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The Computer Course Correlation between Learning Satisfaction and Learning Effectiveness of Vocational College in Taiwan

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Received: 20 May 2019; Accepted: 10 June 2019; Published: 21 June 2019

Abstract: In this paper, we surveyed the influence of learn effectiveness in a computer course under the factors of learning attitude and learning problems for students in senior-high school. We followed the formula for a regression line as $R = A + BX + \varepsilon$ and simulated on SPSS platform with symmetry to obtained the results as follows: (1) In learning attitude, both the cognitive-level and behavior-level, are positively correlated with satisfaction. This means the students have cognitive-level and behavior-level more positively correlated with satisfaction in computer subjects and have a high degree of self-learning effectiveness. (2) In learning problems, the female students had higher learning effectiveness than male students, and the students who practiced on the computer on their own initiative long-term each week had higher learning effectiveness.

Keywords: learning attitude; computer subject; learning effectiveness

1. Introduction

Education should focus on cultivating professional skills and combining practice with practice to enable students to have the ability to work in response to the rapid changes in the current industrial structure. Therefore, in addition to paying attention to students' professional and practical abilities, students should also have professional abilities in order to improve their graduation employment rate and employment competitiveness [1].

The ultimate goal of school is to assist students in acquiring the skills of employment. Therefore, the content of the curriculum should complement the workplace and assist students in obtaining professional skills related to their work [2].

How to make students have the motivation to learn, and then generate interest in active learning is an important question. A teacher should understand the behavioral motivation of students in a timely manner while teaching [3], as well as the learning attitude (including cognition, emotion, and behavior) that students hold while studying computer courses, and the troubles encountered in learning.

We also analyze the "learning attitude" and "learning problems" of the learning effectiveness frame for high vocational students to understand the student's personal background variables for learning attitude, learning problems, and learning effectiveness, and the relationship between learning attitude, learning problems, and learning effectiveness [4,5].

This paper is based on the symmetry subject of computer courses with students of the Information Process Department and International Trade Department to survey student learning attitudes and learning problems in the subject of computers. This paper aims to analyze the learning effectiveness and related issues of computer courses for higher vocational students through the questionnaire approach.

The rest of this paper is structured as follows. Section 2 describes the design structure and progress of the research. Section 3 presents the implemented research. Section 4 documents symmetry regressing on analysis between learning attitude and learning effectiveness. The regression analysis of learning problems to learning effectiveness is described in Section 5. Finally, we conclude the paper in Section 6.

2. Research Design and Progress

In this paper, we use a frame work to measure learning attitudes and learning problems for analyzing the learning effectiveness influences on students studying a computer course. In order to implement the above framework, firstly, we used a questionnaire survey to search the symmetry relationship between variables, and statistical methods for analyzing empirical data and verification the hypothesis.

2.1. Research Object and QuestionnaireResponse

The research objects of this paper were aimed at the three degree students of the Information Process Department and the International Trade Department. We issued in total 219 questionnaires through on-site distribution to students. The number of responses of valid questionnaires was 196 (89.49% response rate).

2.2. Research Tools

The measurement tool was a questionnaire of "learning attitudes and learning problems for learning effectiveness influences of computer courses", which included the following four categories: learning attitude, learning problems, learning effectiveness, and personal basic information. They are described as follows.

(1) Personal basic information includes sex, age, department, and practice computer time every week.
(2) Learning effectiveness factors include the learning attitude frame and the learning problems frame. The learning attitude frame has three parts as cognitive, emotional, and behavioral. The learning problems frame has four parts: personal, family, school, and course content. The learning effectiveness frame has four parts: class schedule, teacher teaching, learning environment, and learning results.

2.3. Assessment Method of Questionnaire

The questionnaire used a scale from 1 to 4, with "4" indicating very much agree, "3" indicating agree, "2" indicating disagree, and "1" indicating very much disagree. For the questionnaire, we set some reverse test questions, which meant that the sampled students had the attention item content when answering "not applicable".

2.4. Questionnaire Pretest

The pretest questionnaire was processed by random to 25 third grade students of high vocational education school. The main purpose of this pretest was to test the internal consistency and consistency when answering the questionnaire questions. We found α coefficient with high reliability for values larger than 0.898. The results of α coefficient are listed as Table 1.

Table 1. Questionnaire Cronbach α reliability analysis.

Frame Classification	Numbers	Cronbach α Coefficient
Learning attitude-cognitive	8	0.877
Learning attitude-emotional	8	0.805
Learning attitude-behavioral	11	0.871
Learning problems frame	14	0.887
Learning effectiveness-class schedule	3	0.755
Learning effectiveness-teacher teaching	8	0.929
Learning effectiveness-learning environment	5	0.850
Learning effectiveness-learning results	4	0.791
Total Reliability	61	0.898

3. Research Implementation

The samples of this questionnaire were third grade students of the International Trade Department and Information Process Department. As for the initial issued samples, the number was 219 and the number of valid questionnaires was 196. The details of these are shown in Table 2.

Table 2. Questionnaire response information.

Items	Issues	Sort	Response Questionnaire	Ratio of Useful Questionnaire
International Trade Dept. A	45	valid invalid	43 2	95.56%
International Trade Dept. B	36	valid invalid	30 6	83.33%
Information Process Dept. A	34	valid invalid	30 4	88.24%
Information Process Dept. B	34	valid invalid	33 1	97.06%
Information Process Dept. C	35	valid invalid	33 2	94.29%
Information Process Dept. D	35	valid invalid	27 8	77.14%
Total	219	valid invalid	196 23	89.49%

3.1. Data Analysis and Results

After administering the response questionnaires, we deleted the invalid questionnaire, and then carried out statistics and analyzed the valid questionnaire using SPSS 15.0. The methods of statistical analysis are described as follows.

(1) Narrative statistics was used to organize and present the characteristics of the existing data using statistical description groups. The methods used in this paper were: average, standard deviation, number of times, and percentage to understand the situation of the subject [6].

(2) Variance analysis was used to test whether there was a difference in the average of the maternal group. If there was a significant difference in variance analysis, then carried out a T-test to confirm whether there was a difference in the average of each selected group. In this paper, single factor variance analysis was used to test whether the student's personal background variables had a significant level of learning attitude, learning problems, and learning effectiveness [7,8].

(3) Regression analysis (RA) was used as a symmetry statistical method for analyzing data, mainly to determine specific relationships between the survey data.

Regression analysis is a relation model that was used to create the symmetry dependent variable Y and independent variable X. In this paper, we exploited multi regression analysis to create the frame

of learning attitude and learning problems to use as a pre-prediction model for learning effectiveness, and then survey the influence level between those two frames and learning effectiveness [9].

3.2. Learning Attitude and Learning Problems for Learning Effectiveness

For the learning attitude, if a higher score was obtained, the more positive the learning attitude was than if a lower score was obtained, and vices versa. The average score of the fourth-order scale was 2.5 points. However, for learning problems, if the average scale was lower than 2.5 points which indicated those had less learning and those who had higher learning.

For learning effectiveness, an average scores for each question higher than 2.5 indicated that the training effectiveness was slightly positive. We found that if the teacher patiently guided students through computer related issues, the average score was 3.01 points. This meant students had satiable faction of learning because the teacher was able to patiently teach the students and the students were more satisfied.

4. Regression Analysis between Learning Attitude and Learning Effectiveness

In this paper, we used the symmetry regression analysis (R), coefficient of determination (R^2), adjusted R^2, and F test. Regression analysis is a powerful statistical method that allows the examination of the relationship between two or more variables of interest. The formula for a regression line can be given as $R = A + BX + \varepsilon$, where A and B are coefficients (also are constants). X and R are the independent and dependent variables, and ε is the error term [10].

We also showed the p value, which referred to the probability that the statistical symmetry summary (such as the difference between the two groups of samples) was the same as the actual observation data, or even larger, in a probability model.

4.1. Learning Attitude and Learning Effectiveness under Class Schedule

Table 3 shows the regression analysis of computer subject for learning attitude to learning effectiveness under class schedule. For the class schedule relation, the cognitive coefficient of learning attitude to learning effectiveness was 0.578 and was significantly positively correlated. This meant that with students in computer courses, the learning attitude was higher and more positive, and the active students had more satisfaction with the class schedule.

Table 3. Attitude to class schedule regression analysis.

Item		**Value**	
Regression factor (R)		0.656	
R^2		0.430	
AdjustedR^2		0.421	
F-test		48.36	
Learning attitude / Class schedule	Cognitive	Emotion	Behavior
Coefficient	0.578	0.205	0.327
p value	<0.000***	0.144	<0.01**

For the class schedule correlation, the coefficient of learning attitude behavior to learning effectiveness was 0.327 and was also significantly positively correlated. This indicated that the computer course students had a higher number and more positive learning attitude, and the positive students were more satisfied with the class schedule.

The learning effectiveness correlation coefficient of the emotion of learning attitude was 0.205, but the p value was 0.144, which indicted that there was no significant difference. Inferred from the above, the possible reasons may be that the students were just beginning to experience the computer subject

or if just contact with the course was not enough to influence class schedule satisfaction by the aspect of learning emotion.

4.2. Regression Analysis between Learning Attitude and Teacher Teaching

Table 4 shows the symmetry regression analysis of teacher teaching under the computer subject of learning attitude cognitive to learning effectiveness with a p value <0.000***, so the equation was valid. As seen in Table 4, we found the correlative coefficient between cognitive of learning attitude cognitive and teacher teaching of learning effectiveness was 0.287 and had a positive correlation ($P < 0.005$**).

Table 4. Subject of learning attitude to teacher teaching regression analysis.

Item		Value	
Regression factor (R)		0.586	
R^2		0.344	
AdjustedR^2		0.333	
F-test		33.58	
Learning attitude / Teacher teaching	Cognitive	Emotion	Behavior
Coefficient	0.287	0.041	0.406
p value	<0.005**	0.717	<0.000***

Based on the above results, if the learning attitude of students in the computer course was higher and more positive, the positive students had higher satisfaction with teacher teaching.

Regression analysis of teacher teaching of the computer subject of learning attitude behavior to learning effectiveness had a p value <0.000***, so the equation was also valid. As seen in Table 4, the correlation coefficient between cognitive of learning attitude cognitive and teacher teaching of learning effectiveness was 0.406 and had appositive correlation. This indicated that the students' learning behavior in the computer course was higher and more positive, and the positive students were more satisfied with teacher teaching.

Finally, we conducted symmetry regression analysis of teacher teaching under the computer subject of learning attitude emotion to learning effectiveness. We found the correlation coefficient between emotion of learning attitude cognitive and teacher teaching of learning effectiveness was 0.041, but the p value was 0.717, which meant there was no significant difference. The possible reason was that students were beginning to understand the computer subject, and they had a preliminary feeling about learning emotion in the course. There were not enough factors to influence their satisfaction with teacher teaching.

4.3. Regression Analysis between Learning Attitude and Learning Environment

Table 5 shows the regression analysis of learning attitude to learning environment in the computer course. As seen in Table 5, we found the correlation coefficient between cognitive of learning attitude cognitive and learning environment of learning effectiveness to be 0.390, which was a positive correlation. This indicates that the computer course students' subject of learning attitude cognitive was higher and more positive, and the positive students had higher satisfaction with the learning environment.

The symmetry correlation coefficient between emotion of learning attitude cognitive and learning environment of learning effectiveness was 0.326, which was a positive correlation. This indicates that the computer course students' learning attitude emotion was higher and more positive, and the positive students were more satisfied with the learning environment.

Furthermore, the symmetry correlative coefficient between behavior of learning attitude cognitive and learning environment of learning effectiveness was 0.446 and had a positive correlation. This indicated that the computer course students' learning attitude behavior was higher and more positive, and the positive students had higher satisfaction with the learning environment.

Table 5. Subject of learning attitude to learning environment regression analysis.

Item	Value		
Regression factor (R)	0.692		
R^2	0.479		
AdjustedR^2	0.470		
F-test	58.86		
Learning attitude / Learning environment	Cognitive	Emotional	Behavioral
Coefficient	0.390	0.326	0.446
p value	<0.001***	<0.01**	<0.000***

4.4. Regression Analysis between Learning Attitude and Learning Results

Table 6 shows the regression question for the computer subject of learning attitude to learning results. As seen in Table 6, we found the correlation coefficient between cognitive of learning attitude cognitive and learning environment of learning effectiveness to be 0.573 with a positive correlative. This indicates that the computer course students' learning attitude cognitive was higher and more positive, and the positive students had higher satisfaction with the learning results.

The correlative coefficient between emotions of learning attitude cognitive and learning environment of learning effectiveness was 0.126, but the *p* value was 0.717, which meant that there was no significant difference. The results may indicate that students were beginning to understand the computer subject, and they had a preliminary feeling about learning emotion in the course. There were not enough factors to influence their satisfaction with learning results.

Furthermore, the correlative coefficient between behavior of learning attitude cognitive and learning environment of learning effectiveness was 0.382 and was appositive correlation. This indicates the computer course students' learning attitude behaviors were higher and more positive, and the positive students had the higher satisfaction with the learning results.

Table 6. Subject of learning attitude to learning results regression analysis.

Item	Value		
Regression factor (R)	0.655		
R^2	0.429		
AdjustedR^2	0.420		
Learning attitude / Learning results	Cognitive	Emotional	Behavioral
Coefficient	0.573	0.126	0.382
p value	<0.000***	0.360	<0.000***

5. Regression Analysis of Learning Problems to Learning Effectiveness

5.1. Regression Analysis of Class Schedule between Learning Problems and Learning Effectiveness

As seen in Table 7, which shows the regression question between the computer subject of learning problems and class schedule, we also found the *p* value <0.000***, which indicated the regression question was valid. We also found the correlation coefficient between learning problems and learning effectiveness of class schedule was –0.479, which was a negative correlation. This represents the lower degree of computer subject learning problems of student with higher satisfaction in the class schedule.

Table 7. Computer subject of learning problems to class schedule regression analysis.

Item	Value
Regression factor (R)	0.378
R^2	0.143
AdjustedR^2	0.138
F-test	32.442
Coefficient	–0.479

5.2. Regression Analysis between Learning Problems and Teacher Teaching

As seen Table 8, which shows the regression question between the computer subject of learning problems and teacher teaching, we also found the *p* value <0.000***, which indicated the regression question was valid. We also found the correlation coefficient between learning problems and learning effectiveness was –0.309, which was a negative correlation. This represents the lower the degree of computer subject learning problems of student with higher satisfaction in teacher teaching.

Table 8. Computer subject of learning problems to teacher teaching.

Item	Value
Regression factor (R)	0.319
R^2	0.102
AdjustedR^2	0.097
F-test	22.129
Coefficient	–0.309

5.3. Regression Analysis between Learning Problems and Learning Environment

As seen in Table 9, which shows the regression question between the computer subject of learning problems and learning environment, we also found the *p* value <0.000***, which indicated the regression question was valid. We also found the correlation coefficient between learning problems and learning effectiveness was −0.510, which was a negative correlation. This represents the lower the degree of computer subject learning problems of students with higher satisfaction in the learning environment.

Table 9. Computer subject of learning problems to learning environment.

Item	Value
Regression factor (R)	0.408
R^2	0.166
AdjustedR^2	0.162
F-test	38.777
Coefficient	-0.510

5.4. Regression Analysis of Learning Problems to Learning Results

In Table 10, which shows the regression question (=0.465) between the computer subject of learning problems and learning results, we also found the *p* value <0.000***, which indicated the regression question was valid. We also found a negative correlation coefficient between learning problems and learning effectiveness of –0.580. It represents the lower degree of computer subject learning problems of student with higher satisfaction in learning results.

Table 10. Computer subject of learning problems to learning results regression analysis.

Item	Value
Regression factor (R)	0.465
R^2	0.216
AdjustedR^2	0.212
F-test	53.64
Coefficient	–0.580

6. Conclusions

In this paper, symmetry we surveyed a computer course of learning attitudes and learning problems to learning effectiveness as influences. We summarized the results as follows.

1. For students in computer course, learning attitude to learning effectiveness had a higher difference. However, for the level of cognitive and behavioral with positive correlative satisfaction results showed students with more positive learning attitude cognitive and learning behavior than with higher satisfaction of class schedule, teacher teaching, teaching environment, and learning results.
2. For the emotion of learning attitude to learning effectiveness, there are significant differences in learning environment. The most students had more approval in the learning environment in emotion.
3. For the computer course analysis of learning problems to learning effectiveness, the learning problems to learning effectiveness symmetry as class schedule, teacher teaching, teaching environment, and learning had results with negative correlations. If they have higher satisfaction of class schedule, teacher teaching learning environment, and learning results.

Author Contributions: The authors contributed equally to the conception of the idea, implementing and analyzing the experimental results, and writing the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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