和教育工作者的主要學術聚會。GCCCE 2011 深入探討資訊技術促進教育創新的相關問題，推動全球資訊教育應用界同仁的交流。本次會議共有 1327 論文投稿，錄取 414 篇論文，錄取率約 31.2%。論文集由 IEEE 出版，並送交 EI 檢索。本人投稿之論文得以被錄取為長篇論文發表，可見本人在相關領域之研究，已獲得國際之肯定。在研討會期間，本人與多位包括來自各國學者進行學術與生活文化上之交流。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議邀請享有盛名之教育技術領域的華人專家、學者圍繞著“資訊技術促進教育創新”這一主題，展開了積極熱烈而富有成效的探討。在特邀報告階段，來自香港大學教育應用資訊科技發展研究中心主任羅陸惠英教授、華中師範大學副校長楊宗凱教授、臺灣科技大學黃國楨教授、華東師範大學祝智庭教授分別作了“資訊技術促進教育創新的可持續性發展”、“深化融入，支撐創新—關於教育中長期規劃教育資訊化問題的思考”、“移動泛在學習的研究趨勢與應用”、“中國基礎教育資訊化發展：從班班通到教育雲”的主題報告。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。

三、考察參觀活動

參觀杭州市勝利小學與西湖、河坊街。

四、攜回資料名稱及內容

會議論文集與議程手冊紙本、會議活動照片。

五、論文摘要

In recent years, game-based learning play an important role in education. Many students feel learning English is difficult and do not like studying English. Some researchers suggest that computer games can be effective student's learning. Because it is interesting to play a game, so we combine English vocabulary and bingo game to design a game-based online English vocabulary learning system in this study.

國科會補助專題研究計畫出席國際學術會議心得報告(6)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	100年10月1日至 100年10月2日	會議地點	Chengdu, China
會議名稱	(中文) (英文) The 2nd International Conference on Education and Educational Technology (EET 2011)		
發表題目	(中文) (英文) Design of Adaptive Web Interfaces with Respect to Student Cognitive Styles		

一、參加會議經過

EET 2011 論文集為 Springer 出版之 AISC (Advances in Intelligent and Soft Computing) 系列之一 (AISC 108)，被列為 EI，吸引眾多學者投稿參加。在研討會期間，本人與多位包括來自台灣的各國學者進行學術與生活文化上之交流。詳細議程中漏列本人之論文，經要求更正後，安排本人於 10/1 下午進行口頭報告，並取得口頭報告證明。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議邀請來自日本之 Dr. Ogata 進行關於無所不在學習之專題演講，讓本人獲益良多。本人報告之論文被分別安排在 10/1 下午，獲得數位學者之熱烈回響。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。本次會議有多位報告者缺席，且將不同主題論文安排在同場次發表，此缺點為日後安排研討會時應注意之事項。

三、攜回資料名稱及內容

會議論文集與議程手冊紙本、會議活動照片。

四、論文摘要

One of the obstacles for incorporating student cognitive styles into web-based learning systems is the adaptive representation of learning material in web-based environments. This study designed adaptive web interfaces with respect to students' cognitive styles by investigating the relationships between students' cognitive styles and browsing patterns of content and interactive components. The system then

adaptively recommended learning content presented with a variety of students' preferred content and interactive components based on the students' cognitive styles. The cognitive style instrument applied in this study was the Myers-Briggs Type Indicator which is based on Jung's theory of cognitive styles. It is based on two fundamental cognitive functions, perception and judgment whose combinations form four cognitive styles, Interpersonal, Mastery, Understanding, and Self-expressive. An experiment was conducted to examine the impact of the proposed adaptive web-based system on students' engagement in learning. Two classes of college freshmen participated in the experiment. One class was assigned as the control group using the conventional web-based system without adaptive web interfaces. The other class was assigned as the experimental group using the designed adaptive web interfaces. The experimental results revealed Interpersonal and Mastery students in the control group lost their patience more quickly than students of the other styles. Furthermore, the results showed the proposed adaptive learning system could effectively enhance students' engagement in learning for Interpersonal and Mastery students especially. The results provided evidence of the effectiveness of the adaptive web-based learning system focusing on student cognitive styles.

(本論文為本人之前國科會計畫研究成果，計畫編號：NSC 94-2213-E-216-006; NSC 93-2213-E-216-009)

國科會補助專題研究計畫出席國際學術會議心得報告(7)

日期：101年10月31日

計畫編號	NSC 98-2511-S-216-003-MY3		
計畫名稱	建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同		
出國人員姓名	羅家駿	服務機構及職稱	中華大學資訊管理學系教授
會議時間	101年3月27日至 101年3月30日	會議地點	Takamatsu, Kagawa, Japan
會議名稱	(中文) (英文) 4th IEEE International Conference on Digital Game and Intelligent Toy Enhanced Learning (DIGITEL 2012)		
發表題目	(中文) (英文) A Study of 2nd Grade Students' Attitude on a Mathematics Game		

一、參加會議經過

DIGITEL 2012 與 WMUTE 2012 (7th IEEE International Conference on Wireless, Mobile & Ubiquitous Technologies in Education) 共同舉行，為兩年一度由 IEEE 協會贊助主辦之研討會，其論文集被列為 EI，為相關領域之世界性重要研討會，吸引全球之學者投稿參加，本研討會之水準堪稱一流。本人投稿之論文得以被錄取發表，可見本人在相關領域之研究，已獲得國際之肯定。在研討會期間，本人與多位包括來自台灣的各國學者進行學術與生活文化上之交流。

二、與會心得

本次研討會除了一般論文之報告討論外，在會議邀請享有盛名之學者，如 Dr. David Cavallo 演講 Liberating Learning: How Ubiquitous Access to Computational Devices Releases Education from Tyranny of Information Recall；Dr. Matthew Kam 演講 Voice-Command Games for Literacy Learning in the Developing World；Dr. Masahiko Tsukamoto 演講 A Perspective on Wearable and Ubiquitous Computing: How Does It Impact on Daily Life? 並由多國著名學者進行多場之 SIG 與 PANEL 討論。總而言之，參加本次研討會讓本人不僅有機會見識國外學者之研究，並將自己之研究與他人交流，對研究之與國際接軌，提高研究品質，有莫大之助益。

三、考察參觀活動

在此研討會中，大會安排參訪當地著名之 Ritsurin Garden and Yashima)。

四、攜回資料名稱及內容

會議論文集與議程手冊紙本與會議活動照片等。

五、論文摘要

This study investigated students' attitudes on the mathematics game *Arithmetic Climbing*. In this game, players are required to calculate numbers in a strategic fashion to move their tokens to the

destination faster than their opponents. Twenty six second grade students played the game for forty minutes once a week for four weeks. A questionnaire for students' mathematics attitudes and a questionnaire for students' attitudes toward *Arithmetic Climbing* game were applied in this study. The students' mathematics attitude questionnaire included three variables: cognition, affection, and behavior. It was conducted with pretest/posttest design. The students' attitudes toward *Arithmetic Climbing* game questionnaire included four variables: pedagogy, game, society, and system. The results show that students had high cognition and behavior but poor affection on mathematics. There were significant differences between pretests and posttests for cognition, affection, and behavior. The experimental results also show that *Arithmetic Climbing* game is a well designed digital game-based learning program with both high "education" and "entertainment" ingredients. The students have positive attitudes on *Arithmetic Climbing* game regarding pedagogy, game, society, and system.

國科會補助計畫衍生研發成果推廣資料表

日期:2012/10/18

國科會補助計畫	計畫名稱: 建構英文閱讀寫作鷹架輔助環境: 從閱讀到寫作, 從個人到協同
	計畫主持人: 羅家駿
	計畫編號: 98-2511-S-216-003-MY3 學門領域: 資訊教育-電腦輔助教學
無研發成果推廣資料	

98 年度專題研究計畫研究成果彙整表

計畫主持人：羅家駿		計畫編號：98-2511-S-216-003-MY3				計畫名稱：建構英文閱讀寫作鷹架輔助環境：從閱讀到寫作，從個人到協同	
成果項目		量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）	
		實際已達成數（被接受或已發表）	預期總達成數（含實際已達成數）	本計畫實際貢獻百分比			
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	3	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	12	12	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	3	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	3	4	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

<p>其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)</p>	<p>無</p>
--	----------

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	3	1. 程序導向之英文閱讀學習輔助系統。 2. 程序導向之英文寫作學習輔助系統。 3. 協同寫作輔助系統。
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與(閱聽)人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

達成目標

未達成目標（請說明，以 100 字為限）

實驗失敗

因故實驗中斷

其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文： 已發表 未發表之文稿 撰寫中 無

專利： 已獲得 申請中 無

技轉： 已技轉 洽談中 無

其他：（以 100 字為限）

1. 程序導向之英文閱讀學習輔助系統。

2. 程序導向之英文寫作學習輔助系統。

3. 協同寫作輔助系統。

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

本研究建構一個英文閱讀寫作鷹架輔助環境，從閱讀輔助開始到寫作輔助，從個人閱讀寫作輔助開始到同步協同閱讀寫作輔助。閱讀他人的文章，能有效地幫助學生探索寫作決策程序，此系統可幫助學生明瞭閱讀與寫作為彼此連結相互影響的程序。並可明白協同寫作可發揮集思廣益，激發每個人的創意與思考，匯集更多的知識。第一年，本研究利用線上註記系統來幫助學生藉由判斷各段落主題句、控制概念與支持細節等關鍵要素，分析文章基本結構。開發一個程序導向之英文閱讀鷹架學習輔助系統，幫助學生學習如何根據各段落之關鍵要素來，逐步地分析閱讀不同文體之文章。在第二年中，本研究應用鷹架輔助理論開發一個程序導向之英文寫作輔助系統，幫助學生學習逐步地建立不同文體文章之結構，確立各段落之關鍵要素，協助學生撰寫文章。在第三年中，本研究將腦力激盪機制融入於第二年研究中開發之英文寫作學習輔助系統，透過腦力激盪機制，有效的達成討論共識，提高協同寫作的效率與品質。在每一年之研究中，除了進行英文閱讀/寫作學習輔助系統之開發建置外，並對每一系統實施實證研究以評量其效果。實驗結果顯示本研究在開發的系統能有效地提升學生的英文閱讀理解與寫作能力。