

# A Critical Analysis on the Impact of Technological Advancement for Supporting Education At Secondary, Primary and Tertiary Level

**Vipin Soosadasan**

Principal, St. Paul's Kerala School

## **ABSTRACT**

The goal of this study is to see how information and communication technology (ICT) affects high school students' academic performance. The study's major premise is that information and communication technologies (ICTs) have no statistically significant impact on student achievement. The study was conducted in public high schools in New Delhi. A total of 350 people were recruited for the study. The data was collected using a self-administered survey questionnaire with a 5-point Likert scale. Descriptive and inferential statistics were used to analyze the data. The findings of this study suggest that communication via information technology has a major impact on student accomplishment. The findings are expected to reveal significant benefits of ICT on student academic performance as well as issues linked to teacher education programme enhancement.

**Keywords:** Information and communication technology, communication, academic performance

## **INTRODUCTION**

The primary goal of ICT in education is to integrate ICT equipment and tools into the teaching- learning process as a media and methodology, as well as to acquaint students with computer use and operation. Information and communication technologies (ICTs) are a broad category of technological tools and resources that are used to communicate as well as create, transmit, store, and manage data. Because communication and information are at the centre of the educational process, ICT has a long history in education. In formal and non-formal settings, ICT has played a role in educational programmes provided by governmental agencies, public and private educational institutions, for-profit and non-profit organizations, and secular and religious societies. The study of developing and using technology to process information and improve communication is known as information and communication technology (ICT).

ICT expands the flexibility of educational delivery, allowing students to access information at any time and from any location. As a result, learners will be better prepared for lifelong learning as well as contributing to the industry. It has the potential to improve learning quality and so contribute to the economy. ICT makes education freely available at any time and in any location. This enables students to make all of their learning materials openly available. This has the potential to lead to lifelong learning. Students might create a learning habit by using the Internet. This will have a direct impact on the

country's economic growth and development.

Information and communication technology (ICT) is often seen as a tool of bringing about effective educational transformation, which will lead to enhanced economic development. The impact of an ICT-supported education system on the nation's economic growth is direct or indirect. Today's information and communication technology has the potential to have a large and positive impact on the country's educational and economic environments.

Nowadays, information and communication technology (ICT) is the most advanced technology. It is technology that enables information to be exchanged more quickly and easily. As a result of this technology, the distance between nations has shrunk, and the globe has become a global village. Technology has a bigger role in the growth of a country like India, which has a confluence of dynamic culture and diverse languages. The focus of this research is on Impact of Technological Advancement for Supporting Education at Secondary, Primary and Tertiary Level. This work will also provide an up-to-date overview of the rapidly growing field of Information and Communication Technologies (ICT) in Rural Education, as well as its application in the form of technical advances for rural development.

This research investigates the many elements that influence the use of computers in the classroom. ICT encourages students to take charge of their own education by providing problem-based and inquiry-based learning opportunities with simple access to information. Effective use of ICT, particularly in developing nations like India, leads to the development of the educational sector, resulting in enhanced educational competitiveness and employment. South and West Asia, Bangladesh, Nepal, and Sri Lanka all have national ICT in education programmes that are sector-wide. In fact, these plans were only released in Bangladesh and Nepal in 2013. The use of fewer computers and other devices in classrooms aids in the development of 'higher-order' abilities by strengthening the links between ICT and curriculum.

Any country's economic and social progress is driven by education. Given this, it is critical to discover ways to make high-quality, accessible, and cheap education available to all, utilizing the most up-to-date technologies. ICT has the capacity to break down the barriers that lead to low educational rates in any country. Lack of access, time constraints, a lack of mentors, and training opportunities, according to one author, have an impact on teachers' use of ICT in teaching and learning. It can be used as a tool to help overcome challenges such as cost, a shortage of teachers, and low educational quality, as well as time and distance obstacles, which are key roadblocks in progress. Various techniques to integrating ICT in schools in Asia include combining radio, television, computers, and the Internet in classrooms, computer laboratories, and other venues, as well as establishing a structure to allow mobile learning utilizing various smart phone and tablet devices.

The educational system is fluid and evolves over time. It adapts to societal demands by incorporating technological advancements. Teleconferencing, email, audio conferencing, television classes, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs, and other ICT products that are relevant to education have all been employed in education for various purposes. The involvement of school management in addressing future development and consistency, as well as some way of monitoring progress against set milestones, is a vital aspect in the effective use of ICT.

## **RATIONALE OF STUDY**

"Technology is the means by which our economy can achieve non-linear growth." The study of the need

for rural technology promotion would lead to a focus on people's basic needs. Five parts of social and economic infrastructure can be distinguished, each of which should be successfully managed by local governments and the federal government. Health, education, drinking water, housing, and power are among them. Following these, the necessity for roads, efficient agricultural output, grassroots employment, and telecommunications must not be overlooked. All of these rural development objectives converge on the development of effective rural technologies and a good rural education to absorb technical advancements.

The school system, it is widely accepted, is in desperate need of reform. In a very short time, information and communication technology (ICT) has become one of the fundamental building elements of modern society. Understanding and mastering basic ICT skills and ideas, along with reading, writing, and arithmetic, is now considered part of the core of education in many nations. Education is not supported by ICT-based systems in the majority of primary, secondary, and university institutions across the country. Where ICT does exist, it is hampered by a number of issues ranging from a lack of reliable energy to a scarcity of ICT-trained educators.

In terms of improving economic growth, ICT capital outperforms non-ICT capital: a higher level of ICT capital stock per capita allows a typical economy to attain a better growth rate for given levels of labour and capital input growth. In this regard, it is also conceivable to argue that it is sometimes not how much capital you invest, but how you invest it, that makes a difference.

Most policymakers, business executives, practitioners, and parents believe that wiring schools, purchasing hardware and software, and disseminating the technology will result in more classroom use and improved teaching and learning.

Higher engagement and interaction are possible with e-learning. It refutes the notion that traditional face-to-face education is superior. The web and the Internet are the most important information and communication technologies (ICTs) for e-learning. E-portfolios, cyber infrastructures, digital libraries, and online learning object repositories are among the components. All of the above components work together to form a student's digital identity and connect all of the stakeholders in their education. It also makes cross-disciplinary research easier. According to many early innovator teachers' experiences, the usage of ICT is stimulating for both students and teachers. Mention how ICT can help underprivileged communities enhance performance, instruction, and administration, as well as develop appropriate skills. Learning by doing, real-time dialogue, delayed-time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to interact, collaborate, and learn, all improve the quality of education. ICTs also give a platform for sharing information and knowledge, according to the author.

The primary goal of this project is to investigate students' attitudes on the use of ICT. There is a strong emphasis on how students actually utilize technology rather than how they should use it.

## REVIEW OF LITERATURE

'Factors affecting teachers' use of information and communication technology policy for education,' according to **Afshari et al. (2009)** They suggested that schools attempt to persuade ICT professionals of the importance of integrating technology into classrooms. The Ministry of Education and Sports should encourage schools to invest in high-quality technology and enhance mechanisms for monitoring and maintaining ICTs in the classroom. This could be accomplished by developing innovative ways (including staff training) to ensure that breakdowns are dealt with as quickly as possible. Teachers can

access the school network, the internet, and computer accessories with the help of information technology; they said (printer, digital camera, data projector, large TV screen, scanner and video camera). They also stated that as novice computer users, teachers want technical training to assist them in the teaching-learning process when they encounter difficulties, whereas skilled instructors are ready to share their knowledge and provide technology assistance to their peers. As a result, teachers' lack of technical expertise of how to keep computers running confused them when it came to integrating ICT in the classroom. They discovered that instructors' ability to utilise computers effectively is determined not only by their attitudes, but also by the training they had received. Positive attitudes toward ICT, awareness of ICT's educational potential, capacity to use ICT successfully in the curriculum, and ability to manage ICT use in the classroom are all prerequisites for a teacher's competency.

In his study 'Technological impediments to learning,' **Bahr (2009)** discovered that complicated ICT settings can have a negative impact on student learning. When integrated pedagogies are used to soften the sometimes high-load information environments of ICT, learning improves. In addition, a framework for ICT in education must take into account teachers' professional competencies in terms of their varying ability to create and integrate technology for learning.

'Pupils' views toward school science when they migrate from an ICT-rich primary school to a secondary school with fewer ICT facilities,' according to **Beauchamp et al. (2009)**. They looked at a sample of scientific students who transferred from a technology-rich primary school to a rural UK secondary school with fewer ICT resources. They discovered that the lack of ICT in secondary school was a source of irritation, but that the group remained overwhelmingly enthusiastic about science. The pupils particularly loved the hands-on parts of scientific lectures, which they had not had in primary school and which they claimed compensated for the lack of ICT in science instruction.

**Grani et al. (2009)** conducted research on the 'Design, implementation, and validation of a Europe-wide pedagogical framework for e-learning.' From static e-learning and mobile (m-learning) approaches, the study developed a pedagogical framework for online learning in secondary schools. They discovered that successful integration necessitated administrative support, proper resources, and suitable continuous professional development; nonetheless, with practise, the instructors' understanding and opinion of the program's usefulness improved. The researchers point out that a well-implemented ICT framework allowed for both collaborative and autonomous learning, which improved teaching and learning outcomes across the European school network.

'ICT in science education: A quasi-experimental study of achievement, attitudes about science, and career goals of Korean middle school students,' **Park et al. (2009)** studied. The researchers discovered some evidence that ICT aids high-achieving pupils and promotes science enrollment.

In their study 'Faculty participation: Motivations, incentives, and rewards,' **Wolcott et al. (2011)** discovered that intrinsic motivations, such as job satisfaction and experimenting with new technology tools and teaching strategies, were the most influential factors in faculty decisions to participate in online learning. Extrinsic reasons such as monetary assistance, course release time, and tenure and promotion credit were found to have the least impact on professors who desired to participate. Furthermore, several colleges that did not allow faculty release time to build online courses had other staff employees, such as instructional designers, multimedia developers, and technical experts, handle the work.

'Preparing instructors for quality online education' was the topic of **Young et al (2012)**. research. They discovered that an instructor's position in an online classroom can be more difficult than in a regular

classroom. Online instructors were assumed to be burdened with the additional responsibilities of planning courses ahead of time, constantly facilitating the course, modelling effective communication skills, and changing courses to meet the diverse needs of students.

Reid (2013) conducted research on "quality assurance, open and distant learning, and Australian universities." They discovered that committed online educators went through distinct stages of their online learning journey, with varied needs at each stage. Furthermore, educational leaders required to participate in professional development and experiment with online learning environments, infrastructures, and technologies because they were responsible for the quality of online programmes and instruction.

**RESEARCH METHOD**

The effects of ICT on student achievement were measured using a quantitative design in this study. There were 3300 high school pupils in all. The Morgan formula was used to pick 350 students, and then the simple random sample procedure was employed to identify participants.

The data was gathered via a survey questionnaire. The survey was created using a 5-point Likert Scale ranging from strongly agree to strongly disagree. A convenience sample of 35 students was used to pilot test the instrument. The results were sufficiently comprehensive and proved the utility of the instrument after 32 surveys were completed with a 100% response rate. However, after the pilot test, the final survey questionnaire was revised to reflect the changes.

There were two sections in the final survey instrument: The first portion focuses on the demographic features of the respondents. The second segment assessed the scope of pupils' accomplishments. Respondents were asked to score the statements on a five-point Likert scale, with one indicating strong disagreement and five indicating strong agreement. Academic achievement was measured using a composite variable that included seven variables in this study.

To show and describe the data, descriptive statistics such as frequency, percent-ages, averages, and standard deviation were used. Multiple regression analyses and other inferential statistics are used to forecast the elements that influence pupils' academic progress.

**RESULTS**

**TABLE-1: DISTRIBUTION ON THE BASIS OF DEMOGRAPHIC INFORMATION OF RESPONDENTS**

Variable	Category	FREQUENCY	PERCENTAGE (%)
Gender	Male	155	44.2%
	Female	195	55.71%
Grade	10th	90	25.71%
	11th	115	32.85%
	12th	145	41.42%
Computer	Yes	300	85.71%
	No	50	14.28%
Smartphone	Yes	260	74.28%
	No	90	25.71%

The gender of respondents is shown in Table 1 as part of their personal information. Males accounted for 44.2 percent of respondents, while females accounted for 55.71%. 85.71 percent of them used a

computer at home and 74.28 percent used a smartphone. Other information, such as how to use a computer and a smartphone for educational purposes, is shown in table 1.

**TABLE-2: DISTRIBUTION ON THE BASIS OF THE EFFECT OF ICT ON STUDENTS' ACADEMIC ACHIEVEMENTS**

Variables	MEAN	SD
High level of hope	10.50	2.40
Motivation	11.15	3.05
Resistance	9.70	2.31
Retry	9.80	2.22
Time Perception	8.30	2.38
Foresight	7.10	2.38
Competency	7.40	2.13
Good function	8.02	2.30

The study also tried to determine the academic components of students. Table 2 shows the majority of teachers' perceptions of ICT's effects on students' motivation (M=11.15, SD =3.05) and hope (M=10.50, SD 2.40). ICT can affect students' resistance, repetition, time perception, function, competency, and foresight, according to the answers.

**Main Hypothesis:** The ICT has positive effects on student achievement.

**TABLE 3: THE OVERALL EFFECTS OF ICT ON STUDENT ACHIEVEMENT**

Predict variable	beta	T	P<	R <sup>2</sup>	F	P<
ICT	0.50	7.33	0.001	0.28	25.69	0.001

As result indicated in Table 3 the ICT affect on academic achievement this result could be predicted by 0.14%.

**Hypothesis 1:** ICT has no effect on the level of students' hope. To answer to this hypothesis, we used regression analysis. As result indicated in Table 4,

**TABLE- 4: THE EFFECT OF ICT ON STUDENTS' HOPE**

Predict variable	beta	T	P<	R <sup>2</sup>	F	P<
ICT	0.33	8.28	0.001	0.11	53.69	0.001

ICT increase the level of students' hope and the result could be predicted by 0.14%.

**Hypothesis -2:** ICT has effect on the level of students' motivation. The result indicated in Table5 shows that

**TABLE 5: ICT AND THE LEVEL OF STUDENTS' MOTIVATION**

Predict variable	beta	T	P<	R <sup>2</sup>	F	P<
ICT	0.28	7.19	0.001	0.7	37.23	0.001

ICT increase the level of students’ motivation and this result could be predicted by 0.10%

**Hypothesis -3:** ICT effect on students’ homework

**TABLE -6: ICT EFFECT ON STUDENTS’ HOMEWORK**

Predict variable	beta	T	P<	R <sup>2</sup>	F	P<
ICT	0.31	8.37	0.001	0.13	52.55	0.001

As result indicated the ICT increase the level of students’ motivation and this result could be predicted by 0.14%

**Hypothesis- 4:** ICT effect on students retry on their homework.

**TABLE 7: ICT EFFECT ON STUDENTS RETRY ON THEIR HOMEWORK**

Predict variable	beta	T	P<	R <sup>2</sup>	F	P<
ICT	0.47	9.91	0.001	0.22	98.31	0.001

As result indicated the ICT increase the level of students’ motivation and this result could be predicted by 0.22%

**CONCLUSION**

In all spheres of life, information and communication technology (ICT) have become commonplace. The use of information and communication technology (ICT) has significantly transformed the routines and procedures of practically all types of activities over the last two decades. ICT has begun to make an impact in education, although not to the extent that it has in other disciplines. Education is a very socially oriented activity, and great education has long been associated with strong and qualified teachers who have a lot of one-on-one time with students. The use of ICT in education promotes more student-centered learning environments, which can lead to tensions between teachers and students. However, as the world rapidly moves toward digital media and information, the role of ICT in education is growing in importance, and this importance will continue to increase and develop in the twenty-first century.

In light of this, the current research has been a pleasant experience in elucidating the perplexing consequences of ICT programmes. It is recognised that programmes are beneficial and serve a function. The study has clearly demonstrated the potential function of ICT in improving secondary school quality, as well as boosting student learning and generating greater learning among them.

According to the findings of this study, all of the principals appear to have an average attitude on ICT programmes. Principals of private unassisted schools, on the other hand, had a more favourable attitude than principals of private aided schools, who were followed by principals of government schools. Also, principals who had access to a computer at home had a more favourable attitude than those who did not. Furthermore, principals who had an Internet connection at home had a better opinion than those who did not.

The primary goal of this study was to look at the impact of information and communication technology on high school students' academic performance. The data was gathered via a survey questionnaire. The major theory was put to the test, and related material was combed through. The findings revealed that information and communication technology (ICT) had a considerable impact on student academic attainment. The study also showed that ICT may be utilized to predict academic components in students.

## RECOMMENDATION

The following recommendations are given based on the study's findings:

- The Ministry of Education should collaborate with computer businesses to create novel networking and cooperation arrangements. This may make it possible for schools to obtain educational equipment at a lower cost.
- More ICT instructors should be hired and trained in high schools so that they can effectively offer ICT-based curricula. It is critical that school has well-trained instructors who are capable of integrating ICT into the classroom.
- Students and teachers should receive adequate training in how to use ICT in the classroom.
- Teachers and students should be supplied with ICT capabilities, as well as ways for designing training needs and staff development programmes to equip them with critical classroom skills.
- The government should mobilise educational resources to provide ICT infrastructure to schools. Schools should invest in current ICT infrastructure so that both teachers and students can study.
- High school administrators should keep up to date on educational technologies so that they can persuade teachers who are hesitant to adopt it.

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