

THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

Factors for Effectiveness of Online Learning: Case Study in Cao Thang Technical College, Vietnam

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Abstract:

This study aimed to explore key factors for effectiveness of online learning. The survey questionnaire used to gather data from students of different faculties at Cao Thang Technical College, Ho Chi Minh City, Vietnam. Nine variables have been used to measure the effectiveness of the online learning. Cronbach's Alpha is used to evaluate the reliability and internal consistency of the associated factors. The exploratory factor analysis is used to extract the variables and measure the factor loading in this study. Nine factors have been explored, including learning goal setting (LGS), feedback and formative assessment (FFA), Instructional content organization (ICO), learning outcomes (LOs), applying knowledge (AK), managing online learning (MOL), teaching method (TM), student-teacher interaction (STI), learning resources materials (LRM). The linear regression models are used to identify the relationship among these factors. The results show that eight independent factors used in the study viz. LGS, FFA, LOs, AK, MOL, TM, STI, LRM positively impact students' satisfaction and further students' satisfaction positively impact the effectiveness of online learning (EOL).

Keywords: Online learning model, exploratory factor analysis, students' satisfaction, effectiveness of online learning.

1. Introduction

Due to the COVID 19 pandemic, online learning strategy was designed, developed, implemented in higher education. As a result, online learning has grown to complement traditional classroom based learning in higher university institution. Therefore, finding an effectiveness of online learning model for University student is vital important. There were many research E-learning effectiveness (Mehra & Omidian, 2011; Mbarek & Zaddem, 2013), these research revealed some factors affecting on E-learning effectiveness such as computer self efficacy, perceived usefulness of E-learning, ease of E-learning use, availability of resource interaction between teacher and students, and social presence. However, little attention has been paid to the issue of an online learning and teaching model effectiveness in virtual classroom. Therefore, finding an online learning and teaching model effectiveness in response to the students' learning needs is important. The purpose of the study is to explore key factors for online learning model to facilitate students engaging and persisting during the learning process.

2. Literature Review

E-learning is defined as a process of acquiring knowledge with two learning types i.e. synchronous and asynchronous E-learning. Synchronous is a learning process in which all participants are logged on at the same time and communicate directly with each other. This form of E-learning is beneficial to the student in that they have access to immediate feedback and live online interaction. In asynchronous E-learning, people do not require real time online present of teacher and students (Aguti, 2005).

Research on science education mentioned that an effective E-learning model must be motivated students in the learning process. According to Viau (2009), motivation is a key factor for successful learning. With respect to learning motivation, Keller (1987) presented an ARCS model. ARCS is an acronym that identifies four basic elements of motivation i.e., attention (A), relevance (R), confidence (C), and satisfaction (S). Relating to attention toward students, videos or emotional stimuli are used to maintain students' engagement. With regard to relevance, learning goals must be clarified to students at the beginning of course. In connection with students' confidence, students' capacity of achieving learning outcomes should be considered. Concerning students' E-learning satisfaction, teacher anticipate learning results or some reward for students' efforts.

In order to design an E-learning based on the content type, the instructional design is used such as ADDIE model. The ADDIE model includes five stages: Analysis, Design, Development, Implementation, and Evaluation (Ghirardini, 2011). The effectiveness of E-learning relates to the process of instructional design (ID). The ID should focus on the product around the students' learning needs. The six primary factors to consider in ID include learning goal setting, designing and planning assessment strategy, defining objectives of instruction, identifying core knowledges, material learning resources, and designing teaching methods and learning activities. Relating to ID, backward design course development of Wiggins & McTighe (1998) is used to plan and deliver learning course. The backward design model is used as a roadmap to establish a clear vision for the e-learning course will unfold.

During the design, development, and implementation online course, some of learning theories were used i.e., behaviorism, cognitivism, constructivism, and socio-constructivism (Raby et al., 2007). Behaviorist learning theory is used to teach concepts by presenting a series of step that lead to expected outcomes. Moreover, this theory can be used in giving students feedback, and measuring learning and retention. With regard to cognitive learning theory, instruction designer need to establish learning strategy in order to facilitate students discovering news knowledge, integrating them into prior one, and applying them to solve real world problems. Concerning constructivist learning theory, prior knowledge, material learning resources are organized to support students to build new knowledge (Gauthier & Tardif, 2005). As constructivist theory relates to hands on learning, thus it plays an important role in virtual learning environment. In E-learning process, interacting and sharing knowledge between students and teacher and among peers is vitally important, so Vygotsky's social constructivist learning theory is applied. To enhance interaction among students, collaborate learning in virtual environment impacted positively on E-learning (Henri & Cayrol, 2001). To deliver online course, learning based scenario is effectuated (Clark & Mayer, 2012). In virtual learning, teacher-students interaction play a vital role in the learning process, interaction can be effectuated through email, smartphone, social network, student response system (SRS). As a result, it is necessary that integrating the SRS into virtual learning environment is sine qua non for feedback and formative assessment strategy to students.

Feedback and formative assessment in virtual learning is a key factor affecting the effective E-learning (Baleni, 2015). The teacher needs to check for understanding and provide meaningful feedback to students. Formative assessment is a process, it's important to collect evidence of learning over time. Formative assessment can be administered in synchronous and asynchronous forms. In the synchronous form, where teachers and students are working together at the same time via online platform such as zoom, Google meet, teachers can provide feedback to students in real time. In the asynchronous form, where teachers and students are separated by both space and time, online tool such as Google Classroom and Moodle can help teachers provide feedback to students through questions, tasks, quizzes. Based on the literature review, a model online learning is elaborated as shown Figure 1.

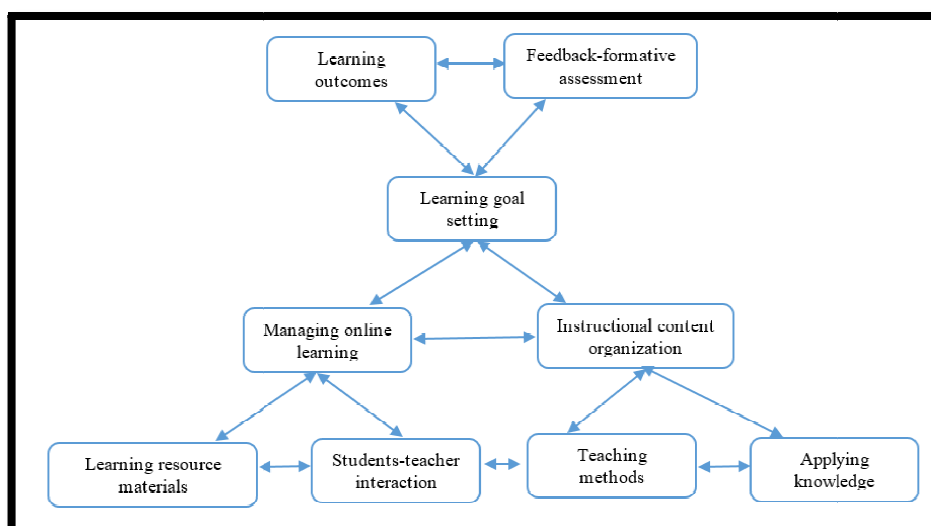


Figure 1: Online Learning Model

A set of subscales has been described in the literature which measures learning satisfaction and is used to guide development of questionnaire items, as seen Table 1.

Subscale	Description
Goal learning setting	Learner needs to set their goal and measurable performance toward their studies (Kennedy, 2006)
Feedback Formative Assessment	Refers to improve online teaching and learning by making use of student learning data (Vonderwell & Boboc, 2013)
Learning outcomes	Lists the specific core standards required for the course (Grubbs & Strimel, 2015)
Instructional content Organization	Refer to understanding the role of clear and organized instruction (Roksa et al., 2017). Teacher needs to establish learning strategy in order to facilitate student discovering news knowledges, integrating them into prior one (Gauthier & Tardif, 2005). Because students learn by connecting new knowledge with previous one, a roadmap can help facilitate their learning
Applying knowledge	Refer to students' capacity to apply what they have learned to solve problems (Jonassen, 2004)
Student-teacher interaction	Teacher student relationship play a vital role in the learning process (Hagenauer & Volet, 2014)

Subscale	Description
Managing online learning	Refers to effective communication, instructor communication (P. Elison-Bowers et al., 2011)
Learning resource materials	Refers to conditions and methods of utilizing teaching and learning resource (Kellam et al., 2012)
Teaching methods	Refers to choosing teaching method, learning outcome and teaching method (Bourner, 1997)
Effective online learning	Refers to the individual's feeling and attitudes towards education process and perceived level of achievement connected to the individual's desire to learn (Chang & Chang, 2012)

Table 1: Instructional design subscales for effective online learning

Based on literature mentioned above, as seen Table 1, nine hypotheses are stated as follow

H1: The goal learning setting is effective for students.

H2: The feedback and formative assessment strategy to students is effective for students.

H3: The learning outcome statement is effective for students.

H4: The instructional content organization is effective for students.

H5: The applying knowledge to new situation is effective for students.

H6: The managing online learning is effective for students.

H7: The students-teacher interaction and students and among peers is effective for students.

H8: The teaching method is effective for students.

H9: The learning material resource is effective for students.

3. Research Method

3.1. Empirical Model and Scale

Based on inheriting the theories and results of an experimental study, this study proposed an online learning model effectiveness at Cao Thang Technical College. This study selected and proposed the model consisting of nine factors with 28 observed variables, as follows:

Code	Measurement Scales
GLS	I. GOALS LEARNING SETTING
GLS1	1 The specific goal focus on the needs of students for whom the goal is aimed
GLS2	2. The results based goal identify specific outcome which students know, and able do
GLS3	3. The attainable goal include action that students can be accomplished
LOs	II. LEARNING OUTCOMES
LOs1	1. The content knowledge is clarified to students
LOs2	2. The required skills are stated to solve problem
LOs3	3. The core competencies are clarified to students
FFA	III. FEEDBACK and FORMATIVE ASSESSMENT
FFA1	1. Teachers regularly monitor students' progress in the learning process
FFA2	2. Teachers comment on the extent to which students gain knowledge after finishing an appropriate learning topic
FFA3	3. Teachers provide feedback to students to correct knowledge deficiencies for students timely at the end of the unit
FFA4	4. The teacher usually assesses and confirms the level of competency the student has achieved as compared to the learning outcomes listed at the beginning of the lesson
ICO	IV. INSTRUCTIONAL CONTENT ORGANIZATION
ICO1	1. The role's prior knowledge in learning is used with coherence
ICO2	2. The driving question system for building new knowledge is coherent
ICO3	3. The learning roadmap can help facilitate students learning.
AK	V. APPLYING KNOWLEDGE
AK1	1. Applying knowledge to solve the real-world problem
AK2	2. Applying knowledge in new context effectiveness
AK3	3. Applying knowledge to solve the engineering problem
MOL	VI. MANAGING ONLINE LEARNING
MOL1	1. The teacher communicates to students via variety of means
MOL2	2. Teacher keeps students engaged and committed
MOL3	3. The teacher creates connections with small group through collaborative learning
STI	VII. STUDENT TEACHER INTERACTION
STI1	1. The guidance of the teacher in the construction of knowledge for students is coherent
STI2	2. When students encounter difficulties in the learning process, the support of teachers is always timely

Code	Measurement Scales
STI3	3Using interaction tools between students and teacher is suit for learning
TM	VIII. TEACHING METHOD
TM1	1. Teaching methods motivate and engage students in the learning process
TM2	2.The teacher often combine a variety of methods to highlight important points of a lesson
TM3	3.The teacher keeps the rhythm of teaching appropriately
LMR	XIX. LEARNING MATERIALS RESOURCE
LMR1	1.The teacher provides perfectly appropriate learning support materials
LMR2	2. The assessment tool is effective
LMR3	3. The learning video is fully equipped
EOL	EFFECTIVE ONLINE LEARNING
EOL1	1. The content knowledge for teaching meet students' expectations
EOL2	2. Teaching organization helps students develop 21st-century skills
EOL3	3.This online course allowed them to integrate their knowledge, skills, and attitudes to develop their ability to solve practical problems
EOL4	4. The academic achievement results are very good

Table 2: Measurement Scales

The study explores the relationship among GLS, FFA, LOs, ICO, AK, MOL, STI, TM, LRM, and EOL, in which EOL is dependant variable, the other is an independent variable.

3.2. Research Design

The first, E-learning materials was designed, and uploaded on Google classroom. Then, the online course were delivered via zoom cloud meeting. The online course took place two months, from 10 February 2020 to 10 April 2020, during the period of Covid-19 pandemic. After the online course finished, an online questionnaire sent to students to survey students' perceived effective online learning.

3.2.1. Sample and Sample Size

In this study, the data were collected from first year student at the Cao Thang Technical College, Ho Chi Minh-Vietnam. A questionnaire was sent to 600 students, received from 310 and response rate 52%. A structured questionnaire is used as a data collection instrument. Data was collected using an online survey.

According to Hair et al. (2010), the sample size must be 5 times larger than the observed variables. This means that if n is the sample size, m variables, then $n \geq 5m$. In this research, theory model has 28 variable, so the sample size is $n \geq 5.28 = 140$. In this research, a total of 310 students participated in the survey, thus the sample size responds to the research.

3.2.2. Research Instrument

The research instrument used was a questionnaire prepared following the Likert scale. The statement consists of a choice answers with the values (1) very dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) very satisfied.

3.2.2.1. Instrument Validity

The content validation has been used in this study. The content validation is a process of examining the contents of the items of the questionnaire to check whether they represent the entire theoretical construct of the designed model of the problem under consideration. Content validation is done by a panel of experts who have expertise with the construct of the questionnaire and capable to evaluate content validation. The content validation team checks the questionnaire items and their adequateness in measuring the constructs and to know whether the chosen items are sufficient to measure the variables in the domain.(Oluwatayo, 2012).

3.2.2.2. Instrument Reliability

To measure reliability of the instrument, a pilot study was conducted with 100 students who were not included in the study's sample. The results were analyzed using Cronbach's alpha which is calculated, which is commonly used to test the reliability of questionnaire items (Cronk, 1999).

3.2.3. Data Collection

In the survey, the questionnaire was distributed in 9 groups of categories including goal learning setting (GLS), learning outcomes (LOs), feedback and formative assessment (FFA), instructional content organization (ICO), Applying knowledge (AK), Managing online learning (MOL), student teacher interaction (STI); Teaching method (TM), Learning resources materials (LRM), and dependent variable, namely effective online learning (EOL).

3.3.4. Analyzing Data

The data were encoded, and analyzed by SPSS 22.0 through the following process.

3.3.4.1. Reliability Analysis by Cronbach's Alpha

The Cronbach's alpha has been used to evaluate the reliability of the factors and to understand they are internally consistent. Internal consistency describes the extent to which all the items in a test measure the same concept, and Cronbach's Alpha is one way of measuring the strength of that consistency.

3.3.4.2. Exploratory Factors Analysis

Exploratory factor analysis (EFA) is designed for a situation where the relationships between the observed and latent variables are uncertain (Yong & Pearce, 2013). EFA was performed in this study because that survey questionnaire included the new items. All 28-items in the questionnaire have been analyzed to find the factors that contribute to the effective online learning by using the Varimax method, which attempts to minimize the number of variables that have high loadings on each factor. According to Williams et al. (2010), discovery and analysis must consider under the following criteria.

- The reliability of the observed variable (Factor loading >0.5): An important part in EFA is interpreting factor matrixes. This research will use a Varimax rotation process to produce multiple group factors. Factor loadings which indicate correlations between the variables and the factors are required to have values greater than 0.5.
- Verification of model appropriateness: The sampling adequacy of factor analysis is based on the Kaiser-Meyer-Olkin (KMO) measure. In the case that the KMO has a value between 0.5 and 1, and Sig. is smaller than 0.05, the factor analysis is accepted.
- Bartlett's test of sphericity: The Bartlett's test of sphericity tests whether a matrix is significantly different from an identity matrix. This statistical test for the presence of correlations among variable. To apply factor analysis, some relationship between variable are needed, thus, a significant Bartlett's test of sphericity is required ($\text{sig} < 0.05$).
- The cumulative variance: The cumulative % gives the percentage of variance accounted for by n first components. The variance explained should be greater than 50%.

3.3.4.3. Regression Analysis

The linear regression model was used to analyze between the dependent variable (effective elearning) and independent variables (GLS, LOs, FFA, ICO, AK, MOL, STR, TM, LRM). Then, based on the regression function, the impact of independent variables on the dependent variable is considered.

To test assumptions for regression analysis, the principal assumption is that there is a linear relationship between the independent and dependent variables. Due to the research model with more than one independent variables, the correlation among independent variables (multi-collinearity) should be checked through a Variance inflation factor (VIF) (the variables which have a VIF smaller than 10 will be accepted). In addition, the Durbin Watson statistic is a test for autocorrelation in the residual from a statistical regression analysis. Moreover, it is assumed that the error terms ε are independent, there are normally distributed random variables with mean value of 0, and there is constant variance.

4. Findings

4.1. Reliability Test

Testing the quality of scale by Cronbach Alpha's coefficient is used to evaluate the reliability of factors and understand they are internally consistent. The quality testing results of the scale seen in Table 3 revealed that the coefficients ranged from 0.705 to 0.975, indicating that all factors had a high rating for reliability.

Scale	Observed Variable	Number of Items	Cronbach's Alpha
Goal learning setting	GLS1, GLS2, GLS3	3	0.819
Feedback and formative assessment	FFA1, FFA2, FFA3, FFA4	4	0.948
Learning outcomes	LOs1, LOs2, LOs3	3	0.961
Instructional content organization	ICO1, ICO2, ICO3	3	0.871
Applying knowledge	AK1, AK2, AK3	3	0.783
Managing online learning	MOL1, MOL2, MOL3	3	0.975
Student teacher interaction	STI1, STI2, TSI3	3	0.840
Teaching method	TM1, TM2, TM3	3	0.831
Learning resources materials	LRM1, LRM2, LRM3	3	0.802
Effective online learning	EOL	4	0.705

Table 3: Cronbach Alpha Reliability Test

4.2. KMO and Bartlett Test of Sphericity

The Kaiser-Meyer Olkin Measure verified the sampling adequacy for analysis, KMO = 0.799 which is above Kaiser's recommended threshold of 0.6 (Kaiser, 1974). Bartlett's test of sphericity ($p < .0000$) indicated that correlations between items were sufficient for EFA, as shown in Table 4.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.799
Bartlett's Test of Sphericity	Approx. Chi-Square	10517.381
	df	378
	Sig.	.000

Table 4 : KMO and Bartlett's Test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.650	30.891	30.891	8.650	30.891	30.891	3.593	12.834	12.834
2	2.469	8.818	39.709	2.469	8.818	39.709	2.901	10.361	23.194
3	2.252	8.044	47.753	2.252	8.044	47.753	2.899	10.355	33.549
4	2.034	7.266	55.018	2.034	7.266	55.018	2.483	8.866	42.415
5	1.905	6.803	61.821	1.905	6.803	61.821	2.349	8.390	50.805
6	1.755	6.266	68.088	1.755	6.266	68.088	2.312	8.256	59.061
7	1.522	5.435	73.523	1.522	5.435	73.523	2.265	8.088	67.149
8	1.410	5.034	78.557	1.410	5.034	78.557	2.217	7.917	75.065
9	1.207	4.311	82.869	1.207	4.311	82.869	2.185	7.803	82.869
.....									
28	.010	.034	100.000						

Extraction Method: Principal Component Analysis.

Table 5: Total Variance Explained

To extract factors from the observed variables, the principal component and varimax rotation have been used. Table 5 shows that the 28-items structure was found to explain 82.86 % of the total variance in the pattern of relationships among the items. The factors loadings are greater than 0.5 for all the factors which endorses that there is a good association between the items and the factor groupings to which they belong. This is consistent with the research of Williams et al. (2010).

4.3. Regression Analysis Results

The study adopts Multiple Regression Analysis (MRA) to test the research framework. MRA is a symmetric test that elucidates the effect of the set of independent variables on the dependent variable. The study enters all nine variables to verify the framework, R^2 is 0.794 and adjusted R^2 is 0.788, standing for 78.8% of the total variance in the dependent variable explained by the independent variables, as seen in Table 6. In the Table 7, the p-value for Anova analysis is smaller than 0.05 at 95% confidence level, thus the theoretical model is consistent with the actual data. No multicollinearity exists because the VIF is between 1.226 and 1.767 (the VIF is smaller than 10), as seen in Table 8. In addition, no autocorrelation exists because the Durbin Watson has a value of 1.966 (the Durbin Watson has value between 1 and 3), as shown in Table 6. Due to the $\text{sig} < 0.05$ at 95% confidence level, the regression coefficients of the independent variables are not equal to zero. Thus, the theoretical is built in accordance with the reality, as shown in Table 8.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.891 ^a	.794	.788	.11377	1.966

Table 6: Model Summary^b

a. Predictors: (Constant), FFA, AK, MOL, KBP, GLS, TM, TSI, LRM, LOs

b. Dependent Variable: EOL

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.953	9	1.661	128.369	.000b
	Residual	3.883	300	.013		
	Total	18.835	309			

a. Dependent Variable: EOL
b. Predictors: (Constant), FFA, AK, MOL, KBP, GLS, TM, TSI, LRM, LOs

Table 7: Anova^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics		
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	1.407	0.107		13.176	0	1.197	1.617		
	GLS	0.077	0.018	0.128	4.352	0	0.042	0.112	0.789	1.268
	LOs	0.148	0.025	0.19	6.037	0	0.1	0.196	0.693	1.443
	ICO	0.077	0.017	0.13	4.478	0	0.043	0.11	0.816	1.226
	AK	0.106	0.019	0.158	5.668	0	0.069	0.143	0.88	1.137
	MOL	0.079	0.016	0.145	4.844	0	0.047	0.111	0.772	1.296
	STI	0.081	0.017	0.145	4.817	0	0.048	0.114	0.761	1.314
	TM	0.127	0.02	0.197	6.218	0	0.087	0.167	0.687	1.456
	LRM	0.049	0.019	0.08	2.559	0.011	0.011	0.086	0.703	1.422
	FFA	0.119	0.014	0.271	8.267	0	0.091	0.148	0.638	1.567

Table 8: Coefficients^a

a. Dependant Variable: Effective Online Learning (Eol)

F Value 128.369 (Sig. =0.000)

R Square 0.794

Adjusted R Square 0.788

Durbin-Watson 1.966

In the Table 8, the p-value for nine independent variables are smaller than 0.05, thus these variables are correlated with dependent variable at 95 % confidence level.

Testing the variance of the constant residuals, is called the homoscedasticity, has been effectuated using the Spearman correlation: In Table 9, the variable ICO is eliminated due to the p-value less than 0.05 (sig < 0.05). As a result, the variables that remain in the model include GLS, LOs, FFA, AK, MOL, STI, TM, LRM.

			ABSRES
Spearman's rho	ABSRES	Correlation Coefficient	1
	FFA	Correlation Coefficient sig.(2-tailed)	0.184
	GLS	Correlation Coefficient sig.(2-tailed)	0.24
	LOs	Correlation Coefficient sig.(2-tailed)	0.128
	ICO	Correlation Coefficient sig.(2-tailed)	0.030
	AK	Correlation Coefficient sig.(2-tailed)	0.127
	MOL	Correlation Coefficient sig.(2-tailed)	0.268
	IST	Correlation Coefficient sig.(2-tailed)	0.110
	TM	Correlation Coefficient sig.(2-tailed)	0.933
	LRM	Correlation Coefficient sig.(2-tailed)	0.224

Table 9: The Variance of the Constant Residuals

5. Discussion

As the variable ICO is eliminated (seen in Table 10). As a result, the hypotheses retained in the model include H1, H2, H3, H5, H6, H7, H8, H9. The regression function which illustrates the relationship between eight factors and effective E-learning is as follows:

$EOL = 1.407 + 0.148LOs + 0.119FFA + 0.127TM + 0.077GLS + 0.079MOL + 0.081STI + 0.106AK + 0.049LRM$. From the question, eight factors have a positive relationship with the effective online learning :

- The factor has the most significant on effective online learning is learning outcomes LOs with the coefficient 0.148, it means that when students evaluate this factor increasing by 1 point, effective online learning will increase by 0.148. The finding from the research was consist with those obtained by Wiggins & McTighe (2005), who stated that the learning outcomes should be clarified in order that students can be able to think and do to successfully complete assessments.
- The variable FFA, with the coefficient 0.119, have a positive relationship with effective online learning variable. The result aligned with those obtained by Andrade (2015), who mentioned that effective instruction requires feedback and assessment effectiveness. The effectiveness of assessment process improve student learning, and students 'self-regulated learning. As a result, the teaching strategy has improved the virtual learning course. Designing and implementing system response student into the virtual learning course has helped students monitor their progress in relation to the learning goals setting.

- The variable TM, with the coefficient 0.127, have a positive relationship with effective online learning variable, it means that when students evaluate this factor increasing by 1 point, effective online learning will increase by 0.142. This result was in line with Djudin (2018), who stated that using the effectiveness of teaching method has enhanced the effective E-learning.
- The variable GLS, with the coefficient 0.077, have a positive relationship with effective online learning variable. Indeed, setting goal learning has facilitated students understanding the important course learning, helped them determine assessment strategy, provided them with the plans of learning activities to complete desired learning goals successfully. This result was in line with Andrade (2015), Djudin (2018), who stated that the effective learning goal setting enhanced effective online learning for students.
- The variable STI, with the coefficient 0.081, have a positive relationship with effective online learning variable, it means that when students evaluate this factor increasing by 1 point, effective online learning will increase by 0.081. The results were consistent with those from the previous finding by Martínez-Caro (2011), Baleni (2015) who stated that interaction between students and teacher is an important factor to help students learning in online learning.
- The variable AK, with the coefficient 0.106, have a positive relationship with effective online learning variable, it means that when students evaluate this factor increasing by 1 point, effective online learning will increase by 0.106. To facilitate students applying knowledge learned, at the begging of the course, students be provided with the intended learning, explained how to apply knowledge learned to solve problems in the real world.
- The variable LRM, with the coefficient 0.049, have a positive relationship with effective online learning variable. The results are consistent with the work of Chang & Chang (2012), who stated that learning resource materials support student learning, motivate them to learn, and help develop independent learning. As a result, learning resource materials play a vital role in the virtual learning, it is a key parts of the teaching and learning in online environment, and it is also a factor affecting students' academic achievement.
- The variable MOL, with the coefficient 0.079, have a positive relationship with effective online learning variable. The results are consistent with the work of Kimball (2002); Cangelosi (2013), who stated that the purpose of organizing management classroom is to lead students to cooperate in the learning process, and to motivate students to engage in learning activities through synchronous or asynchronous communication.

The results show that eight independent factors viz. LGS, FFA, LOs, AK, MOL, TM, STI, LRM positively impact students' satisfaction and further students' satisfaction positively impact the effectiveness of online learning (EOL). Finding from this research is considered as an online learning model to enhance effectiveness in virtual learning. These above mentioned factors involved students engaging and persisting during the learning process, made the online learning more interesting, created a positive ambiance of students and teacher interaction in the learning outcome and assessment methods. The online course designed with a specific structure helps students gradually develop greater autonomy, self-regulation, and targeted skills and knowledge as they set goals, apply what they are learning, and reflect on their learning.

6. Conclusion

In this study, we conducted an exploratory factor analysis in order to determine which are the factors involved in the online learning course. The study executed a questionnaire survey, adopts MRA to test the proposed framework for online learning model effectiveness. Based on the finding, it was concluded that, of nine factors that affect effective online learning model, there are eight factors most affecting the effective online learning at Cao Thang Technical College; namely learning outcome (LOs), teaching method (MT), feedback and formative assessment (FFA), goal learning setting (GLS), managing online learning (MOL), learning resource materials (LRM), applying knowledge (AK), and student teacher interaction (STI). These results lead us to advocate these variables in the future in order to understand more precisely their influence on effective online learning.

7. Acknowledgments

I would like to thank the Cao Thang Technical College for funding this research. I am also extremely grateful to all students who took the time to complete the survey this study. I truly value the information they have provided. Their responses contributed to my analysis of this research.

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