

# ICT in Indian Higher Education: A Review

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## Abstract:

The present study compared the technological situations in Indian Higher educational universities considering various technological factors. The huge survey was conducted in the academic year of 2014-2015 in six higher educational universities in Punjab and Haryana. A differential analysis was performed using statistical techniques with five major parameters like availability, usability, problem, solution and opportunity towards technological awareness. Each parameter has different attributes spotting ICT. The target variables such as locality, gender, educational standard, occupation, state were selected to explore significant difference. It was proved that state variable has not impact on sentiments of students towards ICT. One hand, there is no variation between private and government students towards ICT availability, usability and problems in their Universities. On another hand, the affiliation status influenced their feelings towards ICT. Also, it was revealed that there is a significant difference between boy and girl students; overall male and overall female stakeholders towards availability and no significant difference between boy and girl students, male and female faculty, overall male and overall female stakeholders towards availability.

**Keywords:** ICT, differential analysis, Educational Standard.

## Article History

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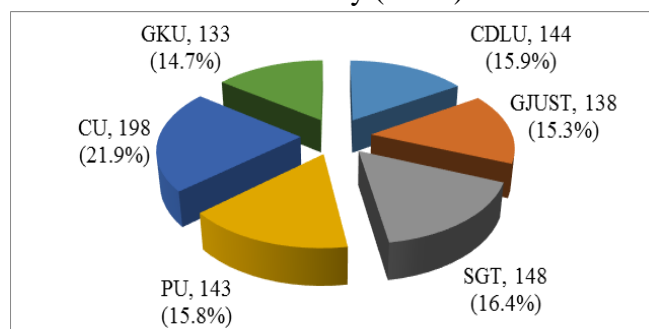
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## I. INTRODUCTION

The main objective of this chapter is to understand differential analysis of ICT awareness among students towards ICT in Indian universities. The basics concepts of ICT, its components, and issues associated with research problem. The chapter discusses about major ICT issues in higher education system and describes brief of higher education status in Punjab and Haryana. It explores details of Universities involved in Higher education in two states. Below is the description of universities:

1. Ch. Devi Lal University (CDLU)- Government
2. Guru Jambheshwar University of Science & Tech. (GJUST)- Government
3. Shree Guru Gobind Singh TriCentenary University (SGT)-Private
4. Punjabi University (PU)- Government
5. Chandigarh University (CU)- Private

## 6. Gurukashi University (GKU)- Private

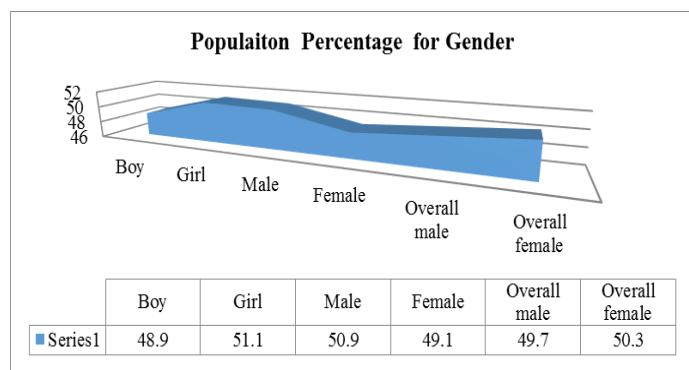


**Fig. 1 University's Samples**

Fig. 1 depicts that 14.75% respondents from GKU, 15.9% from CDLU, 15.3% from GJUST, 16.4% from SGT, 15.8% from PU and 21.9% stakeholders from CU have been taken part in this survey. The authors circulated a total of one thousand questionnaires among educators and reverted back only nine hundred four. The rate of response

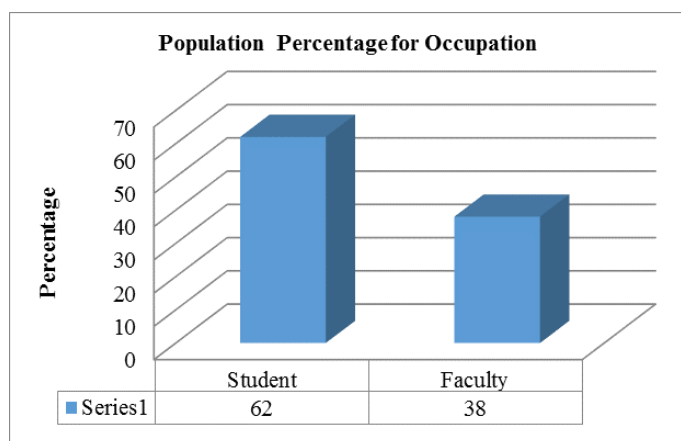
Following formula was used to calculate the 90.4% response rate

$$\frac{\text{\#Received}}{\text{\# distributed}} \times 100 \leftrightarrow \frac{904}{1000} \times 100 = 90.4\%$$



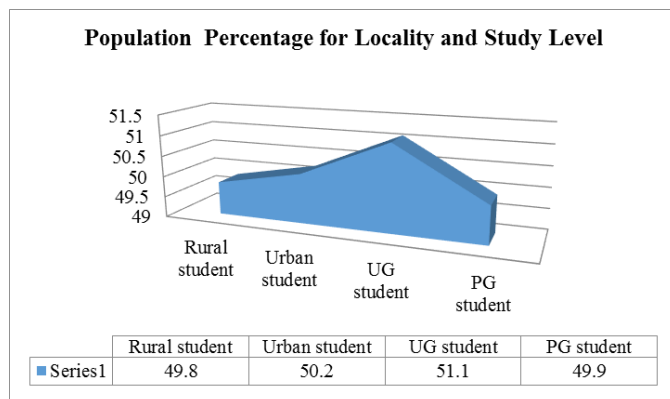
**Fig. 2 Population for Gender**

The Fig. 2 shows the population percentage according to gender of stakeholders. In our first objective, gender wise analysis of participants is aimed. There is 48.9% boy and 51.1% girl student took part in this study. From the faculty side 50.9% males and 49.1% females are participated. The overall 49.7% males (including boy student and male faculty) and 50.3% (including girl student and female faculty) are participated in this study.



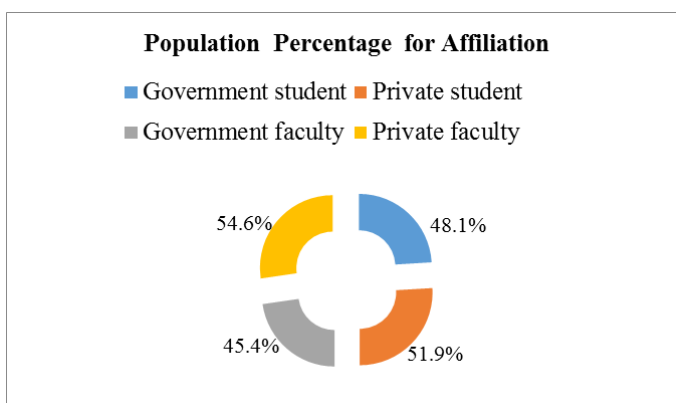
**Fig. 3 Population for Occupation**

The Fig. 3 displays the population percentage according to occupation of stakeholders. Our second objective is based upon occupation. There is 62% student and 38% faculty are participated.



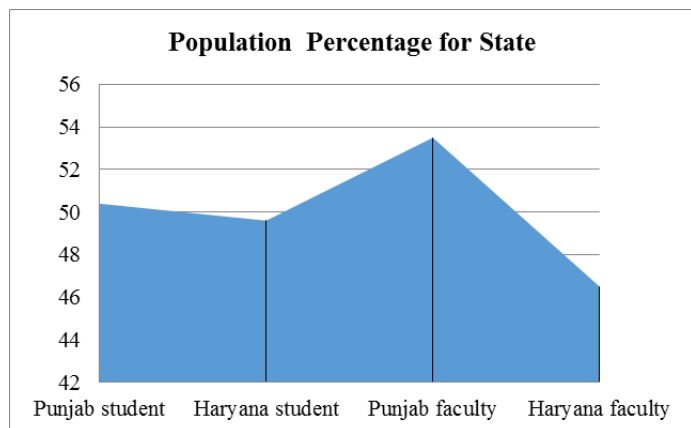
**Fig. 4 Population for Demography and Educational Standard**

The Fig. 4 gives pictorial view of the population percentage of students according to their demography and educational standard. In our third objective, locality and study level wise analysis of students considered. For Demography, there is 49.8% rural student and 50.2% are urban participated. Another side, 51.1% undergraduate (UG) level students and 49.9% are postgraduate (PG) level students are participated in this research.



**Fig. 5 Population for University's Affiliation.**

Our fourth objective is based up on the University affiliation wise analysis of students. The Fig. 5 shows graphical view of percentage of population from Govt. and private institutions. There are 48.1% Govt. students and 51.9% private students are involved in this study. There are 45.4% Govt. faculty and 54.6% are private faculty are participated.



**Fig. 6 Population for State.**

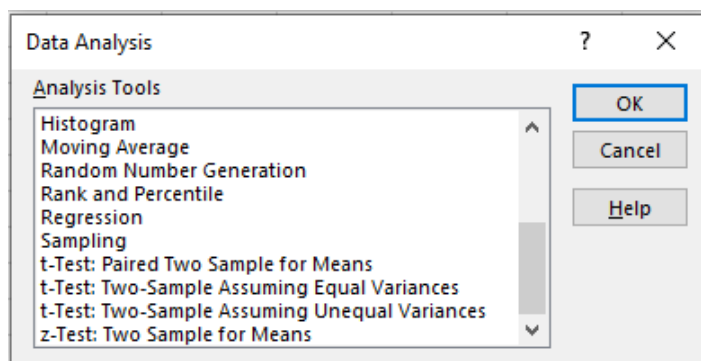
Fig. 6 shows graphical view of the population percentage of students according to their state. Our fifth objective includes state wise analysis of students and faculty. There is 50.4% strength of Punjab student and 49.6% students from Haryana are included. There is 53.5% faculty from Punjab and 46.5% faculty from Haryana state is involved in this study. Table 1 shows the schematic representation of our survey based research design.

**Table 1 Schematic Representation of Research study**

S.No.	Type	Sources
1.	Nature of Research	Survey Research Design
2	Factors	Availability, Usability, Problem, Solution, Opportunity
3.	Variables	Independent-35 and Dependant-24
4.	Tool Used	A five point Likert-Type Structured Questionnaire developed by Investigator having the five part which contains questions related to ICT factors.
5.	Validation Test	DV-DP test by Kelley's in 1939
6.	Sampling Method	Stratified Random Sampling
7.	Sample	Students -560, Faculty- 344

	Size	and Total-904
8.	Statistical Technique used	Mean, Standard Deviation, Variance, T-Test, F-Test, Z-Test, and Anova.
9.	Data Analysis package	Analysis Toolpack

Fig. 7 shows the Excel Microsoft Add in tool that has been used during data analysis which contains almost statistical analysis methods such as t-test, z-test, f-test and ANOVA and used in the statistical evaluation of educational datasets [1][2][3].



**Fig. 7 Data Analysis Tool.**

## II. RESULTS DISCUSSION

### 1. Technological awareness between students and faculty towards ICT adoption in higher education, research and development?

It has been found that students and faculty of concerned Universities are using ICT resources in their teaching and learning to make their lectures Interactive and also in research and project development. They are using ICT resources in various activities of University such as placement, admissions, accounts, controlling staff and students, planning and management etc. It has been found almost student updated with latest development in technology. They believed that ICT is learner-centered approach and reduce cost for effective learning; ICT supports Globalization of integrated technology and help to stand India at common global

platform of world. The faculty is found to be optimum utilization of resources. They believed that ICT makes education system reliable, exploring and attractive. It has been also found that ICT is helpful to enhance academic skills of stakeholders. Both students and faculty are considering ICT as resource of exchange of knowledge and integration tool for scattered information and knowledge over globe. By using ICT students and faculty are become professional, active, motivated confident, intensive, intellectual and more responsible. It has also been found that ICT is enhancing scope of students, teachers and stakeholder in their field of study and creating their interest in teaching-learning as well as in developing. It has been observed that ICT is not only reducing the cost for information exchange but also providing cost effective teaching and learning in Universities. It is also realized that ICT provides fast and effective way to spread and promotes Government policies in country peoples. ICT provides global knowledge sharing, fast and easy access of information as well as time saving of student and teachers. The stakeholder believed that ICT act as communication gap remover between student and teacher by using e-teaching and e-learning [4].

## **2. What are the problems facing by students and faculty in use of ICT and proposed solutions to overcome problems in Universities?**

The Punjabi University has no clear or transparent policies and rules to deploy ICT projects, awareness program like training and workshops etc. Some senior faculty has shown lack in their readiness to adapt ICT. The students have committed that their teachers are not guiding them proper regarding ICT based education. The University's stakeholders are facing slow Internet speed due to less bandwidth and no sufficient arrangements for providing quality based training to learn and use latest ICT tools and equipment. Even Government is not providing financial support to Institution that's why insufficient funds are a key issue for unavailability

of required ICT Infrastructure. It has been found that stakeholders have negative attitude of Institutions regarding ICT awareness. Moreover, few political issues like corruption and bribery avoids the ICT projects implementation in educational Institutions.

In Ch. Devi Lal University, it has been found latest and proper ICT infrastructure is not available. The lethargic attitude of the staff is key issue to adapt ICT in education. The stakeholders are facing problems such as inadequate technical support or guidance, less opportunity to attend ICT awareness programs, lack of internet bandwidth and heavy cost of new ICT equipment and Unfriendly ICT tools and software. The University has lack of expert or ICT Trainer who can train stakeholders. It has been also found that there is lack of technical knowledge among students and teachers. The stakeholders are not providing required Internet speed for education. Besides of all, they are bearing other problems likewise lack of ability and proper training material, less financial support, lack of student concentration and willpower.

The Chandigarh University' stakeholders believed that due to high cost of skilled trainer, the institutions are providing freshmen, even though their parents and teachers are not able to direct and support regarding ICT learning. They have felt that integration of ICT into teaching, learning, research and development is time consuming. Few more obstacles are coming in front of stakeholders such as slow Internet, Lack of commitment, lack of motivation, Shortage of ICT tools, unavailability of ICT resources on time and lack of readiness to adapt ICT by the trainer. It has observed that due rapid alternation in technology makes outdated to stakeholders. The enforcement to adapt the traditional trends in education by parents is major barrier in institution.

The Gurukashi University is facing obstacles like insufficient training and fund, inadequate confidence level, Minimum Internet bandwidth and Unawareness in rural area regarding ICT. It has



found that due to high cost of latest ICT infrastructure, the institution is not providing latest ICT facilities to stakeholders. With all these problems, the University has lack of proper planning and ICT implementation policies to integrate ICT in higher education and research work. It has been observed that stakeholders have lack of hesitation and weak will power to adapt ICT in education.

The SGT University' stakeholder is bearing problems such as lack of ICT awareness, hesitation problems, insufficient training, Lack of financial support, Raising the cost of new ICT equipment etc. It has been seen that traditional ICT resources make no effect on interest of stakeholders. The Institution' Library is not fully equipped with latest ICT tools and equipment [d].

The GJUST University was found with lack of high speed Internet in the campus and students were found less aware towards the technological use in their study and teachers were found a bit aware about the technological usage. Further, other problems likewise lack of ability and proper ICT workshop, less financial support, lack of student concentration and willpower etc.

### **3. What is the disparity between students and faculty of Universities towards ICT in respect of gender in Punjab and Haryana?**

It is discovered that there is no significant change between opinions of male and female faculty towards all 35 variables which represents the usability, availability, problem, solution and opportunity of ICT. Also, a significant difference is explored between boy and girl students; overall male and overall female stakeholders towards availability of adequate ICT infrastructure, sufficient Internet bandwidth, clear policy framework to integrate ICT and sufficient ICT tools/software/ hardware are available in research laboratory; Use of ICT in access the E-contents from other libraries; lack of readiness to adopt ICT technology in Teaching and Learning. Gender did not affect the attitude of boy and girl students; male and female faculty; overall

male; and overall female stakeholders towards availability of campus WI-fi, ICT tools/software, E-library, E-journals/ E-contents. Both students and faculty of two states are found to be aware towards ICT in relation to gender. Both have positive attitude towards ICT awareness in education [5].

In present study, accepting status of hypothesis H011 explores that there is no significant difference found between boys and girl student's opinions towards ICT awareness. The mean of both boys (3.58) and girls (3.64) are almost identical. Hence, the gender did not influence the opinions of faculty because of identical mean score (male's mean=3.83 and female's mean=3.86). Hence our second hypothesis H012 is also accepted. The failed to reject status of our third hypothesis H013 reveals that opinions of overall males and overall females from two states are not different. It is proved that gender variable did not make impact on the opinion of students and faculty of Punjab and Haryana state [6].

### **4. What is the difference between students and faculty of Universities towards ICT in relation to their occupation in Punjab and Haryana?**

The research presented the scatteredness in responses of stakeholders for their occupation. It has been found the significant difference between variances of boy student and male faculty; girl student and female faculty towards the availability and problem parameter. But another side, we have found no significant difference between variances of boy student and male faculty; girl student and female faculty towards availability of easy accessible, clear policy framework, Planning and Management, Lack of readiness, need to enhance Internet bandwidth with latest ICT infrastructure, Increase productivity using ICT.

This research found that occupation of stakeholders is left impact on their opinions towards ICT. It has been found significant difference found between students and faculty's opinions towards ICT

awareness [7]. The mean of students (3.61) and faculty (3.99) are showing difference between their attitudes towards ICT. The faculty have higher constructive approach towards ICT as compare to students.

It has been inferred that there is noteworthy difference between mean values of boy student and male faculty towards ICT, which infers that higher mean value of male faculty as compare to boy student. It has been found that male faculty has much positive attitude towards ICT as compare to boy students. It is also concluded that female faculty won from girl students regarding higher positive opinions towards ICT. The mean value of female faculty is greater than mean value of girl students [7].

It has been found that 52% students and 66% faculty are agreed regarding ICT resources availability in their institutions. Regarding the use of available ICT resources, only 62% students and 77% faculty are agreed. It is also found that 56% students and 71% faculty are facing obstacles such as Unfriendly ICT tools, lack of training and time consuming to adapt ICT. It is observed faculty is facing a lot as compare to students. This research also explored that 84% students and 83% faculty are given positive consent to our proposed solutions to overcome the obstacles introduced. There are 78% students and 85% faculty agreed with the ICT opportunities in research and higher education.

##### **5. What is the dissimilarity between students and faculty of universities towards ICT in Government and Private Institutions in Punjab and Haryana?**

It has been found that there is no dissimilarity between private and Government students towards ICT availability, usability and problems in their Universities. But affiliation status influenced the opinions of students for ICT opportunity and proposed solutions. Furthermore, it is also inferred that there is no significant variation between opinions of Govt. faculty and private faculty towards

availability, usability, problem, solution and opportunity factors. Finally, it is concluded that University affiliation status did not affect the opinions of faculty towards. The accepting status of hypothesis H041, reveals that no meaningful variation between mean of students towards ICT for affiliation status of Institutions. The mean value of Government student is almost identical to mean of private student. But the students who are taking education in Government have little bit positives opinions towards ICT as compare to students from private institutions. It is also found that there is no significant variation between opinions of private and Govt. faculty towards ICT awareness. Because of their mean are not unequal. The private faculty is more aware towards ICT as compare to Government faculty. The University affiliation status did not affect variance difference between students and faculty for 21 and 23 independent variables respectively. It has been observed variance difference among students and faculty is influenced by affiliation status for 14 and 12 independent variables respectively.

##### **6. What is the diversity between Haryana and Punjab towards ICT awareness?**

It has been also proved that state variable has not impact on opinions of students from Punjab and Haryana towards ICT. The mean score for Punjab and Haryana students are identical. The students from the two states have positives attitude towards ICT awareness in their education. It was discovered that there is no significant diversity found between opinion of Punjab faculty and Haryana faculty towards ICT. It has been concluded there is no state diversity towards ICT awareness among stakeholders. The opinions of stakeholders from institutions in Haryana are equal to the opinions of stakeholder from institutions in Punjab state [8]. Also, it has been calculated smaller T-value and Z-value from tabular value, which enforce to accept the two null hypotheses H051 and H052. Hence, there is no significant mean difference between Punjab student and Haryana student and there is no

significant difference mean of Punjab faculty and Haryana faculty. Thus, there is no significant state wise difference in between opinion of students and faculty towards ICT. The results of ANOVA test are matched with the findings of T test and Z-test. It is also discovered that there is difference in between variance of student and faculty in relation to state variable. The findings of study also concluded that there is scatteredness in responses of students and faculty for 20-20 variables and no scatteredness found in responses of them for 15-15 variables.

### III. CONCLUSION

It is recommended to the institutions that there should be providing smart class rooms using projectors/Interactive boards/ Internet/power point presentation and mandatory to teach and learn through these resources in order to promote ICT based quality education. By these way student's curiosity can be increase. It was focused on organizing seminars/workshops and training by institutions in order to skilled stakeholders and to make them user friendly ICT tools and software. There should be introduced one ICT based subject in each course of work.

Also, it is pointed out the weakness of Government and private Institution's administrations in educational Universities. The University management should introduce novel rules and policies to boost up technological usage in each activity of institutions. The Government of Punjab and Haryana should make policies to provide financial assistance not only to Government institutions but also to private institutions to organize ICT awareness program such as workshop/seminars/Training/Camps etc. to make and attract attention of stakeholders. The Training should be start from user friendly tools/software. The Government should have framed strict law and rules to implement ICT in Institutions. There is vital need to strengthening the leadership, management and governess regarding ICT awareness.

It has been also analyzed that there is lack of sound ICT infrastructure and slow Internet

bandwidth in every institution under study. The clarification in this regard, there is urgent need to update with traditional ICT resources with latest ICT infrastructure. There should be providing enough bandwidth with Wi-Fi facility at campus for twenty-four hours. There should provide fast Internet access on laptop, desktop, tabs and mobiles in Institutions. It was also focused on key issue of increasing cost of lasted ICT equipment and software. The vendor of ICT should develop low cost high quality ICT product so that it can be easy available to a common man. There should be cost reduction policies in ICT product manufacturing companies.

The investigator focused on lack of willpower of teacher towards adapts ICT based teaching. It is suggested here that faculty member should self-motivated and be confident while teaching using ICT. On time workshop and training should be given to the teachers regarding ICT tools. Teachers must have made friendly environment with unaware students from technology. There should be reducing extra workload from them so that they can learn latest technology based teaching methodology for providing quality based education. They should be engaged more in ICT learning instead of extra fruitless works. Teachers must be active and enthusiastic towards ICT teaching-learning. The ICT training should not be confined to faculty members; instead each and every member of institutions should be involved in it.

Institution must have emphasized on the practical work in laboratories and should aware their staff about role of ICT in education. Institution must focus on practical work assignment as compare to theoretical study. The stakeholder must emphasize on practical aspects of ICT resources. The Institutions should frame a centralized web portal for students to implements new concepts to promote ICT. The Institutions should introduce a special ICT awareness subject in course curriculum. The stakeholder should be provided with at least 10 hours ICT awareness study in week to wake up their interest. There should be proper distribution of ICT

learning tutorial required in institutions. There should be scheduled weekly meeting to exploring ICT problems among stakeholders. As it has been found there is deficiency of fully e-libraries in Institutions under study. It is hereby recommended that institutions should provide E-library with high speed Internet to promote E-contents, E-books and E-journals in research and higher education. Library should be provided with full access to all education related site and downloading facility.

It has been observed that the Low interest of stakeholders due to long use of outdated technology in institutions. There is strict need to update or enhance old technology with new one to create more interest in learning. It is also recommended providing online lectures and tutorial to their students to learn technology over the globe. The students can get interact with famous authors, scientist and educationist from various reputed institutions from the world. Online distance education is key solution of remote area education. In 21<sup>st</sup> century where in upcoming few years, Indian institutions shall be top users of Internet in world, every stakeholder should adapt ICT not only in their academia but also in their daily routine life. Every stakeholder must be addicted to E-learning and E-Teaching in order to promote E- education. There should be way to spreading ICT awareness through social media, news and advertisement. They can promote E-contents, online learning using internet and mobiles.

It has been found that deficiency of domain expert teachers in institutions. They are not able to instruct and guide their students towards technological use in efficient manner. It is recommended that the recruitment policy should be improved by institutions. The Instructor should be expert in his domain. The concept of developing Virtual ICT labs is not a bad idea in growing institutions. It is also focused on enforcing students and teachers to use E-contents, E-books, presentations slide to make their effective teaching and learning. Institution must be ready to adapt E-

education concept to promote mission Digital-India. There is need to promote online education system by providing Internet facility in every digital device at low cost.

### **Delimitations of study**

This research is confined to the following limitations.

1. The sample size was limited to Haryana and Punjab state only.
2. The size of sample was confined to 560 for students and 344 for faculty.
3. The Institutions under study were limited to only 3 private and 3 Government Universities.
4. In these study objectives, hypothesis & statistical techniques were limited.
5. This study was restricted to limited number of variables.

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