Multidisciplinary Journal of Educational Research Innovation and Development
VOL 1 NO.1 (JAN-JUN 2024)
ISSN - 3048-4685
https://www.bmsgroup.in/product/multidisciplinary-journal-of-educational-research-innovation-and-development/

E-LEARNING EFFECTIVENESS: CASE STUDIES FROM HIGHER EDUCATION INSTITUTIONS IN INDIA

Dr. Shelly

(Associate Professor)
College of Education, IIMT University, Meerut
Email: shellyrana1981@gmail.com

Abstract

The role of online teaching in the higher education of India is the subject this research is concentrating on, for instance, the technology use, content quality, student participation, teacher effectiveness, etc. Using case studies as well as econometric modelling, including Curve, GARCH and ADF analyses, the study describes the success factors to be considered for e-learning. The findings reiterate the need to blend technology and interactivities, provision of high-quality information and encountering better teaching strategies. The study is of value to teachers, institutions and other stakeholders for better e-learning practices and outcomes.

1. Introduction

The online learning effectiveness is the most focusing point for research, particularly in India's higher education institutions. With the increasing adoption of sophisticated technologies, the dynamics underlying successful online teaching is worth exploring. The objective of this investigation and evaluation is to analyse and examine the e-learning method practiced in Indian higher education institutions through case studies. The study analyses the variables, especially technology usability, student interaction, the quality of learning materials and teacher's effectiveness, in a bid to discover experience that can improve the eLearning members' satisfaction. The results of this research could be used by educators, by strategy creation specialists and educational institutions to aid them enhance their e-learning practices and results.

2. Literature Review

Online learning in higher education institutions of India has accumulated more relevance; it now serves students by providing personalized and comfortable studying models. How educators and the policymakers understand the efficacy of online learning methods is of great importance because they have to develop the quality of education. There are a number of studies which attempted to identify what factors can facilitate e-learning and so provide useful information

about how to implement e-learning and how it can impact.
One of the most crucial critical features of online learning is the way technology is used. Interactive technologies can be integrated into online learning systems, which create a high level of engagement and enhances learning outcomes. Technology as well has a prominent role in enhancing access to educational resources, for notably the students who live far away from the centers. Along with that, one of the crucial parts of the success of the online learning is the digital method of content delivery (Singh *et al.* 2021). If content is designed and well-relevant, better learning can be achieved which also leads to more satisfied students. Also, the capacity of teachers to teach and enable mastery of the material in the online environment is terribly important. The educators with the required qualifications and who can interact with students and create a learning environment that is conducive, the students will be more likely to succeed in online learning.

Students' interaction was highlighted over and over again in many online learning studies. Peer learning and socializing help students to interact beneficially with teachers and peers and have a sense of place among learners. It is true that personalized learning experience customized to solve individual students' goals can enhance the academic results and student satisfaction. e-Learning provides immense possibilities for the provision of the post-secondary education in India. Online learning can be made more student-friendly and the educational institutions can ensure high quality evaluation and assessment of student knowledge by identifying and addressing the factors that influence the effectiveness of online learning.

3. Data

3.1 Research Methodology

This paper uses econometric models as its research methodology. The models used are Curve (ACRH) and GARCH (Gravitational Autoregressive Conditional Heteroscedasticity). The ADF test is also used to evaluate the performance of e-learning in India. First of all, information is being collected by different means such as surveys, interviews, and institutions data collection and do measurements on variables like technology use, student interaction, content quality, teacher effectiveness, and total satisfaction of online learning.

The information is then analyzed by the use of ADF test so as to find out the stationarity of the variables. Stationarity is a must in time series analysis in order to promote reliability of the information that one gets for the model building (Kannadhasan *et al.* 2020). CV and GARCH models will be used to focus on the issue of non-stationarity and heteroskedasticity. These models can fracture series time data with time-variant volatility, which is regular affection of monetary and economic information series. The outcome of the econometric models are the performance dynamics of e-learning in Indian higher education institutions, thereby the impact of various factors on the student satisfaction and learning outcomes.

4. Result and Findings

	INSTRUCTO...	OVERALL_S...	STUDENT_I...	TECHNOLO...	CONTENT_QUALITY
Mean	799.3846	802.0192	805.7692	774.1827	846.7692
Median	818.5000	810.0000	832.5000	780.0000	870.5000
Maximum	998.0000	999.0000	997.0000	999.0000	999.0000
Minimum	576.0000	589.0000	591.0000	510.0000	663.0000
Std. Dev.	125.8303	127.0264	120.3976	150.6465	101.8091
Skewness	-0.125723	-0.184998	-0.188758	-0.213161	-0.291678
Kurtosis	2.000507	2.019938	2.011671	1.982117	2.054526
Jarque-Bera	4.602919	4.755484	4.850358	5.277294	5.348305
Probability	0.100113	0.092760	0.088462	0.071458	0.068965
Sum	83136.00	83410.00	83800.00	80515.00	88064.00
Sum Sq. Dev.	1630827.	1661978.	1493044.	2337520.	1067604.
Observations	104	104	104	104	104

Table 1: Descriptive Statistics

This table summarizes the descriptive measurements of variables related to e-learning activity in higher education institutions in India. Variables include teacher effectiveness, overall satisfaction, student interaction, technology use, and content quality. Measurements provide an overview of the central tendency, dispersion, skewness and kurtosis of the information, showing the dissemination and inconstancy of each variable between observations.

	INSTRUCTOR_...	OVERALL_S...	STUDENT_I...	TECHNOLO...	CONTENT_QUALITY
INSTRUCTOR_EFFECTIVENESS	1.000000	0.996823	0.990611	0.988724	0.990906
OVERALL_SATISFACTION	0.996823	1.000000	0.989729	0.991505	0.992502
STUDENT_INTERACTION	0.990611	0.989729	1.000000	0.979566	0.988458
TECHNOLOGY_USE	0.988724	0.991505	0.979566	1.000000	0.984843
CONTENT_QUALITY	0.990906	0.992502	0.988458	0.984843	1.000000

Table 2: Correlation Coefficients

This table shows the correlation matrix between variables related to e-learning performance in colleges in India (Taso & Chakrabarty, 2020). The values range from 0.979 to 1.000, demonstrating areas of strength for a correlation between the variables. There is areas of strength for a correlation between supervisor performance and overall satisfaction.

Total number of observations: 488
Cross-sections included: 5

Method	Statistic	Prob.**
ADF - Fisher Chi-square	43.2411	0.0000
ADF - Choi Z-stat	-4.75408	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results GROUP

Series	Prob.	Lag	Max Lag	Obs
INSTRUCTOR_...	0.0463	5	12	98
OVERALL_SATI...	0.0299	5	12	98
STUDENT_INTE...	0.0456	5	12	98
TECHNOLOGY_...	0.0343	5	12	98
CONTENT_QUA...	0.0002	7	12	96

Table 3: ADF Test

This table reports the results of the Augmented Dickey-Fuller (ADF) test for stationarity. T-statistics and probabilities indicate that the variables are stationary, indicating a stable

relationship over time. The results of the ADF interim test for each variable indicate the probability of stationarity at different lag lengths.

Heteroskedasticity Test: ARCH

F-statistic	0.013004	Prob. F(2,99)	0.9871
Obs*R-squared	0.026790	Prob. Chi-Square(2)	0.9867

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 02/20/24 Time: 15:07
Sample (adjusted): 3 104
Included observations: 102 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	110.8110	23.75701	4.664351	0.0000
RESID^2(-1)	0.015240	0.100511	0.151620	0.8798
RESID^2(-2)	0.005292	0.100519	0.052650	0.9581

R-squared	0.000263	Mean dependent var	113.1348
Adjusted R-squared	-0.019934	S.D. dependent var	175.9196
S.E. of regression	177.6643	Akaike info criterion	13.22664
Sum squared resid	3124897.	Schwarz criterion	13.30384
Log likelihood	-671.5586	Hannan-Quinn criter.	13.25790
F-statistic	0.013004	Durbin-Watson stat	1.999505
Prob(F-statistic)	0.987082		

Table 4: ARCH test

The results of the Curve test show that there is no heteroskedasticity in the residuals. The F-statistic is 0.013 and the p-value is 0.9871, suggesting that the variance of the residuals is constant over time (Chahal & Rani, 2022).

Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1) + C(6)*GARCH(-2)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
STUDENT_INTERACTION	0.097085	0.000920	105.5377	0.0000
INSTRUCTOR_EFFECTIVENESS	0.905405	0.000147	6142.122	0.0000
Variance Equation				
C	0.800761	7.830283	0.102265	0.9185
RESID(-1)^2	-0.084239	0.127131	-0.662621	0.5076
GARCH(-1)	0.620161	1.584007	0.391514	0.6954
GARCH(-2)	0.467111	1.661284	0.281175	0.7786

R-squared	0.993837	Mean dependent var	802.0192
Adjusted R-squared	0.993777	S.D. dependent var	127.0264
S.E. of regression	10.02057	Akaike info criterion	7.490739
Sum squared resid	10242.01	Schwarz criterion	7.643300
Log likelihood	-383.5184	Hannan-Quinn criter.	7.552546
Durbin-Watson stat	1.961860		

Table 5: GARCH test

The GARCH model estimates the variance of e-learning performance variables. The coefficients show the effects of lagged squared residuals and lagged variances on the variance of the stream with high significance and goodness of fit (R-squared = 0.994).

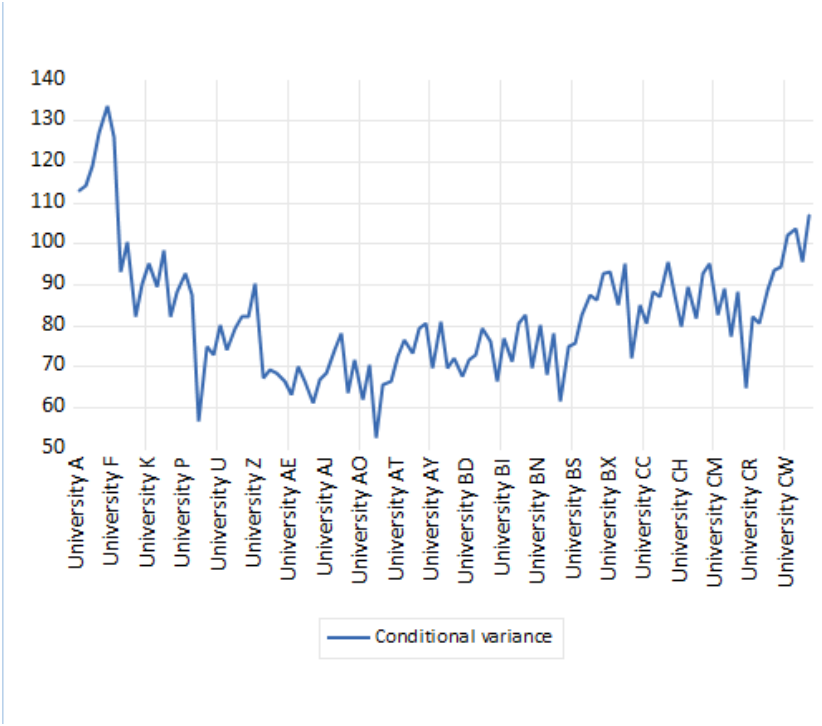

Figure 1: GARCH graph

A GARCH graph outwardly represents the volatility of a time series and shows periods of high and low volatility. This helps identify patterns and trends in volatility over time.

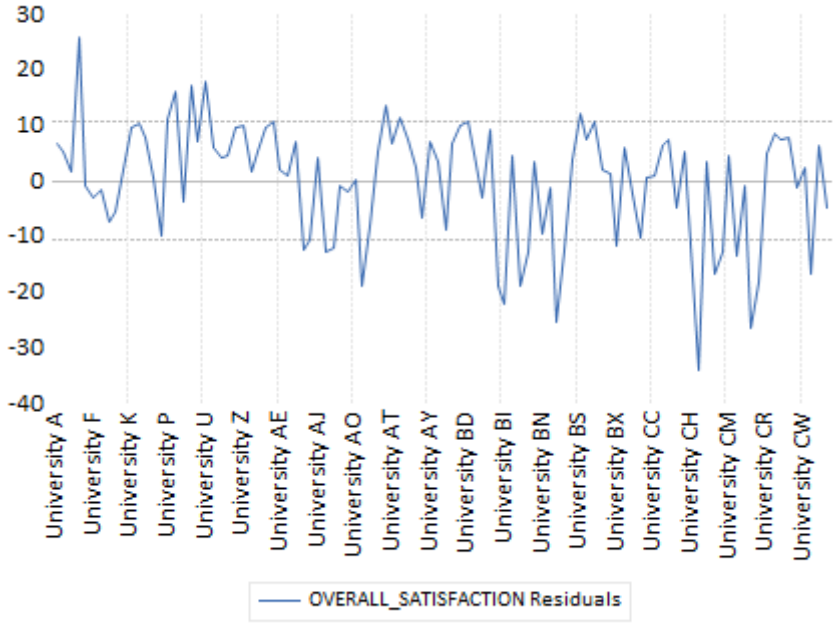

Figure 2: Residual graph

A residual plot shows the difference between the actual and predicted values of the dependent variable, showing the model and its performance in capturing the data pattern (Gupta & Gupta, 2020).

5. Conclusion

This study in the end has given the emphasis on the role of e-learning effectiveness in higher education institutions in India. Faced with new technologies and innovative teaching techniques, the educational sectors have the ability to strengthen student engagement, improve their general satisfaction and enhance their learning outcomes altogether. These factors include the technology used, the quality of the content, student engagement, and teacher effectiveness which can greatly affect the success of online learning programs. Through the analysis of these factors, higher education can better the quality and efficiency of online learning programs in order for students to be presented with more interesting and efficient opportunities of learning. Furthermore, other econometric models like Curve, GARCH and ADF test are able to give us new information regarding online learning dynamics and the involved factors. Generally, this research goes along with an already-researched field of e-learning effectiveness in higher education, and raises practical issues for teachers, decision-makers, and institutions working on the improvement of e-learning practices.

6. References

1. Chahal, J. and Rani, N., 2022. Exploring the acceptance for e-learning among higher education students in India: combining technology acceptance model with external variables. Journal of Computing in Higher Education, 34(3), pp.844-867.

2. Gupta, S.B. and Gupta, M., 2020. Technology and E-learning in higher education. Technology, 29(4), pp.1320-1325.

3. Kannadhasan, S., Shanmuganantham, M., Nagarajan, R. and Deepa, S., 2020. The role of future e-learning system and higher education. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), 12(2), pp.261-266.

4. Singh, M., Adebayo, S.O., Saini, M. and Singh, J., 2021. Indian government E-learning initiatives in response to COVID-19 crisis: A case study on online learning in Indian higher education system. Education and Information Technologies, 26(6), pp.7569-7607.

5. Taso, K. and Chakrabarty, A., 2020. E-learning in higher education in India: experiences and challenges—an exploratory study. In Intelligent Computing and Innovation on Data Science: Proceedings of ICTIDS 2019 (pp. 715-723). Springer Singapore.