

# A STUDY ON FACTORS AFFECTING QUALITY OF IT EDUCATION INFRASTRUCTURE IN INDIA

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## ABSTRACT

*This study aims to reveal the factors effecting the quality of it education infrastructure in India. The latest Annual Status of Education Report shows that learning outcomes are abysmal in Indian schools. There is a lot of work needed in infrastructure when the government announces a new education policy which is in the works. Different statistical methods were used to achieve the objectives of the study.*

*This study seeks to study and assess the factors that have an impact on the quality of the IT education infrastructure prevailing in India. This study also throws light on the importance of the quality of the aforesaid infrastructure in view of the rising-education globally to keep in pace with the developments.*

**Keywords:** *IT Education, infrastructure, Education, e-education*

## I. INTRODUCTION

India holds an imperative place in the worldwide training industry. The nation has more than 1.4 million schools with more than 227 million understudies enlisted and more than 36,000 advanced education establishments. India has one of the biggest advanced education frameworks on the planet. Nonetheless, there is still a ton of potential for further advancement in the training framework.

India has turned into the second biggest market for e-learning after the US. The part is as of now pegged at US\$ 2-3 billion, and is required to touch US\$ 40 billion by 2017. The separation training market in India is required to develop at a Compound Annual Growth Rate (CAGR) of around 34 for every cent# amid 2013-14 to 2017-18. In addition, the point of the legislature to raise its present gross enrolment proportion to 30 for every penny by 2020 will likewise help the development of the separation training in India.

## II. REVIEW OF LITERATURE

An ever increasing number of learners are requiring adaptability in program structure to suit their different obligations, for example, all day employments or family needs (PSU, 1998). With these limitations, understudies search for courses that best suit their calendars and learning styles, and afterward exchange the credit to the college where they will gain their degrees (Johnstone, Ewell, and Paulson, 2002; Paulson, 2002; Carnevale, 2000c). Johnstone et al. (2002) allude to this idea of securing and trading credit at various establishments than the one they get their degree from as "scholastic money" and note that it is developing—starting at 1999, 77% of all understudies graduating with a baccalaureate degree had "went to" at least two organizations.

One aftereffect of the profoundly focused e-learning business sector will be foundations that spend significant time in meeting specific specialties in the market (Gallagher, 2003). Morrison and Barone (2003, p. 4) watched, "We can see the beginnings of the pattern toward the unbundling of courses, credits, administrations, and charge structures." Dunn anticipated a comparable pattern, foreseeing that "courseware makers will offer courses and honor attributes specifically to the end client and along these lines, through intermediation, sidestep the institutional agent" (Dunn, 2000, p. 37).

The cutting edge, customary age understudies are not at all like past eras. They are "keen on [qualifications from] little modules and short projects ... and in discovering that should be possible at home and fitted around work, family, and social commitments" (Bates, 2000, p. 5). Data age learners favor doing to knowing, experimentation to rationale, and writing to penmanship. Multitasking is a lifestyle for them, remaining associated is basic, and there is zero resistance for postponements. Further, present day proficiency incorporates message as well as picture and screen education—it includes exploring data and gathering learning from pieces (Oblinger et al., 2001; Jones and Pritchard, 2000).

## III. OBJECTIVE OF STUDY

**The Objective of the Study is to study the factors effecting the quality of it education infrastructure in India**

**RESEARCH DESIGN**

The research design for present study is **descriptive** in nature. As it is impossible to examine the whole universe, the responses are sought from the business enterprises located in NCR.

**RESEARCH TOOLS & TECHNIQUES**

The five point Likert scale is used to measure the attitudes of business executives towards the selected variables. The respondents were asked to rate the variables using five point Likert scale which ranges from strongly agree to strongly disagree. The collected data is analysed & interpreted with the help of various statistical tools and techniques such as tabulation, diagrammatic representation, descriptive analysis which are suitable for this study.

**DATA ANALYSIS AND INTERPRETATION**

**[1.] Reliability analysis**

**Table 1: Reliability statistics**  
**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.822	.823	15

In order to check the reliability of the questionnaire, the Cronbach's Alpha test was applied for the study. The value of Cronbach's alpha is found to be more than 0.823 in all the dimensions. As the value of Cronbach's Alpha is more than 0.7, the instrument is reliable for the study.

**[2.] Normality Test**

In order to check the normality of data, Shapiro-Wilk test was used.

**Table 2: Shapiro-Wilk test of Normality of data**  
**Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Tech_complabs	.236	206	.000	.864	206	.000
Tech_interclssrm	.163	206	.000	.892	206	.000
Tech_Intgrtcomp	.205	206	.000	.871	206	.000
Tech_Multcontent	.167	206	.000	.902	206	.000
Tech_trngtchr	.198	206	.000	.879	206	.000
Tech_systemcndtn	.154	206	.000	.899	206	.000
ILE_lrngkits	.159	206	.000	.888	206	.000
ILE_useoftech	.152	206	.000	.901	206	.000
CB_abl	.146	206	.000	.899	206	.000
CB_clsrrmmgmt	.177	206	.000	.900	206	.000
CB_mntreval	.182	206	.000	.855	206	.000
Tech	.175	206	.000	.879	206	.000
ILE	.238	206	.000	.846	206	.000
CB	.154	206	.000	.908	206	.000
Quality_of_ITedu	.148	206	.000	.901	206	.000

a. Lilliefors Significance Correction

Since  $p < .05$  in all the cases, thus it indicates that the data is normal and further statistical tests can be used.

**[3.] Validity Analysis**

**Table 3: KMO and Barlett's test of sphericity for working women**  
**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.727
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	1.208E3
	105
	.000

From the test, it is found that the value for Kaiser-Meyer-Olkin Measure of Sampling Adequacy was more than 0.6 in all the parts of questionnaires. Also Bartlett's Test of Sphericity has significant value less than 0.05 at 5 % level of significance in all the parts of questionnaire. Thus the validity of the questionnaire is established.

**Coefficient of correlation**

Karl Pearson coefficient of correlation was calculated to find out the level of relationship between the variables.

**Table 4: Correlation matrix**  
**Inter-Item Correlation Matrix**

	Tech_c ompla bs	Tech_i ntercls srm	Tech_ Intgrc omp	Tech_ Multco ntent	Tech_t rngtch r	Tech_ systmc ndtn	ILE_ lrngk its	ILE_ useof tech	CB_ abl	CB_ cls srm gmt	CB_ m ntreval	Tech	ILE	CB	Quality _of_ITe du
Tech_complabs	1.000	.579	.523	.281	.174	.247	.127	.199	.180	.091	.061	.151	-.075	.150	.214
Tech_interclsrm	.579	1.000	.623	.339	.349	.428	.131	.320	.297	.049	.136	.155	.033	.151	.167
Tech_Intgrtcomp	.523	.623	1.000	.330	.249	.374	.163	.363	.406	.119	.101	.104	-.083	.116	.138
Tech_Multcontent	.281	.339	.330	1.000	.296	.481	.231	.104	.036	.061	.097	.081	.177	.132	.139
Tech_trngtchr	.174	.349	.249	.296	1.000	.513	.179	.097	.176	.233	.163	.358	.090	.236	.282
Tech_systmcndtn	.247	.428	.374	.481	.513	1.000	.467	.433	.398	.092	.141	.226	.050	.130	.155
ILE_lrngkits	.127	.131	.163	.231	.179	.467	1.000	.595	.320	.173	.144	.329	.178	.223	.232
ILE_useoftech	.199	.320	.363	.104	.097	.433	.595	1.000	.700	.263	.229	.295	.128	.223	.285
CB_abl	.180	.297	.406	.036	.176	.398	.320	.700	1.000	.337	.130	.255	.005	.104	.258
CB_clsrmgmt	.091	.049	.119	.061	.233	.092	.173	.263	.337	1.000	.371	.535	.079	.149	.196
CB_mntreval	.061	.136	.101	.097	.163	.141	.144	.229	.130	.371	1.000	.455	.035	.113	.225
Tech	.151	.155	.104	.081	.358	.226	.329	.295	.255	.535	.455	1.000	.359	.416	.471
ILE	-.075	.033	-.083	.177	.090	.050	.178	.128	.005	.079	.035	.359	1.000	.413	.299
CB	.150	.151	.116	.132	.236	.130	.223	.223	.104	.149	.113	.416	.413	1.000	.652
Quality_of_ITedu	.214	.167	.138	.139	.282	.155	.232	.285	.258	.196	.225	.471	.299	.652	1.000

From Table 4, it is quite evident that there is a high level of correlation among the variables of the study. However, there are some variables that have no relationship at all.

**[4.] Hypothesis Testing**

**Hypothesis 1:**

**H01:** There is no significant impact of computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR.

**HA1:** There is significant impact of computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR.

**Table 5: Relationship between computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR**

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.868	.359		5.207	.000	1.160	2.575
	Tech_complabs	.145	.097	.126	1.502	.135	-.046	.336
	Tech_interclssrm	-.024	.109	-.021	-.222	.825	-.239	.190
	Tech_Intgrtcomp	-.044	.099	-.039	-.443	.658	-.239	.151
	Tech_Multcontent	-.080	.084	-.073	-.954	.341	-.245	.085
	Tech_trngtchr	.330	.077	.332	4.282	.000	.178	.482
	Tech_systmcndtn	.088	.090	.084	.971	.333	-.090	.265

a. Dependent Variable: Tech

Since ‘p’ value is less than 0.05 for training of teachers variable that means it is significant at 5% level of significance and it is clear that the factor affects the technological requirements for quality of IT education infrastructure in Delhi/NCR. So the null hypothesis is rejected and alternative hypothesis is partially accepted i.e. there is significant impact of training of teachers on technological requirements for quality of IT education infrastructure in Delhi/NCR.

**Table 6: Regression analysis- computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR**

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.379 <sup>a</sup>	.444	.418	1.325	.144	5.575	6	199	.000

a. Predictors: (Constant), Tech\_systmcndtn, Tech\_complabs, Tech\_Multcontent, Tech\_trngtchr, Tech\_Intgrtcomp, Tech\_interclssrm

b. Dependent Variable: Tech

Since the Adjusted R square is found to be 0.418 which indicates that 41.8% of the impact on health status is explained by computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR. The significant value is found to be 0.000 which is below than 0.05, thus it is significant at 5% level of significance. Thus, null hypothesis is rejected and alternative hypothesis is partially accepted. So, there is significant impact computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers and conditions of systems on technological requirements for quality of IT education infrastructure in Delhi/NCR.

**Hypothesis 2:**

**H02:** There is no significant impact of learning kits, use of technology on interactive learning environment for quality of IT education infrastructure in Delhi/NCR.

**HA2:** There is significant impact of learning kits, use of technology on interactive learning environment for quality of IT education infrastructure in Delhi/NCR.

**Table 7: Relationship of learning kits, use of technology on interactive learning environment for quality of IT education infrastructure in Delhi/NCR**

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.907	.274		6.953	.000	1.366	2.448
	ILE_lrngkits	.160	.087	.158	1.834	.004	-.012	.332
	ILE_useoftech	.037	.094	.034	.395	.693	-.149	.224

a. Dependent Variable: ILE

Since 'p' value is less than 0.05 for only some variables, that means it is significant at 5% level of significance

**Table 8: Regression analysis- learning kits, use of technology on interactive learning environment for quality of IT education infrastructure in Delhi/NCR**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.180 <sup>a</sup>	.432	.423	1.383	.032	3.395	2	203	.035

a. Predictors: (Constant), ILE\_useoftech, ILE\_lrngkits

b. Dependent Variable: ILE

Since the Adjusted R square is found to be 0.423 which indicates that 42.3% of the impact of learning kits, use of technology on interactive learning environment for quality of IT education infrastructure in Delhi/NCR. The significant value is found to be 0.000 which is below than 0.05, thus it is significant at 5% level of significance. Thus, null hypothesis is rejected and alternative hypothesis is accepted. So, there is significant impact of age on health status of non-working women in Delhi/NCR.

**Hypothesis 3:**

**H03:** There is no significant impact of activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR.

**HA3:** There is significant impact of activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR.

**Table 9: Relationship between activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR**

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.333	.306		7.617	.000	1.729	2.936
	CB_abl	.059	.071	.061	.826	.410	-.082	.200
	CB_clsrrmngmt	.106	.080	.103	1.313	.191	-.053	.264
	CB_mntreval	.056	.063	.067	.894	.372	-.068	.180

a. Dependent Variable: CB

Since 'p' value is less than 0.05 only for some cases, that means it is only significant at 5% level of significance for some variables. It can be said that the marital status affects only some variables of health status of working women in Delhi/NCR.

**Table 10: Regression analysis- activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.171 <sup>a</sup>	.029	.015	1.272	.029	2.028	3	202	.111

a. Predictors: (Constant), CB\_mntreval, CB\_abl, CB\_clsrrmmgmt

b. Dependent Variable: CB

Since the Adjusted R square is found to be 0.015 which indicates that 0.15% of the impact on activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR. The significant value is found to be .111 which is greater than 0.05, thus it is not significant at 5% level of significance. Thus, null hypothesis is accepted and alternative hypothesis is rejected. So, there no significant impact of activity based learning, classroom management and monitoring and evaluation on capacity building for quality of IT education infrastructure in Delhi/NCR.

**Hypothesis 4:**

**H04:** There is no significant impact of technology based variables on quality of IT education infrastructure in Delhi/NCR.

**HA4:** There is significant impact of technology based variables on quality of IT education infrastructure in Delhi/NCR.

**Table 11: Relationship between impacts of technology based variables on quality of IT education infrastructure in Delhi/NCR Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.472	.204		7.213	.000	1.069	1.874
	Tech	.445	.058	.471	7.634	.000	.330	.559

a. Dependent Variable: Quality\_of\_ITedu

Since ‘p’ value is less than 0.05 only for some cases, that means it is only significant at 5% level of significance for some variables. It can be said that is significant impact of technology based variables on quality of IT education infrastructure in Delhi/NCR.

**Table 12: Regression analysis- impacts of technology based variables on quality of IT education infrastructure in Delhi/NCR**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.471 <sup>a</sup>	.222	.218	1.176	.222	58.283	1	204	.000

a. Predictors: (Constant), Tech

b. Dependent Variable: Quality\_of\_ITedu

Since the Adjusted R square is found to be 0.218 which indicates that 21.8% of the impact of technology based variables on quality of IT education infrastructure in Delhi/NCR.

The significant value is found to be 0.000 which is below than 0.05, thus it is significant at 5% level of significance. Thus, null hypothesis is rejected and alternative hypothesis is accepted. So, there is significant impact of technology based variables on quality of IT education infrastructure in Delhi/NCR.

**Hypothesis 5:**

**H05:** There is no significant impact of interactive learning environment on quality of IT education infrastructure in Delhi/NCR.

**HA5:** There is significant impact of interactive learning environment on quality of IT education infrastructure in Delhi/NCR.

**Table 13: Relationship between interactive learning environments on quality of IT education infrastructure in Delhi/NCR**

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.193	.181		12.129	.000	1.837	2.550
	ILE	.284	.064	.299	4.474	.000	.159	.409

a. Dependent Variable: Quality\_of\_ITedu

Since 'p' value is less than 0.05 only for some cases, that means it is only significant at 5% level of significance for some variables. It can be said that the monthly income affects only some variables of health status of working women in Delhi/NCR.

**Table 14: Regression analysis- interactive learning environments on quality of IT education infrastructure in Delhi/NCR**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.299 <sup>a</sup>	.089	.085	1.273	.089	20.020	1	204	.000

a. Predictors: (Constant), ILE

b. Dependent Variable: Quality\_of\_ITedu

Since the Adjusted R square is found to be 0.774 which indicates that 77.4% of the impact on health status is explained by monthly income in working women in Delhi/NCR. The significant value is found to be 0.000 which is below than 0.05, thus it is significant at 5% level of significance. Thus, null hypothesis is rejected and alternative hypothesis is accepted. So, there is significant impact of monthly income on health status of working women in Delhi/NCR.

**Hypothesis 6:**

**H06:** There is no significant impact of capacity building on quality of IT education infrastructure in Delhi/NCR.

**HA6:** There is significant impact of capacity building on quality of IT education infrastructure in Delhi/NCR.

**Table 15: Relationship between capacity building on quality of IT education infrastructure in Delhi/NCR.**

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.837	.182		4.602	.000	.478	1.196
	CB	.677	.055	.652	12.287	.000	.568	.786

a. Dependent Variable: Quality\_of\_ITedu

Since 'p' value is less than 0.05 only for some cases, that means it is only significant at 5% level of significance for some variables. It can be said that the number of members in the family affect only some variables of health status of working women in Delhi/NCR.

**Table 16: Regression analysis- capacity building on quality of IT education infrastructure in Delhi/NCR**

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R	Std. Error of	Change Statistics
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			Square	the Estimate	R Square	F Change	df1	df2	Sig. F
					Change				Change
1	.652 <sup>a</sup>	.425	.422	1.011	.425	150.967	1	204	.000

a. Predictors: (Constant), CB

b. Dependent Variable: Quality\_of\_ITedu

Since the Adjusted R square is found to be 0.889 which indicates that 88.9% of the impact on health status is explained by number of members in the family in working women in Delhi/NCR. The significant value is found to be 0.000 which is below than 0.05, thus it is significant at 5% level of significance. Thus, null hypothesis is rejected and alternative hypothesis is accepted. So, there is significant impact of number of members in the family on health status of working women in Delhi/NCR.

#### IV. FINDINGS

From the above analysis, it is clear that all the variables that have been considered for the study, i.e. computer labs, interactive classrooms, integrated computers, multimedia content, training of teachers, condition of systems, learning kits, use of technology, activity based learning, classroom management and monitoring and evaluation have an effect on the quality of IT education infrastructure. A positive relationship is found in every strata of analysis between the quality of IT education infrastructure and other factors in the field.

This study throws light on the fact that all of the considered factors are important to develop a digitally conducive environment in order to support quality of IT education.

#### V. RECOMMENDATIONS & SUGGESTIONS

According to the results of the study, the following are the recommendations and suggestions:

8.1 The technological base for learning should be strong and technically sound to provide a quality platform to students.

8.2 There should be an interactive environment in the classrooms.

8.3 There should be proper use of latest technology

8.4 Proper learning kits should be provided

8.5 There should be proper monitoring and evaluation done regularly to check the level of quality of education imparted.

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