

## INTERVENTION EFFECTIVENESS OF A DIGITAL LEARNING TRAINING PLAN

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## ABSTRACT

**Background:** In 2000, the Taiwan National Health Research Institutes set up a national health insurance database to promote a longitudinal study on health insurance policy and preventive care. We hope this research course will be implemented through intervention and integration into a digital learning platform to improve the research ability of teachers and students, and enhance their competitiveness in the development and cultivation of application research. **Objective:** The purposes of this research project are as follows: 1) Kirkpatrick's training effectiveness evaluation model is used to investigate the effectiveness of teachers and students using digital learning, 2) to understand the satisfaction of teachers and students on this course, and 3) to investigate the effect of personal attributes on digital learning effectiveness and course satisfaction factors. **Method:** This paper is a pretest-posttest of a quasi-experimental design. The design is intended to create 12 courses for a 60-minute research teaching intervention and digital learning platform, facilitate the participants in drawing up the theme and collect the data, and finally finish the report to realize the teaching intervention effectiveness. The design adopts the structured questionnaire survey to collect data. The objects of study are 30 teachers and students from a science and technology university. The questionnaire is divided into three parts, namely, personal attributes, digital learning training effectiveness, and satisfaction. A five-point Likert scale is used to score expert validity and Cronbach's  $\alpha$  reliability. The data in the form of percentage, average, and ANOVA are analyzed using SPSS 17.0. **Result:** Result shows that digital learning platform intervention brings a high degree of satisfaction, which is helpful for the study. Associate professors and assistant professors with extensive work experience have higher education effectiveness and are responsible for providing guidance and help to young students. Chinese and English periodicals and Chinese conference papers indicate that the posttest result is higher than the pretest result in the oral and poster presentations. Teachers and students believe that intervention activities can improve knowledge and research skills, and enhance research interest. Therefore, intervention activities are helpful in personal study development. **Conclusions:** The research and development of gender awareness of teaching materials, we suggest that a research community be established to provide education in the future to create a collective inquiry action and expand collective knowledge and ability.

**KEYWORDS:** digital learning, research training plan, health insurance database, Kirkpatrick's evaluation model, effectiveness.

## INTRODUCTION

Long-term studies aim to collect and analyze long-term data. The objects and variables of these studies are not limited by time as indicated by research trends in recent years. In long-term investigations, we can find valuable data and understand the phenomenon relation to be examined. Taiwan and other Asian countries give importance to the overall demand and application-related result in health care service.<sup>[1,2]</sup> In 1885-2010, the epidemiological study ratio in Taiwan was 1.2%. In recent years, the trends of cross-department, integrated, and multivariate studies have gradually enhanced.<sup>[3]</sup> Du Youlan pointed out that American studies focus on universal health and disease prevention.<sup>[4]</sup> Teachers believe that longitudinal studies will be the reference for future research. Xiao Shuzhen et al. suggested that

related conferences should be opened for sharing experience. Instructors and new researchers should make introductions in the research plan and establish a mentoring system. Senior staff and lead junior staff should undertake long-term research that effectively stipulates the research direction for patient care and health promotion in the future.<sup>[2]</sup>

The four-level training effectiveness model proposed by Kirkpatrick is widely used and cited as a training assessment criterion. Kirkpatrick's four-level training effectiveness model is clear, simple, complete, easy to understand and conduct, and highly available as expected by the effectiveness assessor.<sup>[5]</sup> Kirkpatrick's model divides learning effectiveness into four levels in an increasing trend, namely, reaction, learning, behavior,

and results. Various enterprises and schools have also adopted Kirkpatrick's model to evaluate the training effectiveness of employees.<sup>[6-13]</sup> Kirkpatrick intended this model to be a progressive one. The first level must have an effect to obtain results. Additionally, behavior in the third level and results in the fourth level are training transfers. The relation among these four evaluation steps is that reaction affects learning, learning affects behavior, and behavior affects results.<sup>[12]</sup>

Wang found that at the results level, trainees consider the knowledge and skills obtained from the training course to be limited in the production process, applications, and other aspects.<sup>[8,14,15]</sup> Thus, affecting the same generation and organization is not easy for individuals to benefit. Yang Tingting found that trainees with extensive work experience score higher in the learning results than those with a limited work experience.<sup>[16,17]</sup> After teachers with extensive work experience participated in the training, the plan was conducted in such a way that it was more applicable to the work. Therefore, the organization's benefit was significantly high.<sup>[16,17]</sup> The associate professors that participated in the training had stronger application ability than other teachers with richer results.<sup>[2,18]</sup> The overall training effectiveness was better for people with higher training satisfaction than for those with lower training satisfaction.<sup>[9,18,19]</sup>

Palloff and Pratt considered social learning to be the key factor to success in network learning.<sup>[20]</sup> The formation of a learning community is helpful to improve the effectiveness of network learning. According to Wang Qianxin, a social learning network refers to a group of people who learn and communicate through a network, share ideas, knowledge, experience, and strategies, and establish a common goal.<sup>[21]</sup> Cohesive communities cause some learners in the network learning environment to have a group feeling, thus generating a sense of identity and belonging. Lin Xuanyi argued that self-learning methods have gradually become diversified because of the progress of information technology, and that Web-based learners have the necessary skills to manage their learning.<sup>[17]</sup>

In 2000, the Bureau of National Health Insurance directed the Taiwan National Health Research Institutes to establish the National Health Insurance Research Database and reinforce the empirical foundation to promote the discussion on health insurance policy. The National Health Insurance Research Database in Taiwan includes 23 million people. The rate of people under the insurance scheme is more than 99%. Medical information (National Institutes of Health, 2011) has become one of the most important academic resources for studies related to national public health.<sup>[22]</sup> The number of papers using the health insurance database and that have been published in international academic journals is growing at an exponential rate. In addition, the impact factor of published journals is increasing. The credibility of the data has been affirmed by the international academic community.<sup>[23,24]</sup> As it saves time and money and has a large sample size, the National Health Insurance Research Database can be used as a source for study objects through the long-term longitudinal method. Therefore, the database is expected to integrate this study process into a digital learning platform to initiate real-time discussions and corrections to improve the learning effectiveness of teachers and students. The purposes of this study are 1) to understand the digital learning effectiveness of teachers and students, 2) to understand the course satisfaction of teachers and students, and 3) to discuss the effect of personal attributes on learning effectiveness and course satisfaction.

## MATERIALS AND METHODS

### 1. Study design

This study is a pretest–posttest of a quasi-experimental design. The study intervention was conducted for 12 sixty-minute courses. The pretest was conducted one week before the educational intervention and the posttest one year after the educational intervention to realize the effectiveness of the educational intervention.

### 2. Study framework

This study framework shown in Figure 1 is conceptualized according to the objectives of the study and related literature.

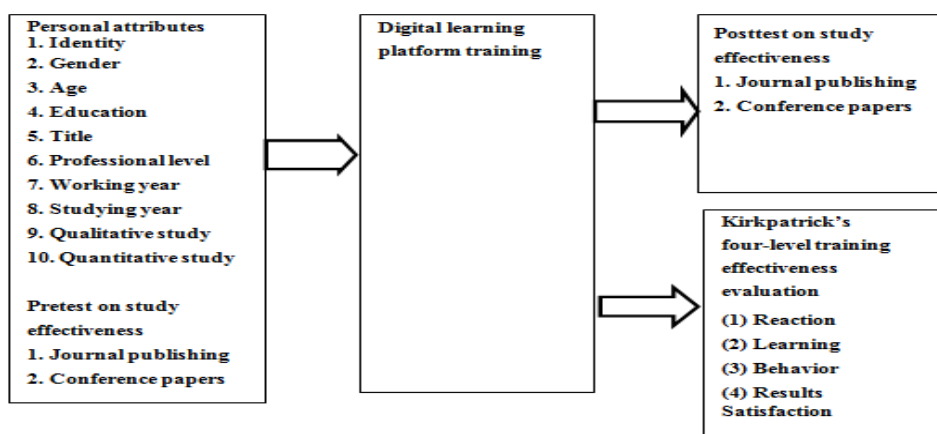


Figure 1: Study framework.

**3. Objects of the study**

Purposive sampling method is adopted in the study. The objects of the study are 30 teachers and students from the nursing and medical management departments of a science and technology university.

**4. Study tool**

This research adopts a self-administered structured questionnaire designed to measure the personal attributes, digital learning training effectiveness, and course satisfaction with reference to domestic and foreign research questionnaires. Kirkpatrick’s four-level training effectiveness evaluation sheet is divided into four levels, namely, reaction, learning, behavior, and results. This study uses a five-point Likert scale of Highly Disagree, Disagree, No Comment, Agree, and Highly Agree scored from 1 to 5 points, respectively.

In the five-point Likert scale, the expert validity and content validity index (CVI) ( $CVI > 0.80$ ) and the Cronbach’s alpha coefficient value  $> 0.70$  were used to test the internal consistency reliability.

**5. Study course intervention activities**

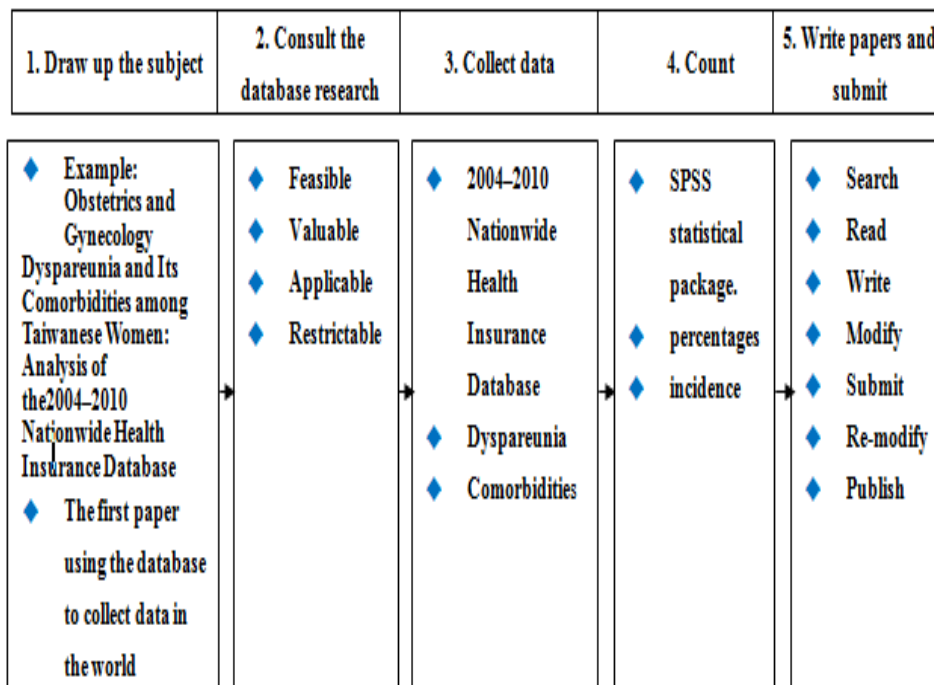
The center for statistical analysis of health data of this university aims to provide research consultation. The course was conducted for three days. With a total of 4 hours per day, the total course time was 12 hours. Afterward, the participants drew up the study topic, collected the data, and finally wrote the study report. The training course was divided into two phases:

**Phase 1: Contents of the basic course**

- 1) Introduction to the concept of the database
- 2) Introduction to the steps and methods of data collection
- 3) Writing and submission of papers

**Phase 2: Research process using the thematic database (Fig. 2)**

- 1) Draw up the subject
- 2) Consult the database research
- 3) Collect data
- 4) Count
- 5) Write papers and submit



**Figure 2: Research steps using the thematic database.**

**6. Data process**

After the questionnaires were recovered, the SPSS 17.00 statistical package was used to analyze the data. The analysis methods used were percentage, mean, and ANOVA.

**STUDY RESULTS**

**Personal attributes**

The total sample includes 30 individuals, among which 20 are students (66.7%) and 25 are women (83.3%). Most of the participants are aged less than 24 years, followed by 7 participants aged 46–55 (23.3%). Among

the sample, 10 have a bachelor’s degree (studying) (33.3%), have a master’s degree (studying) (30.0%), and 6 have a doctorate degree (graduated) (20.0%). The participants are mostly students at 19 (63.3%), followed by lecturers at 5 (16.7%), and associate and assistant professors at 3 (10.0%). Among the participants, 20 are at the professional level (94.7%) and 7 are not (23.3%). Ten participants have no work experience (33.3%), and five have 21–24.9 (16.7%) years of work experience. Ten participants have complete education (33.3%), eight have study years below five (26.7%), and seven have

5.1–10.9 (23.3%) study years. A total of 13 (43.3%) participants studied qualitative research, and 30 (100.0%) studied quantitative research.

### Evaluation results of educational training effectiveness

As shown in the evaluation result of educational training effectiveness in Table 1, the mean value ranges from 3.23 to 4.87, and the average score is 4.24 (0.34) in the reaction, learning, behavior, and results ranking.

**1. Reaction:** The average score is 4.63 (0.32). The average scores of all sub-questions are at the level of Highly Agree (M=4.47–4.77). The sub-question with the highest average score is about whether or not the digital learning platform can be used simply (M=4.77). The sub-question with the lowest average score is about whether or not the interaction with other learners in the digital learning platform can be helpful for learning (M=4.47).

**2. Learning:** The average score is 4.46 (0.32). The average scores of all sub-questions are at the level of Highly Agree (M=4.33–4.70). The sub-question with the highest average score is about whether or not knowledge and skills can be learned through the digital learning platform (M=4.70). The sub-question with the lowest average score is whether or not the participants are

satisfied with the self-learning effectiveness on the digital learning platform (M=4.33).

**3. Behavior:** The average score is 4.35 (0.53). The average scores of all sub-questions are at the level of Highly Agree (M=4.20–4.70). The sub-question with the highest average score is about whether or not the knowledge learned through the digital learning platform can be helpful for learning other related knowledge and skills (M=4.70). The sub-question with the lowest average score is whether or not the participants are willing to engage in research work after studying on the digital learning platform (M=4.20).

### 4. Results

The average score is 3.51 (0.55). The average scores of all sub-questions are at the level of Moderate to Highly Agree (M=3.23–4.87). The sub-question with the highest average score is about whether or not they have participated in organized activities and will offer an appropriate solution to the study's development in the coming year (M=4.87). The sub-question with the lowest average score is about whether or not they have participated in organized activities and will promote or support the study's development more effectively in the coming year (M=3.23).

**Table 1: Educational training effectiveness evaluation sheet.**

Variables	N(%)					Mean (standard deviation)
	Highly Disagree	Disagree	No Comment	Agree	Highly Agree	
<b>Reaction</b>						
1. The digital learning platform is suitable for me.	0(0)	0(0)	0(0)	11(36.7)	19(63.3)	4.63(0.49)
2. The digital learning platform is simple to use.	0(0)	0(0)	0(0)	7(23.3)	23(76.7)	4.77(0.43)
3. The interaction with the teachers on the digital learning platform is helpful for learning.	0(0)	0(0)	0(0)	9(30.0)	21(70.0)	4.70(0.47)
4. The interaction with other learners on the digital learning platform is helpful for learning.	0(0)	0(0)	0(0)	16(53.3)	14(46.7)	4.47(0.51)
5. I like using the digital learning platform. With vivid teaching methods, it can arouse my interest.	0(0)	0(0)	0(0)	12(40.0)	18(60.0)	4.60(0.50)
Mean (standard deviation)	4.63(0.32)					
<b>Learning</b>						
6. The study knowledge and skills can be learned through the digital learning platform.	0(0)	0(0)	0(0)	9(30.0)	21(70.0)	4.70(0.47)
7. I can understand the study courses introduced on the digital learning platform.	0(0)	0(0)	0(0)	18(60.0)	12(40.0)	4.40(0.50)
8. I am satisfied with the self-learning effectiveness on the digital learning platform.	0(0)	0(0)	1(3.3)	18(60.0)	11(36.7)	4.33(0.55)
9. I have become more aware of my research work goal on the digital learning platform.	0(0)	0(0)	1(3.3)	16(53.3)	13(43.3)	4.40(0.567)
10. I have more confidence in facing the challenge of research work on the digital learning platform.	0(0)	0(0)	0(0)	16(53.3)	14(46.7)	4.47(0.51)
Mean (standard deviation)	4.46(0.32)					
<b>Behavior</b>						
11. The knowledge learned through the digital learning platform is helpful for me to learn other related knowledge and skills.	0(0)	0(0)	2(6.7)	5(16.7)	23(76.7)	4.70(0.59)
12. The knowledge learned from the digital learning	0(0)	0(0)	3(10.0)	17(56.7)	10(33.3)	4.23(0.63)

platform is helpful for me to engage in similar tasks.						
13. I am willing to engage in research work after studying using the digital learning platform.	0(0)	0(0)	3(10.0)	18(60.0)	9(30.0)	4.20(0.61)
14. I can apply the knowledge learned through the digital learning platform in my research.	0(0)	0(0)	3(10.0)	15(50.0)	12(40.0)	4.30(0.66)
15. After studying through the digital learning platform, my study method has slightly changed.	0(0)	0(0)	3(10.0)	15(50.0)	12(40.0)	4.30(0.66)
Mean (standard deviation)	4.35(0.53)					
Results						
16. I participated in the organized activities and will plan to promote the study more effectively in the coming year.	0(0)	1(3.3)	14(46.7)	3(10.0)	12(40.0)	3.87(1.01)
17. I participated in the organized activities and will plan to assist department colleagues to improve their study ability in the coming year.	0(0)	2(6.7)	20(66.7)	6(20.0)	2(6.7)	3.27(0.69)
18. I participated in the organized activities and will promote or support the research development more effectively in the coming year.	0(0)	2(6.7)	21(70.0)	5(16.7)	2(6.7)	3.23(0.68)
19. I participated in the organized activities and will provide opinions for the study's development in the coming year.	0(0)	0(0)	22(73.3)	5(16.7)	3(10.0)	3.83(0.83)
20. I participated in the organized activities and will offer an appropriate solution to the study's development in the coming year.	0(0)	0(0)	13(43.3)	9(30.0)	8(26.7)	4.87(0.35)
Mean (standard deviation)	3.51(0.55)					
Four-dimensional mean (standard deviation)	4.24(0.34)					

ANOVA of professional title, educational training effectiveness, and satisfaction degree

Table 2 shows an analysis on the variables of personal attributes, educational training effectiveness, and satisfaction degree. Significant differences are found in educational training effectiveness and satisfaction degree between the older and younger participants ( $F = 8.58-11.79, p < 0.001$ ), between the participants with a doctorate degree (graduated and studying) and those with a bachelor's degree (graduated and studying) ( $F = 6.38-7.17, p < 0.01$ ), and between associate and assistant professors and students ( $F = 10.91-14.45, p < 0.001$ ). Significant differences are found in the educational

training effectiveness and satisfaction degree between the participants with working years of 21-24.9 and those with working years of below 5 years, and between the participants with the working years of 11-15.9 and those without education ( $F = 8.88-12.81, p < 0.01$ ). Moreover, significant differences are found in the educational training effectiveness and satisfaction degree between the participants with working years of 5.1-10.9 and 11-15.9 and those without work experience, and between the participants with working years of 5.1-10.9 and 11-15.9 and those with the working years below 5 ( $F = 9.49-14.47, p < 0.001$ ).

**Table 2: ANOVA of personal attributes, educational training effectiveness, and satisfaction degree.**

Variables	Dimension	Options	People	Mean	Standard deviation	F value	p	Post hoc test
Age	Training effectiveness	Below 24	10	2.67	0.68	11.79	0.001	5>1;5>2; 5>3
		25-29	4	2.37	0.91			
		30-35	6	2.37	0.90			
		36-45	3	2.86	0.92			
		46-55	7	2.37	0.90			
	Satisfaction	Below 24	10	2.67	0.68	8.58	0.001	4>1;5>1;5>2; 5>2
		25-29	4	2.37	0.91			
		30-35	6	2.37	0.90			
		36-45	3	2.86	0.92			
		46-55	7	2.37	0.90			
Educational degree	Training effectiveness	Bachelor (studying)	10	4.16	0.10	6.38	0.01	5>1
		Master (studying)	9	4.33	0.14			
		Master (graduated)	2	4.47	0.66			
		Doctor (studying)	3	4.33	0.13			
		Doctor(graduated)	6	4.67	0.22			

	Satisfaction	Bachelor (studying)	10	3.98	0.29	7.17	0.01	5>1
		Master (studying)	9	4.17	0.27			
		Master (graduated)	2	4.50	0.28			
		Doctor (studying)	3	4.45	0.09			
		Doctor(graduated)	6	4.59	0.15			
Title	Training effectiveness	Associate professor	3	4.79	0.19	10.91	0.001	1>4;2>4
		Assistant professor	3	4.60	0.30			
		Lecturer	5	4.41	0.21			
		Student	19	4.23	0.16			
	Satisfaction	Associate professor	3	4.62	0.24	14.45	0.001	1>4;2>4
		Assistant professor	3	4.60	0.09			
		Lecturer	5	4.55	0.17			
		Student	19	4.04	0.24			
Studying years	Training effectiveness	Below 5 years	4	4.41	0.22	12.81	0.001	4>1;4>3;4>5
		5.1-10.9	2	4.34	0.17			
		11-15.9	8	4.74	0.23			
		21-24.9	6	4.16	0.10			
		None	10	4.67	0.26			
	Satisfaction	Below 5	4	4.00	0.11	8.88	0.01	4>1;4>3;4>5
		5.1-10.9	2	4.23	0.04			
		11-15.9	8	4.43	0.23			
		21-24.9	6	4.58	0.19			
		None	10	3.98	0.29			
Working years	Training effectiveness	Below 5	8	4.27	0.16	9.49	0.001	1>3; 2>4; 3>4
		5.1-10.9	7	4.52	0.28			
		11-15.9	5	4.64	0.22			
		None	10	4.16	0.10			
	Satisfaction	Below 5	8	4.09	0.14	14.47	0.001	2>1; 3>1; 2>4
		5.1-10.9	7	4.54	0.08			
		11-15.9	5	4.57	0.06			
		None	10	3.98	0.09			

\*p< .05 ; \*\* p< .01 ; \*\*\*p< .001

**Use satisfaction of the digital learning platform**

Table 3 shows that the average value of the satisfaction degree of all objects of the study in intervention activities is 4.24 (0.34). The average score of all sub-questions is Highly Agree (M=4.17-4.87). The sub-question “I believe the interaction on the digital learning platform made the course to be more interesting” (M=4.87)

obtains the highest score, followed by “I believe that the Web-based learning model is a good choice” (M=4.73) and “Web-based learning platform helps me learn the knowledge and skills I want to learn” (M=4.43). The sub-question “I like Web-based learning” has the lowest score (M=4.17).

**Table 3: Use satisfaction of the digital learning platform.**

Variables	N (%)					Mean(SD)
	Highly Disagree	Disagree	No Comment	Agree	Highly Agree	Mean (standard deviation)
1. I believe that the interaction on the digital learning platform made the course more interesting.	0(0.0)	0(0.0)	0(0.0)	4(13.3)	26(86.7)	4.87(0.35)
2. I believe that the interaction on the digital learning platform is helpful for real-time knowledge sharing and problem solving.	0(0.0)	0(0.0)	0(0.0)	24(80.0)	6(20.0)	4.20(0.41)
3. I believe that the interaction on the digital learning platform can promote the depth of the course with rich time.	0(0.0)	0(0.0)	0(0.0)	24(80.0)	6(20.0)	4.20(0.41)
4. I believe that the interaction on the digital learning platform can help me establish partnership with learners more easily.	0(0.0)	0(0.0)	1(3.3)	18(60.0)	11(36.7)	4.33 (0.55)
5. I believe that the application of the Web-based learning platform is simple.	0(0.0)	0(0.0)	1(3.3)	19(63.3)	10(33.3)	4.30(0.54)
6. I believe that the application of the Web-based learning platform does not require much time.	0(0.0)	0(0.0)	1(3.3)	16(53.3)	13(43.3)	4.40(0.56)

7. The Web-based learning platform helps me learn more of the knowledge and skills I want to learn.	0(0.0)	0(0.0)	0(0.0)	17(56.7)	13(43.3)	4.43(0.50)
8. Web-based learning is not subject to time and space constraints, and meets my needs.	0(0.0)	0(0.0)	0(0.0)	22(73.3)	8(26.7)	4.27(0.45)
9. Web-based learning gives me more guidance in the learning aspect.	0(0.0)	0(0.0)	0(0.0)	21(70.0)	9(30.0)	4.30(0.47)
10. I believe that the Web-based learning resources are rich.	0(0.0)	0(0.0)	0(0.0)	24(80.0)	6(20.0)	4.20(0.41)
11. I believe that the Web-based learning model is a good choice.	0(0.0)	0(0.0)	0(0.0)	8(26.7)	22(73.3)	4.73(0.45)
12. I like Web-based learning.	0(0.0)	0(0.0)	0(0.0)	25(83.3)	5(16.7)	4.17(0.38)
13. I want to use network teaching and learning.	0(0.0)	0(0.0)	0(0.0)	20(66.7)	10(33.3)	4.33(0.48)
14. I want to recommend other people the use of the Internet for teaching and learning.	0(0.0)	0(0.0)	0(0.0)	19(63.3)	11(36.7)	4.37(0.49)
15. The learning activities on the digital learning platform are arranged appropriately.	0(0.0)	1(3.3)	0(0.0)	20(66.7)	9(30.0)	4.23(0.63)
16. The overall learning gains on the digital learning platform are rich.	0(0.0)	1(3.3)	0(0.0)	18(60.0)	11(36.7)	4.30(0.65)
Total	4.24(0.34)					

### Pretest–posttest results of journals

According to Table 4, significant differences are found in publishing in Chinese journals, publishing in English journals (accepted), publishing in English journals (published), and oral and poster presentation of papers in

Chinese conferences ( $p < 0.05$ ). The posttest result is significantly higher than the pretest result and has good performance in publishing Chinese journals, English journals, and oral and poster presentation of papers in Chinese conferences.

**Table 4: Pretest–posttest results of journals.**

Variables	Pretest		Posttest		t value	p
	N (%)	Mean	N (%)	Mean		
Publishing of Chinese Periodicals	3(10.00)	0.10(0.31)	11(36.70)	0.37(0.49)	3.24	0.01
Publishing of English Periodicals (accepted)	0(0.00)	0(0.00)	6(20.00)	0.00(0.00)	2.69	0.05
Publishing of English Periodicals (published)	5(16.70)	0.17(0.38)	8(26.70)	0.27(0.54)	2.11	0.05
Oral presentation of papers in Chinese conference	1(3.30)	0.03(0.00)	5(16.70)	0.17(0.38)	2.11	0.05
Poster presentation of papers in Chinese conference	1(3.30)	0.03(0.18)	5(16.70)	0.17(0.38)	3.25	0.05

\* $p < .05$  ; \*\*  $p < .01$  ; \*\*\* $p < .001$

### DISCUSSION

The research result shows that the scores in reaction, learning, behavior, and results are high with an average score of 4.24. The level that is easiest to reach is reaction, and the score of results is the lowest. Reaction and learning indicate the knowledge and skills learned through the digital learning platform, which is helpful for the research. The application of rich and multiple resources and tools from the Internet can enhance self-learning interest and the sharing of experiences because of the progress of information technology and diversified self-learning methods. Self-learning methods are one of the major tools for autonomous learning. The important factor affecting the level of achievements is proving that this training can help the organization. However, the objects of the study are not certain about effectively promoting or supporting the development of the study. Enterprises believe that training at the higher level is more difficult than at other levels. Wang pointed out that trainees considered the application of knowledge and skills from the course to be limited in the production and application to the dimension of results.<sup>[8]</sup> This finding is consistent with those of Liu, Green, and Hanson, and it indicates that expanding personal benefits to affect the same generation and organization is not easy. The promotion and extension of the research courses will be still studied in the future.<sup>[7, 13, 15]</sup>

In comparing the old with the young, the participants with a doctorate degree (graduated and studying) those with a bachelor's degree (graduated and studying), and the associate and assistant professors with the students, the former ones have a stronger application degree than the latter and revealed richer results after participating in the training.<sup>[2,18]</sup> Significant differences are found in the educational training effectiveness and satisfaction degree between the participants with many years of research experience and those without research experience, and between the participants with many years of work experience and those with less work experience. Yang found that people with more working years have a higher learning effect than those with less working years.<sup>[2,16,24,25]</sup> After the teachers with more working years participated in the training, the plan was conducted more smoothly, and their communication ability was improved. Thus, employees' capacity can support the organization's development, which can be used at a higher working degree.<sup>[9,16]</sup>

The average score in satisfaction degree of the intervention activity is at the Highly Agree level. Interaction on the digital learning platform made learning more interesting. The Web-based learning platform helped the participants learn more knowledge and skills. Furthermore, the Web-based educational intervention

model is a good choice as it can enhance the knowledge of students.<sup>[17]</sup> Educational institutions adopt the Web-based learning environment to transform it into a learner-centered guided knowledge construction to enable learners to obtain the most appropriate studying opportunities. The higher the satisfaction with the educational training is, the better the overall training effectiveness.<sup>[9,18,19]</sup> With the high agreement with intervention activities, intervention activities can improve the application of the objects of the study and enhance research confidence and ability. The object of the study can help personal and professional growth.

Some papers published in journals and conferences show the significant improvement in educational training effectiveness and satisfaction degree. The posttest of paper publishing in Chinese and English journals and that of oral and poster presentation of papers in Chinese conferences significantly increased in learning effectiveness than the pretest. Thus, the educational intervention of the research course has its effects. If this research course education is brought into the research community, thus encouraging interested people to participate, the implementation of the course will effectively improve the publishing rate of papers of teachers and students.

## CONCLUSION

The study shows that the knowledge obtained from the digital learning platform is helpful in research. The application of Web-based learning in self-learning is demand oriented and learning interactive. Participants with extensive work experience as well as associate and assistant professors have high education training effectiveness. In addition, they are responsible for guiding young students. The satisfaction degree in the intervention activity is at the level of Highly Agree. Aside from the intervention activity, the posttest of publishing of Chinese and English papers is higher than the pretest. Teachers believe that the activity can enhance knowledge and skills in research, improve interest in research, and help personal professional growth. In the future, adopting learning in the community is suggested. The formation of learning in the community helps increase the effectiveness of Web-based learning. Moreover, it shares concepts, knowledge, experiences, information, and strategies to create a common goal, create a united exploring action, and expand the combined knowledge and ability. Thus, individual learners in a Web-based learning environment can own the collective feeling to have a sense of identity and belonging.

## Limitations

The pretest and posttest were conducted in this paper. Therefore, we could not thoroughly explore the subsequent effectiveness. Adding a posttest in the educational intervention research in the future is suggested to realize the extension effect of the object of the study after the intervention. Moreover, the number of

objects of study should be increased to expand the scope of inference.

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