

การใช้แฟ้มสะสมงานอิเล็กทรอนิกส์ในชั้นเรียนการเขียนภาษาอังกฤษเป็น  
ภาษาต่างประเทศ : ผลกระทบ และเจตคติของนักศึกษา

The Use of Electronic Portfolios in the EFL Writing Class  
: Effects and Student Attitudes

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### บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อ 1) ศึกษาผลกระทบของแฟ้มสะสมงานอิเล็กทรอนิกส์ที่มีต่อผลสัมฤทธิ์ทางการเขียน 2) เปรียบเทียบผลสัมฤทธิ์ทางการเขียนภาษาอังกฤษของนักศึกษาที่มีระดับสมรรถภาพทั่วไปทางภาษาอังกฤษที่ต่างกัน (สูง กลาง และต่ำ) และ 3) ศึกษาการเจตคติของนักศึกษาที่มีต่อการใช้แฟ้มสะสมงานอิเล็กทรอนิกส์ในการเรียนวิชาการเขียน รูปแบบการทดลองเป็นงานวิจัยเชิงเดี่ยวซึ่งมีการเปรียบเทียบคะแนนผลสัมฤทธิ์ทางการเขียนก่อนและหลังการทดลอง โดยการใช้แฟ้มสะสมงานอิเล็กทรอนิกส์และระดับสมรรถภาพทั่วไปทางภาษาอังกฤษที่ต่างกันของนักศึกษาเป็นตัวแปรต้น และผลสัมฤทธิ์ทางการเขียนเป็นตัวแปรตาม กลุ่มตัวอย่างเป็นนักศึกษาศาสนาเทคโนโลยีพระจอมเกล้าพระนครเหนือคณะวิศวกรรมศาสตร์จำนวน 30 คน โดยการวิจัยครั้งนี้ ใช้เว็บล็อก (weblog) ที่ให้บริการโดยบริษัท Google เป็นเครื่องมือในการสร้างแฟ้มสะสมงานอิเล็กทรอนิกส์ของนักศึกษา เครื่องมือที่ใช้ในการเก็บข้อมูลเชิงปริมาณได้แก่ แบบทดสอบวัดผลสัมฤทธิ์ทางการเขียน และแบบสอบถามปลายเปิด ส่วนการเก็บข้อมูลเชิงคุณภาพใช้แบบสอบถามปลายเปิด และการสัมภาษณ์ การวิเคราะห์ข้อมูลใช้สถิติพรรณนา t-test และ One-way ANOVA ผลจากการวิจัยพบว่า 1) โดยเฉลี่ยคะแนนผลสัมฤทธิ์ทางการเขียนภาษาอังกฤษของนักศึกษาภายหลังการใช้แฟ้มสะสมงานอิเล็กทรอนิกส์เพิ่มขึ้นจากเดิมอย่างมีนัยสำคัญทางสถิติ ( $p=0.05$ ) 2) โดยเฉลี่ยระดับสมรรถภาพทั่วไปทางภาษาอังกฤษมีผลอย่างมีนัยสำคัญทางสถิติต่อผลสัมฤทธิ์ทางการเขียนภาษาอังกฤษของนักศึกษา และ 3) นักศึกษาทั้งสามกลุ่มมีเจตคติที่ดีต่อการนำแฟ้มสะสมงานอิเล็กทรอนิกส์มาใช้ในการเรียนวิชาการเขียนภาษาอังกฤษ

คำสำคัญ : แฟ้มสะสมงานอิเล็กทรอนิกส์ การสอนการเขียน ผลสัมฤทธิ์ในการเขียน

### Abstract

The objectives of the study were 1) to investigate the effect of the use of electronic portfolios on the students' writing achievement, 2) to compare the effect of levels of general English proficiency (high, moderate, and low) in the use of electronic portfolios on the students' writing achievement, and 3) to survey the students' attitudes toward the use of electronic portfolios in the writing class. The study was conducted by using a single group, pretest-posttest design. The use of electronic portfolios and levels of general English proficiency were the independent variables, whereas the students' writing achievement score was the dependent variable. In total, 30 second-year engineering students at King Mongkut's University of Technology North Bangkok (KMUTNB) were randomly selected and assigned. Google's free weblog website (located at [www.blogger.com](http://www.blogger.com)) was used as a tool for creating and developing the students' personal electronic portfolios. The concept of electronic portfolios, the purposes, the contents, and the criteria used for assessment were discussed with the students at the beginning of the course. A writing achievement test and a close-ended questionnaire were used for the quantitative data collection, while the qualitative data were gathered from the open-ended questions and interview. Descriptive statistics, t-test, and one-way ANOVA were employed for the data analysis. The findings were as follows: 1) on average, the students' writing score after the use of electronic portfolios was significantly higher than their pre-test score ( $p=0.05$ ); 2) on average, the levels of general English proficiency had a significant effect on the students' writing achievement; and 3) the students had highly positive attitudes toward the use of electronic portfolios in the writing course.

**Keywords :** electronic portfolios, writing instruction, writing achievement

## 1. Introduction

Due to the failures of the traditional teaching and learning approach focusing on rote learning, which does not allow students to achieve the appropriate level of language competency successfully, the paradigm shift of language instruction to the learner-centered approach has become a popular issue in Thailand. This approach emphasizes the individual needs of learners, the role of individual experience,

the need to develop awareness, self reflection, critical thinking, learner strategies, and other qualities and skills that are believed to be important for learners to develop (1). This attempt will certainly be useless if the appropriate tools for learning assessment are not employed.

Writing is viewed as a process of thinking. The composing process involves a number of activities: setting goals, generating ideas, organizing information, selecting appropriate language, making drafts, reading, reviewing, revising, and editing (2). To better gauge students' writing performance and learning process with less exam-centric method, as well as to encourage life-long learning skills, portfolio-based assessment is considered as one of the most effective alternative assessments worth applying in the EFL classroom, because using portfolios provides authentic and meaningful

collection and assessment of student work that accurately demonstrates achievement or improvement (3).

Nowadays, the advance of technology has changed the form of traditional portfolios to electronic portfolios, where coursework is typically assigned, accessed, completed, evaluated, and stored on a computer or website instead of on paper (4). Love, McKean, and Gathercoal (5) have stated that electronic portfolios will have an increasingly important role in education.

Although electronic portfolios are increasingly being used by colleges and universities to track progress toward general educational outcomes, research concerning portfolio use at the college and university level is limited at this time (6). For example, little research has been conducted on the use of electronic portfolios in English courses at the university level in Thailand, where most students and teachers are more familiar with traditional testing. Barrett (7) has stated that "There is a need for more data collection and longitudinal research on the perceptions of teacher candidates and faculty whether the benefits extend to the classroom and enhance student learning." As a result, it is interesting to study the effects of the use of electronic portfolios on students' writing achievement and their perceptions of using it in the writing course for learning

and assessment.

In this article, the author describes how the research was conducted, followed by the results of the study, and concludes with the discussions and recommendations for instruction.

## 2. Literature Review

According to Barrett (7), a portfolio is a collection of work that a learner has collected, selected, organized, reflected upon, and presented to show understanding and growth over time. Previous studies have confirmed that portfolios are better predictors of students' performance in an authentic situation, improve their higher-order thinking skills (8), cited in (6), empower students to be more actively engaged in the learning process and to

take control of their own learning (9), (10), (11), improve students' learning achievement (12), and provide a continuous and ongoing record of student progress with the attachment of peer feedback to observe their own growth.

The era of information technology has changed the form of portfolios, from traditional paper-based to electronic. Generally speaking, electronic portfolios contain the same types of information as paper portfolios; the main difference is that electronic portfolios use technologies such as CDs, DVDs, and the Web. Not only is a student's work changed from paper-based to computer-based, but other different characteristics are also found, as illustrated in Table 1.

**Table 1:** The Main Characteristics of Paper-Based Portfolios and Electronic Portfolios (13)

Criteria	Paper-Based Portfolios	Electronic Portfolios
Place for portfolio development	The students' work is assigned, assessed, and stored on scrapbooks, paper folders, or paper binders.	The students' work is assigned, assessed, and stored on the computer or a website.
Type of communication	One way communication	Two-way communication (without time or place restrictions)
Level of interaction	Less interaction and negotiation of meaning	More interaction and negotiation of meaning with unlimited participation online
Feedback and assessment condition	Handwritten feedback and assessment on papers	Typewritten feedback and assessment by posting on students' electronic portfolio website
Rate of response	Less immediate response from teacher and peers	More immediate response from teacher and peers

Criteria	Paper-Based Portfolios	Electronic Portfolios
Communication environment	Less support and lack of a sense of community	Greater support and sense of community
Degree of cultural barriers	Greater cultural barriers	Fewer cultural barriers
Other facilities	No other facility support	Writing is facilitated by computer technology functions such as cutting and pasting. This also allows students to collect and organize their portfolios in many media such as audio, video, graphics, and texts (7).
Content permanence	Less potential feelings of content permanence	Greater potential feelings of content permanence

According to Table 1, it is clear that the advantages of electronic portfolios seem to outweigh the traditional paper-based portfolios in several ways, so it is not surprising that they have received considerable attention and have become more widespread in various educational settings.

### 3. Research Objectives

1. To investigate the effect of the use of electronic portfolios on the students' writing achievement.

2. To compare the effect of the levels of general English proficiency (high, moderate, and low) in the use of electronic portfolios on the students' writing achievement.

3. To survey the students' perceptions toward the use of electronic portfolios.

### 4. Research Methodology

This study employed a single group, pretest-posttest design. This research aimed at investigating the effect of the use of electronic portfolios and levels of general English proficiency on the students' writing achievement. The use of electronic portfolios and levels of general English proficiency were the independent variables, while the students' writing achievement was the dependent variable of the study.

#### Subjects

The subjects were 30 Thai second-year undergraduate engineering students enrolled in Writing I as an elective course at KMUTNB in the second semester of academic year 2009. The students were divided into 3 groups: high, moderate, and low English proficiency groups according to their previous English course scores. In the

study, the random sampling technique was used for subject selection and assignment.

### Research Instruments

The following research instruments were employed for data collection. It is noted that all of the instruments were validated and piloted before the experiment.

#### 1. Writing achievement test

The test was constructed by the researcher and distributed at the beginning and at the end of the study. The purpose of the test was to assess the students' writing achievement and to answer the first two research objectives. The test is comprised 3 main parts. The first two parts measured the student's knowledge and recognition of grammatical points, while the third part aimed at measuring the students' writing ability at the paragraph level.

#### 2. Questionnaire

The survey was carried out at the end of the experiment. The questionnaire consisted of 2 main parts. The first part explored the students' personal information and the others investigated their attitudes towards the use of electronic portfolios in the writing class.

#### 3. Interview

The interviews were conducted at the end of the course, out of class, and tape recorded in order to collect more in-depth information about students' attitudes toward the use of electronic portfolios. Nine students (3 high, 3 moderate, and 3 low English proficiency) were randomly assigned for the interview.

### Experimental Process

The following table describes the experimental process in the study.

**Table 2:** The Experimental Process

Phases	Activities	Weeks ( 1-15)
I	● The students took the pre-test.	1
	● The use of electronic portfolios was introduced to the students. The objectives, contents, and scoring rubric of the electronic portfolios were also discussed.	2
	● The students were trained in how to construct their personal electronic portfolios by using weblogs.	3
II	● The students developed their own electronic portfolios by collecting the assignments and work assigned by the teacher.	4-14
III	● The students took the posttest and questionnaire. Further, nine students were randomly assigned to the interview session.	15

## 5. Results of the Study

According to the first research objective, the results from the t-test shown in Table 3 revealed that there was an effect of the use of electronic portfolios on the students' writing achievement, as the

students' post-test scores were significantly higher than those of the pre-test after the electronic portfolios had been used in the writing class ( $t = 11.29$ ,  $p < 0.05$ ).

**Table 3: Results of the pre-test and post-test scores of the students from the t-test analysis**

		Paired Differences					t	df	Sig. (1-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	POST -PRE	8.63	4.19	0.76	7.07	10.20	11.29	29	.0005*

\*  $p < 0.05$

According to the second research objective, the results of one-way ANOVA shown in Table 4 revealed that there was an effect of level of general Eng-

lish proficiency on the students' writing achievement after the use of electronic portfolios, as the mean scores of the three proficiency groups were significantly different ( $F = 7.18$ ,  $p < 0.05$ ).

**Table 4: Results of the students with different levels of English proficiency from the one-way ANOVA**

Levels of general English proficiency

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	336.267	2	168.133	7.18	.003*
Within Groups	632.700	27	23.433		
Total	968.967	29			

\*  $p < 0.05$



For the third research objective, investigating the students' attitudes toward the use of electronic portfolios, the results from the questionnaire were reported under four main aspects, as illustrated in Tables 5. A 5-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5), was used. The interpretations were: 1.00-1.50 means that the students had very low positive attitudes toward the use of electronic portfolios; 1.51-2.50

means that the students had low positive attitudes toward the use of electronic portfolios; 2.51-3.50 means that the students had moderately positive attitudes toward the use of electronic portfolios; 3.51-4.50 means that the students had highly positive attitudes toward the use of electronic portfolios; and 4.51-5.00 means that the students had very highly positive attitudes toward the use of electronic portfolios.

**Table 5: Attitudes toward the benefits of using electronic portfolios in the writing course**

Statement	Mean	S.D.	Meaning
1. The use of electronic portfolios is useful when applied in the writing course.	4.00	0.69	High
2. The use of electronic portfolios makes the writing course more interesting.	4.13	0.43	High
3. Electronic portfolios provide sufficient storage space for collecting my work.	4.33	0.55	High
4. The use of electronic portfolios is convenient for submitting writing assignments that cover several drafts.	4.17	0.79	High
5. The use of electronic portfolios increases out-of-class interaction.	3.90	0.66	High
6. I have fun developing my electronic portfolios.	3.67	0.55	High
7. I pay more attention to the writing course than usual when using electronic portfolios.	3.67	0.61	High
8. I am proud of my electronic portfolios.	4.20	0.48	High
9. The use of electronic portfolios encourages me to engage in my own learning.	4.10	0.76	High
10. I can control my own learning through electronic portfolio development.	3.67	0.61	High
11. It is convenient to give and to receive feedback from peers and teachers.	4.00	1.02	High

Table 5 displays the mean of the questionnaire and its interpretation in relation to the students' perception of the benefits of using electronic portfolios in the writing course. The results show that the students strongly agreed with all of the items stating the benefits of the electronic portfolios. For example, the use of electronic portfolios was considered to be useful when applied in the writing course (item 1,  $M = 4.00$ ,  $SD = 0.69$ ), as it provides sufficient storage space for collecting work (item 3,  $M = 4.33$ ,  $SD = 0.55$ ), was considered convenient for submitting writing assignments that include several drafts (item 4,  $M = 4.17$ ,  $SD = 0.79$ ), encouraged the students to engage in their learning (item 9,  $M = 4.10$ ,  $SD = 0.76$ ), and was felt to be convenient in terms of giving and receiving feedback (item 11,  $M = 4.00$ ,  $SD = 1.02$ ). Perhaps most importantly, the students were proud of their personalized electronic portfolios (item 8,  $M = 4.20$ ,  $SD = 0.48$ ).

## 6. Discussion of the Results

### 1. Why does the use of e-portfolios have a significant effect on the students' writing achievement?

#### 1.1 The use of electronic portfolios facilitates students' writing and learning process.

With regard to the characteristics of electronic portfolios and paper-based

portfolios, it is obvious that these two modes are different, and the benefits of the electronic portfolios seem to outweigh the benefits of the traditional approach, facilitating students' writing and learning process in several ways. First, writing is facilitated by computer technology functions which allow students to collect and organize their electronic portfolios in many media types (7). Evidence from the questionnaire results shows that the students had highly positive attitudes toward the use of electronic portfolios, as they allow students to store a great deal of information and record dynamic documents with little physical space. According to the interviews, most of the students reported that the use of electronic portfolios offered several benefits. In particular, the students were able to organize their portfolios conveniently, systematically, and attractively, and the problems of lost or forgotten papers were also reduced. As a result, it was easy for students to maintain, edit, and update their personalized electronic portfolios.

In addition, electronic portfolios were considered two-way communication because students could respond to teachers or classmates or ask for suggestions anywhere, anytime, so a more immediate response was gained. This important feature tended to enhance students' learning and engagement out-

of-class. Previous studies have found that the technology mode not only increases teacher-student and student-student interactions but also creates a sense of community among students for meaningful negotiation and discussion (14) (15) (16). Unlike electronic portfolios, paper-based portfolios are considered one-way communication because of the lack of immediate feedback. Consequently, it is seen that the interaction in the traditional mode is lower than that of the electronic mode. However, the online interaction environment will not be successful without teacher support and encouragement.

It can be concluded that the beneficial characteristics of electronic portfolios could be an important factor contributing to the effect of electronic portfolios on the students' writing achievement, as the use of the electronic mode can facilitate students' writing process and enhance learning as a result.

### **1.2 The use of electronic portfolios increases student motivation.**

A key prerequisite for effective learning with electronic portfolios is that students be motivated (17) cited in (4). In this research, the students reported that the use of electronic portfolios increased their motivation to learn and engaged them in their own learning in several ways. Most of them reasoned that that the weblog was used as a tool for developing

the students' electronic portfolios, and its tools allowed them to choose the background, colors, music, and graphics that expressed their individuality and identity. These findings are consonant with previous studies that asserted that these special features make portfolios more appealing and pleasing to the students and motivate their creativity (18).

In addition, the use of electronic portfolios not only facilitates the students' learning process, but it also enhances computer and technology skills while they are creating, selecting, organizing, editing, and evaluating the portfolios. The demand of technological skills can enhance the students' extrinsic motivation, as no one denies that in the technology and Internet era, computer literacy is one of the top desirable competencies that both academic and business sectors require (19) cited in (20).

Next, the students might have greater feelings of content permanence and increased public access with electronic portfolio use since the electronic portfolios are published on the WWW. This can be confirmed by the questionnaire results, which indicated that the students were proud of their electronic portfolios. This created a greater sense of achievement and empowerment, as the students' authentic voice and identity were truly expressed to teachers and

fellow classmates.

Finally, the purpose of using electronic portfolios in the writing class could be another important factor that can increase or lessen the students' motivation and learning engagement. In this study, the main purpose of implementing the electronic portfolios in the writing class was to support the students' learning and low-stake course assessment. In regard to this approach, the students have to engage in the process beginning with setting the purpose, content, and rubrics of the electronic portfolios, collecting and organizing their work, providing and receiving feedback, and selecting their work for final evaluation. Therefore, these tasks seem to offer greater learner ownership and involvement in development and will certainly lead to more intrinsic motivation (7).

In conclusion, it can be said that the use of electronic portfolios can enhance both the extrinsic and intrinsic motivation of students and lead to greater learning engagement. As a result, this could be another reason why the students' writing scores increased after the use of electronic portfolios.

## **2. Why do the levels of general English proficiency have a significant effect on the students' writing achievement?**

### **2.1 Characteristics of high and low proficiency students**

The differences between high- and low-proficiency students have been investigated by many researchers (21) cited in (22). The findings reveal that high-proficiency students consistently outperform on tests, show higher task orientation, a higher attention level, a higher learning ability, higher engagement in social factors, higher cognitive processing skills, and a more self-directed effort than those of the low-proficiency students. Therefore, the different characteristics of language learners could indicate why the high-proficiency group outperformed the moderate-proficiency group, and the moderate group outperformed the low-proficiency group. The interview results of the study corroborate the previous studies mentioned above, as the lack of confidence in the ability to assess their writing assignments and those of their classmates' was mostly expressed by the moderate- and low-proficiency students. All of the low-proficiency students in the interviews reported that they were uncertain about selecting their work for the final electronic portfolio evaluation at the end of the course. Two low-proficiency students said that they asked their friends

to make the decision. In this case, help and guidance from the teacher is necessary and should not be totally excluded.

## **2.2 The relationship of general English proficiency and writing ability**

Based on the writing achievement mean scores, it could be said that the high-proficiency group performed better than the moderate-proficiency group and the moderate-proficiency group performed better than the low-proficiency group. These findings are supported by prior studies in ESL/ EFL writing, where the results showed that the quality of L2 writing and students' writing performance depended on their general level of proficiency in the target language (23), (24), (25), (26). This is a vital factor that distinguishes good writers from poor writers (27). Interestingly enough, former studies concluded that proficiency level can influence language learning achievement, not only in terms of writing skills but also other learning areas as well. These claims corroborate the results of the aforementioned studies (28), (29), (22), (30), which showed that the high-proficiency group outperformed the low-proficiency group no matter which types of learning methodology they received and regardless of the language skills the researchers focused on. Since the findings of this study are consistent with previous studies, it can be concluded that the level of general

English proficiency tends to influence the writing ability of students.

## **3. Why do the students have positive perceptions of the use of electronic portfolios in the writing course?**

### **3.1 New language assessment experience**

The first reason may be due to the excitement of a new language learning experience and assessment, which they had never experienced in their study. No one denies the fact that the education system of Thailand relies on more examination-oriented methods. Thai students seem to be familiar with the traditional testing taken at the end of the course, so the students' achievement is considerably based on the product rather than on the learning process. Previous studies have shown that traditional testing cannot accurately demonstrate a rich picture of student performance, achievement, or improvement, and does not provide students with the opportunity to take control of their own learning. This can be supportive to the questionnaire and interview results, which revealed that the students had never experienced portfolio assessment in their study before. They did not even know about the concept of the use of portfolios in collecting their work since they were more accustomed to examinations and

grades. All of the students in the interviews reported that this was the first time that they had used electronic portfolios in their study. All of them were confused at first when the concept of electronic portfolios was introduced and when they knew that the score on the electronic portfolios was counted as a part of the course evaluation. However, all of these feelings were released after the electronic portfolio training provided at the beginning of the course.

### **3.2 Student learning support and the advantages of weblogs**

Additionally, another reason why the students had positive attitudes toward the use of electronic portfolios may be because the characteristics of electronic portfolios can support student learning, including learner ownership and engagement with the portfolio, emotional connection, and encouragement of an authentic voice (17). The use of weblogs, the main tool for electronic portfolio development in this study, possesses these three key characteristics and provides advantages to the students. The evidence supporting these three issues is derived from the questionnaire and interview results, as follows.

In terms of learner ownership and engagement with portfolios, weblog tools allow the students to feel that they are in control of their own portfolios, as they

have freedom to create, design, organize, and edit their personal portfolios. In terms of emotional connection, the questionnaire results showed that the students strongly agreed that they had fun developing their electronic portfolios, were proud of their work, and the use of e-portfolios motivated them to be more interested in their learning. As regards the third characteristics, it was clear that the learners' authentic voices not only resulted from navigating the portfolios and reading the reflections on the screen, but the students' voices were shown via the opinions, comments, and suggestions they provided to their friends online. Moreover, it has been said that in an electronic portfolio, the ability to add multimedia elements expands the definition of voice within that rhetorical construct (14).

In sum, based on previous research and the results of the present study, it can be said that the characteristics of electronic portfolios, which can support student learning and the advantages of weblogs, enhance the students' positive attitudes toward the use of electronic portfolios.

## **7. Recommendations for Instruction and Research**

Based on the research results and the previous discussion, recommendations are presented as follows:

1. Based on the first research question, revealing that the use of electronic portfolios tends to have a significant effect on the students' writing achievement, it is recommended that if possible, teachers should find an opportunity to implement electronic portfolio assessment into their writing classes because of the advantages of technology that can support the students' learning and facilitate the writing process. However, teachers should be aware of the students' need and preferences and degree of computer literacy as well.

2. According to the second research question, showing that the level of general English proficiency has a significant effect on students' writing achievement, this does not mean that use of electronic portfolios does not work well with the low-proficiency group because the results from the questionnaire and interview showed that the students from this group also had highly positive attitudes toward the use of electronic portfolios. Teachers should be aware, however, of the students' readiness to apply less exam-based assessment in their study, of the students' ability to provide feedback, and the students' ability to assess their work and their classmates' work. As a result, electronic portfolio training, peer-feedback training, and self- and peer-assessment practices should be implemented as a part of the course

content. It is also recommended that the teacher give some credit to students for the activities in which the students are trained.

3. Teachers should provide a collaborative learning environment, trust and warmth, and the objectives of the electronic portfolios should be clearly indicated and explained because the students are sometimes only familiar with traditional testing.

4. As this study has a minimum number of subjects for an experimental study, further studies should be used with caution in terms of generalization (31). Moreover, it would be interesting to explore further whether the study will yield the same results if the study is carried out with the subjects in other settings, such as public universities or with subjects at other educational levels.

5. In order to strengthen the reliability of the study, the use of a control group is recommended for further studies. In addition, this research was conducted with engineering students in a writing course;

consequently, students in other faculties and in other content courses would be interesting to research.

## 8. Conclusion

In conclusion, the results of this study, both theoretically and practically, shed new light on the area of writing assessment and writing instruction, as the use of electronic portfolios can effectively supports student learning, particularly as regards writing achievement. It is highly recommended that electronic portfolio training be implemented in the classroom, where the concept of electronic portfolios is sometimes unfamiliar to students. In addition, the instructors should bear in mind that the students' writing achievement is not only affected by the use of

electronic portfolios. Whether the use of electronic portfolios will be successful in the writing class also depends on other important factors, such as type of peer or teacher feedback, the quality of the feedback, and peer feedback training.

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