

## **An Analysis of Factors that Affected e-Learning of Students at Public Universities in Bangkok Metropolitan Area**

by

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### **Abstract**

The purposes of this research were to analyze and to describe the major factors that affected e-Learning of students at public universities in Bangkok metropolitan area. The sample chosen for this study were 1,014 or 97.5 % out of 1,040 students at the Faculty of Education of public universities in Bangkok metropolitan area. The instrument used for data collection was 7 rating scales. The reliability of the instrument, calculated by Cronbach Alpha Coefficient is 0.92. The data was analyzed by using the means ( $\bar{X}$ ), Standard Deviation (S.D.) and Analysis of Factors by Principal Component Analysis technique: PCA, orthogonal rotation axis by Varimax Method.

The results of the study were as follows:

1. There were 14 major factors that affected e-Learning of students at public universities in Bangkok metropolitan area as follows: 1) virtual lesson, 2) promptness of network system as well as the students' readiness, 3) useful learning, 4) feeling of persons and interesting lessons, 5) supporting thought system and equity of education, 6) supporting from the institutes, 7) personal status, 8) anyplace, anytime for education, 9) social value and the acceptance of innovation, 10) experienced and facilitated by others concerned, 11) supporting self-learning and 12) finding out knowledge and enhancing English language. These factors could be explained 63.551 % of the total variance.

2. A study of Correlation Coefficient between 12 and 52 factors was 0.390 – 0.779 and Correlation Coefficient between 12 factor with that affected e-Learning was 0.438 – 0.863, which was in high level. Correlation Coefficient within the internal factors of 12 was of 0.005 – 0.070, which was in low level.

3. The regression or predicting equation that affected e-Learning of students at public universities in Bangkok metropolitan area was :

$$\begin{aligned}
 Y &= Z + 0.673 (\text{Virtual}) + 0.843(\text{Network}) + \\
 &0.863(\text{Useful}) + 0.657(\text{Interesting}) + \\
 &0.701(\text{Thought}) + 0.623(\text{Supporting}) + \\
 &0.598(\text{Status}) + 0.706(\text{Any place/time}) + \\
 &0.737(\text{Value}) + 0.820(\text{Experience}) + \\
 &0.650(\text{Learning}) + 0.438(\text{Knowledge})
 \end{aligned}$$

The predicting equation has the power of prediction 82.857 % and the error of predicting was 7.143.

**Keywords:** Factor Analysis / Learning / e-Learning

## **Introduction**

e-Learning is defined as any use of technology for learning outside the boundaries of the physical classroom. Also, e-Learning, referred to as Web-based training, is anywhere, anytime, self-paced instruction that is presented over the Internet to browser-equipped learners and to meet the needs of today's life-long learners. Thus, with e-Learning we can empower learners, and the learner, as well as the mentoring system, is held accountable. What's more, e-Learning provides a new set of tools that can add value to all the traditional learning modes-classroom experiences, textbook study, CD-ROM, and traditional computer based training. However, e-Learning will not replace the classroom setting, but enhance it, taking advantage of new content and delivery technologies to enable learning. The ultimate objective of the e-learning portal is to increase and facilitate access to education resources in different regions of the world in different languages while stimulating professional cooperation to improve the quality of education and learning.

### **1.1 Objective**

The objectives of this research were to analyze and to describe the major factors that affected e-Learning of students at public universities in Bangkok metropolitan area.

### **1.2 The expected outcomes**

The expected outcomes were as follows :

1. The administrators can support students' learning through e-Learning effectively and efficiently as needed by students. This means that the students will be supported through budget subsidize, equipment as well as technicians, programmers and consultants. These personnel might need more training, study visits, and/or seminar to improve their knowledge.

2. The students will get more knowledge because the content is more concrete, virtual, problem-solving, without time-limitation, no border but with a lot of alternatives that they are student-centered.

3. Peopleware are instructors, programers and evaluators will know the students' needs through e-Learning. Thus, these group of people will be able to develop the lesson according to the students' interest; for example, the lesson that attracted students' interest and motivation.

4. Parents will help support students through e-Learning such as the expense throughout the program including monitoring and evaluating the students closely than any other types of learning.

5. Any other concerned might want to do more on statistical analysis such as ANOVA, and Regession.

### **1.3 Sample**

The sample chosen for this study were 1,014 or 97.5 % out of 1,040 students at the Faculty of Education of public universities in Bangkok metropolitan area.

### **1.4 Scope of the study**

The scope of the study was concerned with the following sub categories

1) personal status, 2) characteristics of e-learning lesson, 3) supporting from the institutes, 4) computer networking system for accessing through the lesson, and 5) the utilization of e-learning.

## 2. Procedure of data collection

The data was survey in nature. The instrument used for data collection were questionnaire which were 7 rating scales. The reliability of the instrument, calculated by Cronbach Alpha Coefficient is 0.92. Then, the data was analyzed by using the means ( $\bar{X}$ ), Standard Deviation (S.D.) and Analysis of Factors by Principal Component Analysis technique: PCA, orthogonal rotation axis by Varimax Method.

## 3. Results of the Study

The results of the study were :

### 3.1 The analysis of each factor by using Means and Standard Deviation

The means of 52 factors were between 2.58-6.21 and standard deviation was between 0.96-1.40. This is an indication that these factors were rather small to great levels and there were dispersion of data. The lowest means average but highest standard deviation of factor was "sex".

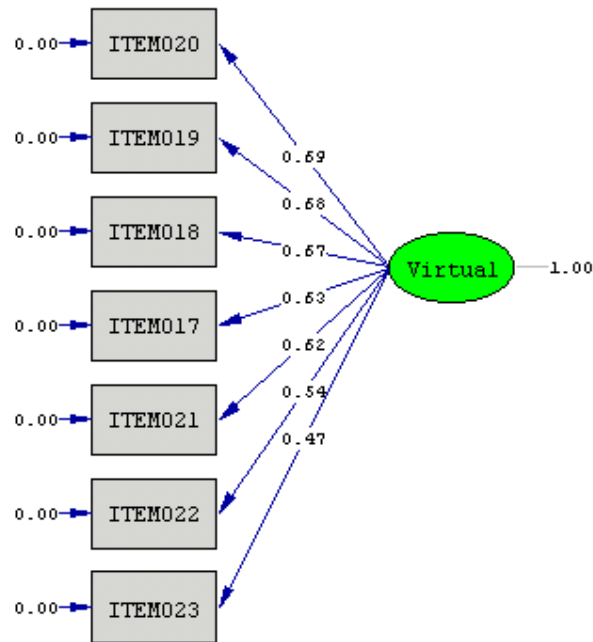
### 3.2 The analysis of factors that affected e-learning by using multiple correlation

When factor loadings of e-learning were analyzed, it was found that the explained factors were shown on Table I-16 along with 9 new factor meaning as follows:

Table I Virtual Lesson Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
20	Virtual lesson	0.690	0.273
19	Ability to update the content	0.683	0.261
18	Ability to see the concrete content	0.670	0.262
17	New data	0.636	0.207
21	The convenience, and the speed of learning	0.623	0.230
22	The congruence of learning environment which one needs to know	0.542	0.195
23	Ability to apply such as reporting	0.476	0.146
Eigen Values = 4.093 or 7.871%			

Table I showed that the factor loadings of virtual lesson were composed of 7 components which could be weighted 0.476 - 0.690, the eigen values was 4.093 or 7.871% as shown on Figure I



**Figure I Confirmatory Model (No. 1) of Virtual Lesson**

Table II Promptness of Learners toward Learning Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
34	The conveniece of access	0.750	0.305
35	The rapid of downloading	0.748	0.302
33	The promptness of external networking	0.700	0.286
36	Searching Time for Learning	0.632	0.231
37	The promptness of equipment/tools at starting point	0.583	0.189
38	Ability to afford for the lesson and networking	0.540	0.165
Eigen Values = 3.898 or 7.495%			

Table II showed that the factor loadings of promptness of learners toward learning were composed of 6 components which could be weighted 0.540 - 0.750, the eigen values was 3.898 or 7.495% as shown on Figure II.

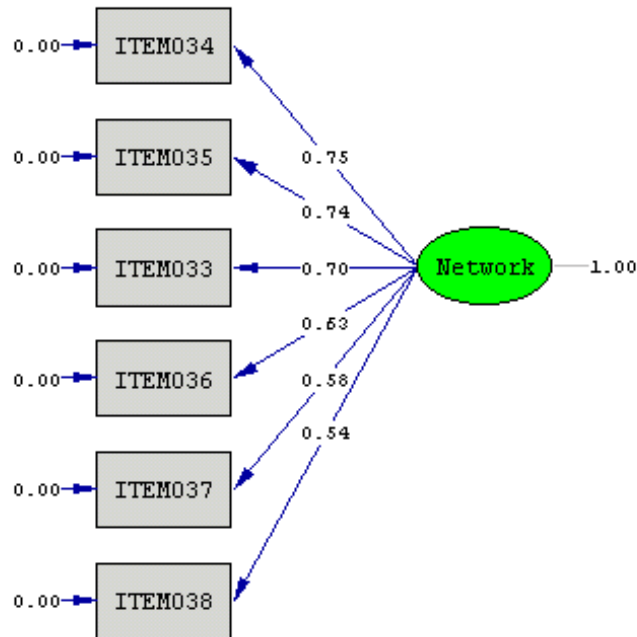


Figure II Confirmatory Model (No. 2) of Learners' Promptness toward Learning

Table III Useful Learning Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
44	Problem-Solving in Learning	0.771	0.316
43	Flexibility of Non-Formal Education	0.704	0.282
42	Economical Savings	0.662	0.290
45	Skills and Practical Works Promotion	0.629	0.235
46	The Development and Upgrading the Quality of	0.569	0.183
47	Life		
	The Ability to Get Feedback Spontaneously toward Learning	0.515	0.111
Eigen Values = 3.805 or 7.317			

Table III showed that the factor loadings of useful learning were composed of 6 components which could be weighted 0.540 - 0.750, the eigen values was 0.515 - 0.771 or 7.317 % as shown on Figure III.

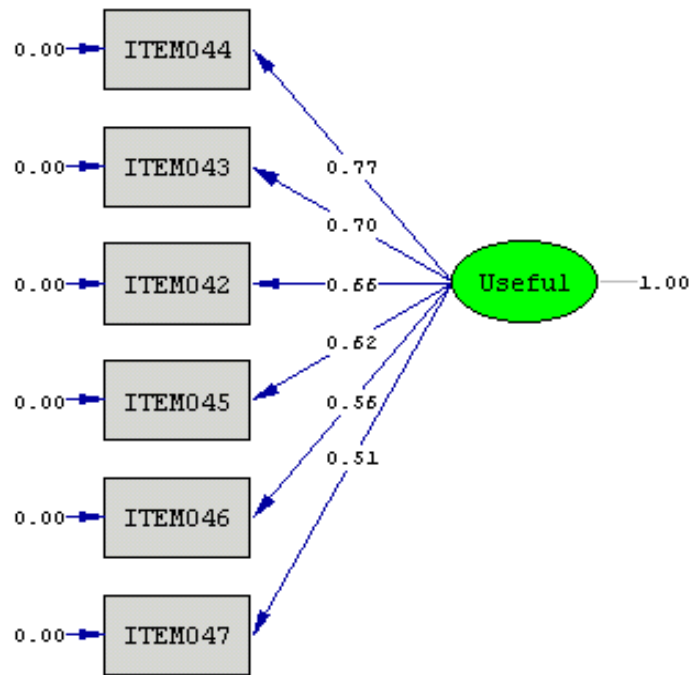


Figure III Confirmatory Model (No. 3) of Useful Learning Factor

Table IV Feeling of Persons and Interesting Lessons Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
14	Eagerness to Know	0.779	0.377
13	Excitement, Enthusiastic	0.735	0.372
15	Interesting and Motivating Lesson	0.712	0.332
16	The Beauty of Presentation	0.559	0.219
Eigen Values = 2.689 or 5.170			

Table IV showed that the factor loadings of persons' feeling and interesting lessons were composed of 6 components which could be weighted 0.559 - 0.779, the eigen values was 2.689 or 5.170 as shown on Figure IV.

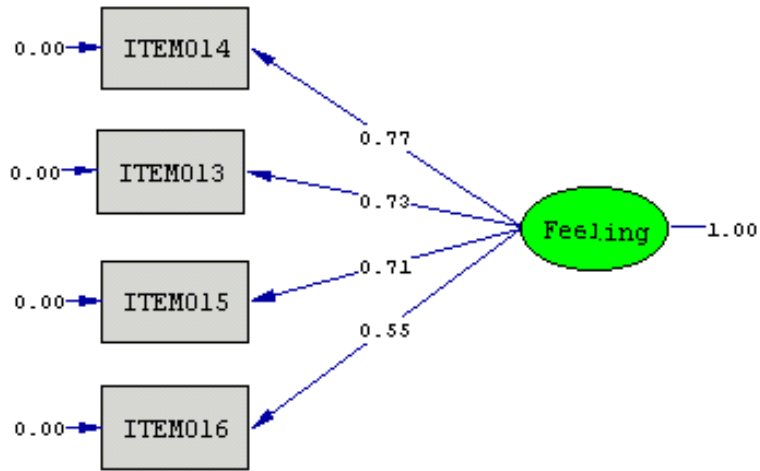


Figure IV Confirmatory Model (No. 4) of Feeling of Persons and Interesting Lessons Factor

Table V Supporting Thought System and Equity of Education Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
51	Thinking Development	0.689	0.390
52	Open Mind for Perception to Keep up with the World or Situation	0.634	0.378
50	Educational Equity	0.535	0.256
Eigen Values = 2.490 or 4.788			

Table V identified that factor loadings of supporting thought system and equity of education were composed of 6 components which could be weighted 0.535 - 0.689, the eigen values was 2.490 or 4.788% as shown on Figure V.

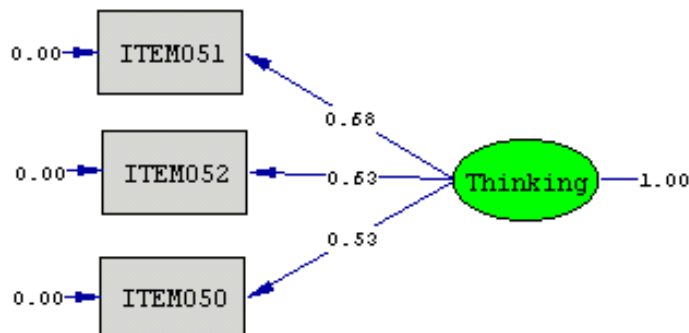


Figure V Confirmatory Model (No. 5) of Feeling of Persons and Interesting Lessons Factor

Table VI Supporting from the Institutes Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
29	Attendants and Mentors	0.668	0.348
30	Being Trained in and/or Attending Seminars	0.658	0.325
31	Educational Services such as Registration	0.587	0.324
32	Learning Atmosphere	0.491	0.248
28	Being As a Part of the Curriculum	0.422	0.172
Eigen Values = 2.410 or 4.635			

Table VI showed that the factor loadings of supporting from the institutes were composed of 6 components which could be weighted 0.422 - 0.668, the eigen values was 2.410 or 4.635% as shown on Figure VI.

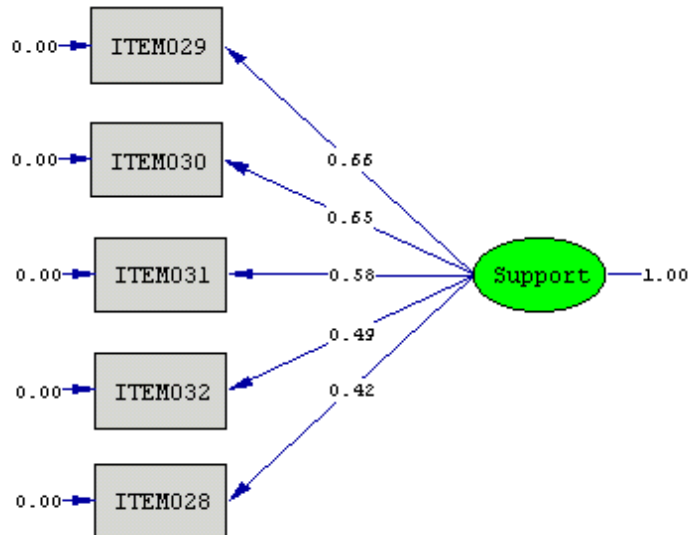


Figure VI Confirmatory Model of (No. 6) Supporting from the Institutes Factor

Table VII Personal Status Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
2	Age	0.711	0.370
3	Educational Program	0.700	0.353
4	Level of Education	0.694	0.348
1	Sex	0.571	0.316
Eigen Values = 2.018 or 3.880			

Table VII was found that the factor loadings of personal status were composed of 6 components which could be weighted 0.571-0.771, the eigen values was 2.018 or 3.880% as shown on Figure VII.

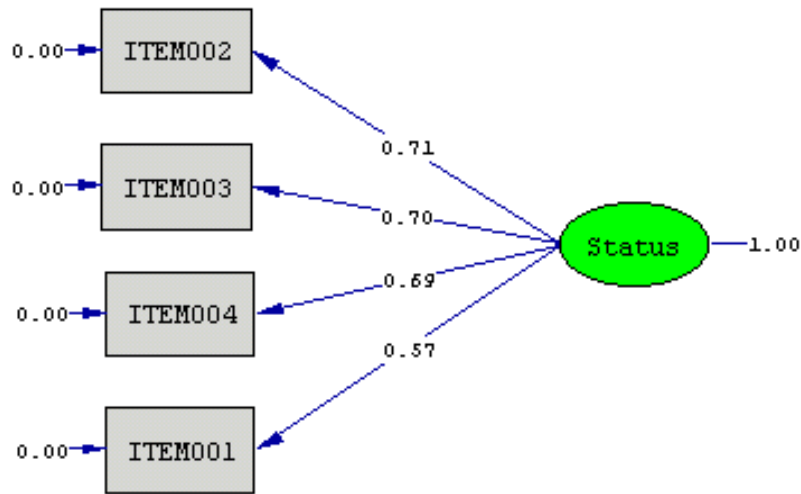


Figure VII Confirmatory Model (No. 7) of Personal Status Factor

Table VIII Learning at Anyplace, Anytime Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
40	No Limitation of the Distance in Education	0.756	0.468
39	No Time Limitation in Education	0.717	0.435
Eigen Values = 2.011 or 3.868			

Table VIII was found that the factor loadings of learning at anyplace, anytime were composed of 6 components which could be weighted 0.756 - 0.717, the eigen values was 2.011 or 3.868% as shown on Figure VIII.

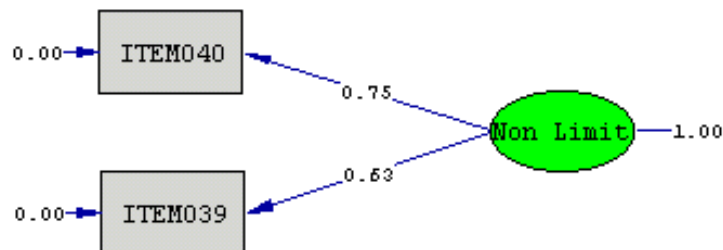


Figure VIII Confirmatory Model (No. 8) of Anyplace, Anytime for Education Factor

Table IX Social Value and Innovation Acceptance Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
6	Social Value	0.778	0.459
7	New Innovation Acceptance	0.635	0.359
5	Attitude	0.613	0.332
12	Society, Culture and Environment	0.585	0.331
Eigen Values = 1.955 or 3.759			

Table IX described that the factor loadings of social value and innovation acceptance were composed of 6 components which could be weighted 0.585 - 0.778, the eigen values was 1.955 or 3.759% as shown on Figure IX.

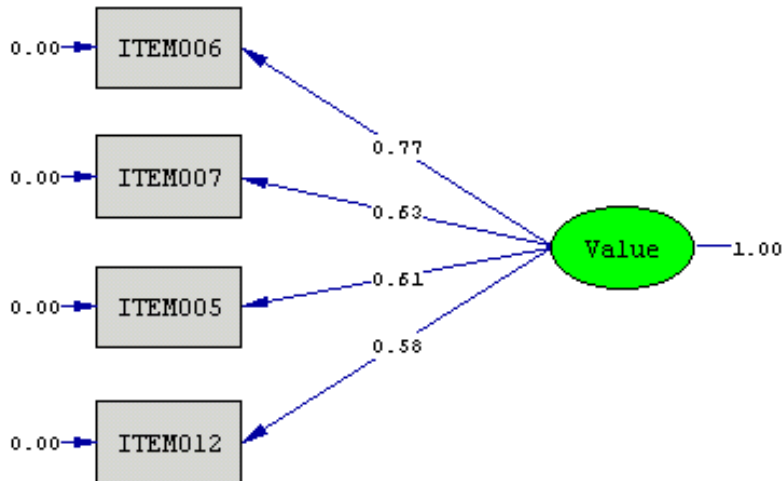


Figure IX Confirmatory Model (No. 9) of Value and Innovation Acceptance

Table X Experienced and Facilitated by Others Concerned Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
10	Friends and Teachers Mentor	0.747	0.452
9	Learning Experienced of the Lesson	0.743	0.429
8	Parental Supporting	0.523	0.265
Eigen Values = 1.955 or 3.759			

Table X identified that the factor loadings of experienced and facilitated by others concerned were composed of 6 components which could be weighted 0.747 - 0.523, the eigen values was 1.955 or 3.759% as shown on Figure X

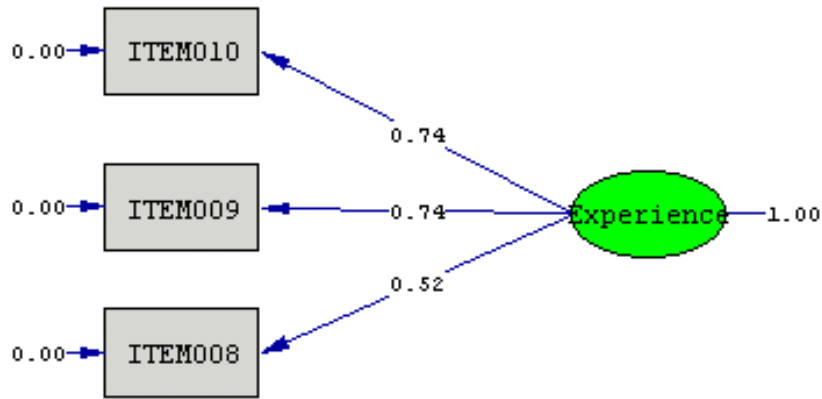


Figure X Confirmatory Model (No. 10) of Experienced and Facilitated by Others Concerned Factor

Table XI Self Learning Supporting Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
26	Constructionism	0.531	0.325
25	Personal Ability Improvement	0.479	0.281
27	Follow-up, Verification, Evaluation of Self-	0.469	0.273
24	Learning Learner-Lesson Interaction	0.390	0.210
Eigen Values = 1.857 or 3.571			

Table XI showed that the factor loadings of self-learning supporting were composed of 6 components which could be weighted 0.390 - 0.531, the eigen values was 1.857 or 3.571% as shown on Figure XI

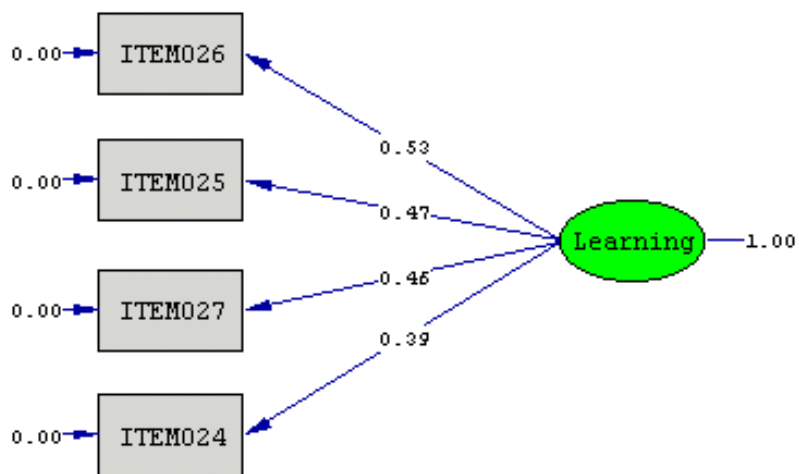


Figure XI Confirmatory Model (No. XI) of Self Learning Supporting Factor

Table XII Finding out Knowledge and Enhancing English Language Factor

Item	Factors	Factor Loadings	Component Scores Coefficient
49	Life-long Learning	0.590	0.440
48	English Language Improvement	0.431	0.312
Eigen Values = 1.857 or 3.571			

Table XII identified that the factor loadings of finding out knowledge and enhancing English language were composed of 6 components which could be weighted 0.431 - 0.590, the eigen values was 1.857 or 3.571% as shown on Figure V.

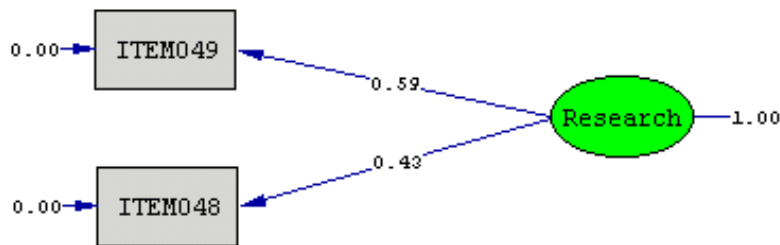


Figure XII Confirmatory Model (No. 12) of Finding out Knowledge and Enhancing English Language Factor

From Figure XIII below, it was found that the Multicorrelation between 12 and 52 factors was 0.455-0.832 and Multicorrelation Coefficient between 9 factors with that affected e-Learning was 0.530-0.800 which was rather high. On the otherhand, the Multicorrelation Coefficient between the internal factors was 0.078-0.278 which was rather low. Then, when 12 factors were compared by using  $\chi^2$  was 29.96. It means that there was no significant relationship between the students' levels of e-Learning at the 0.05.

#### 4. Conclusion, Discussion and Recommendations

The results of the study were led to discussion as follows:

