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Article

Applying the Technology Acceptance Model (TAM) to explore the effects of a Course Management System (CMS)-Assisted EFL writing instruction

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Abstract

This study illustrates a teaching model that utilizes a Blackboard (Bb) course management system (CMS) to support English writing instruction. It was implemented in a blended English research paper (RP) writing course, with specific learning resources and activities offered inside and outside the Bb CMS. A quasi-experimental study in which the results of two academic years were analysed is presented. The results showed that the experimental group significantly outperformed the control group in their final drafts. The research methodology included the Technology Acceptance Model (TAM) to evaluate the course. The results of the survey showed that most students displayed positive learning outcomes, indicating that the instruction model could contribute to the effectiveness of learning English writing. Major factors influencing the improvement of writing performance included technical support, perceived usefulness, perceived ease of use, and attitude; however, the influence of writing activities on the Bb was limited in comparison to the other variables.

Keywords: Blackboard; Course Management System; English as a Foreign Language (EFL) writing instruction; Technology Acceptance Model (TAM)

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Introduction

Course Management Systems (CMSs) have been commonly used in higher education for a number of years. A considerable body of research reveals that CMS is an important and promising instructional tool to help teachers manage their courses and enhance student learning outcomes (Malikowski, 2008; West *et al.*, 2007; Yu *et al.*, 2010). The basic infrastructure of CMS contains multiple functions to support an easy implementation of e-learning (Chou *et al.*, 2010), which enables teachers to manage their courses more efficiently. These functions can be used to assist the storage and distribution of teaching materials, the record and monitoring of learning schedules and activities, and the evaluation of teaching and learning quality.

One of the major characteristics of higher education is continuous application and integration of advanced information and communication technology (ICT) (Chan *et al.*, 2003). Among other advances of Web 2.0 technology, CMSs have been regarded as one of the most popular and powerful educational innovations (Cappel and Hayen, 2004; Leahy, 2004; Yu *et al.*, 2010). A CMS is defined as a system integrating subject management and instructional technology to support the design, establishment, and distribution of an online or virtual learning environment (Coates *et al.*, 2005). This is especially true for virtual campuses. Many scholars have integrated CMSs into blended e-learning and found positive feedback from teachers and students (Cheng, 2007; Hölbl and Welzer, 2010; Novo-Corti *et al.*, 2003; Sanprasert, 2010; Tsai and Ernest, 2009).

The integration of CMS with language instruction is promising because CMSs support meta-cognitive self-regulation and help provide a suitable motivational level during students' learning processes. For example, Winne and Haswin (1998) suggest that meta-cognitive knowledge about learning strategies promotes an understanding and memorization of knowledge in a particular content area, such as reading or writing. This indicates that if the student awareness of using meta-cognitive and cognitive strategies is enhanced, then language proficiency could also be facilitated at the same time. Through CMS-supported self-regulated learning, students are offered tools that can help them activate and maintain cognition that is oriented towards their individual learning goals. As Vovides *et al.* (2007) claim, 'CMSs should inspire, motivate, and guide students to develop self-regulated learning cognitive skills' (p. 69). This is where CMSs can provide the vital support learners need to utilize their language knowledge in solving problems found in various situations, thus further enhancing their process of effective learning.

In second language (L2) learning some researchers have investigated student satisfaction, willingness, and perceived effects of using CMSs (Liaw, 2008), and analysed the motivational factors of accepting CMSs in learning

(Sánchez and Hueros, 2010). Sanprasert (2010) compared Thai students' English learning autonomy before and after the implementation of blended learning with Moodle CMS. The findings revealed that CMS plays an important role in developing four dimensions of language learning autonomy: strategy, awareness, behaviour, and social interdependency.

In a Taiwanese language learning context, Cheng (2007) investigated college student perceptions towards English courses assisted by CMSs. A total of 296 Taiwanese college students from 10 higher education institutions were involved. The results of the descriptive analysis showed positive feedback from the students, indicating that CMS was a helpful and user-friendly invention for language learning. The findings showed no difference of perception between students with different language proficiency levels. A different study conducted by Tsai and Ernest (2009) proposed an English reading strategy instruction model integrated with Moodle CMS. The results implied that CMS could successfully enhance EFL (English as a Foreign Language) student strategy usage and reading comprehension, especially for higher proficiency students.

Concerning these evaluations, the technology acceptance model (TAM) proposed by Davis (1986, 1989, 1993) has been a well-known instrument for evaluating the quality of e-learning. The purpose of TAM was to investigate the effects of technology on user behaviour. Specifically, perceived usefulness and perceived ease of use were regarded as two major elements influencing user willingness to utilize a specific technology (Davis, 1989). However, it has been argued that TAM only provides general information concerning the acceptance of a specific technology. In order to develop the technology in the right direction, it is necessary to obtain further detailed information regarding its content-specific usage. As far as e-learning is concerned, a number of researchers have proposed extended versions of TAM which involve more internal and external factors regarding CMS usage. These include either factors related to individual motivation (Lee *et al.*, 2011; Liu *et al.*, 2010; Park, 2005, 2009; Roca *et al.*, 2006) or factors dependent on information culled from student satisfaction surveys (Arbaugh, 2002; Gao, 2005; Landry *et al.*, 2006).

Despite the wide application of CMS found in various fields, such as physics (Martin-Blas and Serrano-Fernandez, 2009), microeconomics (Novo-Corti *et al.*, 2003), and energy resources (Liao and Lin, 2011), the empirical knowledge based on language education in relation to CMS remains weak. Most frequently used CMS functions are still limited to uploading, hosting discussion forums, or storing teaching materials and assignments, which reduces many of the potential merits. In this respect, the study of Yu *et al.*, (2010) calls for content specificity and technical training to assist language instructors with

blending CMS strategically into their subject area in order to maximize CMS functionality. There is also a striking lack of research into blended language learning via CMS and the evaluation of CMS-assisted language instruction through TAM. Previous studies have indicated that technical support has a direct effect on perceived ease of use, perceived usefulness, and attitude. However, most of the case reports were not conducted in an EFL education setting. Therefore, this study proposes a CMS-assisted EFL writing instruction and aims to evaluate the effects of such instruction by using TAM. Specific research questions are addressed as follows:

1. What are the effects of a CMS-assisted writing instruction as perceived by the EFL learners?
2. What are the variable relationships that might influence EFL learners' intention regarding the utilization of the CMS to learn English writing?

Method

Research framework

The components integrated within the Blackboard (Bb) CMS included online resources, a wiki, discussion forums, e-course materials, and e-assignments. A conceptual model of the CMS-assisted writing strategy instruction is proposed in Figure 1. In the present study, the students had access to the following features within the course management system: (1) an electronic users' guide of the Blackboard system, (2) a forum section, (3) a section of teaching materials, (4) an assignment section, (4) an assessment section, (5) a wiki, and (6) communication channels, including blogs, email, and messaging features.

Participants

The subjects of the present study (ages ranged from 19 to 24) were Chinese-speaking EFL learners in the third year of their undergraduate degree at a university in southern Taiwan, all of whom were majoring in Applied English. All subjects had studied English for at least six years up to a secondary school level and had taken additional English coursework upon entering the university. In order to confirm the extent to which the CMS-assisted writing instruction contributes to student performance, we have compared results from students who learned within the CMS-assisted instruction to results gathered from those who learned in a traditional classroom, where the CMS infrastructure was unavailable. The participants in the control group (CG) and experimental group (EG) were junior students from three different classes each year. The CG consisted of 96 students who took the research paper (RP) course during the 2011 school year's winter semester, whereas

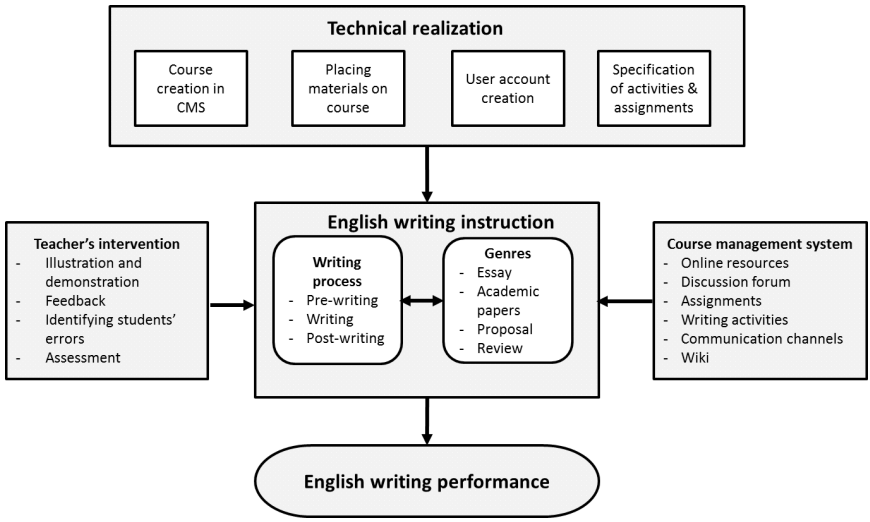

Figure 1. A Model of a CMS-Assisted English Writing Instruction

the EG consisted of 151 participants who attended the RP course during the 2012 winter semester. The same textbook (Winkler and McCuen, 2008) was used for both CG and EG. It has also been used for the RP course at the institute where the study was conducted. It offers guidelines for writing research papers, including the choosing of topics and writing of abstracts, introductions, literature reviews, discussions, and conclusions. The CG received the instruction in a paper version as scheduled in the EG, as well as the same assessment. The differences in the delivery of teaching between the EG and CG included the interface, activities, and assignments. The EG attended the class in a computer-based environment, while the CG received the course materials in the paper version. The content of the textbook was outlined in ppt. files which were uploaded to the CMS for the EG. The EG was required to participate in online activities and accomplish the assignments, which enabled them to get instant feedback from the instructor; however, the CG had no access to the course materials and activities offered on Bb CMS and had to accomplish the assignments in the paper version. The feedback from the instructor was provided relatively later. Before the instruction, the average writing grades of the previous semester, i.e. the spring semester, for both EG (year 2012) and CG (year 2011) were compared by using an independent samples *t*-test. The result of the *t*-test showed no significant difference between the EG and CG ($t = 1.85$, $p > 0.05$). Therefore, we may conclude that the participants' writing ability was compatible in EG and CG before the instruction.

Tool for evaluation

For the evaluation of the CMS-assisted course, the researcher developed a questionnaire based on TAM (one which was used in previous studies) (Davis, 1989, 1993; Liu *et al.*, 2010; Sánchez and Hueros, 2010; Venkatesh, 2001). Some modifications were made by the author for the purpose of the current study, and six constructs were included in the questionnaire: (1) technical support ($N = 4$); (2) perceived usefulness ($N = 6$); (3) writing activity on the Blackboard CMS ($N = 3$); (4) perceived ease of use ($N = 3$); (5) attitude ($N = 4$); (6) demonstrated improvement of writing through Blackboard CMS usage ($N = 5$). There were 25 items in total. Content validity was established by pilot testing the instrument with 20 undergraduate students at the same university where the study was conducted. Regarding the reliability, internal-consistency coefficients showed a Cronbach's alpha (α) of 0.94, so there was a high reliability among the questionnaire items.

Curriculum design

The curriculum design was based on Bloom's taxonomy of learning domain. The original taxonomy was divided into six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation (Krathwohl, 2002). To enhance student learning outcomes through using the CMS, specific CMS functions were implemented. Table 1 shows the online activities and their connection to the categories of Bloom's taxonomy of learning. All the online activities in Table 1 were created in the assignments section.

Table 1: CMS activities and the linkage with Bloom's taxonomy of learning

Online activities	Description	Categories of Bloom's taxonomy
Presentation of comparing five references	Presenting five different references including the title of journal or book, author, year of publication, purpose of the research, and major findings	comprehension, analysis, synthesis and evaluation
Presentation of RP proposal	Briefly presenting RP proposal including thesis, introduction, literature review, methodology, results, discussion and conclusion	knowledge, application, analysis, and synthesis
Presentation of the final draft	Presenting the final draft including abstract, introduction, literature review, discussion and conclusion	knowledge, comprehension, application, analysis, synthesis and evaluation
Group presentation	Presenting topics related to research paper writing skills	knowledge, comprehension, synthesis and evaluation

Exercise on creating a reference list	Finding the references assigned by the instructor and create a reference list	comprehension and application
Exercise on identifying an example of a quotation, paraphrase or summary	Finding an example of a quotation, paraphrase or summary from the references	comprehension and synthesis
Exercise on outlining	Constructing an outline of a sample student paper	knowledge and synthesis
Exercise on note-taking	Taking a short note from reading the literature and providing publication information	knowledge and comprehension
Exercise on finding the article from the reference list	Downloading the article uploaded by the instructor and finding one journal article on the reference list	comprehension and application
Exercise on finding three references (books or journal articles)	Providing the publication information of three references	comprehension and application

Instructional process

The course was implemented via a blended e-learning mode that advanced through three stages. During the first stage of technical realization, the teaching materials, online activities, and assignments had already been created in the system before the experimental course. During the implementation of the writing instruction, the instructor conducted face-to-face instruction through illustration and demonstration, guided the students to accomplish the online assignments, identified students' errors, and provided suggestions in each session. Meanwhile, the system was open 24 hours a day and participants were welcomed to use the CMS functions at their own pace. After the experimental course, students' English writing performance was evaluated.

Assessment of writing performance

At the beginning of the course, the students were informed that their performance was to be evaluated through three written reports and three oral presentations. The grades for written assignments – which included a summary of five references, a literature review, and a final draft – were to be used for data analysis. To evaluate the final drafts, a rubric (see Appendix A), which served as the basis for holistic scoring, was created by two instructors who have been teaching English writing for eight and ten years respectively. Both have also published research papers on referred journals for years. The rubric consists of five categories in keeping with the minimum expected content of usual research papers, including an abstract, introduction, literature review, discussion, conclusion, and references. The student papers were evaluated

for grammatical accuracy, vocabulary usage, originality, consistency, and use of formal research paper organization. Each category was awarded a maximum of 20 points, for a possible total of 100 points. Following Matsumura and Hann (2004), two instructors read about 5 per cent of the CG (implemented in 2011) student papers separately, at which point their scores were compared. The interrater reliability Kappa value was 0.85, which represented a satisfying degree of agreement (Elliott and Woodward, 2007). After the experimental instruction (implemented in 2012), the same two raters scored each writing sample in EG and CG. The average of these two scores was used as the holistic score.

Procedure

This CMS-assisted writing course was implemented in three junior research paper writing classes and lasted for 18 weeks. The course was offered three hours a week for each class. As illustrated in Figure 1, technical realization of the system included objective identification, syllabus design, course material preparation, user account creation, and activities and assignments specification. For the EG, the introduction to Bb CMS usage was conducted during the first week. The Bb-assisted writing instruction was then offered for 17 weeks. The English writing instruction was supported by teacher intervention and Bb CMS via blended e-learning. The time individual students spent participating in online activities, assignments, the discussion forum, the wiki, and downloading materials was recorded and can be found in the log reports. For system evaluation, the participants were required to fill in the TAM-based questionnaire one week after the instruction.

Data analysis

Data collected by the questionnaire was coded by research assistants. The data was recorded first in an MS Excel program and later transferred to SPSS, Version 17. A random sample of 5 per cent of the entered data was checked for coding accuracy. Descriptive statistical analyses such as mean, standard deviation, frequency, per cent, and correlation were implemented using SPSS.

Results

The evaluation of student writing performance was based on their grades on three written assignments: a summary of five references, a literature review, and their final draft. Table 2 displays the means and standard deviations (SD) of student grades on the written assignments. A comparison of the writing performance between EG and CG was made using an independent samples *t*-test. Results showed significant difference between final draft grades achieved by students in EG and CG ($t = 2.902$, $p < 0.05$); however, no difference was found

in the summary of five references task (t = 1.907, n.s.) and literature review assignment (t = 1.958, n.s.).

Table 2: Comparison of writing performance between EG and CG

	EG (n = 151)		CG (n = 96)		t-test for equality of means	
	Mean	SD	Mean	SD	t	Sig. (2-tailed)
Summary of five references	71.63	11.51	64.48	12.89	1.907	0.061
Literature review	67.57	12.76	59.83	19.03	1.958	0.055
Final draft	71.86	12.92	62.15	12.29	2.902	0.005**

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The survey results regarding student perception of the effects of the Bb-supported writing course are presented in Table 3. The independent variables of the study were technical support, writing activities on Bb CMS, attitude, perceived usefulness, and perceived ease of use. The data indicates that most students were satisfied using Blackboard to assist their learning in writing. Concerning the basic features of the Bb system, the most salient factor was perceived ease of use (M = 4.21, SD = 0.78), indicating that students found that the functions on Bb were not difficult to utilize. The students were also able to receive technical support through Bb (M = 3.95; SD = 0.44). Overall, many students agreed that Bb was a good support system and that they perceived an improvement in their writing (M = 4.21; 0.78); however, not all writing activities on Bb were helpful (M = 3.93; SD = 0.57). Among the activities on Bb, they found the assignments (M = 4.05, SD = 0.65) more helpful than the wiki (M = 3.87, SD = 0.80). Student learning attitude was less satisfying (M = 3.75, SD = 0.72), as they found using Bb neither fun (M = 3.59, SD = 0.99) nor attractive (M = 3.59, SD = 0.85). Nevertheless, they have perceived some usefulness (M = 3.87, SD = 0.67).

Table 3: Results of the survey on the effects of the CMS-assisted writing course

Technical support		Mean	SD
1	Blackboard provides assistance when there is a writing problem.	3.95	0.76
2	E-mail enquiries can be made when there is a writing problem.	4.13	0.40
3	Blackboard enquiries can be made when there is a writing problem.	3.97	0.48
4	Blackboard offers good technical support.	3.97	0.81
	Average	4.01	0.61
Perceived usefulness			
5	Blackboard helps me to learn more efficiently.	4.05	0.81
6	Blackboard improves my academic performance.	3.79	0.96

7	Using Blackboard to learn writing is helpful.	4.02	0.89
8	Blackboard makes writing easier to learn at university.	4.03	0.76
9	Blackboard gives me more control over my learning.	3.74	0.97
10	Blackboard is advantageous for my learning of English writing.	4.08	0.72
	Average	3.95	0.64
Writing activities on Blackboard			
11	I believe that the Wiki helps me cooperate with classmates.	3.92	0.85
12	I believe that assignments help me improve writing performance.	4.10	0.70
13	I believe that a discussion forum helps me improve my writing performance.	3.92	0.75
	Average	3.98	0.62
Perceived ease of use			
14	Learning to use the Blackboard is easy for me.	4.15	0.87
15	It is easy to get materials from the Blackboard.	4.20	1.06
16	Overall, I believe that the Blackboard is easy to use.	4.43	0.86
	Average	4.26	0.84
Attitude			
17	Learning on Blackboard is fun.	3.64	1.01
18	Using Blackboard for learning is a good idea.	4.10	0.84
19	Blackboard is an attractive way to learn.	3.64	0.90
20	I like using Blackboard for learning.	3.82	0.79
	Average	3.80	0.88
Improvement of writing through using Blackboard			
21	I believe Blackboard is useful for me as a student.	4.15	0.76
22	Blackboard helps me improve my writing skills.	4.07	0.72
23	I feel comfortable with using Blackboard to improve my writing.	4.15	0.73
24	Blackboard materials are useful to me for learning how to write.	4.18	0.74
25	I think Blackboard should be used in writing classes in the future.	4.20	0.76
	Average	4.15	0.74

Figure 2 shows the correlations among the factors and the standardized path coefficient, R^2. A *t*-test was applied to examine the statistical significance and found technical support had a significant effect on perceived usefulness ($\beta = 0.61$, $p < 0.001$) and perceived ease of use ($\beta = 0.57$, $p < 0.001$). Writing activities on Bb CMS had significant effect on perceived usefulness ($\beta = 0.31$, $p < 0.05$), but not on perceived ease of use ($\beta = 0.18$, $p = 0.19$). It was also found that attitude had a significant effect on writing performance ($\beta = 0.66$, $p < 0.001$). Paths that affect writing performance have an explained variance of 0.65, as shown in Figure 2. The correlations among the variable factors and writing performances were also computed. It was found that writing

performance was significantly correlated with technical support (r = 0.567), perceived usefulness (r = 0.621), perceived ease of use (r = 0.493), and especially attitude (r = 0.799). Perceived usefulness and attitude were highly correlated with each variable. In comparison, writing activities on Bb had relatively low correlations with other variables.

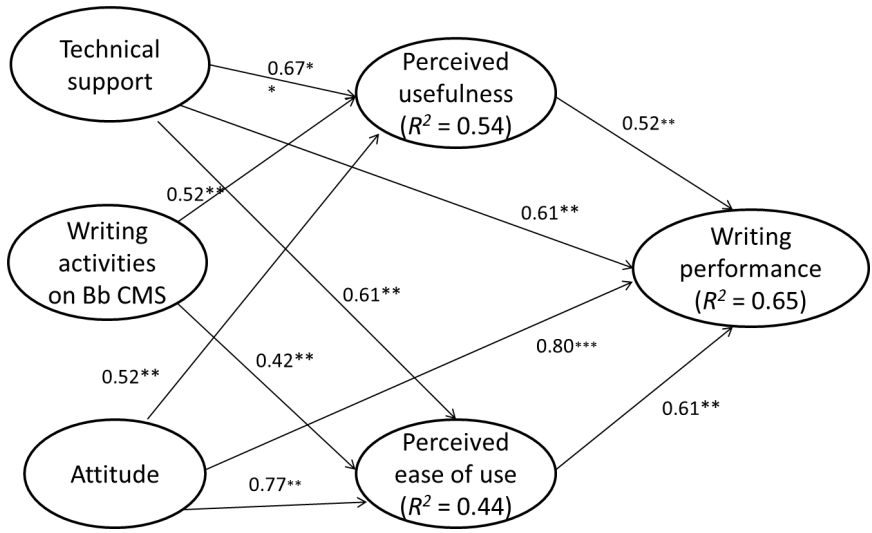

Figure 2. The relationship between the variables and writing performance

Discussion

Evaluation of student writing performance

The writing performance comparison shows a significant difference between the EG and CG regarding their final draft. This indicates that with the support of the CMS, the EG students made more progress than the CG students overall. There was no difference in the other two assignments: a summary of five references and a literature review. It is possible that students lacked familiarity with the CMS in the preliminary stage of the course, and because they had not yet taken much advantage of the CMS when these two assignments were submitted, the CMS's effect was limited. Another reason may be attributed to features of the assignments themselves. Summarizing references is similar to literature review, which requires mainly citation, summarizing, and paraphrasing skills. Meanwhile, in the final draft, students need to demonstrate their ability to evaluate, organize, and think critically, all of which are supposed to be facilitated through the integration of the CMS. Since the EG students had more opportunities to practise the exercises offered on the CMS, they made more improvement in these skills than the CG students.

Evaluation based on TAM

The main purpose of this study was to investigate perceived effects of using a CMS to support English writing improvement. The findings indicate that the participants generally held positive attitudes towards the use of CMS, in line with the results of Yu *et al.* (2010). The majority of the students have perceived improvement in writing (M = 4.15; SD = 0.74) from attending the CMS-assisted course. The overall mean scores are high in each item. This indicates that CMS effectively supports student learning, which is in accordance with previous studies (Tsai and Talley, 2014; Hölbl and Welzer, 2010).

The major factors that might influence writing performance improvement are technical support, perceived usefulness, perceived ease of use, and attitude, indicating that these are important factors affecting the usage of the Bb system. In other words, if the users find the system beneficial and easy to use, then they will have a stronger inclination towards using the CMS. This is consistent with the results derived from the original TAM (Davis, 1986; Sánchez and Hueros, 2010; Venkatesh and Davis, 2000). The findings also illustrate that attitude is a key element for the success of writing performance. This suggests that it is important to foster learner motivation regarding the CMS's usage so that learners can perceive their improvement from using the system. Results showing that technical support has positive effect on perceived usefulness and ease of use are also in agreement with previous studies (Ngai *et al.*, 2007; Sánchez and Hueros, 2010).

Nevertheless, there is no significant correlation between writing activities on the Bb CMS and writing improvement. Most students agree that they have benefited more from the assignments, compared to the wikis and discussion forums. We can infer two reasons why this might be the case. First, the system log records show that many students used the CMS during class, indicating that participants used the CMS passively (mainly when they were required to). Second, there may be cultural reasons for student unwillingness to share opinions on an open platform. In favour of this explanation, Sarker (2005) found in her study that US students tended to share more opinions, compared to their Thai peers who were from a collectivist culture. In her study, Ferriman (2013) also observed a similar phenomenon among Thai students who were reluctant to share with or use data from other students. It is therefore highly possible that the Taiwanese students, coming from a collectivist culture, might not have responded as well to wikis or discussion forums as their counterparts from a more individualistic culture, which leads to the diminished effectiveness of the online activities. Concerning this, Ling and Yang (2011) also note that Taiwanese students encountered both functional and psychological obstacles to using new tools, such as wikis, in writing courses, indicating that they had to adapt to technologically enhanced learning systems. Accordingly,

it is suggested that the CMS provides further and more detailed guidance for using the online activities, so the functions can be better integrated with the instruction.

Contributions of the study

The contribution of the present study is twofold. First, this study provides empirical knowledge concerning the integration of virtual learning environments with classroom-based courses by using a CMS. CMSs may have been popular in e-learning for decades, but empirical data regarding the effects of using a CMS specifically constructed for EFL writing courses is rarely found. Results of the study confirm that CMS-assisted instruction can provide functions that non-CMS instruction can't offer. The CMS creates circumstances and structures that encourage students to take control of their own learning processes by comprehending, analysing, synthesizing, applying, and evaluating their knowledge. It would be less likely in a non-CMS writing class for the instructor to observe student learning processes, such as finding references, constructing a reference list according to APA format, and/or getting feedback immediately during the class. The results show that experience using the system changed the way the students perceived and behaved in the course of learning English writing. The conventional classroom does not allow much room or time for such unique learning experiences, whereas the CMS-assisted instruction makes teaching culture more flexible.

Second, in response to the issued call for more research (Park, 2009; Ferriman, 2013), this study was carried out by employing TAM to evaluate the effects of CMS-assisted instruction, in the hopes of understanding the factors influencing student willingness to use the CMS. This study confirms the same theoretical importance of technical support, perceived usefulness, and perceived ease of use shown in previous studies (Davis, 1986; Sánchez and Hueros, 2010; Venkatesh and Davis, 2000). Moreover, the results indicated that student attitudes significantly influence their learning outcome. Student attitudes reflect their acceptance or belief in using the Bb CMS, such as whether they think using Bb is a good or attractive way of learning or whether they like using it.

In short, this study illustrates and provides empirical data of how student writing performance can be promoted in a blended e-learning setting which involves the integration of a course management system into an EFL writing course. Non-CMS-assisted RP writing courses are regarded as exhausting and heavily-loaded for many undergraduates and instructors in Taiwan. Most students start the class with no idea of how to use databases to find references or cite the references according to an academic format (e.g. APA style). It is therefore important to help students solve their problems at

different stages of developing their draft in an efficient and immediate way. This study demonstrates how a CMS-assisted RP writing course can be more manageable time-wise for instructors when the students have already benefited from writing improvements. It serves as a framework for instructors who would like to implement a CMS to support their instruction in other language learning aspects such as reading, speaking, and listening. Furthermore, through the factor analysis provided by TAM, it was found that learner attitudes would be the major factor influencing student willingness regarding usage of the CMS.

Thus, our findings encourage instructors to focus on changing user beliefs by considering the following strategies:

1. Integrating tools based on familiar devices (e.g., FB, twitter, Skype) because continuous innovations face less resistance by users;
2. Developing training programmes that help students overcome psychological barriers associated with Internet usage;
3. Providing more specific descriptions regarding online activities to help avoid confusion;
4. Educating low-motivated students about how using the CMS is relevant and beneficial to their learning.

Limitations and suggestions

Students' perception when it comes to using the CMS in their writing class indicates a positive learning experience. However, there are some limitations to this study. First, the sample size of this study is too small, including only participants of one university in Taiwan. In order to further verify the efficacy of the CMS, it is suggested that future studies include more participants from other universities. Moreover, in this study we did not use qualitative research methods; as a result, we cannot get more detailed information from the participants. Therefore, future studies should include qualitative research methodology, such as interviewing, in an effort to gather comments from the participants after using the CMSs.

Finally, it would be interesting to investigate perceptions of the CMS-assisted writing instruction between students of different performance levels. Therefore, we recommend that future studies conduct a formal standardized language test before the instruction, e.g. TOEIC, which can help classify students into higher or lower proficiency groups. Students of different proficiency levels might have different beliefs and attitudes toward using the CMS. Thus, the effects on learning outcomes might also be different.

Based on the study's findings, several guidelines can be drawn for developing future CMS-assisted English instruction.

1. The learning outcome is strongly affected by perceived usefulness and perceived ease of use. Thus, when constructing the content of the CMS, a comprehensive and user-friendly design is essential. We have to ensure that users feel the system components are helpful to their learning and the functions are easy to operate.
2. Despite the potential advantages of the CMSs, they are not systems designed specifically for language courses. Therefore, it is necessary to integrate online activities that are specially intended to facilitate language skills and strengthen student interest in language learning. For a successful instruction implementation, cultural aspects should also be taken into consideration. In a collectivist cultural context such as the one found in Taiwan, users should be more encouraged to exchange their opinions and collaborate with peers through various communication channels or incentives.
3. Given the significance of the technical support variable in this study, it is recommended to conduct a need survey before the instruction. Providing students with sufficient technical support can boost their intention to use the CMS, so that the efficacy of the CMS can be optimized.

Conclusions

In summation, this study has proposed a model for integrating a CMS with EFL writing instruction evaluated within the framework of TAM. The majority of the participants have perceived a positive effect from the instruction. This study confirms the findings of previous studies that perceived usefulness and ease of use are important factors for enhancing the learning outcome, which is indirectly influenced by technical support. This study also emphasizes the role of student attitude, since the success of e-learning depends largely on student acceptance of the system and willingness to use it. There is more to be discovered about the efficacy of the CMSs in language education. Taking a wider and more global perspective, CMS will likely play a greater role in education. A CMS – which requires minimal administration to run as an educational platform and can provide circumstances and structures that encourage students to take control of their own learning – will have much to offer those teaching under time constraints in a more flexible and efficient way.

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Appendix A. Rubric of final draft

Abstract	20	20.00	16.00	12.00	8.00
		Careful and/ or suitable organization	Logical organization	Lapses in focus and/or coherence	Random or weak organization
Introduction	20	20.00	16.00	12.00	8.00
		Clear presentation of the background, motivation and purpose	Limited description of the background, motivation and purpose	Limited presentation of the background and motivation without purpose	Lack of the description of the background, motivation and purpose
Literature review	20	20.00	16.00	12.00	8.00
		Depth and complexity of ideas supported by rich details	Depth of idea development supported by elaborated, relevant details	Unelaborated idea development	Minimal idea development, repetitious details
Discussion & conclusion	20	20.00	16.00	12.00	8.00
		Results match the objectives, and demonstration of professional knowledge	Provide answers to the research questions, or major findings, compare with previous studies	Provide answers to the research questions or major findings	Fail to provide answers to the research questions or major findings
References	20	20.00	16.00	12.00	8.00
		Use of references indicate substantial research	Use of references indicate ample research	Some references related to the research topic	Most references are not related to the research topic