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IT – A Tool to Accelerate the Pace of Education

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ABSTRACT

Education is an essential aspect for personal growth both internal and external, social development, national prosperity and global civilization. Many factors affect the education and education system as a whole and Information Technology is one of them. Information Technology provide the base and platform through which education can be imparted in a more clear, concise and faster way. IT in itself is a vast field covering many tools and techniques. This paper focuses on some important and latest technologies which is affecting education at 360° dimension. This paper covers cloud-based services(virtualization), Geographic Information System, Integrated Development Environment and Online platform in relation to education. Aim of this paper is to enhance the understanding and application of these technologies which can be used as a significant tool to support, accelerate and impart education. Education sector can reach to the greater height by 2025, by holding the hand of technology.

Keywords: technology, Tool, Education, Cloud, Geography, Information, Internet, Services

1. INTRODUCTION

Education one of the basic needs of every human being, has undergone several changes, from the time when education was given under a Pepal tree in Gurukul to the today's time where it is given by someone who is sitting 1000's of Kilometres apart in some other part of the world. The world has become a global classroom. There are several factors that has contributed to the growth in the education sector, but the main credit goes to Information Technology. Technology has empowered education sector. Technology means anything that accepts, stores, manipulates, analyses and present information in digital format. Technology in itself is a vast field covering Artificial Intelligence, cloud computing, Geographic Information System, Big Data, bots, Integrated Development Environment, Internet, augmented and virtual reality, Natural languages etc. Over the past few decades, we have seen a rapid development in the technology. IT has provided such a strong infrastructure on which education sector is growing and will grow at ever increasing rate. In the coming years artificial intelligence, augment and virtual reality will take a lead. By 2025 everything will be connected by data and smart either it is classroom, exam assessment, management, degree distribution etc. It won't be wrong to say 2025 will be true digital era and will empower students to be employed and successful.

2.   TECHNOLOGIES, THEIR USAGES AND BENEFITS

This section focusses on selected technologies, their purposes, relation with education sector and their future prospects.

2.1 Cloud Computing

- Cloud computing refers to on demand services provided over the internet. It provides three types of services – Infrastructure as a Service, Platform as a Service and Software as a Service. These capabilities are stored remotely at the server and provided to the client through internet on demand.
- Education sector has enormously benefited from cloud-based services. It has reduced the necessity for infrastructure.
- Cloud computing in education sector helps students, teachers and administrators in the same way. Cloud computing allows students access to homework, perform and submit wherever there's an internet connection, teachers can instantly upload assignments, learning materials and administrators can easily team up with one another and save money on data storage.
- Cloud computing has brought teachers and learners together on a single, unified platform. Educational establishments such as schools, colleges, and universities don't need to buy, and maintain their own servers and data centres. Instead, they can borrow and buy cloud computing services to avail computing power, databases, storage, and other services. Cloud storage also provide data security, data is under the strict security of server.
- Cloud computing helps to reduce cost in education.
- Few examples are - The Google's G Suite apps all reside on the cloud. A special classroom version - G Suite for Education, includes extra features for apps like Google Docs, Sheets, Drive, Gmail and others. With the Explore tab, students can use natural language to input formulas in Sheets or get layout suggestions in Slides. Another product, Google Classroom, links Google's online cloud applications (like Calendar or Docs) so it's easier to complete or schedule assignments using a central hub.
- Office 365 Education is Microsoft's free of cost special version for students and educators: Office 365 is cloud-based version of Microsoft Office, which includes apps like Microsoft Word, PowerPoint and Excel. Instead of buying and installing software in hard drive, students and educators can set up an Office 365 account and save all Office documents to the cloud for easy access. Office 365 Education has additional classroom tools.
- Cloud based applications help teacher to create interactive lessons, activities and quizzes, and then assign them to students.
- Another example is Cloud Guru which is an online database system of courses designed to teach and train people in cloud computing.
- All the sectors and industries are incontestably being benefited by the Cloud technology, education sector also depend upon the cloud technology for making the knowledge sharing enhanced, empowered, and simplified.

2.2 Internet (Online Platform)

- Internet or Online Platforms has generally been a medium of communication. People from one point of the globe could communicate with someone at some other point because of the internet. But eventually because of its speed and efficiency it has

become multi-functional. Now internet is used for several purposes such as education, business, agriculture, infrastructure etc.

- Online Platforms have capacity to provide multiple applications while using them. For instance, a tutor taking a lecture online, not only can communicate with the students from distance but also can use different tools like Excel, PowerPoint, and Google Jam board to make the content and interaction more efficient.

- Online Platforms provide the flexibility of time which makes the two-way communication much easier. With the availability of virtual classrooms, the data can be stored on cloud as well as the device itself, so that it can be retrieved in no time. For instance, a student is asked to submit an assignment online, the student can have the document stored on cloud and submit it anytime.

- Reducing costs and use of other resources while surfing through online platforms have always had an edge. Interestingly, online education provides the same knowledge as traditional education but with more interactive tools, higher quality, much more definitive experience and all of that for least cost of any sort of resources.

- Online Platform has nowadays even started providing degree in almost every stream be it engineering, medical, humanities etc. which also shows not just great value but is also accessible for the people who have a low economic background. Today, a student sitting at any far end of the globe, may be a village too, can study and understand interactive and free courses from some of the world's top universities like Harvard, Stanford, Oxford, Cambridge etc. all because of the availability and efficiency of online platform.

- With platforms such as Google Meet, Microsoft Teams, zoom etc. online education has achieved new heights. Earlier students had to view pre-recorded courses and then did lack the opportunity of one-to-one interaction. But now, because of those platforms, online lectures are conducted and with a participant capacity of 1000+ and streaming services offered by YouTube and Facebook, a professor sitting at his own home, can give lectures to students across the globe.

- For years, online platforms like Udemy, Coursera, Edx and others have shown variety of contents to learn, but still their certifications lack a bit of value in the market. People still have a positive side for traditional educational approach which is great but people also do need to understand that with the pacing world, everybody needs to catch up and not everybody can travel to a better place for pursuing education at large expenses. People need to understand that online education is the only solution to this problem and the future generations depend upon it.

2.3 Integrated Development Environment

- Integrated Development Environment (IDE) is a collection of technologies which serves as a simplified mechanism in developing and testing of codes from various languages. It generally consists of word-processor, a debugger, a compiler and execution of applications of various programs.

- IDE has enhanced the ways of teaching methodology over the time in terms of programming. With more efficient technology and execution power it has to come to a point from where growth in the education sector is unshakable.

- Educators at any level have seen vast increase in the number of students who have chosen IDE for programming instead of different software's for various languages. The more a student finds it convenient to learn, the less efforts are required by the educator to teach.

- IDEs such as NetBeans, Eclipse, Visual Studio etc. are efficient in many ways be it cost, speed, storage, availability of languages etc. They are generally available for free

of cost and also do provide cloud-based data storage for specific versions as to save the space in user's device.

- Earlier, people had to install a particular application for coding in the required language and another set of applications for other purposes such as database, cloud connectivity etc. but with the increase in efficiency of IDEs, all those applications are now condensed into a single one – The IDE itself.

- Students who face trouble in getting started with new languages have felt relief in understanding and coding in them because of the interactive user interfaces of the IDEs. With the multi-lingual support available, students or coders can easily shift between languages according to their convenience without installing extra resources.

- In the coming years, it will become a necessity for coders, students and others interested in programming to use IDEs because of their speed, variety, interactive interfaces, multi-lingual support and also development of major technologies such as machine learning, artificial intelligence and others will become more convenient because of the IDEs.

2.4 Geographic Information System

- Geographic Information System (GIS) is a branch of study which uses geographic information such as maps, positional and attribute data for collecting, organizing, managing, manipulating and analysing spatial data in order to make efficient and precise decisions. It has wide applications associated to education, security, engineering, planning, management, environment study, transport, insurance, telecommunications, and business.

- Main aim of GIS is to enable students analyse data using various GIS tools and techniques for better decision making and help them in study of geographic concepts, applications, and systems.

- In the last few decades, it was only used by big organisations but now its capabilities and proficiency has made it available for common people also especially students. Today, educating students to develop better infrastructure and understand complex geographic phenomenon, GIS plays a vital role.

- At different levels, students are taught different applications of GIS and also its practical usage helps in analysing as well as predicting geographic changes across the globe. Educators find it very convenient to teach students through GIS software and also conduct practical's using the same.

- GIS has become an essential industry too. Employment and job opportunities in this sector have increased in the past decade. Several MNCs, such as Google, Uber, and Amazon now require GIS experts in order to help in various process such as supply chain and logistics, data analysis, prediction of weather phenomenon etc.

- Some commonly used GIS software's such as QGIS, ArcGIS, GrassGIS, and SAGAGIS have shown sharp increase in usage especially among students. Technologies related to planning, navigation, telecommunication etc. need GIS for better analysis and decision making and thereby students who can be future experts in the said field, need to get familiar with different tools available for GIS studies.

3. OBJECTIVE

- To illustrate that IT has helped in the growth of education sector.
- To prove that IT will help education sector to grow in all dimensions by 2025.
- To give insight how information technology has made education easily available to all
- To prove that IT has made the complicated concept simple to understand

- To show that IT has made education cost effective
- To illustrate that IT has provided global platform to the learners.
- To prove that IT has made the learning process easy.
- To show that IT helps to implement the concept with the less effort.

4. RESEARCH METHODOLOGY

To meet the objectives of this paper, the methodology is as listed below-
- Research is based on primary data, so the first step is to create a questionnaire through Google Form.
- Undergraduate students are the targeted respondents, so second step is to circulate the form and collect the data from the Undergraduate students (50 respondents approx.). The sample is a mixed collection of male and female between the age group 18 to 22 years.
- Success and quality of output is dependent on quality of input, so the next step is to prepare the data, remove any anomalies or extreme data.
- Next step is data manipulation.
- Next step is to analyse the data using various tools and techniques using Microsoft excel.
- Final step is to present the outcome with the help of tables and charts.

5. DATA ANALYSIS AND INTERPRETATION

Data analysis and presentation has been done through Google Spreadsheet. Questionnaire to meet the objective consists of nine question in varied domain. Responses are recorded in google sheet which is further analysed to derive inferences. Out of 50 respondents 30% are female respondents and 70% are male respondents.

Outcome of the responses have been summarized in the following table.

Question	Option 1	Option 2	Option 3	Option 4
How often you use technology during your education	Every time	Frequently	Some Time	Never
	74%	20%	4%	2%
How cloud services have affected the cost of education	Increased the cost	No difference in the cost	Reduced the cost	Can't say
	28%	24%	34%	14%
How Integrated Development Environment (IDE) has affected the teaching - learning and software development process	Made the process simple, fast and easy	No difference	Made the process complicated, slow and tough	
	94%	4%	2%	
Using Information Technology concepts can be understood and implemented	Very easily	Fairly good	Can't be understood	
	56%	42%	2%	
How frequently you use online platform for education	Always	Regularly	Need based	Never
	32%	50%	18%	

Online platforms for education have made teaching learning process	Effective	Non-Effective	No difference	Can't Say
	74%	10%	8%	8%
Technology provides global platform to the students	Agree	Disagree	Neutral	
	96%	2%	2%	
Information Technology has made education related content and resources easily available to all	Yes	No	Can't Say	
	92%	4%	4%	
How frequently you use cloud services (storage, online software etc.)	Always	Some times	Rarely	Never
	42%	48%	8%	2%

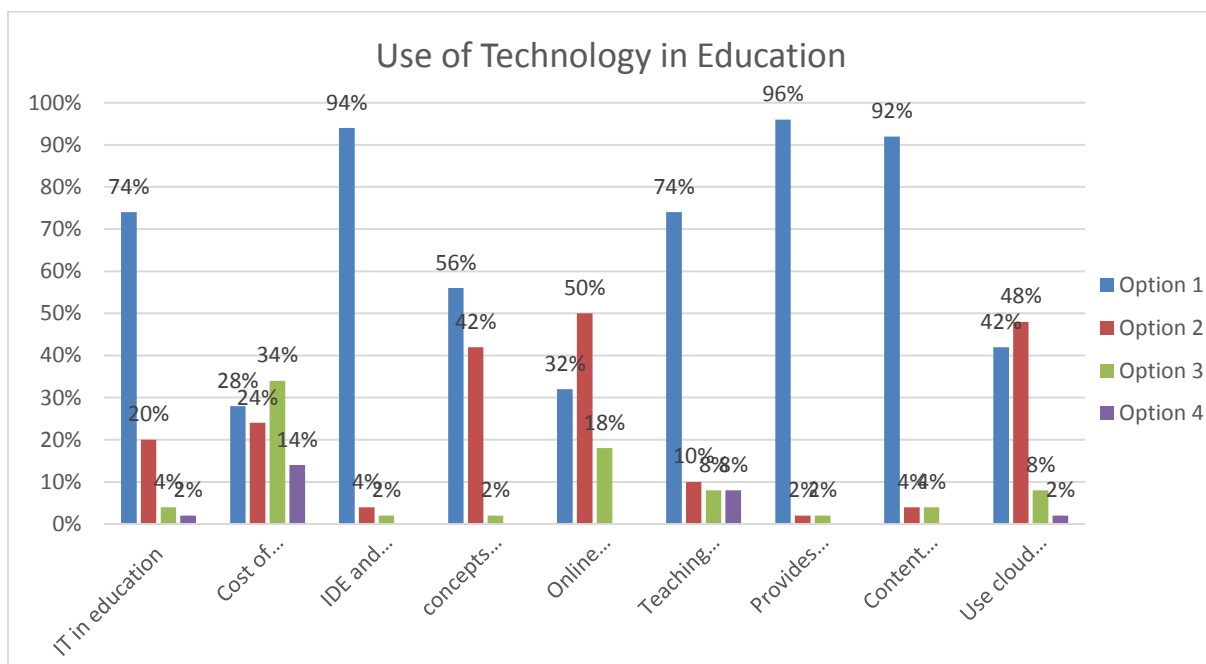*Table 1: Summary of Questionnaire Responses*

Fig. 1: Use of Technology in Education

- Above chart illustrates that 74% of the population use technology every time during their studies.
- 34% of the respondents have the opinion that the use of technology has reduced the cost of education overall.
- 94% of the respondents believe that Integrated Development Environment which is the collection of technologies at a common platform has made the education and software development process easy.
- 56% of the students are of the opinion that through technology concepts can be understood in an easy and convenient way.
- 50% of the respondents use online platform such as Google Meet, Zoom, Google Classroom and other virtual methods for education.
- 74% of the respondents believe that virtual platform either it is for lecture, assignments etc are easy to access and very helpful.
- 96% of the students agree that IT has provided global platform.
- 92% believe that online they get all the required material for their learning.

- 45% of the students are using various services provided by cloud computing.

6. CONCLUSION

In the light of above research work and discussion, it can be concluded that information technology is a tool that has been supporting and can further accelerate the growth rate of education sector. Today almost every learner, teacher and admin people use technology in one or the other way. Internet, cloud, virtualization, data house, everyday ever-growing new techniques, application, languages, IDE's, online courses, online content, online forum, online platform has provided sustainable growth to the education sector. IT has not only made the education easily available and accessible to all but also cost effective. These technologies are growing all leaps and bounds and so the education sector. Technology is providing such an infrastructure on which a strong and wide monument of education system can be built by the year 2025. By 2025 the whole world will become a classroom. Education can be made available at fingertips and 24X7.

I conclude with these words "IT is the engine of the sail boat on which Education can sail with a great pace."

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