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# Effect of E-Learning on Academic Performance of Undergraduate Students at Nankai University, China

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## Abstract

The purpose of the study was to examine the effect of e-learning on the academic performance of undergraduate students at Nankai University in China. The study adopted the descriptive research design. Descriptive research design is a type of research design that aims to systematically obtain information to describe a phenomenon, situation, or population. The sample size was 361 students and they were purposively picked. The collection of the data was done using questionnaires. Descriptive and inferential were used to analyze the data. It was found that e-learning is positively and significantly related to academic performance. E-learning is among the expanding areas, particularly in tertiary education. Educational institutions are different in growing nations than in developed nations, like poor quality of education and low chances of attending learning institutions in the local areas because of long distances. E-Learning enhances accessibility to effective learning and therefore boosts the performance of learners. It is easy since learners watch a video documentary in the lecture room. In an E-learning system, learners can interact anytime and from anywhere with various educational materials like messages, audio, pictures, video and more via the internet. The study concluded that e-learning is positively and significantly related to academic performance. The study recommended that both the lecturers and the learners are required to develop a personal interest in the usage of ICT. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. There is a need to have a steady power supply to use ICT effectively. It is also recommended that tertiary institutions' management make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives.

**Keywords:** *E-Learning, academic performance, Undergraduate Students, Nankai University, China*

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## **1.0 Introduction**

Education is an essential aspect of sustainable development. The relevance of education, particularly in growing nations, is rising because of the increasing pressure to catch up with the already developed nations (Malik, 2018). Educational institutions are different in growing nations than in developed nations, like poor quality of education and low chances of attending learning institutions in the local areas because of long distances. E-learning signifies the use of ICT by educators and students. Carbonaro (2020) stated that e-learning includes conventional training, like programs, ad-hoc training, chosen learning equipment, formalization through document collections and community formation, which may be done through social software. There are currently several e-learning programs provided in the growing nations. E-Learning is web-based or online learning (Fauzi, Baharun, Mundiri & Mansur, 2018). It is essentially an online system of education that makes information or knowledge available to students. Overall, E-learning overlooks geographic distance.

The adoption of web-based innovations for educational issues has increased dramatically due to the costs of embracing such innovations, which have substantially reduced. Most tertiary institutions are benefiting from internet-based learning and using it to complement the traditional method of learning (Szymkowiak, Melović, Dabić, Jeganathan & Kundi, 2021). E-learning has been quickly arising in different institutions of tertiary education globally. High/ secondary schools are mindful of the impact of e-learning on learners' academic success. E-learning is a technology, company and governance-based structure that allows learners to study through the web and learn conveniently. Zolocheskaya, Zubanova, Fedorova and Sivakova (2021) reported that E-learning uses interactive education platforms like machines, the internet, multimedia disks, electrical papers, and simulated broadcasts to reduce time and expenses to create, speed up and enhance learning. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. There is a need to have a steady power supply to use ICT effectively. Tertiary institutions' management should make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives.

E-Learning enhances accessibility to effective learning and therefore boosts the performance of learners. E-learning makes it possible for many students in tertiary institutions to enrol in two programmes concurrently. E-learning uses technology to assist and improve learning (Asad, Hussain, Wadho, Khand & Churi, 2020). It is easy since learners watch a video documentary in the lecture room. E-learning started years back with the introduction of televisions and overhead projectors in lecture rooms and has improved to involve interactive computer programmes, 3D simulations, video and telephone conferencing and real-time online discussion groups consisting of learners from all over the globe. With technological improvements, E-learning has borderless possibilities. E-learning has substantially helped students enhance academic performance, learning process and self-advancement. Overall, E-learning overlooks geographic distance. Most tertiary institutions are benefiting from internet-based learning and using it to complement the traditional learning method. Tawafak, Romli, and Alsinani (2019) note that because of high speed, convenience and performance in accessing and processing information through internet systems, e-learning has been a crucial method in technical training and learning at tertiary institutions.

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The influence of E-learning is evaluated by determining if learners can comprehend what was presented or taught to them. Bakri, Sunaryo, Irawan and Mulyati (2018) argued that E-learning limits the ability of learners to grasp what is taught or presented. In an E-learning system, learners can interact anytime and from anywhere with various educational materials (messages, audio, pictures, video and more) via the internet (Setiawan, Qurrohman & Kurniawan, 2019). Additionally, students can exchange ideas with lecturers and classmates individually or in a group discussion using message boards, instant message exchanges and video conferencing. E-learning system is used for open, flexible, and in a different E-learning environments. Additionally, an E-learning system may be regarded as an inventive method for delivering a learner-centred, and facilitated learning environment anywhere, anybody, anytime by the use of features and resources of different electronic technologies along with other sorts of learning materials made for an open, distributed, and flexible learning environment (Kim, Hong & Song, 2019).

An E-learning system enables an approach to education targeted at improving high quality in learners' teaching and higher education (Tawafak, Romli & Alsinani, 2019). The learners from the tertiary institutions indicated that those who have revealed the exceptional use of e-learning typically have better results than learners that only concentrate on individual and physical contact with their professors. Learners from institutions who usually engage digitally or in electronics get to much higher levels than learners who use traditional strategies. E-learning is becoming a substantial priority of education as advancements are happening in modern academic technologies, which is why many education institutions are currently bringing in e-learning programs (Sarker, Al Mahmud, Islam & Islam, 2019). Hence, the study examined the effect of e-learning on the academic performance of undergraduate students at Nankai University, China.

## **2.0 Literature Review**

Torun (2020) conducted research to evaluate the effect of e-learning on academic performance in Singapore. Particularly, we reviewed the effect of online learning on academic staff at the Singapore polytechnic using a sample of 240 participants as our unit of analyses. Structural equation modeling (SEM) was used to assess the effect of the exogenous factors on the endogenous factors. Moreover, SEM was employed to check the hypothesized model. The findings reveal that our hypothesized design fairly fitted the data gathered and 5 of the 9 theories were rejected. The research validated that approval for the online teaching (AFOT), Teacher competency (TC) and synchronous (SYNC) lecturers have indirect effect on performance of academic staff. Furthermore, acceptance for online teaching (AFOT) and Technical competency (TC) have direct influence on performance of academic staff. It is concluded that the empirical version offered ought to lead Singapore polytechnic in making its E-learning initiatives. This is because it will allow Singapore polytechnic learners to attain relatively the same learning results that are comparable to typical lecturer room layout. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. There is a need to have a steady power supply to use ICT effectively. Tertiary institutions' management should make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives.

Suresh, Vishnu Priya and Gayathri (2018) performed research concentrating on the effect of e-learning on academic performance. The research associates to fourth year undergraduate delivered utilizing conventional lectures and e-learning based techniques. E-learning has been exposed in the research not to have a positive influence on academic performance as opposed to the expectations of the research. The research also investigates the data for the existence of interaction impacts in between e-learning research hours and socio-demographic attributes. This is taken on to identify whether or not individual features-related learning design distinctions affect the degree to which learners gain from e-learning. It is noted that, after regulating for other elements, female learners benefited less from e-learning material than their male learners.

Rasheed, He, Khalid, Khizar and Sharif (2022) reported that the high usage of e-learning in learning indicates that it is becoming a usual successful learning approach in broader academic contexts. To improve and help education and literacy, e-learning involves leveraging ICT. The importance of the evaluation was to examine the association between e-learning and the academic performance of learners in tertiary institutions. A collection of 80 author's observational research studies, performed in Belgium universities (both prior to and during the COVID-19 pandemic), was utilized to determine outcomes utilizing Cohen's formula concentrated on a strenuous sampling technique. The results of the formula ( $= 0.852$ ) disclose that ICT has a main statistically positive impact on the academic performance of learners in e-learning. The findings recommend that ICT has a considerable positive impact on the overall success of learners in tertiary institutions.

Alfa (2020) discovered that results have revealed that the significant reason why learners have low or no competent on the use of e-learning to improve their academic performance is because of lack of fundamental structures and well equipped computer laboratories in tertiary institutions in Finland. Results likewise revealed that e-learning elevates interest and performance of learners. The research examined the basic reasons for e-learning; the functions of e-learning on academic performance how e-teaching and e-learning can enhance the quality of education among chosen tertiary institutions in Finland. The suggestions set out based on the issue specified is the need for provision of fundamental quality structures and well-equipped computer laboratories in tertiary institutions in Finland. E-Learning enhances accessibility to effective learning and therefore boosts the performance of learners. E-learning makes it possible for many students in tertiary institutions to enrol in two programmes concurrently. E-learning uses technology to assist and improve learning (Asad, Hussain, Wadho, Khand & Churi, 2020).

Tawafak Romli and Alsinani (2019) notes that e-learning signifies the use of ICT by educators and students. E-learning includes conventional training, chosen learning equipment, formalization through document collections and community formation, which may be done through social software. E-Learning is web-based or online learning. It is essentially an online system of education that makes information or knowledge available to students. Overall, E-learning overlooks geographic distance. Most tertiary institutions are benefiting from internet-based learning and using it to complement the traditional learning method. Because of high speed, convenience and performance in accessing and processing information through internet systems, e-learning has been a crucial method in technical training and learning at tertiary institutions. E-learning has substantially helped students enhance academic performance, learning process and self-advancement. The study recommended that both the lecturers and the learners are required to

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develop a personal interest in the usage of ICT, sustainable integration of ICT in education, financing and other infrastructural issues that need to be resolved. It is also recommended that tertiary institutions' management make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives. E-learning needs to be included in the policy frameworks of the countries. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. ICT needs to be promoted all over and affordable to learners, particularly lecturers and tertiary learning institutions. There is a need to have a steady power supply to use ICT effectively.

Wedin and Saxin (2020) performed research to investigate the impact of e-learning on the learners' academic performance at Lund University, Sweden. 400 learners were arbitrarily chosen from the institution's official documents where a statistical evaluation of the research variables was done utilizing the SPSS version 22. The research has disclosed that there is statistically substantial disparities in the learners' academic performance over the execution of the e-learning technique when it come to the level of the majority of learners, sex, educational program, along with their academic level. The research suggests the need of improving the e-learning method in the tertiary institutions to enhance the learners' academic performance considering the uniqueness of some learning programs. E-learning makes it possible for many students in tertiary institutions to enrol in two programmes concurrently. E-learning uses technology to assist and improve learning (Asad, Hussain, Wadho, Khand & Churi, 2020).

Lorenzoni, Manzini, Soares and Leite (2019) argued that the method of teaching where learners get all learning materials passively from a lecturer is inadequate in promoting of theoretical understanding of data. One method of teaching that engages students in the learning process of statistic is e-learning. The research was hence, created to examine the impact and difficulties of e-learning on learners at Sao Paulo University. The research utilized quasi-experimental model. Sample for the research included 50 learners of English studying literature. Self-made set of questions and literature efficiency tests were utilized to gather information for the research. Data for the research was evaluated utilizing independent sample t-test statistics. The null theory was examined at 5 percent significance level. The results of the research exposed that E-Learning technique enhanced learners' academic performance. According to this, the research advised that E-Learning needs to be employed as an alternative technique in teaching of literature.

Elfaki, Abdulraheem and Abdulrahim (2019) noted that E-learning is among the largely discussed issues in current education sector. Many debate in favor of e-learning, while others slam e-learning and say it cannot give good results contrasted to face to face learning. During COVID pandemic, e-learning came to be essential for universities globally, the study has again concentrated on the subject to ascertain whether e-learning may favorably affect the performance of learners or otherwise. While determining the same, 3 aspects are chosen which consisted of technological competency, e-learning requirements, and e-learning framework. After gathering data from prior empirical studies, it was discovered that e-learning can produce favorable results in regards to learner's performance in various learning institutions. Nonetheless, it was discovered that for favorable performance, technological competency should be improved and the quality of products shared via e-learning has to be effective enough. In regards to facilities, inconsistent outcomes are

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noted as one study work stated that it is not important for better performance, while the other noted that it is key for good academic performance. Generally, the study determined that e-learning may boost learners performance with the required materials and methods carried out with it.

Alameri, Masadeh, Hamadallah, Ismail and Fakhouri (2020) discovered that E-learning is among the expanding areas particularly in the tertiary education. There are several benefits for utilizing e-learning in the learner performance. In third world nations like Jordan, vital actions were taken for embracing the e-learning system. This was executed by giving learners technological and communicational skills and to make learners a bit adaptive to the technology of contemporary societies. A number of studies have analyzed the effect of the e-learning on the learners' performance and discovered that there is a noticeable improvement on the learner performance and is regarded as key component that substantially influence the learners motivations. Online courses at Jerash College like; computer system skills accessed by learners via electronic gate. This research utilized SPSS to analyze the performance of 80 learners (45 e-learning and 35 traditional learning). The research discovered that there are statistically considerable differences in between the two teams for the speculative team.

Al Kurdi, Alshurideh and Salloum (2020) reported that E-learning has ended up being a progressively popular learning strategy in universities because of the steady growth of internet innovations. E-learning is usage of ICT to improve and help with teaching and learning. The research investigates the usage of e-learning model to describe acceptance of the e-learning technology in the learning institutions. The research validates that to promote peoples' intent to utilize an e-learning, favorable understanding on e-learning usage is important. By utilizing linear regression evaluation, the research noted that, while attitudes have effect on intent to utilize, the real e-learning usage has substantial impact on learners' performance. E-learning usage is related to enhanced learners' performance. It was suggested that training and information sessions on e-learning are required to concentrate mainly on how the e-learning technology may assist to boost the performance and effectiveness of learners' learning process. E-Learning enhances accessibility to effective learning and therefore boosts the performance of learners. E-learning makes it possible for many students in tertiary institutions to enrol in two programmes concurrently. E-learning uses technology to assist and improve learning (Asad, Hussain, Wadho, Khand & Churi, 2020).

Yavuzalp and Bahcivan (2021) conducted research to understand the effect of e-learning on learners' achievement. The method utilized in the research was a quantitative study with one team pre-test and post-test design. The number of learners was 54 students and the number of sample was the whole the population (population sampling). The data gathering was done by providing pre-test and post-test to the sample of the research. F test utilized to determine the effect of e-learning strategy on learners' performance in mathematics. The statistical evaluation has shown that the mean score of pre-test and post-test was 69.52 and the mean score of post-test was 79.58. By utilizing F test at the level of significance 5% the current researcher obtained  $F > F$  table. It's mean that e-learning technique was influence on learners' achievement in mathematics. Additionally, by utilizing Turkey's HSD continued test, the researcher obtained ordinary score from pre-test and post-test were enhanced. It was recommended to carry out study making use of e-learning technique with other media like zoom app or Microsoft group.

### 3.0 Research Methodology

The study adopted the descriptive research design. Descriptive research design is a type of research design that aims to systematically obtain information to describe a phenomenon, situation, or population. More specifically, it helps answer the what, when, where, and how questions regarding the research problem rather than the why. The sample size was 361 students and they were purposively picked. The collection of the data was done using questionnaires. Descriptive and inferential were used to analyze the data.

### 4.0 Findings

The findings of the study notably included correlation and regression analysis.

#### 4.1 Correlation Analysis

The results presented in Table 1 describe the correlation analysis

**Table 1: Correlation Analysis**

		Academic Performance	E-Learning
Academic Performance	Pearson Correlation	1.000	
	Sig. (2-tailed)		
E-Learning	Pearson Correlation	.452 **	
	Sig. (2-tailed)	0.000	0.000

The correlation results from Table 1 show that E-learning is positively and significantly associated with academic performance ( $r=.452$ ,  $p=.000$ ). This concurs with Wedin and Saxin (2020), who reported that there is need to improve the e-learning method in tertiary institutions to enhance the learners' academic performance considering the uniqueness of some learning programs.

#### 4.2 Regression Analysis

The section consisted of model fitness, analysis of variance and regression of coefficient. The results presented in Table 2 indicate the model fitness

**Table 2: Model Fitness**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.452 a	0.307	0.287	0.102584

The results from Table 2 show that E-Learning was found to be satisfactory in explaining academic performance in China. This was supported by the coefficient of determination, also known as the R square of 0.307. This shows that E-learning explains 30.7% of the variations in the academic performance of undergraduates in China. E-Learning enhances accessibility to effective learning

and therefore boosts the performance of learners. E-learning makes it possible for many students in tertiary institutions to enrol in two programmes concurrently. E-learning uses technology to assist and improve learning (Asad, Hussain, Wadho, Khand & Churi, 2020). E-learning overlooks geographic distance. Most tertiary institutions are benefiting from internet-based learning and using it to complement the traditional learning method. E-learning has substantially helped students enhance academic performance, learning process and self-advancement. E-learning has been a crucial method in technical training and learning at tertiary institutions.

**Table 3: Analysis of Variance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.45	1	14.45	242.52	.000b
	Residual	21.45	360	0.060		
	Total	35.90	361			

The result in Table 3 indicates that the overall model was statistically significant. The results show that e-learning is a good predictor in explaining academic performance among students in China. This was supported by an F statistic of 242.52 and the reported p-value of 0.000, which was less than the conventional probability significance level of 0.05.

**Table 4: Regression of Coefficient**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.292	0.052		5.616	0.087
E-Learning	0.455	0.102	0.371	4.461	0.006

Based on the results presented in Table 4, it was noted that e-learning is positively and significantly related to academic performance ( $\beta=0.455$ ,  $p=0.006$ ). This was supported by a calculated t-statistic of 4.461, which is larger than the critical t-statistic of 1.96. The results imply that when the efficiency in e-Learning improves by one unit, the academic performance of undergraduate students in China will increase by 0.455 units while other factors that influence academic performance are held unchanged. Al Kurdi, Alshurideh and Salloum (2020) articulated that training and information sessions on e-learning are required to focus mainly on how the e-learning technology can assist in boosting the performance and effectiveness of learners' learning process. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. Tertiary institutions' management should make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives.

## Conclusion

It is concluded that e-learning is positively and significantly related to academic performance. E-learning signifies the use of ICT by educators and students. E-learning includes conventional training, chosen learning equipment, formalization through document collections and community formation, which may be done through social software. E-Learning is web-based or online learning. It is essentially an online system of education that makes information or knowledge available to students. Overall, E-learning overlooks geographic distance. Most tertiary institutions are benefiting from internet-based learning and using it to complement the traditional learning method. Because of high speed, convenience and performance in accessing and processing information through internet systems, e-learning has been a crucial method in technical training and learning at tertiary institutions. E-learning has substantially helped students enhance academic performance, learning process and self-advancement.

## 6.0 Recommendations

The study recommended that both the lecturers and the learners are required to develop a personal interest in the usage of ICT, sustainable integration of ICT in education, financing and other infrastructural issues that need to be resolved. The use of ICT in schools needs to be made mandatory in tertiary institutions and the lecturers should be provided with good training on the effective use of ICT. ICT needs to be promoted all over and affordable to learners, particularly lecturers and tertiary learning institutions. There is a need to have a steady power supply to use ICT effectively. It is also recommended that tertiary institutions' management make a consorted initiative to give e-learning environments that will improve learner performances in tertiary institutions and facilitate their self-development initiatives. E-learning needs to be included in the policy frameworks of the countries.

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