collegedunia AN EDUCATION SUMMIT
connect
CHAPTER 3.0

Reimagining Education in India @100 Years

2023 Edition

Vision India @2047

COLLEGEDUNIA JOURNEY SO FAR...

2022-23

Launched our latest additions **CD Learn, CD Career Carnival, CD Study in India** and conducted **Collegedunia Connect 2.0 - The Delhi Chapter** along with the initiation of the **Collegedunia Excellence Awards.**

2021-22

Our headcount crossed the 1,000 Mark
We bounced back stronger post the COVID - induced industry slowdown.

2020-21

Inaugurated **CD Connect 1.0 - The Chennai Chapter, Touched 92 CR Annual Revenue, Launched CD Agency - a comprehensive range of Digital Services.**

2019-20

Launch of New Portal Prepp.in for Government Exams,
Shifted our base to Gurugram.

2018-19

Our daily traffic touched **1 Million / Day.** Client list crossed 1,000+.
Became **India's Largest Review Portal** collecting over 1,20,000 Genuine Reviews.

2017-18

4 years in the game, we shot to fame,
becoming **India's Largest College Search Portal**

2016-17

Launched the Study Abroad Vertical.
More we dreamed, more we grew in Numbers, Clients & Confidence.

2015-16

Started business having touched 1,50,000 daily sessions,
with industry's best engagement rates.

2014-15

We entered the web & got instant recognition owing to the **Cleanest UI in the industry.**

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National Institute of Technology Srinagar

राष्ट्रीय प्रौद्योगिकी संस्थान श्रीनगर
हजरतबल | श्रीनगर | जम्मू और कश्मीर | 190006
www.nitsri.ac.in

Professor Rakesh Sehgal
Director

No.: NIT/Dir/22/406

Date: 09.12.2022

MESSAGE

India has revived the discussion on the National Education Policy (EP) after 34 years in 2020. A policy can be considered good only when it is practised to the best of its abilities. Thus, it is important to revisit and re-explore the extent of the educational practices, along with its capabilities in 2047 when India will be a century old as a politically free nation.

The Government of India has recently launched a discussion on the Preparation of an Action Plan and a Document of Vision India@2047. An Action Plan and a document related to the Social Sector which includes the Education Sector are to be prepared after brainstorming with the various stakeholders which inter-alia include Research Institutions, Universities, and Domain experts.

I congratulate Collegedunia for preparing the Whitepaper on Reimagining Education in India @100 years. This whitepaper discusses the multiple challenges facing the education and skill eco-system in India including that of capacity, scale as well as quality. For transforming Indian education to the needs of a well-equipped and skilled society of the future, there is a need for undertaking reforms in the sector both, at the Centre as well as State level, besides taking policy measures to encourage greater participation of private partners in the sector.

Some of the key issues in terms of higher education are the future of education, future skills, gender equality, entrepreneurship, innovation, employment issues, and others. High-quality education is the most important step for the development and growth of any country. With the highest number of young population in the next decade, the country's future is going to be largely dependent on the quality of education it can provide to all individuals.

I once again congratulate Collegedunia for preparing this whitepaper. It will definitely help policy makers in drafting India's education landscape in the coming decades.

09/12/2022

(Prof. Rakesh Sehgal)

Telephone: 0194-2422032 | Office: 0194-2414101 | Mobile: 09419433770 & 09418058442
Email: rakeshsehgal.nitham@gmail.com | director@nitsri.net
Hazratbal | Srinagar | Jammu & Kashmir | 190006

भारतीय प्रौद्योगिकी संस्थान रोपड़
INDIAN INSTITUTE OF TECHNOLOGY ROPAR
रूपनगर-140001, पंजाब, भारत
Rupnagar- 140001, Punjab, INDIA
दूरभाष/Tele : +91 - 1881- 231006
ई - मेल / E-mail : director@iitrpr.ac.in

प्रो. राजीव आहूजा
PROF. RAJEEV AHUJA
निदेशक
DIRECTOR

Message

Collegedunia is pleased to host **Collegedunia Connect 2.0.** This is a college summit celebrating thought leaders in education and her makers of change.

This is a major initiative that brings together key stakeholders, including policy makers, educators and industry leaders, to discuss strategies and share best practices that contribute to the development of 21st century education systems.

Collegedunia is preparing a **white paper on reimagining education in India in 100 years**. This white paper explores the many challenges facing the Indian education and skills ecosystem, including capacity, scale and quality. In order to adapt education in India to the needs of future well-resourced and skilled society, sector reforms may be implemented at both central and state level, along with policies to encourage private partners' involvement in the sector.

My heartfelt greetings to Collegedunia for the production of this white paper. It will undoubtedly help policy makers shape the education landscape in India for decades to come.

(RAJEEV AHUJA)

Prof. Lalit Kumar Awasthi
Director
01346-257400
+91-9557750888/7018494770
director@nituk.ac.in

राष्ट्रीय प्रौद्योगिकी संस्थान,
उत्तराखण्ड
National Institute of Technology,
Uttarakhand

Azadi Ka Amrit Mahotsav

Message

I am happy to note that Collegedunia is organizing "**Collegedunia Connect 2.0"**, a Higher Education Summit to celebrate thought leaders and change-makers in the higher education in India wherein deliberations are centered at "**Reimagining Education in India@100Years**". It is also heartening to know that a whitepaper is being released wherein the best educationists, best industrialists, best policy makers and education sector leaders have made significant contributions.

The stage is set for India to lead from the front in all sectors including education. The change in education landscape in India is triggered by Hon'ble Prime Minister Sh. Nerendra Modi is by launching much awaited "National Education Policy 2020" after 34 years. We need to change the education system to be more flexible, more inclusive, freedom to learn anywhere-anytime by using technology and paving the way to increase GER. Simultaneously there is a need to boost the standard of research which in a way needs to be channelized for solving the problems being faced by our country India. The initiative of Collegedunia is an important initiative that brings together key stakeholders including policymakers, educationists, industry leaders, to deliberate upon strategies and share best practices that help in developing a 21st century education system.

Collegedunia is preparing the **Whitepaper** on **Reimagining Education in India @100 years**. This whitepaper discusses the multiple challenges facing the education and skill eco-system in India including that of capacity, scale as well as quality in education and research. For transforming Indian education to the needs of a well-equipped and skilled society of the future, there is a need for undertaking reforms in the education sector both, at the Centre as well as State level, besides taking policy measures to encourage greater participation of private partners in the education sector.

I extend my warm wishes to Collegedunia for preparing this whitepaper. It will definitely help policy makers in drafting India's education landscape in the coming decades which in fact will script a plan for India to be a developed and prosperous county by 2047 in years to come.

Date: 09-12-2022

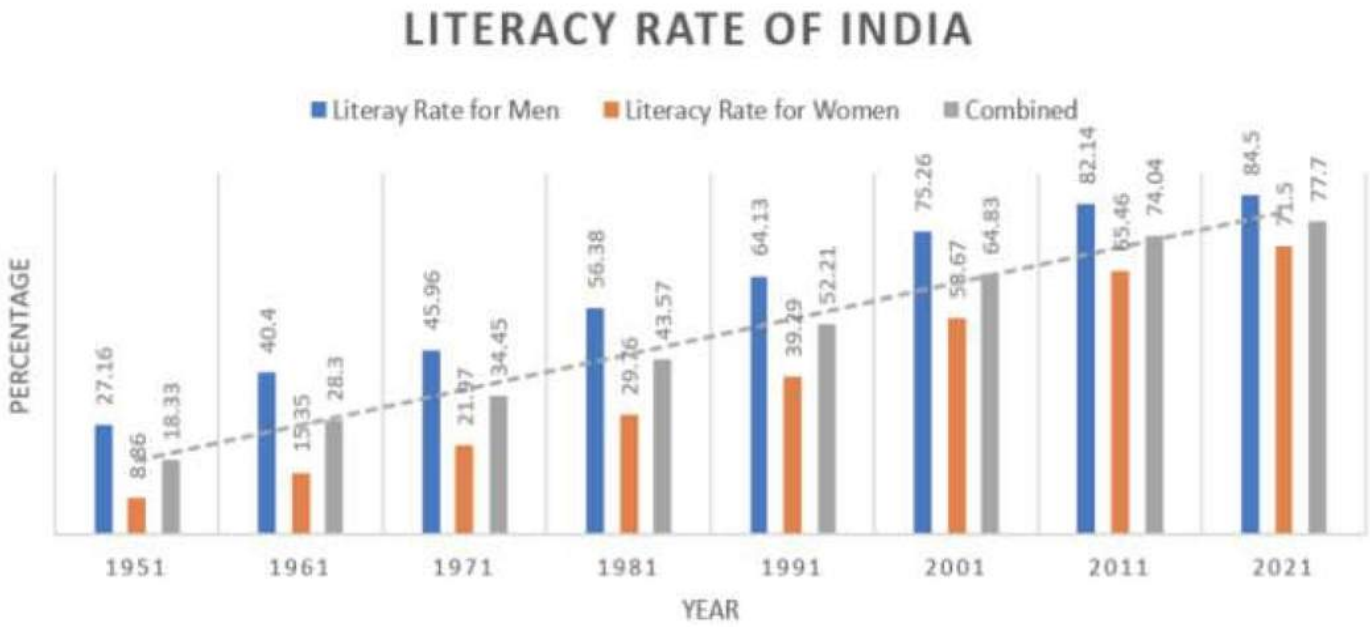
(Lalit Kumar Awasthi)

Temporary Campus-Government ITI, Srinagar (Garhwal), Distt. Pauri Garhwal, Uttarakhand Pin-246174
Phone: 01346-257400 (O), Fax: 01346-251095 E-Mail: nituttarakhand@gmail.com, Website: www.nituk.ac.in

Introduction

Background

Since the nation's independence in 1947, The Government of India has initiated & funded various programs & initiatives to promote education and solve the major problem of illiteracy in urban & rural areas of India. These policies for education have shown a positive year-on-year growth in the literacy rate of India.



Major Initiatives by the Government of India for improving education:

- In 1948, The Government of India appointed a University Education Commission. The Commission focused on making recommendations on various aspects of higher education. After Independence, The commission had to assume wider duties & responsibilities in helping Indian economic growth which was earlier only limited to traditional education & knowledge.
- In 1953, UGC was established and had responsibilities for determining & maintaining standards for higher education in India.
- In 1964, the Kothari commission was formed under the chairmanship of Daulat Singh Kothari (UGC:1961-1973). The main objective of the commission was to provide policies and guidelines for the development of education in India.
- In 1968, The Government of India announced the first national policy on education based on the recommendations of the Kothari commission report, which called for a "radical restructuring" and proposed equal educational opportunities in order to achieve national integration and greater cultural and economic development. This 1968 policy emphasized the learning of regional languages, outlining the "three-language formula" to be implemented in secondary education – the instruction of the English language, the official language of the state where the school was based, and the Hindi language. The use of regional languages in secondary schools was encouraged to establish an effective relationship between teachers and students.
- In 1986, The Government of India introduced a new national education policy. The new policy focused on the

removal of disparities and equalising educational opportunities, especially for women, Scheduled Castes (SC), and the Scheduled tribes (ST) communities. The policy emphasised expanding scholarships for the poor, recruiting teachers from oppressed groups, and developing new institutions.

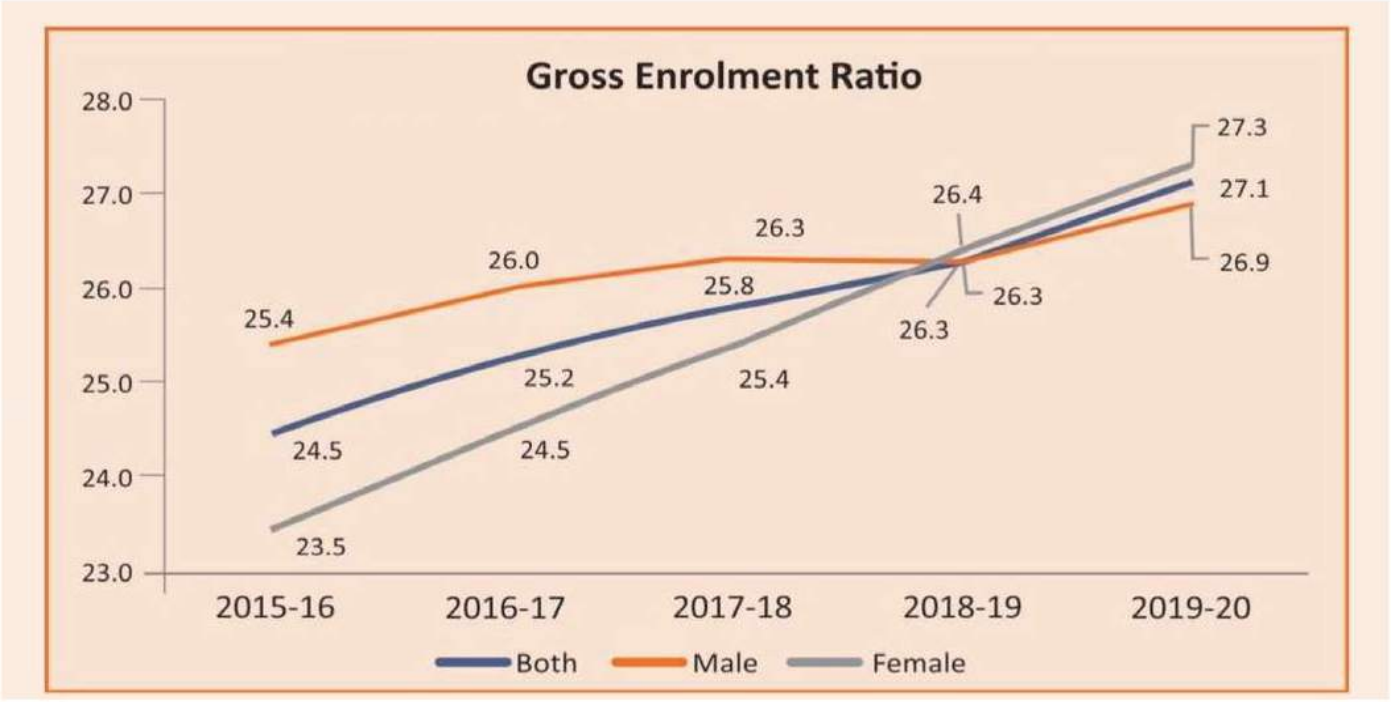
- As per NPE – 1986, the Government launched a scheme of restructuring and reorganisation of Teacher Education in 1987. It aimed to create a sound infrastructure for pre-service and in-service training of elementary and secondary school teachers. It also created the provision for academic resource support to elementary and secondary schools.

Current Scenario

Education helps in the self-development of individuals and plays an important role in the economic growth of a country. India has the largest youth population in the world which is about around 67 % of the total population (below the age of 35 years). Government policies and initiatives have increased the literacy rate in India but there still are several challenges need to be tackled to achieve high national economic growth. Higher education is also a vital tool for us to grow and keep pace with other developed economies.

The Higher education sector in India has experienced significant growth and development in recent years. With a large and young population, there is a growing demand for higher education in the country. In response to this demand, many new colleges and universities have been established, and the government has implemented policies and initiatives to improve the quality and accessibility of higher education.

One of the key challenges the higher education sector faces in India is underfunding. Many institutions, particularly those in rural and underdeveloped areas, struggle to provide adequate resources and facilities for students. This can impact the quality of education and limit opportunities for students. To address this issue, the government has increased funding for higher education and has also implemented programs such as the Rashtriya Uchchatar Shiksha Abhiyan (RUSA) to provide grants to institutions for improving infrastructure and faculty development.



Source: AISHE Report 2019–2020

The above line graph shows Gross Enrolment Ratio (GER) in Higher education in India is 27.1, which is calculated for the 18-23 years of age group. GER for the male population is 26.9 and for females, it is 27.3.

Another challenge the higher education sector in India faces is the shortage of qualified faculty. Many institutions struggle to attract and retain talented and experienced teachers, which can impact the quality of education. To address this issue, the government has implemented initiatives such as the Faculty Recharge Program, which provides funding for faculty development and training.

In addition to these challenges, the higher education sector in India also faces other issues such as the need for better infrastructure and resources, and the need to address inequality and discrimination in access to education. Despite these challenges, the higher education sector in India is making progress and is continuing to grow and develop. The government has implemented several policies and initiatives to improve the quality and accessibility of higher education in the country.

These include the National Education Policy (NEP) 2020, which aims to reform and modernize the education system in India, and the National Higher Education Regulatory Authority (NHERA) which regulates and accredits institutions of higher education. The NEP 2020 emphasizes the importance of providing high-quality and inclusive education and focuses on improving teaching, learning, and research. It also promotes the use of technology and innovation in education and encourages institutions to focus on skill development and employability.

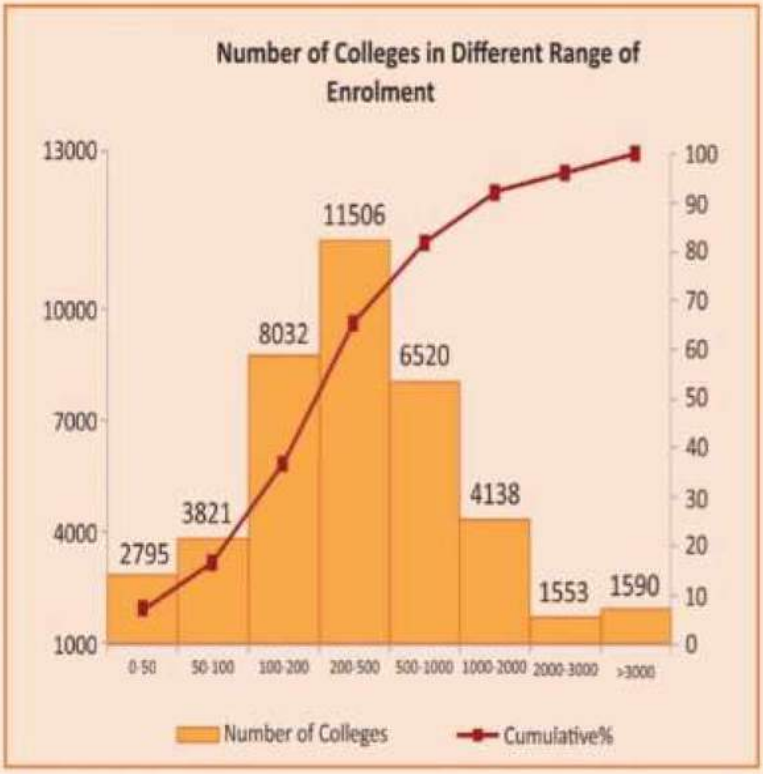
The NEP 2020 also aims to increase the Gross Enrolment Ratio (GER) in higher education and to make higher education more affordable and accessible to a wider range of people. In conclusion, the higher education sector in India is experiencing significant growth and change.

While there are challenges, such as inadequate funding and a shortage of qualified faculty, the government is implementing policies and initiatives to improve the quality and accessibility of higher education. With these efforts, it is hoped that the higher education sector in India will continue to grow and develop, and help the country achieve its goal of becoming a global leader in education and research.

Major challenges faced by the education industry in India:

- **Lack of Autonomy:** In India, most of the educational institutes are in hands of different regulatory bodies. Some extent of autonomy is required for educational institutes to provide them with the flexibility to develop academic standards & revise the curriculum.
- **Underfunding:** With the rapid increase in population, there is a high demand to increase the financial resources for educational facilities. Lack of funds leads to a decline in opportunities for students to reach their real potential.
- **Curriculum**: The curriculum of educational institutes must be revised & modified regularly. With fast-paced changes in technology & market, The Use of an outdated curriculum could lead to a decline in the skills of students.
- **Increase in the cost of higher education**: Due to inflation, there is an increase in the cost of higher education. In India, around 42% of the population is in the Lower-Middle Income group having family income between 3-6 Lakh. Due to an increase in the cost of education & low family income, most students are not able to get proper higher education.
- **Access to Educational Facilities & Infrastructure:** Most of the population in rural areas needs to relocate to urban areas to get proper access to higher education. There is a huge disparity in economic status. Due to this disparity, most of the population does not have access to proper higher educational facilities.

Cumulative Number of Colleges in Different Range of Enrolment (Including colleges pooled)		
College Enrolment	Number of Colleges	Cumulative %
0-50	2795	7.0
50-100	3821	16.6
100-200	8032	36.7
200-500	11506	65.5
500-1000	6520	81.8
1000-2000	4138	92.1
2000-3000	1553	96.0
>3000	1590	100.0



Source: AISHE Report 2019-2020

The above data shows that Most colleges are smaller in terms of enrolment. 16.6% of the Colleges are having an enrolment of less than 100 and 48.9% of the colleges have a student strength of 100 to 500 which means 65.5% of the colleges enroll less than 500 students. Only 4% of colleges have an enrolment of more than 3000.

Recent Trends

- **Use of Technology in Education** – The Growth of India in the technology sector made education more easily accessible for Indian youth. Online classes, Cloud technologies, and Interactive & customized learning is more exciting and enjoyable for students.

- **Industry–Institute partnership** – In the last few years, educational institutes & job industries have come up with collaboration to equip learners with the latest practices of industries & make them job-ready. This helps learners to interact with industry experts and gain the required skills. This collaboration also helps industries to gather and develop future resources.

- **Growth of India's IT Industry** – India is now a $3.1 trillion economy and the growth of India's IT industry is one of the main reasons behind it. Indian IT sector growing at almost twice the rate of the economy. The growing IT industry is creating more job opportunities and high scope for economic growth in India.

- **India as a start-up capital** – India is emerging as a start-up hub. Start-ups in India in the past few years have helped in economic growth and the Government of India provided schemes & grants like Start-up India to increase the culture of entrepreneurship and innovation.

Future Opportunities:

- **Hybrid Learning** – Hybrid learning is the learning model which includes in-person activities along with online classroom learning. This model could be helpful in improving both interpersonal & technological skills and will be used in the future for education.

- **Future Skills** – Education will not be limited to knowledge & textbooks. Developing skills will be a more important part of education. In the future, Continuous upskilling will be an important aspect of growth.
- **Growth opportunities in aviation & aerospace industries** – There will be huge growth opportunities in aviation & aerospace industries as the Government of India is planning to increase its domestic manufacturing and exports to increase its economy.
- **Growth opportunities in Semiconductor Industries** –The plan of the Government of India to make India a manufacturing hub and foreign investments from semiconductor market leaders like Japan & South Korea will bring more opportunities in semiconductor industries in India.
- **Integrative Engineering - New Age Engineering** – In the future, Engineering & technology should not be just focused on a specific core like civil, electronics, electrical, or mechanical and it should be interdisciplinary and more integrative.
- **Entrepreneurship as a tool against unemployment** – Entrepreneurship is playing a major role in the economic growth of our nation. With the increasing population and unemployment rate, Entrepreneurship will also help to create more job opportunities

In 2047, India will be celebrating 100 years of independence. Over the past century, the country has made significant progress in the field of education. However, there is still a long way to go before the education sector in India can be considered truly inclusive and equitable. In this White paper, we explore potential developments and innovations that could shape the future of education in India.

We will discuss the increasing use of technology in education, the potential for a greater emphasis on vocational training and skills development, and the importance of providing equal educational opportunities to all members of society. We argue that the adoption of technology in education has the potential to revolutionize the way students learn. The use of virtual reality and augmented reality, for example, could allow students to experience concepts and phenomena that would otherwise be impossible to observe in the classroom. This could enhance their learning experience and make it more interactive and engaging. We also argue that vocational training and skills development will become increasingly important as the economy and job market continue to evolve.

Vocational training programs could help prepare students for the careers of the future and ensure that they have the skills and knowledge they need to succeed in the workforce. Finally, we discuss the importance of providing equal educational opportunities to all members of society. This could include initiatives to improve access to education in rural areas and to support marginalized communities.

Overall, this White paper highlights the potential for significant developments and innovations in the education sector in India over the next 25 years. By embracing technology and focusing on providing equal opportunities to all, the country could achieve its goal of providing high-quality education to all its citizen

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Teaching about Entrepreneurship

"There are numerous ways in which we can integrate entrepreneurship at the academic level & even nurture young students."

Vishal Khurma
CEO, Woxsen University

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Collaboration of Industries and Institutions

"It is critical for both industry and academia to interact and collaborate for germination of ideas, adopting cutting-edge research in the industry to evolve innovative ideas for solving real-world challenges"

Dr. Sandeep Sancheti
Vice Chancellor, Marwadi University

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Skill-based learning

"Equipping the workforce with the skills required for the jobs of today and those of tomorrow is a strategic concern in the national growth and development."

Dr. Harivansh Chaturvedi
Professor and Director at BIMTECH

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"It's important that the industry partners with reputed academia to create the learning programs."

Manivannan Ranganathan
Business Head, at TCS

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"Total Electronics market in India is estimated to be around US$ 340 billion in the year 2021-22. Of this market, currently only 35%-40% is contributed to by domestic production while bulk is catered to by imports."

Dr. Abhilasha Gaur
CEO at ESSCI

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"By the year 2024, the domestic civil aviation market in India is expected to grow to $30 billion, making it the third largest globally."

Mr. Rachit Bhatnagar
CEO at AASSC

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"Start-ups have seen increasing traction in India over the past few years. Fueled by significant funding even from global investors, 107 Indian startups have turned Unicorn start-ups over the years till date."

Dr.Anil Kumar Pokhriyal
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Dr. Sanjay Yadav
Chief Scientist, NPL

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"In the new age of knowledge and innovation, it is integrative engineering that shall provide the propulsive thrust to lead both the education and research in engineering and technology."

Prof. P.B Sharma
Vice Chancellor, Amity University

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Prof K.K Aggarwal
Chairman, National Board of Accreditation

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Prof. Sudhirkumar Barai
Director, BITS Pilani

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"Emerging technology adoption in recent years has created a healthy digital talent pool and ecosystem – this will certainly place India as a nation with the capability to become the talent capital for the world."

Dr. Sridevi Sira
Dy Director, National Lead Future Skills Prime

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Executive Vice President of Strategy, NSDC

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Vice Chancellor, JK Lakshmipat University, Jaipur

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Dr. M C Misra
Former Director, AIIMS

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Prof. (Dr.) Balvinder Shukla
Vice Chancellor, Amity University Noida

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Founder Chairman, Griffins International School

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CEO, VGU, Jaipur

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Mrs Mamta Nanda
Principal, Ryan International School

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Dr Sujeet Eric Masih
Principal, Apeejay School, Saket

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"It is important to elaborate on how technology assists in interactive learning."

Mrs. Arti Bahadur
Principal, Ryan International School,
Vasant Kunj

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Autonomy of Higher Educational Institutions

Dr. Shankar Subbanarasayya Mantha

Former Chairman, AICTE

Dr. S S Mantha, former Chairman of **All India Council for Technical Education (AICTE)** for six years from 2009 – 2015. Earlier, a Professor of Robotics, Control theory and AI at **VJTI.**

"The author discusses the concept of autonomy, and how it is necessary for institutions to be able to operate free from government or other regulatory interference in order to promote excellence. However, the author also raises some concerns about how feasible it is to provide autonomy to all institutions, given the lack of resources and funding available."

Self-regulation is obviously the best form of regulation. However, every human being and every system that supports quality of life is regulated in some form or the other. Homeostasis is an internal human body mechanism that maintains balance, harmony, equilibrium, and steady-state, all of them fundamental attributes of life and health. Externally, there is no system be it, finance, be it education, be it business or any other, that is devoid of some form of regulation. All forms of regulations are needed ostensibly to protect others rights, for a democracy guarantees equal rights to everyone and must swear by zero exploitation of one by the other.

The right to life under Article 21 read with Articles 14 and 19 permits every person to live life to the fullest and to enjoy freedom guaranteed as fundamental rights, constitutional rights, statutory rights and common law rights. Can we extend this to the way we operate Institutions? In this context is real autonomy possible? Or is it a myth?

Quoting from Dr. Alex Lickerman's book "The Undefeated Mind" published in late 2012, "Why have people throughout history been willing to fight and even die for their freedom? From one perspective the answer is obvious: oppression causes suffering and we're all hardwired to flee suffering. But recent research suggests an additional reason: we also seem to be hardwired to desire autonomy".

Autonomy is defined as the ability to make choices according to one's own free will. Whether or not that will is free, is a research topic in itself and is bound by various decrees. Existing boundary conditions, or the extent to which these conditions can be relaxed in which autonomy operates is important. More of this later. What is important is to feel free. If we feel coerced by even an internal pressure like guilt or shame to say nothing of external pressures like other people, our feeling of autonomy vanishes.

Autonomy when defined for an army commander assumes his ability to take decisions independently on the battlefront. Autonomy for a businessman would assume legitimate profits. Hence autonomy assumes different shades depending on the context in which it is referred. When used in the context of institutions, it refers to running it free from being dictated by either the Government or any other regulatory mechanism so that the larger public good is met with. The leader obviously is the fulcrum around which autonomy would thrive. Such an autonomy would manifest itself as Administrative, Academic, Managerial and Financial in the main.

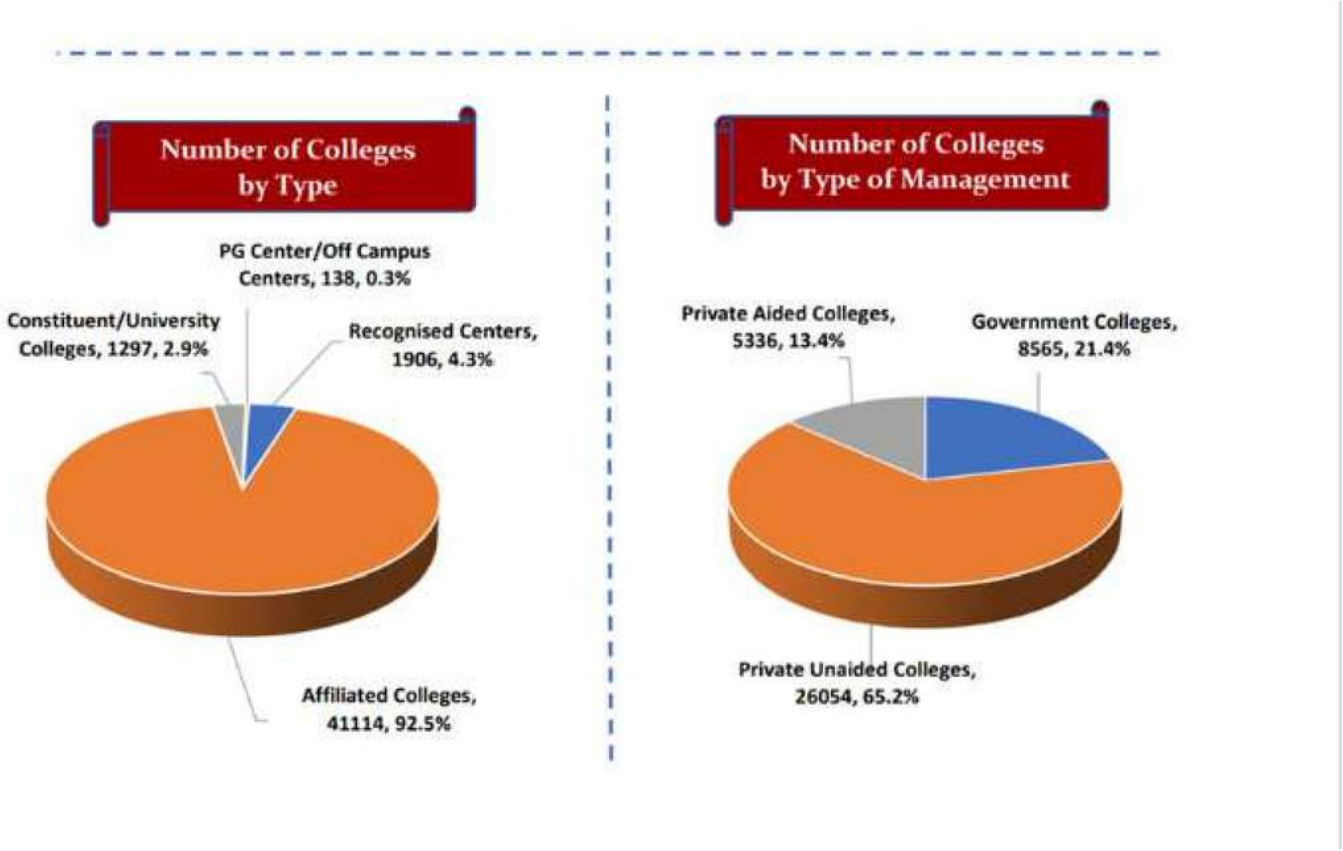
The autonomy analysis supports a claim of obligation, on one side, and a claim of entitlement, on the other, as enumerated by Martha Albertson Fineman in her book "The Autonomy Myth: A Theory of Dependency". She further argues that to the extent that we truly value autonomy, as opposed to merely celebrating it as a myth, we should want caretakers who are, after all, serving the rest of society, to exercise autonomous choice on terms roughly equal to those enjoyed by others.

An editorial in TOI, a couple of years ago, "break the chains" argues on the micro-managing attitude of the regulators and how it impedes innovation. Forget the regulators. Is it necessary, even for a society to actually inform its citizens not to spit in public? We would not

have needed a Swachh Baharat campaign if that were to be so. An uphill global job-scape may be a regulator's bother in terms of providing employability skills but can only be so, when the same uphill global job-scape, for job-creation is adequate. The need to promote excellence in Indian higher education, is certainly paramount and specialisations like cloud analytics, robotics, artificial intelligence, Machine Learning etc. can only be built on sound basics. Autonomy or no autonomy.

The editorial further argues that none of the 16 central universities established since 2009 feature in the HRD list of top 100 universities but various IIMs, IITs and other institutions set up with greater autonomy fare much better. Two cardinals differentiate the world rankings of Universities. Firstly, Internationalisation both in students and faculty and secondly research that connects industry and consequent IPR and patents filed, both of which are inadequate in our universities. International collaborations that are so essential to bring cross cultural exchanges and consequent academic expertise seems to be happening only in a few top-drawer institutions.

A debate of a teaching institute that also does research or a research institute that also does teaching may not lead us anywhere for it is a mix that brings quality. Do we have sufficient number of researchers in every field? Do they have adequate facilities to do both fundamental and applied research? What level of inter/intra/Multi-disciplinary research exists? Are they provided sufficient funding compared with the best in the World? Are they sufficiently compensated so that they remain within the system? These are some questions that will need answers before autonomy can be the balm for every ill. India is a large country. Is it really feasible to provide autonomy to say five hundred institutions in each of the States and monitor them with standard sets of do's and don'ts? Even an autonomous Institute is answerable to its stakeholders sometimes the Government and sometimes the people. What are the benchmarks against which this will be done and achieved?



Though education budget has risen over the years, is it adequate to support more than 150 centrally funded institutions, so that they start looking at innovation and compete with the best in the world not to speak of the very onerous task of providing adequate finances for primary education? With more Institutions in the category of IIT or an IIM or a central University coming up does this budget not spread too thin? More importantly, we also need good academicians, researchers and

innovators to fill the great void that seems to exist. Project GYAN is a welcome inclusion in this space. Mere autonomy without adequate support systems may only lead to unfulfilled promises.

It will be a worthwhile exercise to audit the performance of existing autonomous institutions, do a gap analysis between what was expected and what is the current status that will benefit future interventions. Many institutions as a routine, were chaired by industry bigwigs. Have they delivered? Is this a sustainable model? Like a deficit of good academics, would the system also not have a deficit of good industrialists? If the audit throws up uncomfortable fallout, would we then reinvent the wheel?

Autonomy is the ability to make choices according to one's own free will. It is necessary for the achievement of excellence and the protection of fundamental rights. Autonomy can be threatened by external or internal factors and must be balanced with accountability and commitment.

The government should provide more funding and relax regulations to allow institutions to operate with greater independence, which could lead to improved education and research outcomes. Additionally, interdisciplinary research should be encouraged to support innovation.

Universities were set up to operate as a State within a State. This presupposes that they were autonomous to begin with. Any cursory glance at the Act under which they operate will signal that they are anything but autonomous except in a few academic matters. Here again, the autonomy is only to the extent to which the faculty understands it, for there are any number of cases that can be cited, where a certain unwanted coursework would be retained or a new one added to a curriculum, since otherwise the concerned teacher might lose out on his/her job or would be required to relearn.

Affiliations have only exacerbated the situation by rendering a University to an examination house. De-linking Institutions from the affiliation system through autonomy may look good on paper but would they be in a position to deliver at the required quality levels would be a question to answer besides the massive finding that would be required to sustain this process. This could even be private funding which also is not very forthcoming. Would the powers be, allow these institutions to pass on the cost of education to the knowledge seeker, without for example a fee regulatory commission? Would an IIT ever be allowed to fix its own fees like an IIM does? Quality needs funds. So the shackles have to come off.

Unlike Universities in the West, ours are too small to be viable. Many of them would collapse without external funding let alone provide quality

Traditionally Universities have come up with almost all disciplines that included, basic sciences, applied sciences, social sciences, liberal sciences, fine-arts and library sciences. Innovation thrives in inter/Intra/multi-disciplinary eco systems and not in isolation. None of our Institutions lay stress on productization leading to disaggregated research. Several departments in social science, liberal sciences and even basic sciences are closing due to unavailability of students, faculty and so on. Autonomy would really need to be retrofit with innovation to stop further degradation.

A new phenomenon that we are witnessing currently is where yesteryear colleges are being converted to universities in the private sector in the name of quality. A hard look is probably warranted here, for a reason not often cited for this is the escape that it provides from many of the regulators and function with unbridled freedom and as business houses, by closing courses/ departments or starting new ones as they perceive the markets. Social causes are invariably given a go by.

True autonomy blossoms when the mind is unshackled, the academic environment is facilitating and adequate external links exist for support. This calls for all four attributes, academic, administrative, managerial and financial to be ingrained in autonomy. Free enterprise must be encouraged with negligible regulatory control for autonomy to deliver. This calls for a leader who leads from the front, is committed, passionate, a team builder, one who has a great domain expertise, understands the environment and its links with the external world and above all has integrity, honesty and a foresight that has

matured with hindsight. Sourcing all these qualities in multiples is indeed a tall order.

"States are not moral agents, people are, and can impose moral standards on powerful institutions" said Noam Chomsky, the father of modern linguistics. Let then, the people build powerful institutions. Not the States.

Self-regulation is often seen as the best form of regulation, as it allows individuals and systems to maintain balance and equilibrium without outside intervention. However, no system is completely free from some form of regulation, whether it is the human body's internal mechanisms or external regulations in industries such as finance or education. These regulations are often put in place to protect the rights of individuals and ensure equality and fairness in society.

The concept of autonomy, or the ability to make choices according to one's own free will, is often seen as an important aspect of individual freedom. However, autonomy is not always possible due to external constraints and boundary conditions. For institutions, autonomy refers to the ability to operate independently from government or other regulatory mechanisms in order to serve the public good.

The idea of autonomy also brings up the concept of obligation and entitlement. Those who are granted autonomy have a responsibility to use their freedom to serve the greater good, while also being entitled to the same level of autonomy as others in society.

In the context of education, autonomy for institutions can encourage involvement and commitment from teachers, students, and the management. It allows for innovation and competence in the teaching and learning process, leading to better performance and higher quality. However, excessive micromanagement from regulators can hinder innovation and impede the growth of institutions.

Overall, the idea of autonomy for institutions is a complex topic, with benefits and drawbacks. It is important to strike a balance between autonomy and outside regulation in order to ensure the best outcomes for individuals and society.

While autonomy is important for innovation and competence, it is not always possible, as external factors can impact an institution's ability to operate freely. For example, the government may impose certain regulations or restrictions on an institution in order to protect the public interest. In these cases, it is important to strike a balance between autonomy and regulation in order to ensure that institutions are able to operate effectively and efficiently.

Dr. S S Mantha, former Chairman of All India Council for Technical Education (AICTE) for six years from 2009 – 2015. Earlier, a Professor of Robotics, Control theory and AI at VJTI, he now occupies the Emeritus Chair. He was instrumental in creating the National Vocational Education Qualification Framework which was later rechristened the **National Skill Qualification Framework (NSQF).**

- Currently, he is the CEO of Mahatma Phule Renewable Energy and Infrastructure Technology\ Limited (MAHAPREIT) Start-up Knowledge Centre, a subsidiary of Government of Maharashtra.
- He is also an Adjunct Prof. at the National Institute for Advanced Studies (NIAS), Bengaluru, an Emeritus Prof. at VJTI and Chairman of Technical Committee, National Cyber Safety and Security Standards (NCSSS).
- His knowledge in a variety of socioeconomic, political and technology-related issues is sought after and has been working with a number of government-appointed and independent committees as an Advisory / Expert Member with various State and Central Government departments. Some of these memberships include - Advisor, Department of IT (Government of Maharashtra), Advisor to several Semi / Quasi / autonomous Government and other bodies besides being a consultant to National e-governance division, Ministry of electronics, GOI.

Role of Technology in Transforming Education System

Prof. K. K. Aggrawal

Chairman, National Board of Accreditation

Prof. K.K. Aggarwal, Chairman, National Board of Accreditation is Former Founder, Vice Chancellor, GGS Indraprastha University, Delhi and Former Chairman, Board of Governors, MNIT, Jaipur.

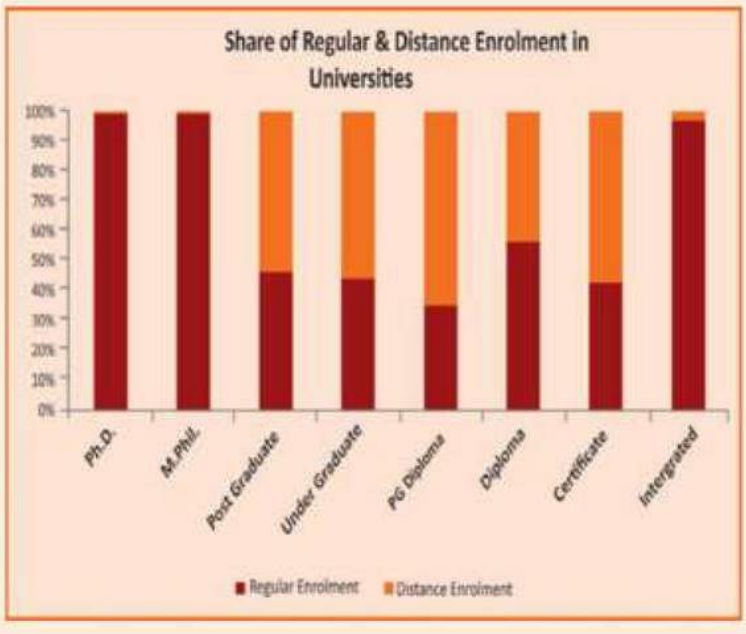
"To guarantee higher quality and to attain better performance in teaching and learning processes it is necessary to encourage the involvement and commitment of all those involved with the process like teachers, students and the management."

Education plays a crucial role in shaping any society. Education is even more important in the creation of any democratic society as it is needed to make a society geopolitically stable. Education alone gives people that knowledge which they need to elect suitable and capable leaders, who can in turn transform the Country. According to Nelson Mandela, "Education is the most powerful weapon which you can use to change the world". Malcolm X says that: "Education is the passport to the future, for tomorrow belongs to those who prepare for it today"[1,2]. Till 20th century, education system was progressing in a traditional manner although new developments of technology also gradually contributed in effective teaching learning. But 21st century has observed a paradigm shift in the use of technology in the education system. Last few years, especially the Covid period has brought a transformational change in the use of technology in education. Five years ago, who could imagine that even the primary-education can be online and that also for almost two years? The whole education structure has been revolutionized, enriching the learning process at just one click of the mouse. The pace of the change of the technology is ultra-fast which is unprecedented in the entire History of civilisation and it impacts all phases of life including education system. It is almost impossible to predict the technology after 10 years from now, what to talk of 25 years? But still, it is almost sure that the technology is going to play a pivotal role in management of learning resources, classroom teaching, examination and evaluation system, etc.

Some obvious advantages of Technology in education are going to be:

Enrolment in Universities and its constituent Units through Regular & Distance mode

Level	Regular enrolment	Distance enrolment
Ph.D.	177775	101
M.Phil.	15805	69
Post Graduate	975105	1121446
Under Graduate	2304499	2917847
PG Diploma	48719	88966
Diploma	156098	120060
Certificate	26103	34746
Integrated	147342	3687
Total	3851446	4286922



Connectedness, collaboration and co-creation

The space of learning will change compared to the typical classroom that we know today. Instead of a teacher being the master and students being followers, students will become partners or co-creators of their own learning. Collaboration, communication and teamwork beyond classroom walls will make learning a totally different experience. Project based learning and teaching will start from primary schools and continue up to college level. Classrooms will coexist as physical spaces and teaching will be supported in online, flipped mode as well so that students can learn beyond school/ college hours also and spend class time collaborating and applying their knowledge to real-life issues.

Anywhere, anytime learning

With the help of 5G technology, connectivity will not be an issue at all. In future, a world of information will be at the fingertip of each student with the click of a button or a simple voice command. Almost all resources will be available online either free or with very low price. Technology will grow in a way that compatibility will be guaranteed vis-a-vis all products. It means multiple types of hardware and software products will exist and all of them will support each other in functionality. It will force the proprietary hardware companies to provide an interface for using it with other hardware & software without difficulty.

Customisation for a 'learner-first' approach

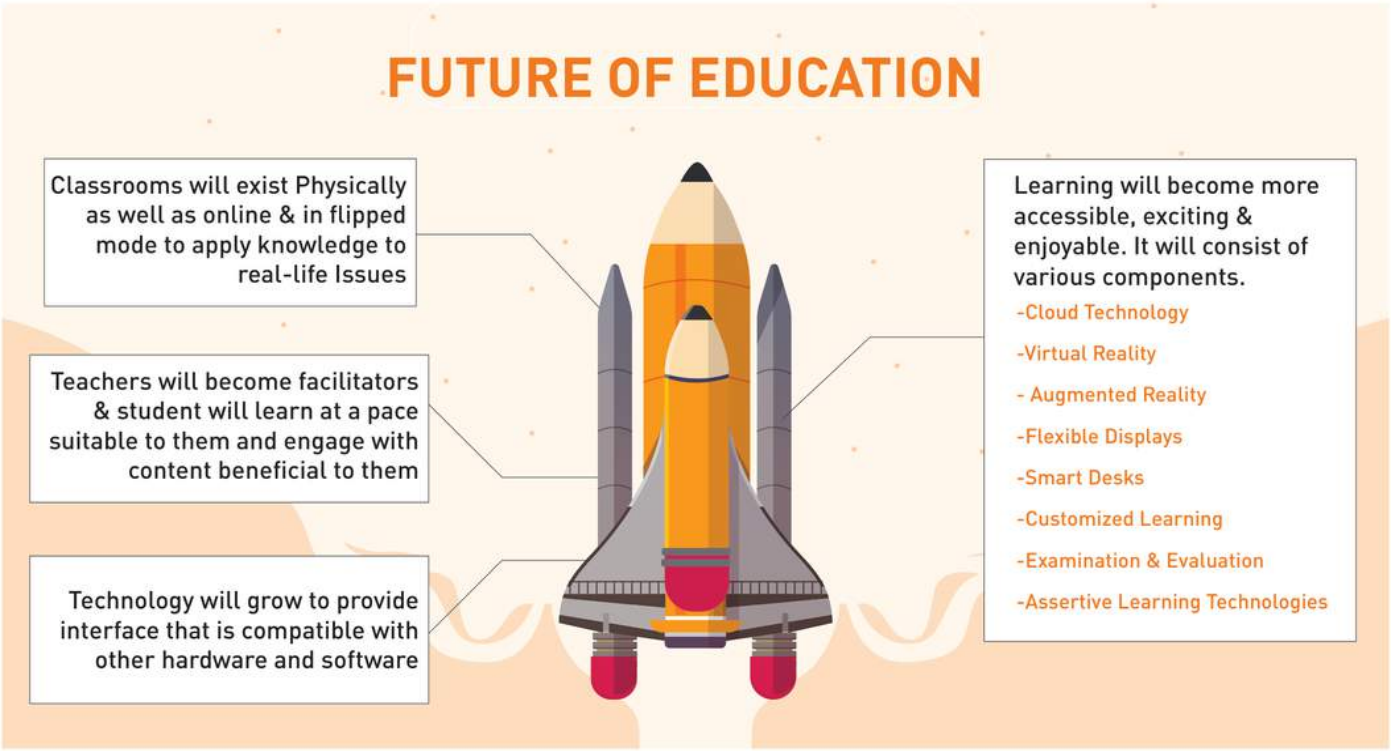
Teachers will become facilitators of learning and students will have more control of their own learning journey. As a result, teachers will have individualised learning plans for students, which will enable each student to learn at a pace that best suits their abilities and to engage with content that is most beneficial to them.

A combination of evidence-gathering and feedback from parents, students and other professions will enable these plans to be successfully integrated into the education system. To maximise the potential for individual progress, some elements of teacher-led learning will remain, which will augment traditional learning practices when combined with online digital media.

Learning as an Entertainment than a burden

Technology will help the learning becomes more accessible, exciting and enjoyable. Teaching will be done using gamification, virtual reality, augmented reality, smartboards, digital notebooks etc. and students will enjoy the studies than considering it as a burden.

So, it can be easily seen that technology will penetrate



in every aspect of education system, starting from classroom up to the overall ranking. It is but obvious that future classes will be in blended mode. Physical classrooms will use pervasive computing, augmented reality, cloud computing, IOT in a big way. No wonder, that a teacher may be able to communicate with his/her students using brain to brain communication. The education system and teaching learning is likely to be transformed in following ways [3-8].

Technology is transforming the education system, making it more accessible, engaging and collaborative. Advantages of technology in education include connectedness, collaboration and co-creation; anywhere, anytime learning; customisation for a "learner-first" approach; and making learning more engaging. However, challenges such as unequal access to technology and a lack of trained teachers must be addressed to ensure the success of technology in education.

Cloud Technology

Homework assignments, educational resources, and other learning materials all will be made available on cloud and can be accessed from any device with an Internet connection. Students may no longer be able to claim that their dog ate their homework, but they also will not have to worry about carrying heavy textbooks and other educational materials around with them. A trip to the library is no longer really necessary, and if you forget to bring home your computer, you can always access the cloud from any device with an Internet connection to access your assignments and textbooks.

Virtual Reality

Virtual Reality creates a completely immersive virtual environment that allows users to interact with their environment as if they were actually there. A lot of VR technologies already exist, but many classrooms don't utilize this technology. Virtual reality technology will get used in future to create unique learning experiences that engage a student's imagination and creativity. The student from India will be able to explore the Louvre in Paris, walk on the floor of the ocean, or even explore the streets of ancient Rome.

Augmented Reality

The true potential of augmented reality technology is yet to be harnessed by the education sector. The educational possibilities of augmented reality technology are nearly limitless. For example, a student could go on fully-guided tours of museums and historical sites without the need of a tour guide. Teachers could take their students to remote and dangerous places without ever leaving the classroom.

Flexible Displays

Note-taking has already made a major shift over the last ten years from pen and paper to keyboard and screen, but further developments are not far off either. One of the exciting possibilities to think about is OLED displays. OLED-based displays would be much like a regular piece of paper. They would be extremely thin and flexible. Imagine folding a screen like a piece of paper or rolling it up into a tube. These smart papers would be fully interactive, allowing users to swipe, write, and manipulate the screen in ways that traditional paper could never match. It might sound like a dream into the future, but let it be known that Technology Companies are already working on technologies just like this.

Smart Desks

This technology would more or less be a large surface tablet that allows students to manipulate the screen much like a tablet. If students get access to smart desk technology, they would be able to collaborate on projects and assignments with students all over the country and the world. This education technology could have a huge impact on students, much like the interactive whiteboards had on the previous generation of students. While the technology exists to make this a reality, there are currently no viable and affordable smart desk devices in the market designed for education.

Customized Learning

With the help of smart sensors, brain signals and data analytics, a teacher will be able to effectively assess the level of learning of an individual in each class. Accordingly, customized teaching-learning will become a reality by providing additional online resources or special videos, animations, quizzes, etc.

Assistive Learning Technologies

Technology will become a real boon for students with disabilities. Alternate input devices, real time speech to text conversion, visualization tools etc will be available and students with disabilities will be able to learn in the same class along with other students.

Overall, it can be summarized that technology revolution will continue and will have a big impact on education system. It will make the learning very interesting, exciting and at the same time, teachers will face lots of challenges to tune themselves according to those technologies and still ensure the quality and effectiveness of the system.

In future, technology will become a boon (but has the potential of being a bane too!) for the evaluation. We are well aware of so many innovative methods being used nowadays through digital technologies for unfair means during the evaluation system. At the same time, technology itself will give the solutions to do an effective evaluation. Technology will become a better invigilator than a human being by using Real Time Video Surveillance. The examination halls will be fitted with CCTVs and real time detection of unacceptable movements, etc will become possible. Similarly, body gestures & eye-tracking system during an online evaluation will ensure that a student will not be able to access non-permissible resources at all. At the same time, brain to brain communication can be an easy way of cheating during the examination and hence, we can expect (hopefully?) to have jammers for brain-to-brain communication.

In future, teachers will have to be really innovative in paper setting and traditional questions are likely to be replaced with case-study based questions. Similarly, instead of writing the answers on traditional sheets, future answers will be working models using 3-d printing, or animated video submissions, etc. Grading and assessments in the future will be evidence based, using measures that allow learning plans to be drawn up and personalised. Artificial Intelligence, Machine Learning and data analytics will become very strong and it will become much easier to grade students on basis of multiple parameters, say understanding, comprehension, out of box thinking, imagination, application of knowledge to new situations, creativity, etc.

Education is a crucial part of any society, as it provides individuals with the knowledge and skills they need to make informed decisions and to participate in a democratic society. In the 21st century, technology has transformed the way that people learn, making it possible for people to access educational materials and resources online. The Covid-19 pandemic has accelerated this shift towards online learning, with many schools and universities moving their classes online in order to continue teaching students in a safe and effective manner.

One of the key advantages of technology in education is connectedness, collaboration, and co-creation. With the help of technology, students can collaborate and work together on projects, even if they are located in different parts of the world. This allows for a more dynamic and engaging learning experience, where students can learn from one another and share their knowledge and experiences. Additionally, technology allows for the creation of virtual classrooms, where students can interact with their peers and teachers in real-time, even if they are not physically present in the same location.

Another advantage of technology in education is that it allows for anywhere, anytime learning. With the help of 5G technology, students will be able to access educational materials and resources from anywhere, at any time, as long as they have an internet connection. This means that students will be able to learn at their own pace, and can access educational materials even outside of traditional school or college hours.

Furthermore, technology in education enables a learner-first approach, where teachers become facilitators of learning and students have more control over their own learning journey. This allows for personalized learning plans that are tailored to each student's individual abilities and needs. Technology can also make learning more entertaining and engaging, with the use of gamification, virtual reality, and other interactive tools and resources.

In conclusion, the use of technology in education has the potential to revolutionize the way that people learn, making education more accessible, engaging, and

personalized. As technology continues to advance, it is likely that technology will play an even more important role in the education system in the future.

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Prof. K.K. Aggarwal, Chairman, National Board of Accreditation is Former Founder, Vice Chancellor, GGS Indraprastha University, Delhi and Former Chairman, Board of Governors, MNIT, Jaipur.

He has been President of the Institution of Electronics and Telecommunication Engineers (IETE) for 2002-2004. He also served as Sectional President (IT & CS Section) in the Indian Science Congress Association, President, Computer Society of India for the period 2007-2009 and President of South East Asia Regional Computer Confederation (SEARCC) for the years 2008-10. He is also the Academy Professor of AcSIR of CSIR.

- Accolades Prof. Aggarwal was honoured by:
- Reliability Society of IEEE, USA for his services as Guest Editor for the special issue on "State of Reliability Effort of the Indian Sub-Continent"
- Declared as the Man of Decade, Man of the Century and finally Man of the Millennium by American Bibliographical Institute, USA.
- He was also awarded Delhi Ratan by the All India Conference of Intellectuals.
- International Biographical Centre, England has published his biography in "The First Five Hundred – at the new millennium" in July 2000.
- Prof. Aggarwal was conferred Distinguished Fellowship in 2010
- Institute of Electronics and Tele-Communication Engineers conferred the very First LifeTime Achievement Award in 2011.
- Computer Society of India also conferred the LifeTime Achievement Award on Prof. Aggarwal during 2016.

Industry - Institutions Partnership to Empower Learners

Prof. Sandeep Sancheti

Vice Chancellor, Marwadi University

Dr. Sandeep Sancheti who holds a highly-dignified position as the Provost (Vice Chancellor) of Marwadi University, Rajkot, has a remarkable 34+ years of experience in the field of higher education.

> *"To guarantee higher quality and to attain better performance in teaching and learning processes it is necessary to encourage the involvement and commitment of all those involved with the process like teachers, students and the management."*

A combination of circumstances including explosion of technology, the growth and reach of the internet and the pandemic which swept through the world, ushered in a fundamental shift in ways to collaborate, work and learn. WFH (Work-From-Home) and LFH (Learn-From-Home) entered our lexicon. This also accelerated the growth of 'ed-tech' companies which made significant in-roads, sometimes at the cost of formal university education, and sometimes complementing the formal education system, thereby effectively blurring the boundaries between formal and non-formal modes of education.

These trends are here to stay in some form or the other though the pandemic has abated.

Another important factor to be considered is the present generation of the students entering and studying in universities. The present lot of students belong to Gen Z. Gen Z is broadly understood to be that demographic cohort born between 1997 and 2012. Hence it is important to understand the mind set of this generation as this is the audience that universities and institutes of higher education seek to prepare for the future.

Studies have identified some traits which distinguish Gen Z from preceding generations:

- 'Zoomers' (as Gen Zs are referred to) tend to be more realistic – they don't mind quitting jobs to discover new opportunities and they don't necessarily believe in loyalty to an organization. Given the state of present global economy, Gen Zs are expected to work harder than previous generations.
- Gen Z cohorts believe in independence and feel strongly about doing things themselves. This makes them self-reliant requiring minimal supervision.
- Gen Zs are 'tech-natives' being born into an inter-connected world of technology. The implication is that this generation finds it difficult to multi-task given their low attention span due to smart phones and other gadgets.
- When it comes to education however, Gen Zs tend to prefer a collaborative approach and prefer 'on-demand' learning.

Given the above, it is critical for both industry and academia to interact and collaborate for germination of ideas, adopting cutting-edge research in industry to evolve innovative ideas for solving real-world challenges... in short, to stay relevant.

The Way Forward

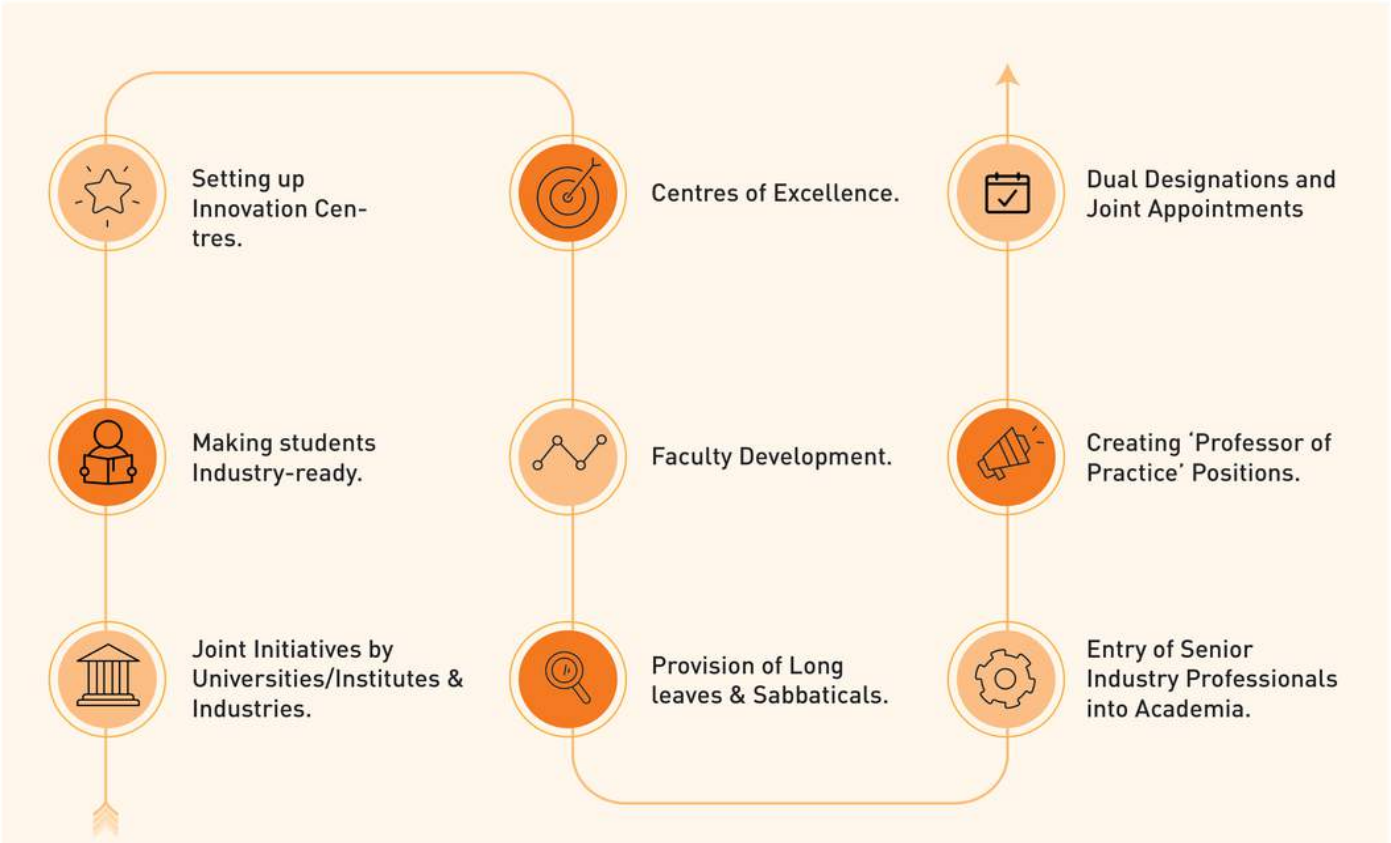
Pro-active universities are viewing the institute – industry partnership in a new light, going beyond the traditional internship and placements paradigm by taking into cognisance the following:

- Ubiquitousness of smart devices in an increasingly inter-connected world

- Changing mindset of students as society transits to a gig-economy
- Heightened expectations from industry for more 'industry-ready' graduates
- Explosion of 'ed-tech' companies opening up possibilities for collaboration to offer hybrid models leveraging technology.

Given that the above, universities and institutes of higher education have embarked on initiatives to broaden and deepen engagement with industry at several levels. These include:

Making students industry ready



Some universities are allowing students to intern with select industry partners for the entire final year. This gives the interns an opportunity to imbibe the organization's culture and values besides learning the appropriate technologies thus making them immediately productive when they make the transition from internship to employment.

Setting up Innovation Centres:

Progressive universities are encouraging students to think beyond employment and become entrepreneurs by encouraging creativity, innovation, incubation and entrepreneurship in centres of innovation equipped with dedicated facilities including equipment, meeting rooms and temporary office space for the budding entrepreneurs. This also includes facilitating an eco-system by providing seed funding for good ideas and connecting with early stage investors. These centres of innovations also work on problem statements from industry to evolve solutions. Hackathons have proved to be one of the most popular vehicles to drive the problem solving abilities with higher degree of potential for innovation.

Centres of Excellence (CoE):

Encourage industry to set up dedicated centres of excellence inside the university campus. Such centres would work with concerned departments for research in relevant areas of mutual interest besides evolving solutions to specific problems. These centres of excellence would be an ideal ground for nurturing talent and would offer an excellent platform for students,

faculty and industry professionals to come together. This would result in greater involvement of students in live industry projects besides providing better trained manpower with relevant knowledge and skills for the participating company. Top companies have seen the benefits of such immersive collaboration and successful examples of CoE include Bosch, Nvidia, IBM, Siemens, Apple besides others. More and more industries are choosing this route to get the best out of their potential employees both by providing them with right training and also deeply assessing them upfront.

Faculty development

Universities are encouraging and facilitating faculty members to engage with industries through initiatives like FIIP (Faculty Industry Immersion Program) whereby up to 10% of the faculty get an opportunity to embed in a company during the vacation period. This would enable the concerned faculty members to understand and appreciate the challenges confronting industry on a 'real time' basis and help make the curriculum contemporary. This would also open up internship and placement opportunities for students. By deputing faculty under FIIP programme institutes can directly benefit by making a permanent bridge between industry and academia.

Provision of long leave and sabbatical

There is provision for senior faculty members to avail of 'long leave' (up to six months) or take sabbatical (more than six months) for fostering long term collaboration and joint R&D efforts with industry or specialised institutes of higher learning in India or abroad. This could also result in seeding of new projects while at the same time providing exposure to best practises in engineering, design, project management besides exposure to cutting edge technology and equipment. This will enable faculty deliver contemporary curriculum to students.

Facilitating entry of senior industry professionals into academia

To foster a healthy cross pollination of ideas between universities and industries, qualified, experienced industry experts can be engaged as adjunct professors in the academic institutions for regular short duration engagements over an extended period. This mode of engagement would cause minimal disruptions to the work schedule of the experts. This would also enable the experts to stay connected with academia by delivering lectures, engaging in research with faculty on industry relevant topics and helping update curriculum and design new multi disciplinary and inter disciplinary courses to meet the dynamic requirements of industry.

Education technology (EdTech) is gaining increasing popularity as a way to improve learning outcomes. However, challenges such as unequal access to technology and a lack of trained teachers must be addressed to ensure the success of EdTech in education. Universities are increasingly partnering with industry to provide internships and innovation centres to help students become more industry-ready and to encourage entrepreneurship. Additionally, universities are using technology to improve the student experience and to facilitate remote learning.

Creating 'Professor of Practice' positions:

Eminently qualified professionals with a proven track record in industry may be invited to join as 'Professor of Practice' to facilitate infusion of best practices from real world settings into academia. Candidates for this position would typically be in a senior management position (CEO/CTO/Director/VP) in industry. Such individuals would facilitate the integration of practical experience with academic scholarship in a symbiotic manner. They may also liaise with industry or government to identify research and teaching opportunities which meet societal needs while at the same time also benefiting the university. Lack of PhD qualification for such candidates may be offset by the quality of their experience and track record of their achievements. Recently retired professionals may also be considered if they are otherwise fit and with solid credentials. Selection for such positions may be through a standing committee based on the recommendations of the concerned institute or department. The appointment can typically be for an initial period of two-three years

with the possibility of being converted into a full time professor position after an appropriate review. Alongside the industry experience those who have higher qualifications would certainly stand to gain more from it.

Dual Designation/Joint Appointments

Faculty members may be encouraged to engage with industry for long duration projects. To facilitate this, faculty members may be permitted to work in industry for extended duration holding dual designation/joint appointment with both the industry and the university. In such an arrangement the faculty member may spend up to 50% of their time in industry. Such positions will be contractual between the concerned industry and university and may range in duration from one to three years. During such period the concerned faculty member may additionally hold appropriate designation like Manager/VP and the like apart from his regular faculty position of Assistant/Associate/Professor. During the period of such engagement, industry may compensate the concerned faculty as per industry norms while the university may pay salary on a pro-rata basis. This would create opportunities for the development of IPR and technology for the mutual benefit of the participating industry and the university.

Benefits for the Learner

By adopting the above innovative practises, universities would equip their students to confidently take on the challenges of an increasingly VUCA (Volatile Uncertain Complex Ambiguous) world where lifelong learning is a necessity and learning to unlearn/relearn is imperative. Students would also be confident to take on the challenges posed by ever changing technology, environment and society as they would have got adequate exposure to industry through the above initiatives .

Conclusion

The above are some of the innovative practises adopted by progressive institutions to ensure that they are ahead of the curve by preparing their faculty and students by giving multiple 'touch points' with industry to ensure their curriculum is contemporary and they are focused on solving real time challenges confronting industry. The ultimate objective would be the creation of a thriving eco system wherein industry clusters are spawned around a university facilitated by the healthy exchange of ideas between industry and institute (as happens in the case of the best universities in the world) so that a professor could become an entrepreneur and an entrepreneur may choose to share his ideas and experience as a professor.

Dr. Sandeep Sancheti who holds a highly-dignified position as the Provost (Vice Chancellor) of Marwadi University, Rajkot, has a remarkable 34+ years of experience in the field of higher education in the domains of teaching, research, and administration. Dr. Sancheti has been one of the longest serving Vice-Chancellor of the country (with more than 15 years in this position) and has served/ headed all major higher educational institutions like Institutes of National Importance, Govt. and Private State Universities, Govt. and Private State Deemed Universities, etc.

Dr. Sancheti has been a diligent and skillful administrator and dedicated Institution Builder over the exceptional years of his academic career:

- He has served as President of Manipal University (Jaipur)
- Founder Director of National Institute of Technology (Delhi)
- Director of NITK (Surathkal) and
- Director In-charge of NIT (Tiruchirapalli), NIT (Calicut), School of Planning & Architecture (SPA) (Delhi), and also Mentor Director of NIT (Goa), NIT (Puducherry) and NIT (Sikkim).

Hybrid Learning as a Future of Education

Prof. Sudhirkumar Barai
Director, BITS Pilani

Prof. Sudhirkumar Barai currently holds the position of Director, BITS Pilani and Director-in Charge, International Programmes and Collaboration Division.

"The author discusses the hybrid learning model, which is a combination of in-person and online instruction, and how it can be used to supplement synchronous, face-to-face instruction. It also talks about how new technologies will change what students learn in the classroom and how they learn, and how research should be supported by practice."

The covid pandemic has completely changed the teaching and learning experience landscape for education systems worldwide. Models such as blended and hybrid learning models are consistently practiced. In Blended learning, in-person teaching with asynchronous learning methods is combined. Students work on online exercises and watch instructional videos during their own time. In Hybrid learning, teachers instruct in-person and remote students simultaneously. In this learning, asynchronous teaching methods can be used to supplement synchronous, and face-to-face instruction.

In-person activities include: (i) Synchronous group brainstorming sessions, (ii) Communicating class expectations and outlining individual responsibilities, (iii) Establishing a collaborative, trust-based learning environment, (iv) Call and response presentations, (v) Providing immediate feedback to students. Online Classroom includes (i) Self-paced learning and activity completion, (ii) Automatic grading programs such as multiple choice True/False quizzes, (iii) Asynchronous group discussions, Written critical analysis, and thoughtful discourse, (iv) Video or aural content consumption.

HYBRID LEARNING

In- Person Activity

- Synchronous group brainstroming ideas
- Communicating class expectations & outlining individuals responsibilities
- Establishing a collaborative trust- based learning enviroment
- Call and response presentations
- Providing immediate feedback to students

Online Class Room Learning

- Self-paced learning & activity completion
- Automatic grading programs such as multiple choice, true/false quizzes
- Asynchronous group discussions, written critical analysis and thoughtful discourse
- Video or oral content consumption

As discussed above, the hybrid learning model is a multi-criteria optimization problem of in-person activities and online classroom learning. On the one hand, classroom teaching is well-established with fascinating pedagogy practices, and online education is heavily driven by digital technology.

Digital technology is a critical driver in achieving the aspirations of Hybrid Learning

- Technology will be leveraged to strengthen and even undertake hybrid learning initiatives. Digital technology is the only viable method to achieve scale and flexibility. Adopting the best practices makes it possible to achieve them without compromising the quality of teaching-learning and learners' engagement.

- New technologies involving educational software and hardware will change what students learn in the Classroom and how they learn. Thus, these areas and beyond will require extensive research on the technological and educational fronts. Such research should be supported by practice and should not end up in a mere academic exercise. HEIs who are early adopters of such technologies should be consulted and involved in such research activities.

- An autonomous body, the National Educational Technology Forum (NETF), has been created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration, and so on, both for school and higher education. NETF will maintain a regular inflow of factual data from multiple sources, including educational technology innovators and practitioners, and will engage with diverse researchers to analyze the data. Technology is just a tool that starts delivering value depending on its application. It is an excellent step to create an independent body to focus on this.

- For all the above purposes, various educational software will be developed and made available for students and teachers at all levels. The approach should not be 'creating such systems centrally' but the creation and encouragement of such an ecosystem where institutional practitioners, innovators, and users can actively contribute. Such an ecosystem should become self-sustainable, something like the hardware-software collaboration in IT systems, and cannot be centrally controlled. There seems to be a tendency to make the technology adoption another regulatory framework where there is an emphasis on formal/centralized control. This is contrary to the essence of NEP2020. Technology development and adoption are left to the practitioners for creativity and adoption to sustain. The central body should create the necessary ambiance, motivation, and policies for the system to thrive.

- Institutions will have the autonomy to approve institutional and non-institutional partners to deliver job-readiness training, which will be integrated with skills and higher education frameworks. This is to be approached with a sense of caution. While laying down policies and rules for such autonomy, this has to be opened only to those select institutes which have demonstrated excellence in their operations for a prolonged period.

- Unless online education is blended with experiential and activity-based learning, it will tend to become a screen-based education with a limited focus on the social, affective, and psychomotor dimensions of learning. This is particularly true in professional education. Every such program should necessarily have a work-integrated learning component at the least, which will demand a workplace that functions as a learning space. Such an instruction model can achieve and scale with a solid industry-institution collaboration.

The pandemic has led to a shift towards blended and hybrid learning models, which combine in-person teaching with asynchronous online methods. In-person activities include group brainstorming sessions, class expectations and individual responsibilities, while online activities include self-paced learning and automatic grading. Hybrid learning is a multi-criteria optimization problem, balancing the benefits of in-person teaching with the convenience and flexibility of online education.

Hybrid Learning for Forever Learners

It is envisaged that a hybrid learning model can enable students to pursue life-long learning. This is also essential in a country like India due to the geographical distances involved and the contrasts between urban and rural areas (in terms of quality of education, infrastructure, etc.). This model can help level the playing field by enabling people from nooks and corners of the country to pursue quality education via the internet (providing infrastructure facilities are ramped up. Of course, cell phone technology and particularly 5G internet connectivity is a great leveler). In addition, it can help adults and working professionals to pursue higher education to give an impetus to their careers without taking a break from work. For many, taking a break from work may not be possible due to family and other responsibilities. It will enable them to continue their learning and fine-tune it to the needs of their particular industry, company, and job profile.

Closing Remarks

Reputed institutions such as BITS Pilani have demonstrated in scale and variety that such a model is feasible, very successful, and valuable for organizations and their employees. This model can be researched further for guidance. They are creating a Dedicated Unit for Building World Class Digital Infrastructure, Educational Digital Content, and Capacity. Institutions of repute, such as BITS Pilani, with its rich experience in continuing lifelong education hybrid learning models and technology adoption, will be keen to participate in such an initiative and contribute to translating the new education policy into a reality.

Digital technology is a critical driver in the adoption of hybrid learning models in education. New technologies in education software and hardware will change what and how students learn in the classroom. Educational research on technology and its applications should be supported by practice. An autonomous body, the National Educational Technology Forum, has been created to provide a platform for the exchange of ideas on the use of technology in education. Hybrid learning can enable students to pursue lifelong learning and can level the playing field for students in remote areas.

Prof. Sudhirkumar Barai currently holds the position of Director, BITS Pilani and Director-in-Charge, International Programmes and Collaboration Division. He was Erskine Visiting Fellow at University of Canterbury, Christchurch, New Zealand during May-June 2008. He was also visiting scientist at National University of Singapore during May-July 2003. He was a recipient of the BOYSCAST fellowship and visited the Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, USA during May-November, 2000. He was a postdoctoral fellow at the Department of Solid Mechanics, Materials and Structures, Tel Aviv University, Tel Aviv, Israel during February, 1997-July, 1998.

He has co-authored three books which have been published by Springer:

- Concrete Fracture Models and Applications
- Shear Strengthening of T-beam with GFRP: A Systematic Approach
- Systematic Approach of Characterisation and Behaviour of Recycled Aggregate Concrete

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Entrepreneurship as an Important tool to solve the problem of rising Unemployment in India.

Vishal Khurma
CEO, Woxsen University

Mr. Vishal Khurma holds the post of CEO for Woxsen University. A successful commercial leader & growth hacker, his illustrious career spans over 22 years in Consumer Goods, Retail, Telecom and Higher Education space.

"The author discusses the need for higher education institutes to partner with businesses and promote entrepreneurship in order to create more employment opportunities and improve the quality of life for citizens. It recommends that universities make incubation facilities available to student entrepreneurs, include subjects like entrepreneurship development and design thinking in their curricula, and conduct ideathons and start-up contests."

India is one of the most vibrant & ethnically diverse countries in the world. We are a young nation that is home to many religions, innumerable castes, tribes, and, hundreds of linguistic groups. With almost 1.4 billion people, its numbers exceed the population of all countries except China. More than 67% of the population is from the age group of 15-64 years, 25% fall below 15 years with an average life expectancy of about 70 years. This makes us one of the largest economies in terms of consumption which is truly a blessing for any industry to flourish.

In the late 70s, India understood that our economic growth is getting clamped due to our highly regulated policy measures and lack of focus on the private sector. The economic & liberalization reforms introduced in 1991, led to a spurt in private sector participation & opened the gateway to economic growth. Today, we have come a long way with the technological and industrial boom in the last few decades leading to our proven leadership prowess in many sectors like Automobile, IT, Pharma, Telecom & many others at the global level. Indian workforce is most sought after in many developed nations for their domain expertise and hard work, which is also a testimony to our progressive educational system. The evolution of the Indian economy has seen its share of ups and downs, from economic crisis to double-digit growth, and now eyeing towards becoming a USD 5 trillion economy. However, we cannot keep basking in the glory of our past when we know that we will become the most populous nation in the world by 2024, while our unemployment rate has already crossed 8% during post covid time. Our Per Capita GDP is just around USD 2000 and ranks 144 among the 194 nations of the world. This forces us to deliberate on the need to improve the overall employment opportunities, social inclusion, and quality of life for elevating our society. And among all, Entrepreneurship will be the key to unlocking the host of capital or wealth creation opportunities for our youth and the same can only be done successfully if the Higher Education Institutes partner in this mission right from the grass root level.

It is critical for the HEIs to integrate entrepreneurship across their business and non-business programs. The HEIs need to stimulate the entrepreneurial mind-set of young students, encourage innovative business start-ups and foster a culture that is amenable to entrepreneurship, which means we will have to re-think the models used for the preparation of students. Students should be able to produce knowledge, research work, and create ideas and also transfer them to act in alignment with an objective of local, regional, and international economic growth. The entrepreneurship courses are somehow completely missing in non-business or non-economic fields of study with limited interdisciplinary exposure. The overall teaching of entrepreneurship in higher

education should contribute towards fostering a culture of appreciation for:

- Social Entrepreneurship
- Research
- Innovation

Through research, it has been established that successful entrepreneurs have some unique personality traits like:

- Passion
- Vision
- Risk appetite
- Internal Locus of Control
- Adaptability

It is indeed challenging for educators to develop varied modes of teaching and learning that can support and cultivate these traits. There are numerous ways in which we can integrate entrepreneurship at the academic level & even nurture young students. The HEIs will have to make their degrees more engaging and hands-on by blending the traditional approach with real-world business situations, practical exposure, and operational challenges to create the next generation of entrepreneurs.

Here are some of the ways to implement these changes and empower the students for a rock-solid foundation of entrepreneurship in the country:

FACTORS TO CONSIDER FOR UNEMPLOYMENT

- 67% of India's population is between the age group of 15-64 years
- 25% of population fall below 15 years with average life expectancy of about 70 years
- Employment rate has crossed 8% post Covid.
- Our per Capita GDP is USD 2000
- For our per Capita GDP, we rank at 144 amongst 194 countries.
- We will become the most populous nation in the world by 2024.
- The goal is to become a USD 5 billion economy.

Multi-Disciplinary approach

Most top organizations have established that convergence of diverse thoughts, skills and domains provide a strong foundation for path-breaking innovations. They can appreciate the business dynamics in a much better way to their diverse exposure. HEIs can create a perfect ecosystem for founders, innovators, and entrepreneurs since they can have easy access to diverse functional talent like marketers, designers, technical, operations, finance, etc.

Disproportionate focus towards non-business domains

More often than not, students from non-business or non-economic studies face more challenges than their counterparts from business studies when it comes to actual implementation of an idea. The HEIs can create platforms through contests or capstone projects which will force the students from non-business domains to collaborate & work with the students from other disciplines fostering learning & appreciation of the new domains apart from networking and other life skills critical for a budding entrepreneur.

Curriculum Design geared for experiential learning

It must be mandated for each university to benchmark their curriculum design every year against some of the globally recognized institutions and align as per the current requirements of the Industry. The learning pedagogy can be tailored to reflect and learn from real-life business challenges through a case study approach, simulation challenges, participation in live industry projects, etc. The students can study the past or present

corporate success stories which can help them dig deeper into processes, analyse situations, evaluate alternatives and choose the most apt solution basis the rationale. The students can be pushed into active industry projects to contribute and learn the practical aspects of the business.

Inclusion of New-Age Technology topics in the Curriculum

Technology space has been booming & it has established that most new age start- ups making big are tech firms with tech-enabled products & services. The HEIs can improve the learning curve of their students by incorporating more technology topics into curricula. The idea is to expose the students to the various strategic ways how companies and entrepreneurs are using technology to innovate, communicate, and create business models.

Promote International Exchange with other Institutions

The Universities should drive the internalization agenda since it creates a host of opportunities for student exchange, faculty exchange, curriculum design, and research. This concept helps the Universities to introduce new & latest learning techniques for the benefit of students. Additionally, it helps broaden the thinking horizon of the students as they connect with other students from diverse cultural & professional backgrounds.

Create opportunities with Social Entrepreneurship contests

There is nothing more exciting and engaging than inspiring the students to participate in entrepreneurship contests. This includes both social entrepreneurship businesses that may focus more on a social cause and tech start-up ventures. These contests focus their energy in the right direction of collaborating with the industry, and subject matter experts, to understand real-life business challenges & find solutions.

Partner with Businesses & invite Business Leaders for delivering modules

The HEIs must ensure partnership agreements and collaboration with industry & corporates from various sectors & domains. This opens up internship opportunities for the students, which is an innovative way to foster practical knowledge and allow young professionals to learn from experienced entrepreneurs. Many a time, these business leaders, successful entrepreneurs, and start-up founders are invited to teach a full course or module or share their life experiences with the students.

Provide Incubation facilities & mentorship support for business ideas:

The incubation center of the institution assists the student-entrepreneurs during their initial stage by providing an array of business and technical solutions, lab facilities, validation of the idea, mentorship, network, and even seed funding. The incubation process allows entrepreneurs to economize on their capital and garner external support to accelerate their business's growth. It should be made mandatory for each University to provide Incubation facilities to all its students across programs & domains. In these uncertain times of high levels of unemployment, nothing would be better than helping students launch their businesses and become job creators.

Summary and recommended Policy Framework

We do understand that entrepreneurship requires a unique mind-set and Higher Education Institutions are rightly placed to create that maximum impact when it comes to the challenging task of inspiring our youth. We can transform young minds to start thinking of job creation rather than seeking jobs. Realizing that entrepreneurship can create employment opportunities, contribute to capital formation and elevate society, we must create a highly conducive ecosystem that fosters the growth of entrepreneurship.

Mandatory provision of Incubation facilities for student-entrepreneurs

The University regulatory bodies like UGC should make it mandatory for all Universities to set up and provide fair access to Incubation facilities to all their students. This will help create the entrepreneurship-focused ecosystem to help student-entrepreneurs an idea validation, access to administrative & technical infrastructure, lab facilities, mentorship etc.

Introduce subjects like Entrepreneurship

development & Design thinking for all students across disciplines

The student will get the right exposure to entrepreneurship if the HEIs make subjects like Entrepreneurship development, Design thinking along with Problem-solving with real life projects as compulsory subjects across all disciplines & programs.

Ideathons & Start-up contests:

We must create various platforms and conduct Ideathons / Start-up contests at national, state & inter-university level to instill the ideas around entrepreneurship & inspire them to learn from their peers.

Financial Assistance for the top 20 start-ups of every University

The HEI regulatory bodies like UGC should create an evaluation framework to support & provide a nominal fund of INR 50-100K each to the top 20 start-ups of each University. Networking events with TIE group members and with other angel investors on a regular occasions can further boost the confidence of young entrepreneurs.

Reduce regulatory hurdles & provide extra support to student-entrepreneurs to protect intellectual & property rights

The government can make streamline all relevant laws by offering simple online access to secure licenses and sanctions in a time-bound manner. Government policies and legislation on property rights are critical factors that boost innovation in the country

Streamline commercial laws to promote entrepreneurship by giving turnover or tenure-based tax holidays and provide reasonable opportunities for wealth creation.: A special purpose entity can be constituted by RBI to offer innovative debt schemes for young entrepreneurs. It will be helpful if start-ups are supported financially by offering turnover or tenure-based tax holidays ranging from 3-5 years. This would require some changes in the commercial laws to protect material and intellectual property rights to help foster entrepreneurship and innovation.

Higher Education Institutions (HEIs) in India should incorporate entrepreneurship into their curricula in order to prepare students for life after graduation, according to a report from the University Grants Commission (UGC). The report recommends that HEIs make entrepreneurship a mandatory subject for all students across disciplines, as well as setting up incubation facilities for student-entrepreneurs.

It is beyond doubt that only entrepreneurship can take the nation to its next phase of economic & social growth. It will be a distant dream for India to become a USD 5 trillion economy unless HEIs contribute by creating a conducive ecosystem for entrepreneurship. Picking one or few of the above recommendations will not suffice since only a holistic & collective approach can solve the problem of unemployment.

Mr Vishal Khurma holds the post of CEO for Woxsen University. A successful commercial leader & growth hacker, his illustrious career spans over 22 years in Consumer Goods, Retail, Telecom and Higher Education space.

- He has been felicitated with Excellence in Education Award at Higher Education Summit 2021 and Global Business Excellence Award at the Asia – African Leadership Summit 2020.
- In his past, his experience has straddled across Global & Indian conglomerates with leading brands such as PepsiCo, Coca-Cola. Dabur, Birla Shakti and Tata Teleservices, catering to mass and premium product categories.

Under his astute leadership, the brand Woxsen University has become a name to reckon with. Over the last few years, Woxsen has strongly emerged at All India Rank 13 in the Times B-School Ranking and Rank 16 in BusinessWorld B-School Survey. With meticulous research, launch of new schools and inclusion of disruptive programs, Woxsen University today has grown substantially by 3X student enrolments and diverse cohorts, during his tenure.

Impact of R&D Investment in the Education Sector

Dr. Sanjay Yadav

Chief Scientist, National Physical Laboratory

After completion of M.Sc. (Electronics) in 1985 and receiving a fellowship from the Ministry of Home Affairs, Govt. of India in 1986, Dr. Sanjay Yadav joined CSIR-NPL, New Delhi as Research Scholar. Two years later, He was awarded SRF of CSIR, New Delhi. He completed a Ph.D. degree in "Research Contributions towards the Development of Ultrasonic Instrumentation for Scientific, Biomedical and Forensic Applications" in 1990.

"The author discusses how research and development drives innovation, which in turn drives economic growth. The private rate of return for an additional year of education is 8.8%. The social rate of return is even higher. However, many developing nations, including India, do not invest enough in R&D due to a lack of clear ROI."

In real world, innovation in all walks of human life energises economic, financial and social evolutions, but big question is what actually drives innovation? The answer is very simple i.e. research and development (R&D), which directly drives the innovations in science, engineering, medicine, agriculture, space, corporations and what not? It comprehends all of the developmental activities from a product to service to market to customers. For the sake of business, it provides corporates fair advantage prior to unveiling the product or service in the market to stay ahead in the race. The R&D innovation lays the foundation for any institute / organization / corporate for their bright future. The chances of any entity significantly reduce to remain in the market without innovations. In nut shell, each institution / organisation / corporate requires change, which begins with innovation, and innovation comes from R&D. If it followed properly, accurately and precisely, it becomes a recipe for success. Be it clear in your mind that innovation and R&D are not same things. Such assumptions are far from truth.

At the microscopic level, it is observed that at the heart of all innovation lies research and development (R&D). The R&D generally encompasses inventive and organized doings carried out to enhance the bank of knowledge related to mortality, culture and civil society and accordingly design and develop new innovative applications based on available knowledge and resources [1]. As an outcome of great R&D efforts, scientists, engineers and researchers make it possible to initiate, design and develop novel ideas, designs, devices, and technologies. With the advent of available advances in innovative technologies, industries produce more in quality and quantity having investing the same amount or lesser, which ultimately leads to increased productivity. This enhanced productivity results in the growth of the economy and nation [2]. Such concept of enhanced investment in R&D leads to economic growth is also reported in several studies including the most recent one in reference [3]. The study reported a sample of 15 Economic Cooperation and Development (OECD) countries highlighting that a 1% enhanced investment in R&D may results into overall growth of the economy by 0.61% [3]. This means that as the country invests more in R&D, its economy will grow faster.

The Human Capital Theory states that investing in education yields both individual returns in the form of increased incomes in the future and social benefits in the form of rapid economic growth and the eradication of poverty. Policymakers must choose how to best use education to achieve the intended outcomes and determine how to get the highest returns for the greatest number of people. A country's future is invested in through spending money on research and innovation in education sector. To preserve and enhance way of life, new solutions must be developed through research. R&D in education helps to fuel innovation by enabling researchers to create novel insights, methods, and technologies. Innovation drives economic growth.

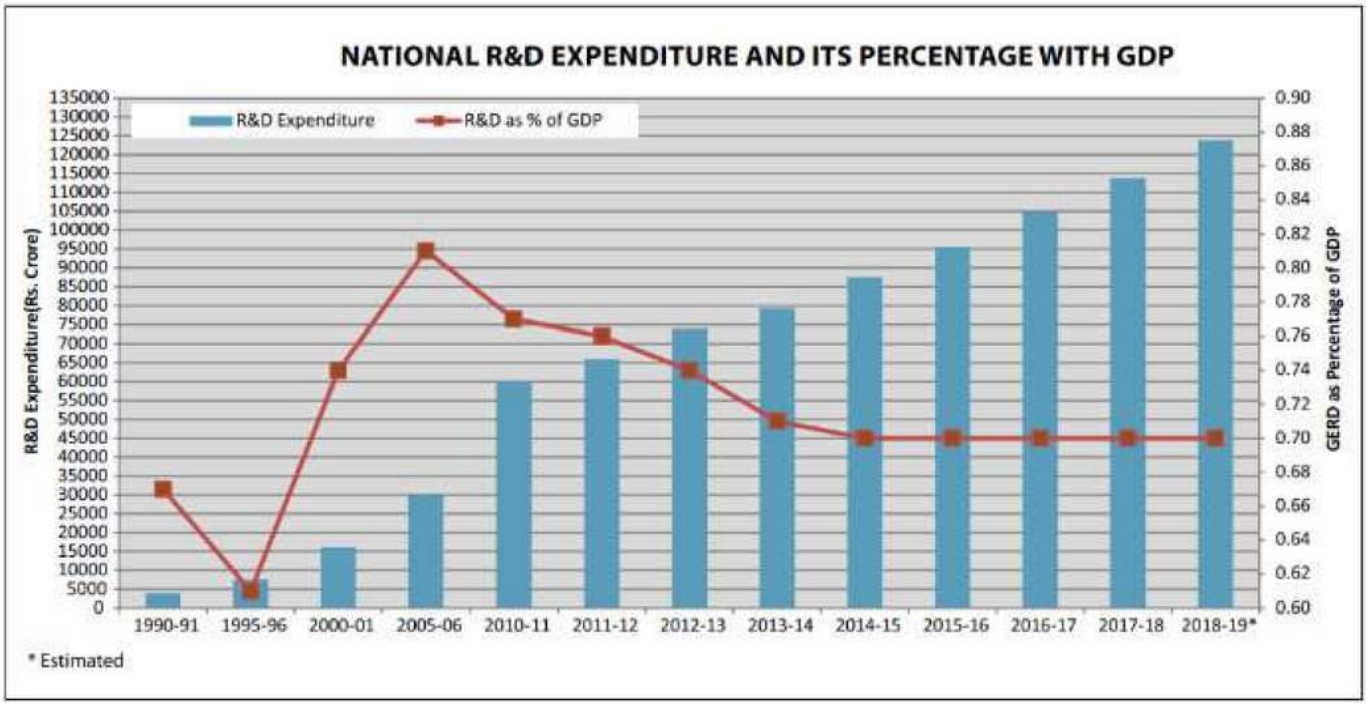
As per an estimate [4], the international R&D investment world over has touched all time high of about US$ 1.7 trillion. With no surprise, 80% of this funding is pumped by only 10 developed nations. It is worth mentioning here that most of the nations have pledged

to increase private and government funding substantially in R&D as part of the United Nation Organisation (UNO)'s Sustainable Development Goals (SDGs by 2030. India's commitment to R&D investment can be viewed from a GDP point of view. In India, R&D expenditure from the year 1996 to 2018 is always below 1% of the GDP. Maximum India's expenditure is in the year 2008 of 0.86% GDP [5]. As per the UNESCO Institute for Statistics, India's investment was only 0.66% only in the latest the survey year of 2018 [5]. It is now amply clear that as much as an economy invests today in R&D, the dividends would be more in the future. This the reason, several OECD economies are hugely investing in R&D, for example, Korea, Japan and USA are as 4%, 2.8% and 2.4%, respectively. For comparison, the R&D intensity of all OECD nations averages at 2.4% [2] while India spends barely 0.6%.

Trends in return on investment have an impact on investment and policy choices. The average person's lifetime earnings are compared to the cost of education to determine their rate of return on investment. The private rate of return on education is determined by calculations done at the individual level, but the social rate of return is determined by including social expenditures, such as money spent on instructors and schools. According to the most recent estimates, the private rate of return for an additional year of education in the world is roughly 8.8%, which is significantly greater than the majority of long-term asset investments. The patterns of rate of return are also influenced by a nation's degree of development. Returns are typically higher in underdeveloped nations.

One of the reasons for lower spending by developing nations including India is basically understood due to the non-availability of clear and quick dividends or return on investment (ROI) on R&D spending. Such assumptions are hindrances to policy makers to devise R&D funding-based policies. However, time to time, some reports appear highlighting R&D funding lucrative. Science/Business report published in (2017) had estimated average ROI in R&D about 20% in 10 years of spending which is quite reasonable and better than return on shares, bonds, or other financial instruments. It is hugely important to share and publicise widely such reports among the stakeholders [6]. The second example is US Human Genome Project, which was funded to map the human genome sequencing in 1990s which resulted into 141 times payback of each dollar invested in terms of new medicines, products, services and employment [7]. Similarly, the European Union has sponsored 380 projects in mobile communication and technologies over 30 years which immensely accelerated the growth of mobile phone markets across the globe [7].

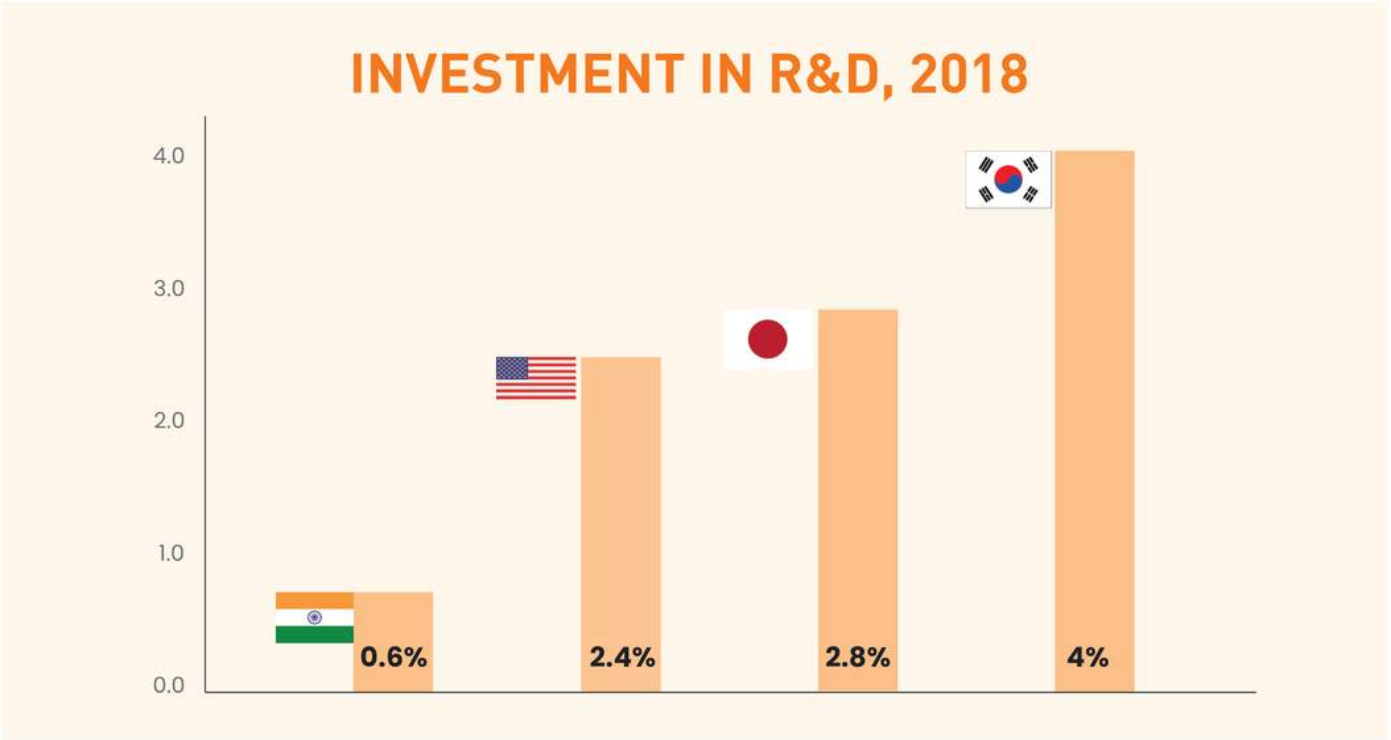
Factually, innovations driven by R&D would grow and



flourish only when all stakeholders, administrators, policy makers, regulators, academia, scientists, engineers, researchers, industry, and government work closely together to convert advance and new R&D results into gainful enterprises. One of the greatest examples is Silicon Valley in California wherein sustained federal government investment to academic institutions during 1990s such as UC Berkeley and Stanford had converted into a flourishing ecosystem which later on becomes corporate technology giants called today Facebook and Google. It is also true that the government funding in R&D has gone down in some of the economies, it is not that the impact of funding is fully utilized but it still plays a crucial role in empowering research into new knowledge, innovations and technologies such as medical and health devices, robotics and automation, nanotechnology, 3D printing and manufacturing and so. Industry and academia continue to play a pivotal role in conducting R&D, too. [7]. Therefore, government investment in the education sector for R&D, along with industrial ties, is a must for economic development.

India, which is the second-most populous nation in the world, has 580 million people in the age group of 5 to 24. With over 250 million kids enrolled in schools across India, this offers a sizeable market for the education sector. By FY 2024–2025, the Indian education market might be valued at US$225 billion, according to IBEF's industry analysis. India's education market is expanding at an exponential rate. Due to the abundance of opportunities in the online education market, the industry may expand further. In fact, the market for digital learning has grown quickly as a result of the COVID 19 pandemic. Elets News Network's (ENN) Namrata Hazarika focuses on the expanding demand for potential investment in enhancing technology-enabled services and fostering innovation.

The education industry has long struggled with issues like inadequate infrastructural development, insufficient investment, and a teacher shortage. To create the digital infrastructure and deliver high-quality education, it is vital to encourage potential investment in the field. In order to meet the country's demand for a quality education infrastructure and skilling resources for nearly 255 million youth in the 15–25 age range, the Indian government now wants to "welcome money from everywhere." Only 110 million of those youth are enrolled in educational institutions now. India, now the second-largest e-learning market after the US, was anticipated to reach a market value of US$1.96 billion with 9.5 million users by 2021. Industry analysts predict that the education technology (Edtech) market in India will develop to a US$30 billion market over the next ten years as e-learning continues to gain popularity.



Few years back, Government of India has taken much desired steps to revamp and improve this important sector of digital transformation to promote online education in India, which are summarised as follows:

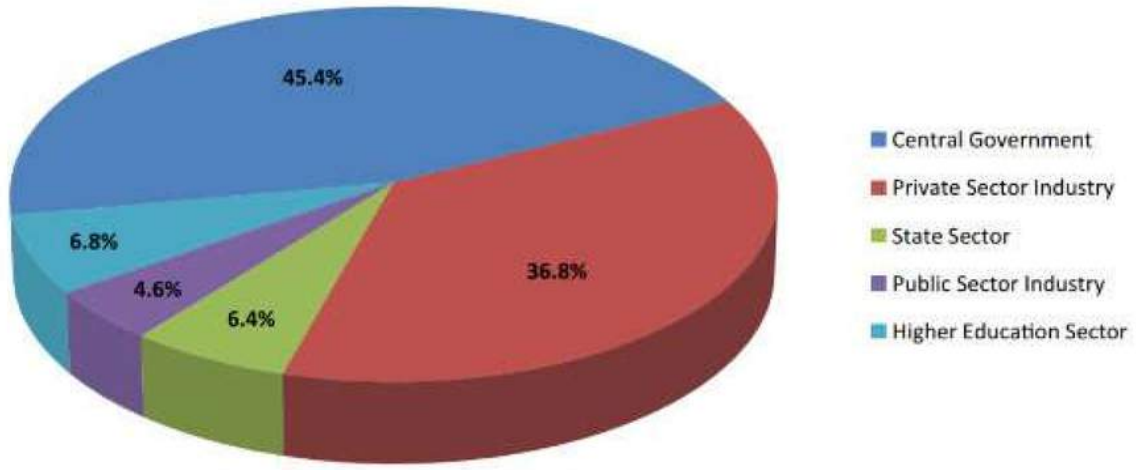
- Inclusive Use of Information and Communication Technology (ICT) in education curriculum would certainly improve and expand the quality, effectiveness and delivery of education. More than 800 experts were trained through master degree courses as trainers / key resource personnel all over India through rigorous and inclusive ICT curriculum up to 2018. This has further been augmented manifolds thereafter.

- The National Council for Educational Research and Training (NCERT) has also introduced and developed the concept of e-pathshala to promote, percolate and disseminate educational e-resources which resulted into almost 3500 audios and videos, 700 e-books (e-pubs) and 500 flip books by 2018. The whole prepared resources were made available on the portal and through mobile app. The sustained efforts are still kept going and generating fruitful dividends.

- A new initiate was taken up to set up a National Repository of Open Educational Resources (NROER) to organize all-inclusive resource materials for teachers and students in schools in multiple languages. The NROR provides This initiative resulted into a collate of extremely useful resource material of 13,635 files (401 collections, 2,722 documents, 565 interactive, 1,664 audios, 2,581 images and 6,105 videos) on the depository portal by 2018. One can access these resource materials form the portal.

- The National Institute of Open Schooling (NIOS) is also providing 44 online courses at the Study Webs of Active Learning for Young Aspiring Minds (SWAYAM) through a portal for the classes starting from 9 to 12 to undergraduate and post-graduate levels.

NATIONAL R&D EXPENDITURE BY SECTOR, 2017-18



- National Digital Library of India (NDL) is an online repository of learning resources with more than 15.3 million digital books available online.

India does not even spend a small portion of what developed economies undertake in terms of research and development-related activities. Even smaller nations like South Korea, Switzerland, and Israel invest a significant portion of their GDP in research and development. Although the National Education Policy 2020 has the right intentions when it comes to R&D, the success of these policies will depend largely on how they are put into practice.

To accelerate the development of infrastructure and

technological advancement, the government must also inject funding into the education sector. The government's increased budgetary allocation is one of the main requests of the education sector. A total of Rs 93,224 crore has been allotted for the Ministry of Education in the fiscal year 2021–2022. Included in this are Rs. 38,350 crore for the Department of Higher Education and Rs. 54,874 crore for the Department of School Education and Literacy. The allocation for 2021–22 was Rs 99,312 crore, 6.13 percent less than the budget for the previous year.

In summary, empirical data points to great variation in educational returns, despite the fact that they are generally favourable. Indian policymakers would need to make sure they maintain a balanced perspective on these differences in returns to education. It is necessary to transfer the emphasis from primary to secondary and higher education. Since higher education yields the best benefits, there are incentives to invest in adolescent education. Since higher education yields the best benefits, there are incentives to invest in adolescent education. In order for education to play an equalising function, greater levels of education must be prioritised together with targeted interventions for the female population and lower income quantiles.

In nutshell, it is inferred from the study and examples cited that R&D spending is extremely important to drive the engine of technology, innovation, social and economic growth of the nation. For this, a major impetus and encouragement to all kinds of R&D in the education sector, like basic research, applied research, and development research is needed. Governments is also required to endeavour to inspire R&D based innovation in academia. Also, academia should be linked to the industry by public support or through direct funding (R&D grants, loans and public procurement), and in some cases tax relief, constituting a major policy instrument.

Research and development (R&D) is an essential part of innovation, as it encompasses all of the activities involved in developing new products, services, and markets. R&D drives innovations in fields such as science, engineering, medicine, agriculture, and space, and allows organizations and corporations to gain a competitive advantage in the market. Without innovation, organizations are at risk of losing their market share and struggling to remain relevant.

R&D is a critical component of innovation because it involves the organized and systematic pursuit of knowledge to enhance our understanding of the world and develop new applications based on that knowledge. Through the efforts of scientists, engineers, and researchers, R&D enables the creation of novel ideas, designs, technologies, and devices. With the advent of advanced technologies, industries can produce more goods and services with less investment, leading to increased productivity and economic growth.

The Human Capital Theory suggests that investing in education yields both individual and social benefits. For individuals, investing in education can lead to higher incomes and better job opportunities. For society as a whole, investing in education can result in rapid economic growth and the reduction of poverty. Policymakers must determine how to best use education to achieve these outcomes and maximize the returns for the greatest number of people.

R&D in education plays a crucial role in fueling innovation by providing researchers with the tools and resources they need to develop new insights, methods, and technologies. Through innovation, economic growth is fueled and quality of life is improved. The international R&D investment has reached an all-time high of around $1.7 trillion, with 80% of this funding coming from just 10 developed nations. Many nations have committed to increasing private and government funding for R&D as part of the United Nations Sustainable Development Goals.

In conclusion, R&D is a vital component of innovation and drives advancements in various fields. Investing in R&D leads to increased productivity, economic growth, and improved quality of life. R&D in education plays a crucial role in fueling innovation and enabling researchers to develop new insights, methods, and technologies. Many nations have pledged to increase funding for R&D as part of the United Nations Sustainable Development Goals.

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After completion of M.Sc. (Electronics) in 1985 and receiving a fellowship from the Ministry of Home Affairs, Govt. of India in 1986, Dr. Sanjay Yadav joined CSIR-NPL, New Delhi as Research Scholar. Two years later, He was awarded SRF of CSIR, New Delhi. He completed a Ph.D. degree in "Research Contributions towards the Development of Ultrasonic Instrumentation for Scientific, Biomedical and Forensic Applications" in 1990.

- Prior to joining NPLI, he has worked more than 6 years as 'Project Officer' in the Science and Technology Department, Government of Haryana for the implementation of various rural energy programmes.
- He has more than 150 research publications to his credit in national and international journals of repute, 12 patents / copyrights, several technologies, author, contributor or editor to several books.
- Currently he is working as Chief Scientist and Head, Physico-mechanical Metrology Division.
- After joining CSIR-NPL, he is dedicatedly working towards development of metrological standards and their dissemination for national growth. He have significantly contributed in the development of 3 primary pressure standards, NPL-HI (20-1000 MPa) in 2000; NPL-H2 [(10- 100) MPa, (20-200) MPa] in 2008 and 2011, respectively, NPL-H3 [(5-50) MPa and (50-500)]

Addressing the "The Skill Gap Conundrum" through an Ecosystem Model of Education

Manivannan Ranganathan
Business Unit Head, Higher Education, TCS iON

"The article discusses the issue of a skills gap in India, where many college graduates are unable to find employment despite the large number of students enrolled in higher education. The World Economic Forum has reported that only one in four management professionals, one in five engineers, and one in 10 graduates are employable. The article suggests that the lack of necessary skills is to blame for this issue. It also highlights the need for workers with skills in technology, such as programming, data science, machine learning, AI, and web development. The article suggests several strategies to address the skills gap, including industry-academia partnerships, learning programs co-designed by industry experts, and dedicated learning and practice zones for hands-on learning."

Several students qualify from various colleges every year with degrees and certificates to declare their skills. As per IBEF report, India had 38.5 million students enrolled in higher education in 2019-20. Yet a large number of such students remain unemployed. As per the World Economic Forum, of the 13 million people who join India's workforce each year, only one in four management professionals, one in five engineers, and one in 10 graduates are employable. When we try to figure out what sets them behind, we realise it is the absence of the requisite skills to be employable. Industries require fresh and dedicated talent to keep up with the competition around. A 2020 World Economic Forum Report also highlighted the need for skills of the future, especially those that involve technology, such as programming, data science, big data, machine learning, AI, and web development. The absence of such talent, in turn, creates difficulty for the industry. While the number of unemployed individuals keeps increasing, the lack of proper employees makes it difficult for the industry to function. This scenario is termed as "The Skill Gap Conundrum".

"The future of work will be a race between education and technology" *– this quote by Mauricio Macri, former president of Argentina, aptly captures the conundrum that we are facing today.*

To address this challenge, the industry must start playing an active role in the higher education space. Here are a few strategies that can be followed to address this challenge:

Learning Programs in trending domains co-designed by industry

Institutes are continuously revamping their curriculum to stay abreast of the technology advancements. However, industry is growing at a much faster pace and the need for bridging the gap is constant. Institutes are left trying to play catchup with the ever-growing gap between Industry and Academia. Industry experts can take lead here and work with the institutes to offer learning programs on trending domains, like Artificial Intelligence (AI), Internet of Things (IoT), Cloud Computing, Blockchain, Data Science, Cyber Security, and many others. The industry experts will ensure that the program design is fully aligned with the need of the industry.

Industry-academia partnerships

It's important that the industry partners with reputed

academia to create the learning programs. While the industry can bring the latest technical know-how to the table, academia brings expertise in course design and pedagogy. Both need to work together to create learning programs that are not only industry-relevant but also well-structured keeping in view students' learning journey.

and there are the ones that require high-end computing infrastructure and equipment e.g. IoT, Robotics, AR/VR. There is also a significant digital divide in the country as more than 60% of learners do not have access to good quality PCs and broadband connections for online learning. This necessitates special zones where students can learn along with the cohorts of shared aspirations. They get to do hands-on practice on the advanced

Current Status of Industry-Academia Collaboration in India

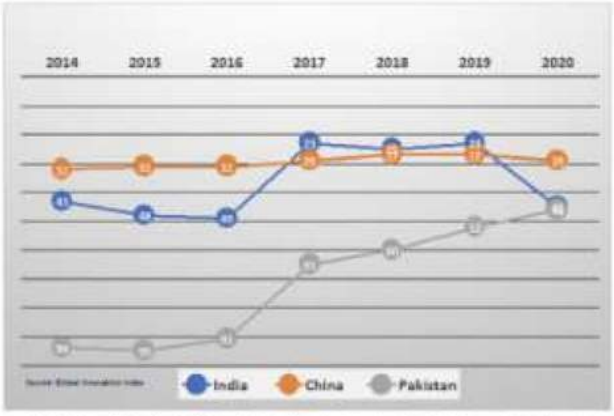
Key Statistics and Insights

- India ranks 7th in scientific production (Citations, published documents etc)
- Ranked 45th in University-Industry research collaboration as per Global Innovation Index 2020
- India GERD* 0.7% of GDP Vs 2% for developed economies

Progress Made and Key focus areas

- World class research parks in various INIs in collaboration with industry
- Multiple tech Start-Ups by students during graduation e.g. Practo

*Gross Expenditure on Research & Development



Global Ranking in University/Industry Research Collaboration 2014-20 (Source: Forbes India)

Source: Forbes India Report on industry-university linkage, published: Sep, 2021

Contextual application of knowledge through projects and internships

It's one thing to learn the concepts of a new subject, but an understanding of contextual applications is what truly matters to make the learners more employable. A combination of elements in the course construct can go a long way in addressing the need e.g., assignments created (by industry experts) based on real-life scenarios, integrated virtual and physical platforms for effective hands-on learning, case study discussion (by industry experts), an opportunity for learners to continuously interact with experienced professionals from industry, internships on projects created and mentored by industry practitioners etc.

Dedicated Learning & Practice Zones for Hands-on Learning

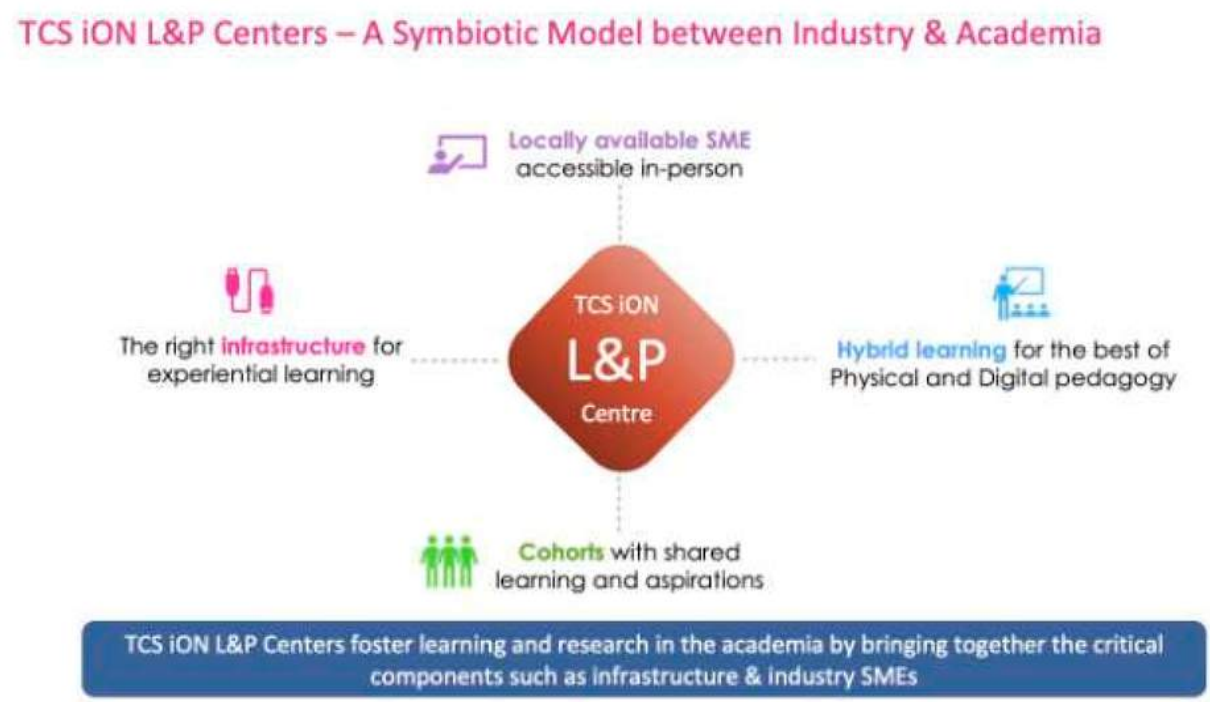
Some technologies can be learned remotely using a PC infrastructure provided and locally available facilitators in those zones.

To achieve this, we at **TCS iON are offering Industry Honour Course (IHC)** developed in partnership with leading IITs, IIMs, OEM partners and top corporates. It is being leveraged by many top universities in the country.

After numerous discussions with renowned academicians from reputed institutions and experienced industry practitioners from across various domains, we have conceptualized a program with the following components that can help in addressing the growing needs in industry and deliver an experiential and engaging learning to the learners' community in higher education space:

Digital Multi-modal content

The digital learning resources will contain content in



formats such as videos, eBooks, etc. as applicable, which can be accessed by students from any device in a self-paced mode.

Digital Lectures

- The digital lectures are delivered online by academician(s) and industry expert(s) accessible to students from any device.

Discussion Room

- The Discussion Room is an online forum (or community) for enhancing collaborations with the SMEs and peers.

Periodic Formative Assessment

- The periodic formative assessment is an internet-based assessment in MCQ format

Industry Assignment

- The industry assignment are online assignments provided to students to improve their practical knowledge.

Summative Assessment (NQT)

- Summative Assessment is an online assessment conducted in two parts: - Test of Knowledge and Test of Application in proctored mode.

Verifiable Digital Certificate

- The verifiable digital certificates are online certificates provided by TCS iON for each IHC course if the student meets the pre-defined criteria.

Internships and Job Opportunity

- Students will get a visibility to the digital internship opportunities powered by TCS iON, i.e., Remote Internships.

- Eligible students will also get visibility to job opportunities from corporate recruiters who are part of TCS iON Job portal, subject to vacancy in corporates and their selection criteria.

It's difficult to achieve the above by any one party. Rather key stakeholders such as academia, the industry, Content creators, OEM companies all need to come together and operate in an ecosystem model where it becomes a win-win for all. In the increasingly VUCA world (Volatile, Uncertain, Complex, Ambiguous), ecosystem model is the way to thrive in every domain, including the education sector.

It's time we address the gnawing problem of unemployment and lack of 'job-ready' talent in the industries. The ecosystem model will get to the root of the problem and fix it entirely. With this, we invite the

industry and academic leaders to share their thoughts on addressing the "The Skill Gap Conundrum".

Higher education institutes & universities can write to us at: **enquiry.tcsion@tcs.com** for partnering & offering these new age programs to their students.

For more information on Industry Honour Course,

Visit us at: **https://bit.ly/TCSiONIHC**

Learning Transformation | TCS iON Industry Honour Course (IHC)

Manivannan Ranganathan, Business Head, Higher Education, TCS iON, a strategic unit of Tata Consultancy Services

- 25+ years in TCS. Strong expertise and experience in handling business development, account management, delivery management and product management roles.
- As Business Head of Higher Education Segment, driving accelerated revenue growth, by creating market relevant products and platforms in Learning, Assessment & Process Management for institutes in India.
- As Program Director of TCS NQT, he has created a strong foundation with more than 6 Lakh+ NQT certified students, developed 30+ NQT variants across industries, partnered with 1500+ corporates to hire our certified talent and supported 1 Lakh+ students in getting jobs in TCS and other partner corporates.
- Played a key role in setting up the Campus Automation Platform for 100+ Educational Institutions across India. Supported a student user base of 10+ Lakhs, in the TCS iON Digital Campus platform.
- Graduated from College of Engineering, Guindy (Anna University) in 1992.

Outshining India's IT Sector in the World

Sridevi Sira
Dy Director, National Lead Future Skills Prime - NASSCOM

She works with NASSCOM as Lead – FutureSkills Academia, she is a highly focused, result-oriented Talent Nurturer, Learning & Development Strategist and Education Management Professional with over 22+ years of professional journey in building Career orientation for Students in Academic segment.

"The author discusses India's journey to becoming a trillion-dollar digital economy, and how the country is in a perfect spot to become the world's Skill Capital and Global Talent Hub. It cites the country's literacy rate growth as well as its large pool of STEM graduates as key advantages. The author also outlines some of the challenges that India faces in becoming a truly global talent hub, such as the need for more vocational training and experience-based learning."

India is all poised to be a trillion-dollar digital economy and it is in perfect spot to become World Skill Capital and Global Talent Hub.

The advantage for India is its current demographic dividend. Past few decades, India has been destination of choice for IT companies for their offshoring since the talent pool was exceptional, competitive and it was exciting on investment policy.

India's Journey

Ofcourse if we peep into history, the story has been totally different. If we observe the literacy rate in India in 1901 it was merely at 5.4%, which progressed to 18.3% in 1951. However, in 2021 the literacy rate shot up to 78% - This phenomenal growth was a consciously driven element wherein constitutional provisions were created and The Right to Education became a Fundamental Right.

Free & Compulsory Education for children between the age group 6-14 was taken up as State's priority.

Education is a key and significant contributor to economic growth and its ability to mould a Nation's work force cannot be undermined. There have been conscious and continuous efforts to ensure that the youth of the country are shaped for the needs of the Industry thereby contributing to growing the economy.

Literacy alone does not meet the ever growing needs of the modern world Digital fluency has become a necessity even to conduct day to day affairs and to reap all the benefits offered by technology, from staying connected with family and friends across the globe, attending classes on zoom, availing banking services online, from ordering stuff virtually and paying for them through UPI, it is important to have digital skills – our world today revolves around technology and digital Skills.

Over the years, the definition of "Skill" has significantly evolved. In recent years, companies have been struggling to find an employable talent pool – with competency to perform the tasks as required by industry. The current globalization has necessitated the demand for multi-skilled workforce – which has emphasized the critical need to provide quality skill development trainings.

An analysis was performed by Draup, to comprehend India's tech talent across various job functions, locations, and technologies. The study estimates that India has a tech talent demand-supply gap of 21.1%, which is the lowest among global tech leaders such as the USA, China, UK, Japan, Canada, and Australia.

The country has one of the largest annual STEM graduates supplies, with 2.14M graduates, and is also the global leader in STEM women graduates at 47.1%. Across the world India is now considered as a lead

sourcing destination;55% of the global services sourcing in 2019-20 was accounted to India.

India's Tech Industry

India's technology industry has seen big bang growth in FY2022, primarily because technology became the fulcrum which allowed businesses to not just keep the lights on, but also to accelerate their journey towards becoming future-ready, agile, and resilient.'According to Gartner estimates, IT spending in India is expected to increase to US$ 101.8 billion in 2022 from an estimated US$ 81.89 billion in 2021.Indian software product industry is expected to reach $ 100 billion by 2025. Indian companies are focusing to invest internationally to expand global footprint and enhance their global delivery centres. Another key area in this segment is Data labelling where India stood at US$250 Mn in 2020 and is expected to accelerate to US$ 7 Bn.

India has a significant advantage in its large demographic dividend, with a skilled workforce and a growing technology industry. The country has a tech talent demand-supply gap of 21.1%, making it a leading destination for global services sourcing. The country's tech industry is expected to grow significantly in the coming years, with IT spending expected to increase to $101.8bn in 2022 and the software product industry expected to reach $100bn by 2025. India is also seeing an increase in the adoption of Industry 4.0, with manufacturing companies investing $102bn in 2021 and an expected capex infusion of $100bn from major economies. This growth is expected to drive the country's economy and make it a global talent hub.

Technology is now all pervasive and is now incorporated into all areas of our lives making technology adoption as a survival element for economies. In India, Digital Skills have rapidly impacted transformation of core sectors such as Manufacturing and Healthcare.

Global Industry 4.0 Adoption Positively Disrupted by COVID-19 With Emerging Economies Picking Up Pace More Rapidly

- Industry 4.0 investments by manufacturing companies, at $102 Bn in 2021, comprise 20% of manufacturing tech spend.
- Capex infusion of nearly $100 Bn by USA, UK, China, Japan, and India will pave the way for accelerated adoption by 2025
- By 2025, digital technologies are estimated to comprise 40% of all manufacturing tech spend

Industry 4.0 has Evolved as a Set of Interconnected Technologies Spanning Entire Value Chains to Build for Smart Solutions

- Industry 4.0 is the "connectedness" of technologies from embedded to integrated to seamlessly coupled from shop floor to smart products
- Industry 4.0 has led to seamless integration of data and insights leading to new-age technology-led business metrics
- Successful Industry 4.0 deployments focus on top-down initiatives broken into smaller projects, rather than aggregating PoCs

NASSCOM Strategic Review 2022 highlighted historic achievements in FY2022 –

- >2X revenue growth from the pre-pandemic FY2019, reaching $227 Bn in total revenue.
- The industry added its latest $100 Bn in just 10 years, while the first $100 Bn took 30! Persistent focus on customer centricity, domain-specific solutioning, go-to-market agility, digital-first talent pool, and a laser sharp focus on creating future-ready solutions have paved the market-defining growth

Where We Are

To sustain its competitive advantage, India needs to continue to invest in its future and nurture the demographic dividend of India.

–A study by McKinsey estimated that by 2025, India could generate up to US$1 trillion in incremental GDP,

taking the country up to the fifth spot in the global GDP rankings.

Government of India has taken major steps in promoting IT and ITeS sector in India:

- · Allocation of Rs.88,567.57 crore ($ 11.58 billion) for IT and telecom sector
- · The STP Scheme, which is a 100% export-oriented scheme for the development and export of computer software, including export of professional services using communication links or physical media.
- · The demand for expertise in advanced technologies like AI, Data science, Robotics will be 20 times greater than the supply

Today India is in a phase of digital adoption:

- 2nd amongst the 17 emerging digital economies. Thanks to this digital adoption phase large scale digital transformation is possible – in a vast nation Aadhar &UPI are implemented and extensively used
- India is amongst the top 3 global economies in number of digital consumers
- The digital divide is narrowing fast

21st Century is witness to high unprecedented changes. From technological advancement to Political instability, the world today is a complex place – it's not easy to meet the challenges of the future in these ever changing and dynamic times. The call of the hour to meet all the demands of the Industry and economy and the best way is to have strategic and educational reforms – but with a totally calculated approach of what can make the Nation a Skill capital for the world.

The current reliability on capability of an Indian is highly promising and with larger companies across the world having their leaders from Indian Origin has placed Indian talent in an advantageous spot.

The Launch of NEP 2020 is a concrete step towards building vocational and industry ready talent pool in the country. Thorough emphasis on Vocational education, aligned to Multidisciplinary skill sets and an uptick for enhancing Entrepreneurial skills have all been identified as key game changers.

Continuous learning, Skill Credits and Experiential learning incorporated into policy has placed India ahead in the race.

The NEP also created special focus on Faculty Development and outcome-oriented learning

Digital India - Vibrant paths to achieve this aspiration are:

- Digital Foundation
- Digital Reach
- Digital Value

The Way Forward-

How do we make India a real Talent Hub & Skills Capital

- Demand driven approach to skill planning – data backed skill building for each sector in economy
- Retraining or reskilling the existing workforce with changing requirements of the industry to map to technology adoption -ensures workforce retainment
- Increase corporate collaborations in Tier-II & III universities to overhaul course curriculum by including introductory to medium-level complexity courses in tech domain
- Quality education totally oriented towards Skills and competencies
- Introduction of unique combinations with Emerging Technology combinations such as – B. Tech in AI, Cyber Security, IoT etc.
- Healthcare and Infrastructure support
- Public Private partnerships to build collaborative working model to spur innovation and investment
- Mobilize and motivate flow of domestic capital into digital businesses.
- Support digital innovation
- Develop workforce skills in design, Innovation and Entrepreneurship
- Identify various sectors poised for growth and create consultative approach to bring in digital transformation element
- Need to Reskill Core Tech Talent into Digital Talent roles and build a resilient workforce for the decade
- Industry feedback on existing curriculum and make relevant changes
- Modular programs enabling the student to learn more and get aligned to Industry demand
- Industry Academia collaboration – Industry engagement with students to enhance employability quotient and periodic interventions to improve their readiness to jobs.
- Project based learning – promoting innovative ideas
- Innovation leading way to Entrepreneurial skills
- Industry mentoring for the innovative ideas
- Creation of Skill Hubs depending on the demand of the industry
- Bring School dropouts into vocational education, empower women through literacy and providing them opportunities to nurture their local talent and convert the same into business avenues
- Apart from the technical skills – creativity, critical thinking and adaptability will be key to success in these changing times. As the world is changing at a faster pace, only those who can adapt and come up with creative thinking can succeed.
- Effective communication skills – with capability to express the vision for future through creative thinking will create a specific place for leaders of future.
- Integrated Industry Academia collaborative programs aimed at providing relevant Tech Skills to enhance current employability quotient of young graduates
- Build vocational education on par with International standards on Pedagogy, technology, and the infrastructure which will pave way for Indian workforce to create impactful presence in world work spectrum
- Government to invest in SEZ's Talent Skilling Programs and revised curriculums with feasibility to revisit the same periodically with changing Industry needs
- 2/3rd of India's population is in rural segment – policies to uplift the rural population economically by supporting skill enablement for local trades and create new opportunities for them

Conclusion:

In the current scenario, India is a leader in few

foundation elements but has the potential to grow in many aspects of reach and value proposition. A few states are ahead of the curve and are leading the forte in digitisation, while other states are consciously catching up on bridging the digital divide.

The Indian government has taken steps to promote online education in India, including the development of a National Repository of Open Educational Resources and the establishment of a National Assessment and Accreditation Council. The National Education Policy (NEP) 2020 has also emphasized vocational education and entrepreneurial skills. India has the potential to become a skill capital and global talent hub, but this will require strategic and educational reforms, corporate collaborations, and investment in digital infrastructure and human capital.

The greatest opportunity that India has is digital talent for the future world – economic growth through business is possible only where Business finds place for investments – The reason to invest is capability to perform which is not achievable if the right skills are missing.

Emerging Technology adoption in recent years has created a healthy digital talent pool and ecosystem – this will certainly place India as a Nation with capability to become the Talent capital for the world.

Think India – Think Digital is the Mantra.

India can become a talent hub and skills capital by adopting a demand-driven approach to skill building, focusing on retraining and reskilling the existing workforce to meet the changing requirements of the industry, increasing corporate collaborations in Tier-II and III universities to overhaul the course curriculum, and introducing unique combinations of emerging technologies in education. Other steps that can help India become a talent hub and skills capital include improving healthcare and infrastructure, promoting public-private partnerships, mobilizing and motivating domestic capital investment in digital businesses, supporting digital innovation, and developing workforce skills in design, innovation, and entrepreneurship. Additionally, engaging with industry to provide feedback on the existing curriculum, implementing modular programs, and promoting project-based learning and innovation can help prepare students for the workforce and enhance their employability.

Ms. Sridevi currently works with NASSCOM as Lead – FutureSkills Academia, she is a highly focused, result-oriented Talent Nurturer, Learning & Development Strategist and Education Management Professional with over 22+ years of professional journey in building Career orientation for Students in Academic segment.

Her ability lies in managing end-to-end learning and Development lifecycle to identify and translate student's learning needs into high impact customised learning solutions & curriculum building training teams to deliver quality education. She is experienced in setting up start-up ventures and spearheading Academic campus operations with zero defect service delivery.

Her expertise include Entrepreneurial & Transformational Leadership, Learning & Development, Program Management, Business Strategy, Business Development, P&L Management, Talent Management, Organizational Development, Strategic Partnership, Customer Service, Employee Relationship, Employee Engagement, Team Building, Training Delivery, Performance Management.

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India as the World's Startup Capital

Col. Anil Kumar Pokhriyal, Retd

CEO, Management & Entrepreneurship and Professional Skills Council (MEPSC)

Col. Pokhriyal has a diverse professional experience of more than three decades across two continents in the fields of Project Management, Operations Management including SCM, Business Development, Procurement. Sector, United Nations and Indian Army.

"The author discusses how the Indian economy is undergoing a transformation, with a focus on tapping into the entrepreneurial potential of its people. This shift has been fuelled by increased investment and government support for startups, which is helping to spur innovation and job growth across the country."

1) How India can become the world's start-up capital by the end of 2047

On 15 August 2015, as part of Prime Minister's Shri Narendra Modi's Independence Day speech from the Red Fort, a new vision for the Indian economy was announced. A vision that aimed to tap the entrepreneurial spirit and potential of the people of India. A vision that enabled the talent of India to dream of ideas, put them in action, and convert them into game changing ventures.

Building on the stated vision, in January 2016, India under the leadership of Prime Minister, officially embarked on the journey of being a Startup Nation. The world though witnessed a surge in startup activity with the explosion of Internet in the dot-com era, which encompassed creation of new innovative firms, trying to experiment with new business models, this wave of startup creation was largely concentrated in United States and Western Europe which already had the right mix of startup ecosystem.

The Indian startups currently are in an experimental phase at this moment and are yet to reach maturity in its overall reach, branding and execution. The risk-averse culture leads to lesser competition as compared to the developed startup economies. And this in turn provides startups with an extended run in their respective market segments. However, lesser competition may seriously impact innovation in the long run. A key aspect for the sharp rise in the number of startups is the escalating valuations, investments and also the Mergers and Acquisitions (M&A) scenario. M&A's provide investors and entrepreneurs an exit strategy which also augurs well for the overall growth of the startups ecosystem apart from inspiring future entrepreneurs. This information and sharing of knowledge, resources, experience and research is one of the key enablers for the startup growth in India.

Start-ups have seen increasing traction in India over the past few years. Fuelled by significant funding even from global investors, 107 Indian startups have turned Unicorn start-ups over the years till date. These unicorns have raised over $94 Bn in funding and have a combined valuation of $344 Bn thereby providing huge gains to their investors. Scaling up a business without the required capital is next to impossible and hence, these investors have catalysed the speedy growth of start-ups. A young consumer base is very encouraging for start-ups offering innovative products/solutions, as it increases the chances of early adoption of products/services.

The government has rightly recognized the value that start-ups can offer for the overall economic growth in terms of innovative solutions to real problems as well as job creation. Thus, numerous steps and increased impetus has been undertaken by the government in providing conducive atmosphere by rolling out Make in India, Digital India, Startup India – Standup India, Skill India, Atma Nirbhar Bharat, Mudra Yojna and numerous other loan schemes for MSME and Agri sector which is beneficial for the Start-ups to grow in India. The government has launched several programs/schemes,

hosted competitive events and amended and introduced several laws to build a strong start-up ecosystem. In addition, adoption of digital technologies is transforming India into a new-age digital economy which is also aiding increased growth of the startups in the country.

Key Trends to boost the Startups during the Amrit Kaal till 2047

Increased digital adoption

Consumer and business habits are changing rapidly with increasing penetration of 4G network in the interiors of the country now poised to be upgraded to 5G network, digital payment solutions, adoption of new age technologies e.g. IOT, AI, Block chain technologies spurring exponential growth of AgriTech, EdTech, FinTech and other startups in the country, fast internet connectivity and cheaper smartphones. COVID-19 has also accelerated digital adoption and now, even small offline retail merchants and street vendors are keen to have an online presence & footprints who are willing to accept digital payments thereby increasing transparency and formal banking penetration through online channels. With the new normal, technology-led start-ups are leveraging this digital wave.

Hiring Contractual Staff for Gig Economy

In a post-COVID-19 environment, companies and especially start-ups with stressed balance sheets have realised that hiring full-time workers lead to higher costs mainly during such uncertain times. This has led to increased hiring of gig workers or contractual staff, particularly by early-stage start-ups for short- term projects. As per a report published by ASSOCHAM in January 2020, the gig sector is estimated to reach US$ 455 billion by 2023.

AI and ML to continue gaining prominence

Artificial intelligence (AI) and machine learning (ML) are hot topics in the start-up and innovation world. Based on data science, AI/ML technologies find application in various fields such as medical, personal assistance and consumer electronics. Hyper-automation, Big Data analytics and cyber security are some of the key application areas of AI/ML. As per a Deloitte survey in 2020, 74% AI adopters say that AI will be implemented in all enterprise applications in the next three years. With investors showing a keen interest in AI/ML-based start-ups, their number is likely to only increase in the future.

Start-up wave is spreading to Tier 2 cities

Rising digitization has led to mushrooming of start-ups in tier 2 cities, which helps leverage the local talent pool and reduce cash burn. Even before the pandemic, as per the Economic Survey of 2018-19, a whopping 50% of the 16,500 start-ups (registered by March 2019) were based in tier 2 and 3 cities. Jaipur, Ahmedabad, Pune, Chandigarh and Indore are some tier 2 cities to witness spiralling start-up activities.

Government Initiatives and Schemes

Government schemes and grants for start-ups are one of the reasons for accelerated growth of these companies, paving the way for a new-age economy. Without government support and encouragement, it becomes difficult for start-ups with novel ideas to follow through on their initial work, resulting in a dearth of innovative products that are truly Made in India. Hence, the government has launched a host of schemes and initiatives to nurture start-ups and innovation.

India has seen a growth in startups over the past few years, with 107 Indian startups becoming "unicorns" by raising over $94bn in funding and having a combined valuation of $344bn. The government has introduced several programmes and initiatives to support startups, including Make in India, Digital India and Startup India, as well as adopting digital technologies to help businesses grow. Key trends that are set to boost startups in India include increased digital adoption, foreign investment and the growth of the gig economy. The Indian government also aims to create 100 million jobs in the startup sector by 2030.

India has made significant progress over a span of three-quarters of a century since its independence. From a primarily agrarian economy in which agriculture contributed up to 56% of the GDP, the world's largest democracy has transformed into a predominantly services sector economy. The services sector now

contributes to over 50% of the country's GDP, while the present share of agriculture stands at less than 20%. The nation has also strengthened its physical and social infrastructure over the last 75 years; that has resulted in life expectancy increasing to 69.4 years from 32.1years.

India has created a strong economic base and is poised to achieve the status of a developed country over the next 25 years. Our projections indicate that India@2047 can exceed a per capita income of USD 26,000 – almost 13 times the current level.

What kind of Strategic & Educational reforms and policies need to be introduced in the higher education sector to develop a Skillful and competitive workforce and promote a startup culture?

Education has been identified as an important determinant of economic growth. Higher levels of educational attainment lead to a more skilled and productive workforce, producing more efficiently a higher standard of goods and services, which in turn forms the basis for faster economic growth and rising living standards

India holds a unique position in the world for several reasons, and having one of the youngest populations is perhaps the most pivotal. With 62 per cent of the population in the working age group and 54 per cent below the age of 25, we have the advantage of leveraging the skill and ability of our youth to drive the nation forward through productive output and innovation.

The Government spend in the education sector in India has been under 3.5% of the GDP, compared to a global mean of about 4.5% of the GDP. The new National Education Policy (NEP) 2020 is an effort in this direction. The new education policy envisages at making India a global knowledge superpower and emphasizes on digital education and remote learning along with the question of equitable access to education given the digital gap in the country.

Higher education plays an extremely important role in promoting human as well as societal wellbeing and in developing India as envisioned in its Constitution - a democratic, just, socially conscious, cultured, and humane nation upholding liberty, equality, fraternity, and justice for all. Higher education significantly contributes towards sustainable livelihoods and economic development of the nation. The main thrust of this policy regarding higher education is to end the fragmentation of higher education by transforming higher education institutions into large multidisciplinary universities, colleges, and HEI

START-UPs IN INDIA

- There were 16,500 startups registered in India by March 2019
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- They have a combined valuation of $344 billion
- 50% on them were based in tier 2 and 3 cities
- They have raised over $94 billion in funding
- The sector is estimated to reach $455 billion by 2023

clusters/Knowledge Hubs, each of which will aim to have 3,000 or more students.

The New Education Policy will foster overall culture of empowerment and will provide autonomy to innovate. Many of the jobs that will be generated over the next two decades do not exist today; yet most of the workforce of those years is already in education and training. Even so, the need to upgrade skills applies not only to young people in schools, universities and training institutions, but also to the current generation of workers. Acquiring relevant skill sets aligned to futuristic goods and services such as servicing of robots, repair of augmented reality (AR)/Virtual reality (VR) devices, and manufacturing of chips would be useful going forward.

India has the advantage of having a young population, with 62% in the working age group and 54% below the age of 25. The government has implemented the National Education Policy (NEP) 2020 to make India a global knowledge superpower and to improve the education system. The policy focuses on digital education and remote learning, as well as increasing access to education. The NEP aims to transform higher education institutions into large multidisciplinary universities, colleges, and clusters/knowledge hubs. The Skill India initiative is aimed at transforming corporate practice by prioritizing skill-based hiring over qualification-based hiring. The policy also emphasizes innovation and technological change as drivers of economic growth.

It is expected that Skill India initiative shall transform corporate practice by turning to skill based hiring rather than qualification based hiring.

Innovation and technological change are powerful drivers of economic growth. Innovation and technology translate into investment in fixed capital and in workforce and entrepreneurial skills which in turn lead to higher productivity.

Most importantly, skills by themselves do not automatically lead to more and better jobs. Skills policies must be part of a broad set of policies that are conducive to high rates of growth and investment, including investment in basic education, health care and physical infrastructure, strong growth in good-quality employment, and respect for workers' rights.

Strategic and Educational reforms which may be adopted are :

- Adoption of AI/ML/Big Data/Blockchain: Businesses would be driven by the Technological changes and AI/ML/Big Data/Blockchain would be the enablers for Industry 4.0. There is a huge need to build the businesses and workforce around these enablers.

- Telecom Infrastructure: With the roll out of 5G spectrum in India, disruption around Businesses are bound. Huge number of Workforce may become redundant, but equal number of new and futuristic roles would emerge.

- e-Office and Virtual Assistant: With the advent of the pandemic, common change which has come across in all sectors is "Work from Home" or "Work from Anywhere", without physically in office. This actually has helped businesses to save cost as well as get workforce with expertise from across the globe. Promoting this concept may help businesses become more sustainable.

- Premium for Skill Education: The preference and premium for Skill Qualification has to be given right impetus for engagement in Contractual jobs or third party jobs. Aspirations of youths, specially in the Tier 2 and 3 cities maps to a Govt job. There is a high need where such jobs be Skill-based rather than Qualification based.

- Mobility of learners – Transfer of Credits: The NEP 2020 delineates on the Academic Bank of credit which is very progressive. It is important that Learners become the Centre-piece and they get the Credits accumulated/redeemed for Formal Education and vice-versa. A common Credit framework may help to build the reform.

foundation elements but has the potential to grow in many aspects of reach and value proposition. A few states are ahead of the curve and are leading the forte in digitisation, while other states are consciously catching up on bridging the digital divide.

The Indian government has taken steps to promote online education in India, including the development of a National Repository of Open Educational Resources and the establishment of a National Assessment and Accreditation Council. The National Education Policy (NEP) 2020 has also emphasized vocational education and entrepreneurial skills. India has the potential to become a skill capital and global talent hub, but this will require strategic and educational reforms, corporate collaborations, and investment in digital infrastructure and human capital.

The greatest opportunity that India has is digital talent for the future world – economic growth through business is possible only where Business finds place for investments – The reason to invest is capability to perform which is not achievable if the right skills are missing.

Emerging Technology adoption in recent years has created a healthy digital talent pool and ecosystem – this will certainly place India as a Nation with capability to become the Talent capital for the world.

Think India – Think Digital is the Mantra.

India can become a talent hub and skills capital by adopting a demand-driven approach to skill building, focusing on retraining and reskilling the existing workforce to meet the changing requirements of the industry, increasing corporate collaborations in Tier-II and III universities to overhaul the course curriculum, and introducing unique combinations of emerging technologies in education. Other steps that can help India become a talent hub and skills capital include improving healthcare and infrastructure, promoting public-private partnerships, mobilizing and motivating domestic capital investment in digital businesses, supporting digital innovation, and developing workforce skills in design, innovation, and entrepreneurship. Additionally, engaging with industry to provide feedback on the existing curriculum, implementing modular programs, and promoting project-based learning and innovation can help prepare students for the workforce and enhance their employability.

Ms. Sridevi currently works with NASSCOM as Lead – FutureSkills Academia, she is a highly focused, result-oriented Talent Nurturer, Learning & Development Strategist and Education Management Professional with over 22+ years of professional journey in building Career orientation for Students in Academic segment.

Her ability lies in managing end-to-end learning and Development lifecycle to identify and translate student's learning needs into high impact customised learning solutions & curriculum building training teams to deliver quality education. She is experienced in setting up start-up ventures and spearheading Academic campus operations with zero defect service delivery.

Her expertise include Entrepreneurial & Transformational Leadership, Learning & Development, Program Management, Business Strategy, Business Development, P&L Management, Talent Management, Organizational Development, Strategic Partnership, Customer Service, Employee Relationship, Employee Engagement, Team Building, Training Delivery, Performance Management.

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Steps to grow India's Aerospace Industry

Wg Cdr Rachit Bhatnagar

CEO, Aerospace and Aviation Sector Skill Council (AASSC)

Wg Cdr Rachit Bhatnagar is the CEO of Aerospace & Aviation Sector Skill Council (AASSC), which is an Awarding Body in his sector. He brings to table a blended insight of civil & military aviation technology to the skill development ecosystem.

"The aerospace & aviation industry in India is expected to grow significantly in the next few years. The government has set a target of increasing the number of civil airports across the country from 140 to 220 by year 2025. In order to meet this goal, skill development must be carried out in a structured and systematic manner. One of the best ways to do this is by introducing outreach programs to develop vocational skills, that target students not only at universities, but also in schools. Additionally, degree apprenticeship programs can be introduced to make students more employable after they have acquired hands-on shop floor skills at the industry premises."

I don't know why people are frightened by new ideas. It's the old ones that frighten me.' - John Cage, American Composer

The aerospace & aviation industry in India can be broadly categorised as Civil & Defence. The global recovery in civil air travel has been mirrored in India, and this is a sector that holds immense potential. By year 2024, the domestic civil aviation market in India is expected to grow to $30 billion, making it the third largest globally. According to the International Air Transport Association, India's domestic revenue passenger kilometres rose 32.3 percent year-on-year as of March 2022. The Indian Government has set a target of increasing the number of civil airports across the country from 140 to 220 by year 2025.

In the same breadth, India has the third largest armed forces in the world and plans to spend billions of dollars on Defence articles over the next several years. India's resolve to drastically reduce its reliance on imports and increase self-reliance, referred as "Atmanirbhar Bharat Abhiyaan" is perhaps the biggest strategic development related to the Defence sector, with the goal of achieving domestic manufacturing turnover of $25 billion in the next five years.

Skills and knowledge are one of the key drivers of economic growth and social development for any country. As India positions itself to achieve strong economic growth, availability of a highly skilled workforce that can help organizations maintain their competitive capabilities will be the pivot point. Considering the significance of skilled workforce and its impact on the stakeholders across the Aerospace and Defence ecosystem, skill development must be carried out in a structured and systematic manner. This is an area where the Government and Industry big players must step-in to meet the larger interest of all.

The government has set a target of increasing the number of civil airports across the country from 140 to 220 by 2025, and the domestic civil aviation market is expected to grow to $30 billion by 2024. In the defense sector, India plans to spend billions of dollars on defense articles over the next several years and has set a target of achieving domestic manufacturing turnover of $25 billion in the next five years. To support these goals, the government has launched the Skill India mission to train the Indian workforce and the Aerospace and Aviation Sector Skill Council to address the skill development needs of the industry.

Anticipating this requirement a few years ago, the

Government of India has already launched the Skill India mission. This is an industry-led and Government-supported initiative. It can be easily opined that "Make in India" initiative cannot succeed without "Skill India". These are two sides of the same coin and must go together.

There are central ministries and departments which are addressing the skill development needs of different target audience such as rural youth, semi urban & urban youth, underprivileged sections of the society, women etc.

Aerospace and Aviation Sector Skill Council (AASSC) is a body set-up under the Government led initiative of "Skill India" to train Indian workforce. This is one of the various Sector Skill Councils formed under National Skill Development Corporation.

Aviation is a long-term play. Skill development is an area which can't be planned for the short term. This must be done with a long-term vision and mission. AASSC is on its way to achieve this by working collaboratively with its accredited training partners. These training partners run skill programs based on industry centric curriculum. These are short term programs, mostly 3 to 4 months.

Aviation and Aerospace skills are in demand across diverse segments like airport operations, airline operations, aerospace maintenance & repair, aerospace manufacturing & design. These are highly regulated, process oriented and specialised in nature. These require significant lead times to build capacity, especially for high end skills.

It is certain that the growth of the aerospace & aviation industry will not happen without the availability of qualified talent. There must be an increased collaboration between all key stakeholders- academic institutions, training organisations, policymakers, and the industry itself to fast-pace the development of skills required by the industry.

Below are a few strategies which the education sector needs to adopt for delivering employable skills among their students:

Rapidly Rationalising Curriculum: Rapidly evolving technology is creating new job roles and rationalising the existing ones in a fast-paced development. The training methodologies must keep pace with these developments. Also, today's workforce are technology natives and not technology migrants, which means, they need to engage with, in a manner which they relate to – meaning greater use of technology in the delivery of training.

Aviation Industry

GOALS

- Domestic Civil Aviation market to grow to $30 billion by 2024
- Increasing civil airports from 140 to 220 by 2025
- Reduce imports and increase self-reliance for Defense articles
- Achieve domestic manufacturing of $25 billion for defense sector in next 5 years
- Enabling India as a Global Skills Hub

REQUIREMENTS

- Highly skilled workforce
- Collaboration between all key stakeholders, academic institutions, training organizations, policymakers and industry experts.
- Rapidly Rationalising Curriculum
- Outreach Programmes
- Degree Apprentice Programs
- Integration of automation, software and technologies
- Integrated knowledge transfer with research and community services

Outreach Programmes: There is a need to introduce outreach programs to develop vocational skills, that target students not only at universities, but also in schools, to promote the attraction of a career in aviation. What is needed is to develop a clear understanding about building a career and industry path for talent who are interested in the Aerospace/ Aviation industry sectors.

Degree Apprenticeship Programs: There is a larger need than ever to integrate apprenticeship programs with the degree programs to derive a win-win situation for students and industry. This will make students more employable after having acquired hands-on shop floor skills at the industry premises. On the other hands there are multitude of benefits for industry in terms of low wage and more energetic aspirational employees besides a ready pipeline of tried and tested future workforce.

We all (industry, government, and academia) as an aerospace ecosystem have much to do to ensure our future security and prosperity. Individually, we face often seemingly insurmountable challenges, but collectively we can succeed if we have the will and imagination to do so. The Aerospace Industry can benefit from the digitalization. With intelligent tools for product design and production planning and seamless communication between all systems. driving the digital transformation of the industry – the seamless integration of automation, software and cutting-edge technologies will take the industry to the next level of efficiency.[1]

One of the best things an aerospace company can do to improve their marketing effectiveness is to start an educational company blog. Social media is a marketing tactic that is getting increased adoption and usage by companies across all sectors. Social media is enabling aerospace companies to increase awareness amongst key audiences, including potential employees.

At the other spectrum, talking about nurturing the young talent to align and expose them with rapid-changing aerospace ecosystem, we need to devise a system where we have student learning-centred approach.

Culture change, as many have advocated, takes generations to accomplish; behaviour change can be accomplished more rapidly if one works with (to the degree possible) rather than against the existing culture and its reward systems as appropriately modified by invoking the simple principle of enlightened self-interest.

As our need increases for, we need more, aerospace professionals in our national future. Departments that offer such programs should learn to market their graduates as such, as an aid to assuring a continued supply for both our own industry needs and enabling India as a Global Skills Hub as well.

Further, not discounting the fact that research remains the lifeline of future roadmap of any nation, and we have much to do in this arena as well, to assure the future health of our industry. Effective mechanisms must be put in place to integrate knowledge transfer (teaching, etc.) with research and community service both vertically, between graduate and undergraduate programs and horizontally, across department, college, and discipline boundaries.[2]

The education sector in India needs to adopt strategies to deliver employable skills to students, such as quickly rationalizing curriculums to keep pace with rapidly evolving technology, introducing outreach programs to develop vocational skills, and implementing degree apprenticeship programs. The aerospace and aviation industry in India is expected to grow significantly, and there is a need for a skilled workforce to support this growth. Collaboration between industry, academia, and government is necessary to develop the necessary skills and support the growth of the industry.

In conclusion, a stronger ecosystem needs to be developed through involvement of all stakeholders of aerospace industry, especially in the wake of rising expectations from India to develop a futuristic oriented aerospace and defence industry. Let's all rise to the call of our Government on the call for self-reliance aka Atmanirbhar Bharat.

The aerospace and aviation industry in India is made up of both civil and defense sectors. The global recovery in civil air travel has been mirrored in India, and this sector holds immense potential. By 2024, the domestic civil

aviation market in India is expected to grow to $30 billion, making it the third largest globally. According to the International Air Transport Association, India's domestic revenue passenger kilometers rose 32.3 percent year-on-year as of March 2022. The Indian government has set a target of increasing the number of civil airports across the country from 140 to 220 by 2025.

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Skills and knowledge are key drivers of economic growth and social development for any country. As India aims for strong economic growth, the availability of a highly skilled workforce that can help organizations maintain their competitive capabilities will be crucial. Considering the importance of a skilled workforce and its impact on the stakeholders in the aerospace and defense ecosystem, skill development must be carried out in a structured and systematic manner. This is an area where the government and industry players must step in to meet the larger interests of all.

To address the skill development needs of different target audiences, such as rural youth, semi-urban and urban youth, underprivileged sections of society, and women, the government has launched the Skill India mission. This is an industry-led and government-supported initiative. It can be easily argued that the "Make in India" initiative cannot succeed without "Skill India." These are two sides of the same coin and must go together.

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Wg Cdr Rachit Bhatnagar is the CEO of Aerospace & Aviation Sector Skill Council (AASSC), which is an Awarding Body in this sector. He brings to table a blended insight of civil & military aviation technology to the skill development ecosystem. He is an accomplished Indian Air Force veteran of over two decades. He transitioned to corporate after a management program from MDI Gurgaon.

- He has spearheaded many technology intensive projects for military helicopter MRO, aircraft component manufacturing and aircraft accident investigations & recovery missions besides curating skill development programs for IAF engineers
- He is also a member of skill development committees of various industry bodies and is working to develop skilling frameworks for emerging drone & other industry 4.0 technology for the aspiring workforce in the country.

India as a Manufacturing Hub of the Semiconductor

Dr. Abhilasha Gaur
CEO, Electronics Sector Skills Council of India

Dr. Abhilasha Gaur is an accomplished professional with vast experience in the Skill Development ecosystem. She is a certified black belt in lean six sigma.

> *"The total electronics market in India is expected to be around $340 billion by 2021-2022, with domestic production making up only 35-40%. The Indian government has formulated a 76,000 crore scheme to boost the country's semiconductor and display manufacturing industry. However, for India to become a leading manufacturing hub for semiconductors, it will need to invest heavily in infrastructure and skilled labor, among other things."*

Total Electronics market in India is estimated to be around US$ 340 billion in the year 2021-22. Of this market, currently only 35%-40% is contributed to by domestic production while a bulk is catered to by imports. Indian domestic electronics manufacturing sector faces multiple disabilities which does not allow it a level playing field and makes it uncompetitive with respect to competing nations. These disabilities include insufficient infrastructure, issues with domestic supply chain and logistics, inadequate access to quality power/ energy, low manufacturing base for electronic components, high cost of finance, limited design & R&D focus as well as inadequate skillset.

To boost the electronics manufacturing in the country, the union government has formulated a comprehensive programme while approving a 76,000 crore scheme for the development of sustainable semiconductor and display ecosystem under Indian Semiconductor Mission (ISM) which is an independent Business Division within the Digital India Corporation. Led by global experts of the Semiconductor and display ecosystem the India Semiconductor Mission (ISM) aims to serve as a focal point for the comprehensive, coherent, efficient, and smooth deployment of the Program for Development of Semiconductor and Display Ecosystem in consultation with the Government ministries/departments/agencies, industry, and academia.

As per the Electronics Sector Skills Council of India Market Research Report, Semiconductor and components market size in India is estimated to be around US$ 82 billion in the year 2021-22. It has been growing, almost consistently, at a CAGR of around 15% since 2015. Growing at the same pace, it is likely to cross US$ 150 billion in the next 5 years. Indian semiconductor industry is dominated by the fabless (or design) phase of the value chain with almost negligible fabrication and OSAT/ATMP operations. So, the Indian semiconductor design market is dominated by embedded systems design with as much as 85-90% share of the revenue.

Now the question is how can India become manufacturing hub for semiconductors?

Presently all of the advanced semiconductor manufacturing capacity in nodes below 10 nanometers(nm) is mainly concentrated in just two countries South Korea (8%) and Taiwan (92%). Not a lot of countries have been able to create a manufacturing hub. For India to become a semiconductor hub will only be possible if the following criterions are met.

Availability of the Skilled Resources

Semicon Manufacturing requires highly skilled labor as the production of semiconductors as the fabrication process is complex, involves 500- 1200 complex steps and requires highly specialized inputs like commodity & specialty chemicals as well as many different types of processing and testing equipment and tools, across a number of stages.

Huge capital investment:

Manufacturing of semiconductor chips require huge investments. Also, since the designs of chip change quite rapidly, these companies always have to invest in acquiring newer technologies to produce the chips.

For instance, the market leader in the industry, TSMC has announced that it will invest $100 billion in its fabrication plants over the next three years. Availability of 10-100 class Clean Room Infrastructure: The production of semiconductor chips has to be done in clean areas as contaminated air particles could alter the properties of the materials that form the electronic circuits.

Chip manufacturing is a cash-hungry business, with a long break even cycle and due to that not a lot of players have survived the industry.

The government though is incentivizing players to establish the units by providing incentives, but a one time incentive may not be enough for them to compete against the giants. For the industry to flourish we need to have R&D capabilities, skilled manpower and of course investors with deep pockets, who can bear the long cycles and huge investments.

Indian Electronics Manufacturing Sector

Disabilities

- Insufficient Infrastructure
- Issues with domestic supply chain and logistics
- Inadequate access to quality power/energy
- Low manufacturing base for electronic components
- High cost of finance
- Limited design and R&D focus
- Inadequate skillset

Requirements

- Availability of skilled resources
- Huge Capital Investment
- Availability of 10/10 class clean room infrastructure
- Long gestation period for break-even
- Self-reliance in semi-conductor development
- Leadership in technology space
- Government support

Dr. Abhilasha Gaur is an accomplished professional with vast experience in the Skill Development ecosystem. She is a certified black belt in lean six sigma. She is a hardcore management practitioner with 19 years of experience in Business Development, Execution of Government Projects and Implementation of various initiatives in Skill development, Corporate and academics.

- After attaining her management degrees, she joined PERGO International as Business Consultant and later on joined Samridhi Finances as Branch Head.
- She switched over to Academics by joining Hyderabad School of Business Sciences as Academics Head and later joined Algol School of Management & Technology as Principal.
- She has worked as Vice President with Algol Group of Companies and started their skill development vertical pan India in 2011.
- In October 2021, she joined Electronics Sector Skills Council of India (ESSCI) as COO.

Skills for the Future

Dr Harivansh Chaturvedi
Professor and Director at BIMTECH, Greater Noida

Dr. Harivansh Chaturvedi is Professor and Director at Birla Institute of Management Technology (BIMTECH), Greater Noida, India and Alternate President of Education Promotion Society for India (EPSI).

"The author discusses the importance of developing attitudes and values through education, as well as the need for upskilling and skill development among the workforce in India. It also highlights some of the challenges faced by the current skill development model in India and suggests ways to improve it. Finally, the text describes how instructional systems can develop knowledge, skills, attitudes and values effectively to adapt to the rapidly changing industry landscape."

1. Knowledge, skills, attitudes, and values needed for today's students to thrive and shape for their bright future?

The importance of developing attitudes and values through education is increasingly discussed in international forums. Attitudes and values are basically the principles and beliefs that influence one's choices, judgments, behaviors, and actions on the path towards individual, societal and environmental well-being.

Values shape a young person's social and emotional competencies, such as self- and social awareness, relationship management, self-management, and responsible decision-making. Values also inform 21st-century competencies, such as civic literacy, global awareness, and cross-cultural skills, critical and inventive thinking skills, and communication, collaboration, and information skills. These competencies are needed to address globalisation, changing demographics, technological advances, and other trends. Together, they are intended to nurture a confident person, a self-directed learner, a concerned citizen and an active contributor

2.Importance of up-skilling for creating competent and trained manpower.

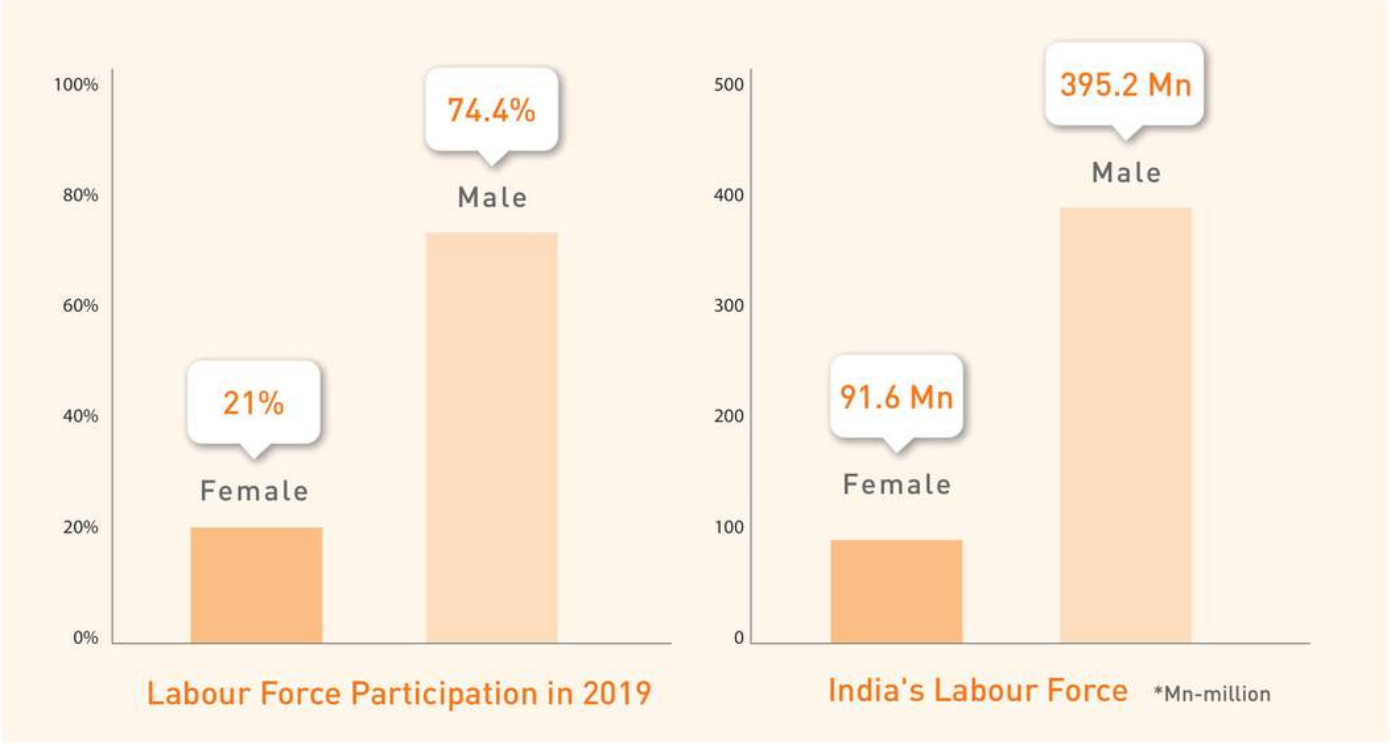
Equipping the workforce with the skills required for the jobs of today and those of tomorrow is a strategic concern in the national growth and development. Presently, the importance of upskilling the workforce has increased as compared to the earlier days. Therefore, new skills are highly imperative and are in demand as it is being introduced every year in almost every organization. Workforce upskilling helps companies to make sure that their employees are equipped with the proper skills and adapt to the changing environment. The cornerstones of a policy framework for developing a suitably skilled workforce are: broad availability of good-quality education as a foundation for future training; a close matching of skills supply to the needs of enterprises and labour markets; enabling workers and enterprises to adjust to changes in technology and markets; and anticipating and preparing for the skills needs of the future.

The present skill development model in India has several drawbacks, including inadequate collaboration with the private sector, lack of international mobility options, and low participation of women in the workforce. To address these challenges, the government has implemented interventions such as Recognition of Prior Learning (RPL) to address information asymmetry and encouraged private sector participation through the National Skill Development Corporation (NSDC).

Robust training policies and systems are grounded in the characteristics and institutions of each country.

Nevertheless, a number of common building blocks can be identified. A good skills development system will be able to: anticipate skill needs; engage employers and workers in decisions about training provision, including in specific sectors; maintain the quality and relevance of training; make training accessible to all sectors of society; ensure viable and equitable financing mechanisms; and continuously evaluate the economic and social outcomes of training.

In this ongoing digital world, everyone should have the knowledge to work in the digital era. Digital upskilling Programs' experiences make people learn how to consider, succeed, and work in the digital world. The trendy environment demands data fluency and in-depth knowledge of the existing technological advancements, which are the industry's foremost inventors.



3. The need and significance of skill development among the women workforce in India.

India is one of the fastest growing economies of the world and has the second largest labour force. Women constitute 49% of the total population. Skill development of women is decisive to the economic progress of the nation. The Indian Government launched "Atmanirbhar Bharat Abhiyan" to make India self-reliant and steer the country to growth. This ambitious mission cannot be achieved without bringing the women to the mainstream workforce. But India has been witnessing a declining Female Labour Force Participation (FLPR) based on various social, political and economic reasons. The Government has adopted various policy-based approach and capacity building through skill development programmes and Corporates are also partnering in the process through their CSR Projects, Apprenticeship & other similar programmes for women.

As per the data of International Labour Organisation (ILO), published by World Bank, the Female Labour Force Participation Rate (% of female population age 15 +) in India is about 21 percent in 2019 against the Male Labour Force Participation Rate of 74.4 percent. To attain the self-reliant tag in a true sense, women need to be empowered economically and integrated with the developmental goals of the nation. The social stereotypes need to be removed and the women needs to be supported & encouraged to partner in the progress of the country and achieve self-reliance.

To increase the Female Labour Workforce Participation rate in India, the Government of India has adopted various policy-based approaches starting from educational scholarships, reservations/quotas, self-employment through self-help groups to capacity

building through skill development training programmes. The Ministries of Women & Child Development (WCD) and Ministry of Skill Development & Entrepreneurship (MSDE) are partnering to enable, skill and empower the women and youth of India. Women Training under MSDE takes care of providing skill training to women and aims at stimulating employment opportunities among women of various socio-economic levels and different age groups. Lives of over 35.36 lakh women have been transformed and their livelihood secured through Skill Development Training under following initiatives of the Skill India mission launched by MSDE. Women constitutes half of India's workforce. The potential of the unutilized Female Labour Work Force can be tapped through skill development of the women which can improve the Gross domestic product (GDP) of India and help in the success of Atmanirbhar Bharat Abhiyan.

4. Drawbacks of the present skill development model in India and changes required.

According to National Skill Development Corporation (NSDC) there have been three major challenges to skills development in India: expanding public sector collaboration with industry and the private sector, creating pathways for international mobility and addressing women's low participation in the labour force.

The aerospace and aviation industry in India is expected to grow significantly in the coming years and there is a need for a skilled workforce to support this growth. The government has launched the Skill India mission to train Indian workers and address the industry's needs. The Aerospace and Aviation Sector Skill Council (AASSC) is working with accredited training partners to provide industry-specific training programs. There is need for collaboration between academia, training organizations, industry, and policymakers to fast-track skill development in the sector.

Creating avenues for private sector engagement has been a crucial strategic pillar for India. Skill development faces several forms of market failures, including information asymmetries – a skilled person knows his or her skills, but a potential employer does not; if employers had all the information, their willingness to pay for a skilled person would rise. Recognition of Prior Learning (RPL) is an example of an intervention to address information asymmetry.

The Not-for-Profit National Skill Development Corporation (NSDC) was set up as a public-private partnership (PPP) to stimulate private sector participation in the Indian skill development sector. A core role of the NSDC is, therefore, to provide long-term development finance to organizations to build for-profit vocational training initiatives.

In this direction, technical collaborations should be undertaken with countries such as the UK, Australia, and the UAE for benchmarking and mutual recognition of standards. Government-to-government and B2B partnerships should also be developed for new markets such as those in Western Europe, Canada, Australia, and East Asia to increase the mobility of blue and white-collar Indian workers. NSDC analysis of labour force survey data suggests that of the country's labour force of 395.2 million, only 91.6 million are women. Skilling initiatives – complemented by a wider push towards empowerment through gender sensitization, creation of economic opportunities, and economic and social support – can be used to raise this number. Providing residential facilities for women trainees, embedding mentoring and coaching in skills programmes and providing social support through mechanisms such as local workshops have all been explored

5. How can instructional systems develop these knowledge, skills, attitudes and values effectively to adapt to the rapidly changing industry landscape?

Value-based education is the much debated and discussed subject in the plethora of education in India. Attitudes and values appear not just in international documents but in curriculum frameworks around the world. Countries acknowledge that curriculum content is underpinned by a set of explicit or implicit values.

Many countries note that education is never value-free. Even if a formal, intended curriculum may not articulate explicitly the teaching of attitudes and values, attitudes and values may still inform and govern the experiences in schools, including how expectations about desirable behaviour are communicated; how conflict and consensus-making between and amongst young people and adults in schools are managed; how student voice and choice matter or do not matter in schools; and how young people experience and act in their school cultures and learning environments.

Parents, communities, and the government have always expected schools to develop students who would contribute to the society in which they live. Effective teaching practices in imparting Value based education have ranges from storytelling, exhibitions, skits, one-act play and group discussions to various other formats. Value acquisition goes on constantly in the school through various activities like instruction, relationship between pupils, co-curricular activities etc. So, Education has a major role in inculcating basic values of humanism, socialism and national integration among the children and it presents a challenging task before the teachers.

Dr. Harivansh Chaturvedi is Professor and Director at Birla Institute of Management Technology (BIMTECH), Greater Noida, India and Alternate President of Education Promotion Society for India (EPSI). He has more than 45 years of experience in teaching, research and academic administration.

Academic Experience

- Director, Birla Institute of Management Technology, Greater Noida, 1999-till date
- Director, All India Council for Technical Education (MHRD), 1998-1999
- Deputy Director, All India Council for Technical Education (MHRD), 1995-1998
- Reader, RBS College, Agra University , Agra, 1977-1995
- Lecturer, Sahu Jain College, Bijnore, 1976

Academic Positions and Assignments

- Special Invitee Member, Board of Governor, United Nations Global Compact Network India, New Delhi
- Member, Advisory Board, Asia Pacific Centre for CSR Sustainability, UNGCNI, New Delhi
- Member, Board of Governor, Birla Global University, Bhubaneswar
- Member, Board of Management, Birla Global University, Bhubaneswar
- Member, Board of Governors, Indian Institute of Tourism & Travel Management (IITTM), Gwalior (under the Ministry of Tourism, Government of India)
- Member, Board of Governors, National HRD Network
- Initiated Vision building for the Birla Institute of Management Technology in 2001, 2006 and 2011.
- Set up two state-of-the-art residential campuses of BIMTECH at Greater Noida (2004) and Bhubaneswar (2013).
- Trustee and Alternate President of the Education Promotion Society for India (EPSI), a national network of private sector education institutions established in 2005 with a vision similar to NASSCOM.
- Founder President, Alumni Association of Agra University (AAAU), a global alumni network of the erstwhile Agra University (currently known as Dr. B. R. Ambedkar University, Agra).

Engineering of the New Age- Integrative Engineering

P.B Sharma
Vice Chancellor Amity University, Gurugram

Prof. P. B. Sharma is an academician and Vice Chancellor of Amity University, Gurgaon and ex-Vice Chancellor of Delhi Technological University (DTU).

"The author discusses the importance of integrative engineering in today's world. It argues that while computer science and IT are important, they should not be the only focus of engineering and technology education. Core disciplines like mechanical, electrical, civil, and electronics engineering need to be revitalized in order to keep up with advances in technology. The author concludes by calling for a redesign of engineering curriculum to better reflect the interdisciplinary and integrative nature of engineering."

With the mind-boggling advancements in science and ever-increasing interest in technology innovations coupled with accelerated growth of applications of AI and Machine Learning technologies, the natural tendency to opt for Computer Science, Software Engineering, and Information Technology as engineering disciplines of study in colleges of engineering and technology is quite visible. Naturally so, as much of the job opportunities are in IT and IT related companies and enterprises. What, however, is not being appreciated is the fact that engineering today is the 'engineering of a new age' that demands an interdisciplinary and integrative approach for studies, research, and innovative product development. What more, the new age that has descended as we entered the 3rd decade of the 21st century, also requires a sustained focus on making phenomenal progress in all aspects of engineering, including the core of mechanical, electrical, chemical, biomedical, biotechnology and civil engineering.

It is here the new generation of students who are excited about engineering and technology in substantial numbers in our country, need to understand that a laptop, a mobile or a IoT based automated and intelligent device is not just computer science but in true sense, a perfect example of what can be legitimately called 'integrative engineering.' Likewise, microchip, a car and an airplane are not just electronics, mechanical or aero engineering, rather they are also today the signing examples of what can be achieved by integrating advancements in material science, engineering design, microengineering, electronics, sensors, embedded microchips, microcontrollers and micro systems besides advances in avionics and aerodynamics. Even on the shop floor of a modern microchip, automobile or computer manufacturing company, we are able to witness a whole lot of engineering in action including the most modern and intelligent robots, horizontally and vertically networked production systems supported by efficient supply chain management which are in themselves are perfect examples of integrative engineering.

Historical Perspective

Looking back at the advent of modern engineering education in the early days in the 19th century, one cannot fail to note that engineering and technology education in India also began with interdisciplinary and integrative focus. The Thomson College of Engineering at Roorkee, Bengal Engineering College at Sibpur, College of Engineering at Pune and Guindy College of Engineering at Madras, all offered courses at bachelor's level that were combination of electrical, mechanical, and civil engineering. In fact, the Degrees offered also carried forward the nomenclatures like civil and mechanical, electrical, and mechanical engineering to retain focus on trans-disciplinary studies of engineering and technology. This kind of twining of disciplines continued for a long time and it produced engineers like Bharat Ratna Sir Mokshagundam Visvesvaraya, Bharat Ratna Dr APJ Abdul Kalam, Er Amarnath Khosla, Er KL

Rao and lately Er E Sridharan, who all had a great love for interdisciplinary engineering and its trans-disciplinary applications.

However, as engineering and technology education grew to great eminence in post-independence era in India and also abroad, the engineering disciplines began growing tall and with larger domain base that gave rise to compartmentalization of engineering with a specialized focus. Even though much of the automation came to engineering and technology with the advancement of electronics, computer science and IT, the studies of core engineering disciplines continued with a major focus on their domain knowledge with little attention to the interdisciplinary aspects of engineering. The compartmentalized approach to education of engineering perhaps has done great damage to the quality as well as the acumen of engineering graduates and that has also affected their employability. The world of engineering profession requires engineers with their domain knowledge to work in an interdisciplinary team for integrative product development and technology innovations, so important today to march ahead of time in engineering and technology sectors of human endeavors.

Perfect Balance between Core and Specialized Modern Engineering is Needed

Now that we have entered the new age of integrative engineering and that no matter what engineering we pursue, the integration of new age technologies and their all-pervasive impact cannot be put aside on the back burners, it would be absolutely essential that our engineering and technology programs are redesigned to nurture the vital integrative and interdisciplinary focus. While one may go deep into any area of the specialized knowledge by carefully selecting courses of study, much of the interdisciplinary and integrative focus can be nurtured by what we call learning by doing through minor and major projects that invoke conceptual clarity, critical design thinking, innovative and creative abilities and above all an integrative focus.

Engineering today and surely that of tomorrow is being greatly impacted by the advancements we make in applied sciences and the ingenuity with which we foster technology innovations for tomorrow's world of sustainability and engineering that shall make impossible possible. With the kind of strides being taken to venture in space with most advanced aerospace systems, advanced geo-space technologies and use of aerospace for tomorrow's solar powered systems that will have the capabilities to generate more than what the world would require for its electricity consumption and that too with the ease of Wireless Transmission of Electricity from Space to planet Earth, is a mind boggling proposition. Likewise, steam at room temperature, s thermoelectric materials having capabilities of directly converting heat into electricity without going through the root of steam power are providing a new hope to mankind for combating mega challenges of climate change as well as sustainable and inclusive development that shall foster a new age of sustainable prosperity. A major boost to solar cell efficiency from around 18%, as of today to 98% in the not-so-distant future is no longer wishful thinking anymore. It is achievable given the advancements in design innovations and new material development. Considering all these and the all-pervasive nature of engineering and technology, humankind is on the threshold of a new era of integrative engineering.

Redesign of Engineering Curriculum is a Must

We need to align our engineering and technology education in a manner that it does not force us into the kind of holocaust that shall happen if the conventional disciplines are given a go by for the glaring attraction for career prospects in IT and computer science related jobs and enterprises. The recent massive wave of layoffs by the IT giants is a blessing in disguise to alert the inspired and intelligent minds of the students who mindlessly opt for studies in computer science and IT disciplines showing little or no respect for core disciplines like mechanical, electrical, electronics, civil, chemical and textile technology besides material science and technology. These core disciplines have received the least attention of the seekers of studies in engineering and technology disciplines over the last 2 decades or more.

At the same time there is a dire need to revitalize the core disciplines like mechanical, electrical, civil, electronics and textile technology to integrate the latest advancements in micro and nano engineering and micro-

mechanisms and micro and nano machines and devices as well as robotics and automation of the kind that the world requires today for industry 4.0 and Industry 9,0 of tomorrow that shall serve the cause of zero-emission technologies, business at speed of thought and sustainability on the strength of new and innovated science and technologies for the circular economy.

It is here that the advocates of the core disciplines of engineering should recognize that like computer science and IT, a lot of water has flown along the engineering river giving rise to micro, nano and smart engineering as off shoots of the core disciplines and thus there is a dire need to phenomenal reboot of the core disciplines of tomorrow that will integrate the advances that have taken place in the areas akin to core engineering of today and the engineering of tomorrow. The planners and policy makers of engineering and technology education have also to recognize the importance of the science base of modern engineering and the interdisciplinary and integrative nature of engineering and technology that is currently shaping the landscape of a whole lot of horizons of engineering and technology applications around the world.

Let me finish by concluding that engineering has been and shall continue to be highly interdisciplinary and integrative in its nature and as such in the new age of knowledge and innovation it is the integrative engineering that shall provide the propulsive thrust to lead both the education and research in engineering and technology. The universities and institutions of higher learning should embrace this great opportunity and create the desired vibrancy in engineering and technology education by revitalizing and reinventing the vital role of core engineering disciplines in accelerating the march on the path of smart and intelligent integrative engineering that shall serve the cause of sustainability engineering of tomorrow for smart and sustainable mobility engineering, Aerospace, Smart and intelligent Computers and networked Devices, Smart and Intelligent Infrastructure. Green Envirotech, Sustainable Agriculture, Bio-Medical Engineering and Life-Technologies that shall thrive on the strength of Body-tech, Mind-tech and Soul-tech amply supported by healthy Food-tech and to create an environment of living and serving in harmony with nature, as the next tech is Lifetech.

Prof. P. B. Sharma is an academician and Vice Chancellor of Amity University, Gurgaon and ex-Vice Chancellor of Delhi Technological University (DTU).

- Currently he is heading the Association of Indian Universities as the President.
- He is also the founding Vice Chancellor of Rajiv Gandhi Technical University, Bhopal, Madhya Pradesh.
- Prof. Sharma is a former Professor of IIT Delhi, Former President of Engineering Science Division of Indian Science Congress
- Former Chairman of Indian Society of Mechanical Engineers
- Vice-Chairman of World Confederation of Productivity Sciences, India Section.
- A Doctorate from University of Birmingham(1978), Prof. Sharma during his professional career spanning over 50 years has made distinguished contributions to the advancement of frontiers of knowledge in the areas of Aero Engineering Technology, Power Plant Engineering, New and Renewable Energy Resources and Knowledge and Innovation Management.
- Prof. P.B. Sharma provided industrial consultancy to organizations including Rolls-Royce of the UK and the Gas Turbine Research Establishment in Bangalore.

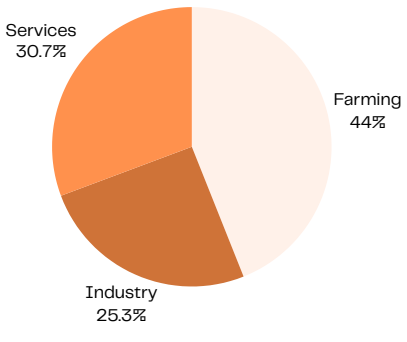
Reskilling and Upskilling; A Lifelong Learning Paradigm for India's Future Workforce

Dr. Maneesh Mishra
Executive Vice President, Strategy, NSDC

Author delves into the necessity of rethinking skill development in a world that's rapidly evolving. These changes significantly impact the labour market, and require a reassessment of skill development strategies to align with global job market demands. The paper advocates for an urgent need to upskill and reskill to meet the demands of a changing world.

India is a unique country, with diverse industries, demographics, and economic aspirations. This adds a layer of complexity to the challenges posed by rapid advancements in artificial intelligence, data analytics, and automation. This revolution is reshaping job roles and skill requirements, particularly impacting blue-collar workers who now need higher-order cognitive skills like critical thinking, creativity, problem-solving, and emotional intelligence. To compete in the global market of innovation and development, the Indian workforce must adapt through upskilling and reskilling. There must be a lifelong effort to upskilling and reskilling.

Indian Workforce - In Numbers



Source: Statista

The Rise of a New Workforce

According to the World Economic Forum's Future of Jobs Report 2023, nearly 50% of all employees will require reskilling by 2025 due to the integration of new technologies. Ethnic groups, people with disabilities, women, and marginalized groups are entering the workforce, increasing the demand for cognitive skill sets. The challenges posed by technological advancements demand for new skill sets. The Indian workforce must adapt and develop these skills.

Driving Forces for Change

- Technological Upgrade & EdTech Growth
- Sustainability Initiatives
- Economic Shifts Due to Globalisation

The Machine-Smart Worker

Over the past decades, there has been a paradigm shift in the composition of the workforce across the globe. Among other things, this shift has been characterised by the emergence of jobs that require high-level cognitive and socio-emotional skills, as well as those that necessitate the performance of non-standardised activities over routine, repetitive tasks. Tech-enabled disruption, machine learning and Artificial Intelligence (AI) have placed a new premium on the human skills that machines cannot master.

Skills in Hot Demand

Going forward, skills will drive the job market. The rise of automation and artificial intelligence is transforming industries, leading to a demand for skills related to these technologies. Jobs that involve uniquely human skills like creativity, critical thinking, and emotional intelligence are becoming increasingly valuable. The skills in hot demand will be:

Cognitive and Meta-cognitive Skills

- Critical thinking
- Problem-solving
- Learning-to-learn
- Self-regulation

Social and Emotional Skills

- Empathy
- Self-efficacy
- Responsibility
- Collaboration

Practical and Physical Skills

- Information utilization
- ICT proficiency
- Adaptability

The future of the job market is poised for significant transformation, driven by technological advancements, sustainability imperatives, socio-demographic shifts, and the globalisation of business. This white paper explores the key factors shaping the labor force market and the demand for job roles in the coming years.

Technological Progress and Opportunities

Advancements in artificial intelligence (AI), blockchain, robotics, automation, virtual reality (VR), augmented reality (AR), big data, and data analysis are creating a landscape ripe for innovation. The burgeoning field of EdTech, exemplified by the growth of companies like Growth School, is expanding rapidly, facilitated by the rollout of connectivity infrastructure such as BharatNet and 5G. This connectivity will enable "on-demand" learning, revolutionising education and skills acquisition. The focus lies on addressing sectoral demands while catering to the diverse needs of youth, social groups, and ethnicities. The approach emphasises creating an end-to-end implementation framework to provide quality short and long-term Skill Development (SD), leading to productive employment and career progression.

Indian Youth: The Envy of the World

India boasts one of the youngest populations globally, with a significant portion under the age of 35. This "youth bulge" means that there are more young people in the workforce, which comes with several advantages for the Indian economy. This numerical strength, combined with a growing focus on education and skill development, positions India as a potential powerhouse for innovation and productivity.

62% Indian population in working age.

54% Below the age of 25.

12m New workers join the workforce.

1/3rd Global workforce is in India

711m Working age labour in India

Evolving & Adapting, One Skill At A Time

Rethinking approaches to facilitating lifelong learning for populations is a critical part of realising the provision of these skills. This is because "front-loading" skills through initial training with a single lifetime qualification may no longer be sufficient in the context of the rapidly evolving skill needs of the workplaces of the future. Education and training systems of the future will thus need to be flexible and adaptive to equip individuals with the capabilities to learn continuously over their lives. To get started, we'll need to focus on the foundational skills that will prepare the youth to successfully face emergent (social, environmental, and technological) changes in the labour market. The next step will be to develop a learning temperament over the life cycle of the students.

The Government Initiatives

India is on its way to establish dominance in the field of reskilling and upskilling. The ongoing efforts to enhance skilling, re-skilling, and upskilling youth and workforce are in full bloom. The initiatives Ministry of Skill Development and Entrepreneurship (MSDE) and National Skill Development Corporation (NSDC) have been focusing on the sectoral demands as well as the requirements of the youth, diverse social groups, and ethnicity by the convergence of skill training initiatives combined with scale and quality of skilling efforts across India.

The approach to creating an end-to-end implementation framework that provides opportunities for quality short and long-term Skill Development (SD), leading to productive employment and career progression that meets the aspirations of trainees has always been at the forefront. To get started, we'll need to focus on the foundational skills that will prepare for changes in the labour market.

Ongoing Skilling Initiatives in India

India's robust skilling initiatives, spearheaded by MSDE and NSDC, epitomize a commitment to holistic workforce development. The Skill India Mission, pivotal since 2015, focuses on futuristic skills, training over 6.15 crore candidates in cutting-edge technologies. PMKVY empowers the youth with flexible training modules, certifying over 1.37 crore individuals. NAPS, fostering apprenticeships since 2016, has engaged 22.74 lakh apprentices, accentuating digital efficiency. VSE bridges educational and vocational realms in collaboration with the Ministry of Education, benefiting over 12,300 schools. Global collaborations amplify India's skills diplomacy, with G2G MoUs and B2B agreements, addressing the increasing global demand for skilled Indian professionals. Inclusion of skilling in migration agreements underlines India's strategic approach to mobility.

Transformative Skilling Initiatives in India

In addressing the need for better coordination and efficiency in skill development, India has taken significant steps to converge efforts. Ten central ministries/departments and six state governments have unified their schemes on the Skill India Portal, offering 1,166 courses aligned with the National Skills Qualification Framework. Twelve ministries ensure adherence to Common Cost Norms, streamlining the skilling process.

Internationally, the Ministry of Skill Development and Entrepreneurship (MSDE) has signed 11 Government to Government MoUs with countries like Australia and Japan. While three MoUs have expired, MSDE actively engages in technical collaborations through bilateral agreements, aiming for globally recognised quality skills.

Plans in Action

Skill India Mission	• Focus: Developing the workforce of the future. • Courses: Drone, IoT, Robotics, Electric Vehicle (EV), AI & ML, 5G technologies, etc. • Implementation: 20 Central Ministries and all State Governments • Achievements: Over 6.15 crore candidates trained during 2015-2022
Pradhan Mantri Kaushal Vikas Yojana (PMKVY)	• Launched in 2015 • Trains and certifies large numbers of youths • Training ranges from 30 to 600 hours • Over 1.37 crore youth trained to date
Convergence of Skilling Efforts	• Onboarding of schemes from 10 central ministries/departments and 6 state governments on the Skill India Portal • 12 Ministries implementing 1,166 NSQF-aligned courses
National Apprenticeship Promotion Scheme (NAPS)	• Launched in August 2016 • Engaged 22,74,412 apprentices, including 4,04,761 women • 1,67,255 registered establishments • Special emphasis on outreach, capacity building, and digitalisation
Skilling Infrastructure & Platforms	• Launched in August 2016 • MSDE's network includes ~15,000 ITIs, 33 NSTIs, 700+ PMKKs, 304 JSSs, etc. • Skill India Digital platform enables online skill training, trusted credentials, payment, and job discovery. • 1,67,255 registered establishments • Special emphasis on outreach, capacity building, and digitalisation
Vocalisation of School Education	• Collaboration between MoE and MSDE • Aims to provide vocational opportunities from class VI to XII • Over 12,300 schools offering 125 NSQF-aligned courses
National Credit Framework (NCrF)	• Released in 2022 • Integrates academic education and skills • Unified credit accumulation and transfer framework applicable to school, higher, and vocational education • Inclusion of skilling agenda in migration and mobility bilateral agreements.
Global Collaborations	• 11 Government to Government MoUs with countries like Australia, Denmark, Japan, etc. • NSDCI has signed 23 B2B MoUs with 11 countries, deploying 23,098 candidates overseas.

The Goals With Reskilling & Upskilling

The vision behind the re-engineering India and the initiatives of skilling, upskilling, and reskilling policy is to position India as an international hub for skill development, fostering talents with dynamic capabilities competitive both locally and globally. This transformative approach necessitates strategic planning by the Ministry of Skill Development and Entrepreneurship (MSDE), aligning short-term and long-term priorities.

- Youth Empowerment: Prioritising equipping youth with high-end skills, aligned with domestic needs, especially in the primary sector.
- Global Competitiveness: Balancing demand and supply domestically and globally, ensuring a harmonised approach to skill development.
- NEP 2020 Integration: Aligning with the National Education Policy (NEP) 2020's objective of exposing 50% of learners to vocational education by 2025.

Strategic Approaches To Reskilling

Any real progress in this front will be the results of collective efforts. The public (herein Government), private sectors (industries), and academia must join forces to create flexible and affordable reskilling pathways for the fresh, and experienced workers.

This initiative, led by the Ministry of Skill Development and Entrepreneurship (MSDE), emphasizes a strategic roadmap to address short-term and long-term priorities.

Integrated Planning

Embedding skills development into national strategies and industrial policies, fostering holistic planning across investment, trade, environment, fiscal, and employment domains.

Collaborative Effort

Forging partnerships among the government, private sector, & academia to create flexible and affordable reskilling pathways with industry clusters and migration corridors.

Conclusion

The proposed "re-engineered skilling, upskilling, and reskilling policy" envisions positioning India as an international hub for skill development, cultivating talents with dynamic capabilities for global competitiveness.

Prioritizing youth empowerment, the policy aims to equip them with high-end skills, balancing domestic needs, and aligning with the National Education Policy (NEP) 2020's goal of exposing 50% of learners to vocational education by 2025.

The envisioned collaboration between the government, private sectors, and academia aims to create adaptable and affordable reskilling pathways, ensuring a smooth transition for the workforce into future-oriented jobs. The model addresses the diverse needs of various sectors, covering reskilling in transitioning industries, upskilling in technology-driven sectors, and foundational digital and financial upskilling for specific workforce segments.

Forward-looking approaches to skills needs should be at the heart of strategic policy mechanisms, with skills development planning integrated into national strategies and industrial policies, such as investment, trade, environmental, fiscal, and employment.

RECAP

- Lifelong learning is crucial as the global job market undergoes dynamic shifts, necessitating continuous upskilling and reskilling efforts to stay competitive.
- The rise of technology demands higher-order cognitive skills such as critical thinking, creativity, problem-solving, and emotional intelligence alongside technical competencies.
- Global technological adoption, innovation, and evolving business requirements drive the need for reskilling. Around 50% of employees are projected to need reskilling by 2025.
- Various schemes like Skill India Mission, PMKVY, NAPS, VSE, NCrF, and international collaborations aim to develop India's workforce through diverse skill training, apprenticeships, and vocational education initiatives, fostering a competitive and adaptable labor force.

Dr. Maneesh Mishra is the Executive Vice President of Strategy at NSDC (National Skill Development Corporation). He spearheads the organisation's strategic vision, and also serves as a key figure in World Skills India, where he serves as India's technical delegate at the World Skills competition.

Dr. Mishra advises the Ministry of Labour and Employment on the G20 labour track and has led NSDC's National Apprenticeship Promotion Scheme. Actively involved in various sectors, he sits on the governing councils of Sector Skill Councils, including Green Energy, Automotive, Power, Rubber, and Petrochemicals, as well as Hydrocarbon.

A member of the UGC committee on nomenclature, he has played a crucial role in developing the capacity-building ecosystem for UIDAI, which is a monumental identity project.

Dr. Mishra also imparts knowledge as a visiting faculty at prestigious institutions like the Indian Institutes of Management (IIMs). As a respected speaker, he contributes to forums and holds senior membership at the Global Institute of Food, Health, and Nutrition, University of Cambridge.

With visionary leadership, he shapes India's skill development landscape and academic discourse, and has an impactful legacy in strategic planning.

The Intersection of Artificial Intelligence & Health Care

Dr. Indrajit Bhattacharya
Former Director, NABET

The author delves into the world of the Metaverse and its potential impact on education in India. Viewing it as a transformative force, technology, with the intersection of augmented reality, virtual reality, and Extended Reality has the power to change the way we educate the youth.

The Metaverse is a virtual shared space that integrates augmented reality (AR), virtual reality (VR), and Extended Reality (XR) technologies. It is often hailed as the "Internet of the future" for its potential to revolutionise online communication, collaboration, learning, and work by creating an immersive experience. In India, where quality physical institutions and faculty are a growing challenge to meet the needs of a growing population, the Metaverse has the power to enable students to learn through enhanced interaction and immersive learning experiences, and can offer hands-on learning even beyond the classrooms. With India's rapid digitisation, we are on pace to make this a possibility.

Metaverse in Education

Metaverse offers to the education sector in India. From creating immersive environments simulating real-world scenarios to accelerating learning speeds, as evidenced by PwC's research indicating fourfold faster learning in VR-enabled courses, Metaverse's potential to foster inclusivity and address accessibility challenges. Metaverse's role in providing affordable educational resources, promoting active learning through gamification, and offering life-like experiences that breathe vitality into subjects. The field holds the attention of burgeoning interest of Indian startups, exemplified by ViewSonic's Universe metaverse platform, which pioneers an immersive 3D virtual campus for educators and learners. Metaverse's unique ability to bridge gaps can be listed as:

Enhanced Real-world Skills

The Metaverse can help digital universities, institutes, and libraries provide near-real-life experiences to students.

Enhanced Student Performance

The most significant advantage of the Metaverse, in education and learning, is its ability to provide the necessary subject matter in an enhanced and incorporated manner.

Immersive Learning Experiences

The Metaverse can create an immersive environment that help students gain practical skills in a safe environment.

Inclusive Learning Environment

The Metaverse offers a promising availability and accessibility of education to people with disabilities.

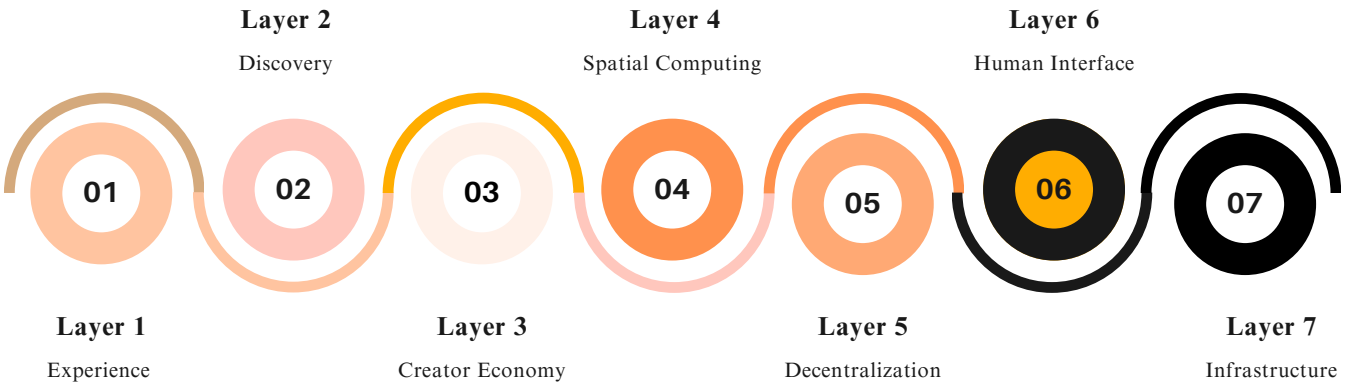
Blooming Government Initiatives

The Indian government holds a vital role in advancing the Metaverse industry, necessitating infrastructure development and specific regulatory frameworks. Seizing the Metaverse's potential for 24/7 service delivery through avatars, the government can revolutionise education by addressing challenges for widespread implementation, offering immersive learning experiences beyond traditional classrooms.

- Investment in Infrastructure: Allocate funds and resources to develop the necessary digital infrastructure, including high-speed internet and advanced computing facilities, to support Metaverse platforms.
- Research and Development Grants: Provide financial support and incentives for research and development activities related to Metaverse technologies.
- Education and Skill Development: Integrate Metaverse-related education and training programs into academic curricula and vocational training to prepare the workforce for emerging roles and skills within the Metaverse industry.
- Public-Private Partnerships: Foster collaboration between the government and private sector to jointly invest in Metaverse projects, leveraging the strengths of both sectors for comprehensive development.

The Seven Layers of Metaverse

Metaverse can be conceptualised as a multi-layered virtual space, each layer contributing to the overall immersive experience. These layers can be thought of as building blocks that together form a comprehensive and interconnected virtual environment. While interpretations may vary, a common framework identifies seven layers that encapsulate the essence of the Metaverse:



Blooming Government Initiatives

There are several challenges that need to be addressed before implementing Metaverse-based education on a large scale. These challenges include immersive design, privacy and security concerns.

The over-reliance on technology leading to a shift away from essential traditional learning methods, accessibility concerns as not all students might have access to the required tech leading to inequality, and privacy and security concerns about data breaches and cyber threats in the virtual realm.

Conclusion

The Metaverse has enormous potential for revolutionising education in India by providing immersive and engaging learning experiences that can enhance student motivation and engagement in the classroom while also offering hands-on learning beyond classrooms.

However, it is essential to address the challenges before implementing Metaverse-based education on a large scale.

The Indian government has a crucial role to play in developing the infrastructure and providing investment to support the growth of the Metaverse industry in India.

RECAP

- The Metaverse, combining AR, VR, and XR, is hailed as the "Internet of the future," poised to revolutionise online communication, collaboration, and learning.
- Metaverse promises immersive learning environments, faster learning speeds (four times faster, as per PwC research), inclusivity for people with disabilities, and hands-on experiences in a safe virtual space.
- Active learning practices through gamification and affordable educational resources are highlighted as key advantages.
- Challenges include investment needs for immersive designs, privacy and security concerns, issues of universal access leading to potential inequality, and health considerations related to prolonged exposure to VR/AR environments.

Dr. Indrajit Bhattacharya is a prominent figure in the realm of technology and governance. He is a thought leader and major contributor to India's progress towards digitization. He works directly under the Ministry of Communications and IT, Government of India, through his role at the Project Management Unit (PMU) of the Global Partnership for Artificial Intelligence (GPAI).

In addition to his role at GPAI, Dr. Bhattacharya serves as the Director of the Centre for Digital Economy Policy (C-DEP) and Research, a policy think tank based in Delhi. His prior experience includes a directorial position at the National Accreditation Board for Education and Training (NABET) under the Quality Council of India (QCI) (June 2015 to January 2023).

During his tenure at QCI, he played a pivotal role in steering the Lean Manufacturing Competitive Scheme (LMCS) for the Ministry of Micro, Small, and Medium Enterprises (MoMSME), focusing on enhancing quality in the MSME sector.

Dr. Bhattacharya has been instrumental in leading initiatives to propel Industry 4.0 in MSMEs across the country through MoMSME. His influence extends to driving the accreditation of Industry Associations and Business Membership Organisations (BMOs), showcasing his commitment to fostering excellence and innovation in various sectors.

An Analysis On Ratings And Its Effect Diversity, Accessibility, And Social Equity

Mr. Ravin Nair
COO, QS I-GAUGE

The author delves into the evolving landscape of higher education in India, where a significant shift towards prioritising quality over historical elitism is evident. This transformation emphasises inclusivity, moving away from a focus on exclusive institutions to a more widespread and equitable system. The recent changes are driven by economic, technological, and social factors, leading to the massification of higher education in the country.

Higher Education in India (HEI) is changing, with a renewed and unwavering emphasis on the concept of 'quality.' It's not just about a few elite institutions anymore; it's about making education accessible to more people. The account of quality in higher education is vast but in general it encompasses the achievement of set standards for delivering a service which extends beyond imparting knowledge. Good higher education institutions have their own ways of doing things that make them stand out and have a lasting impact.

Ratings, Rankings & Accreditation

- Ranking is the process of assessing performance within a competitive setup by providing them a rank.
- Rating assesses how individuals perform against a set standard.
- Accreditation is a review of the quality and standards of the institution.

Together, "Rankings, Ratings and Accreditation" encourages HEIs to put in extra efforts to improve their infrastructure facilities, hire high calibre teaching faculty, align curriculum with industry standards and engage in complete development of students to their full potential.

These structures help in maintaining and building institutional reputation so that students can make informed choices in selecting the right degree program for pursuing higher education. These grades also help stakeholders in making influential decisions about funding, sponsorship, and scholarship which eventually leads to the improved 'quality' of the institution.

Influence of Ratings on Rankings & Accreditation

The influence of ranking and ratings extends beyond a general enhancement of educational quality. It prompts institutions to strategically specialise in specific fields and areas of study.

The criteria and benchmarks upon which rankings are based, such as research output and industry partnerships incentivise institutions to carve out expertise in various domains. This strategic alignment not only contributes to the institution's overall ranking but also fosters a culture of specialisation, resulting in a more nuanced and tailored educational experience for current and prospective students.

India's Accreditation Standards NIRF & MHRD, & More

In the current landscape of higher education in India rankings and accreditation have a well-established space. National Institute Ranking Framework (NIRF) was launched as an initiative of the Ministry of Human Resource Development (MHRD) in 2015 to bring all government and private funded HEIs under an umbrella framework, representative of quality. On the other hand, accreditation agencies for higher education include National Board of Accreditation (NBA), National Assessment and Accreditation Council (NAAC) and the Association of Indian Universities (AIU) etc. These institutions serve the purpose of determining the worthiness of degree, diploma or certificate programs offered by HEIs. However, it is crucial to note that rating higher education institutions in India is a fairly new concept for a nation like ours, and it presents an opportunity to influence policy making at the highest level.

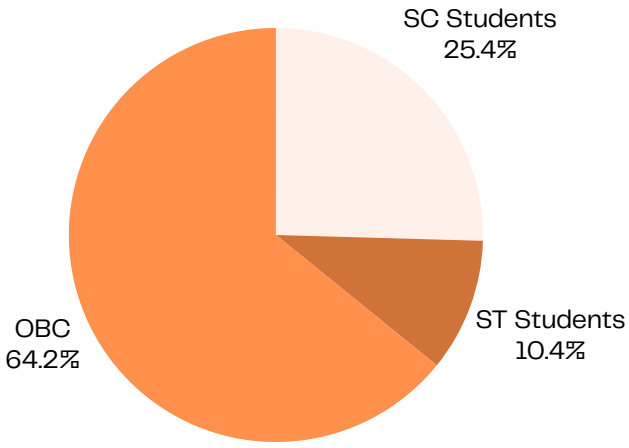
Diversity in Higher Education In India

Diversity refers to the simultaneous presence of physiological, psychological and social elements defining an individual's identity. The Indian education sector is one of the largest at the global level and the country hosts the most diverse population segment as well.

Gender wise distribution of male and female enrolment differs by 2.66% favourable to the male side in higher education.

However, in M. Phil and master's degree programs female students outnumber their male counterparts.

Representation of Backward Castes in HEI



The aim of these policies is to address historical social injustices, promote diversity, and provide equal opportunities for all citizens. The Indian Constitution provides for reservations or affirmative action to uplift these communities and promote their inclusion in various spheres, including education. However, the implementation of these policies has been a subject of ongoing debate and scrutiny, with discussions around their effectiveness, and the need for periodic reviews.

Gross Enrolment Ratio of HEI

The Gross Enrolment Ratio (GER) for higher education has shown positive growth, increasing from 24.1% in the academic year 2016-17 to 27.3% in 2020-21. This upward trend reflects a rising number of students pursuing higher education.

Gender Disparity in GER

The GER for Scheduled Castes (SC) and Scheduled Tribes (ST) students falls below the national average for all categories. In the academic year 2020-21, the national average was 27.3%, while the GER for SCs was 23.1%, and for STs, it was 18.9%.

Approximately 2.21% of India's population is differently abled.

The enrolment rate for such students in primary education is less than 0.1%, which further diminishes to a mere 0.01% in secondary education. Additionally, less than 1% of educational institutions in India are designed to be accessible for special needs students which reflects the lack of concern and leniency in policy making. Thus, due to such an unfavourable environment, access to education for differently abled students gets limited at the primary and secondary level.

The enrolment of students in the higher education category reserved for persons with disabilities (PwD) has not experienced a significant increase in the country over the last five years. Data extracted from the recently published (AISHE) report discloses a notable shift for female candidates. In the academic session of (2016-17), a total of 30,073 female students were enrolled in higher education and the corresponding figure for the academic session of (2020-21) witnessed a decrease in the overall number of enrolments to 29,701.

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Social Equity in Higher Education of India

Social Equity in higher education refers to the fair share, use and distribution of resources for all students irrespective of the features encompassing diversity. However, considering the massive scale of the Indian higher education sector the present schemes might not be enough to accommodate all. Reservation of seats the enrolment for economic weaker sections (EWS) in the last five years hasn't increased either.

Ratings And Its Influence On Accessibility & Diversity

The concept of rating and ranking holds considerable significance in the territory of higher education, serving as a pivotal mechanism for evaluating and comparing academic institutions on a global scale.

Introducing QS I-GAUGE

QS I-GAUGE's multifaceted rating assessment is anticipated to be the future in guiding prospective students, educators, policymakers, and other stakeholders in making informed decisions.

Progress in GER for SC and ST Females

Despite the overall disparities, there has been noteworthy progress in the GER for SC and ST females. In the academic year 2016-17, the GER for SC females was 13.9%, which increased to 19.1% by 2020-21. Similarly, for ST females, there was an improvement from 2016-17 to 2020-21.

Despite the overall growth, there remains a noticeable gender gap in GER. In the academic year 2020-21, the GER for males was 26.7%, whereas for females, it stood at 27.9%, indicating a disparity of 1.2 percentage points. This gender gap persists across all the years, with females consistently exhibiting lower enrolment rates compared to males.

GER 2035 TARGET: 50%

As mentioned earlier the GER for higher education currently stands at 27.2% and it should be the aim of all HEIs to collectively achieve the target of 50% by 2035 as mandated in the National Education Policy (NEP) 2020.

Marginalised and minority communities encounter systemic discrimination. Inclusive enrolment holds paramount importance for several reasons.

- Firstly, it fosters equity, social justice, and inclusivity within India's diverse society.
- Secondly, it contributes to economic prosperity by tapping into untapped talent, diversifying the workforce, and fostering innovation and growth.
- Thirdly, it harnesses the demographic potential of India's youth, a crucial factor for global competitiveness.

Higher education generally plays a pivotal role in human capital development, equipping individuals with skills and knowledge for a more educated and skilled workforce.

Lastly, inclusive enrolment helps mitigate inequality by narrowing income and employment gaps, fostering a more equitable society.

While the Government of India has implemented various initiatives, including reservation policies, scholarships, financial aid, and awareness campaigns, challenges persist. These challenges include inadequate access to quality education in remote areas, a lack of awareness, and socio-economic barriers.

Achieving the 50% GER goal by 2035 necessitates collaborative efforts amongst all government institutions, educational institutions, and the civil society. This collaborative approach may involve infrastructure enhancements, expanded scholarship programs, and improved career counselling to encourage more students from SC, ST, and OBC backgrounds to pursue higher education.

Accessibility in Higher Education of India

Accessibility is defined as the ability to be reached or entered both emotionally and/or physically. Accessible higher education is one which encompasses both the elements in a balanced way. Physical accessibility in higher education consists of multiple elements related to infrastructure development for differently abled students. Approximately 2.21% of India's population are differently abled who face discrimination while attempting to access higher education.

Over the years the rating methodology has evolved on the sidelines of (NEP) 2020. Inclusive education is the norm and future trend at a global scale. The initial response from the QS I-GAUGE's audits has been substantial where higher rated institutions were found to be places of high infrastructure accessibility and student diversity.

Ratings significantly shape the academic standing of an institution, influencing its local and national perception. Positive ratings draw in top-tier faculty and researchers, further elevating the institution's academic reputation.

The Promise of QS I-GAUGE

At QS I-GAUGE, higher educational institutions are assessed based on parameters prioritising social equity. It encompasses:

- The right to engage in intellectual debates without the fear of censorship.
- The right to pursue diverse pedagogical methodologies, and courses of delivery or study.
- The right to express disagreement with administrative policies and proposals.
- The right to determine the mode of course delivery and assessment.

RECAP

- Role of Rankings, Ratings, and Accreditation: Rankings, ratings, and accreditation mechanisms, such as NIRF and agencies like NBA and NAAC, play a crucial role in encouraging HEIs to enhance infrastructure, teaching faculty, and overall academic standards. These mechanisms prompt institutions to specialise strategically, contributing to a more nuanced and tailored educational experience.
- The Indian education sector, one of the largest globally, faces challenges in diversity, with a gender gap in enrolment and disparities among backward castes. Despite improvements in Gross Enrolment Ratios (GER), marginalised communities, especially SC and ST students, continue to face obstacles in accessing higher education.
- The concept of ratings in Indian higher education is evolving, with initiatives like QS I-GAUGE aiming to provide a holistic assessment.

Mr. Ravin Nair is the Chief Operating Officer at QS I-GAUGE. His proficiency spans streamlining systems, facilitating financial operations, ensuring regulatory compliance, and excelling in budgeting and project management. His strategic mindset involves translating vision into actionable steps for growth and implementing organisation-wide goal setting.

Passionate about building a highly inclusive culture, Ravin is committed to enabling team members to thrive towards achieving organisational outcomes. In his current role, he spearheaded efforts at QS I-GAUGE, a subsidiary of the UK's QS Quacquarelli Symonds, with a primary focus on realising the vision of establishing world-class educational institutions in India.

The Role of Artificial Intelligence in Personalised Engineering Education

Mr. Onkar Bagaria
Chief Executive Officer, VGU, Jaipur

The author presents a verified report on how Artificial Intelligence (AI) is revolutionising engineering education by tailoring learning experiences to a student's strengths and weaknesses. AI algorithms analyse student performance data and offer personalised recommendations and timely interventions.

Artificial Intelligence is changing the path of engineering education. From continued advancements in AI algorithms, to intelligent tutoring systems, immersive simulations, and increased collaborative learning opportunities, AI is the solution to many of the gaps in the field of modern engineering education. Through the analysis of past trends, AI offers valuable insights, enabling educators to make informed decisions and provide timely support to students.

Virtual assistants powered by AI contribute to real-time student support, answering questions and offering immediate feedback. This personalised and dynamic approach enhances student engagement, retention, and success in engineering education, fostering a deeper understanding of concepts. AI's multifaceted impact enables custom-tailored learning experiences, ultimately leading to improved learning outcomes.

Hyper Personalised Learning In Era Of Artificial Intelligence

Whether it is a 15-student private learning lab or 60-student public school classroom, personalised education is possible with the help of big data analytics and artificial intelligence.

In this era of colleges facing a wide range of challenges, including disengaged students, damping attention span, high dropout rates, and the ineffectiveness of a traditional "one-size-fits-all" approach to education, a personalised education is the much-needed antidote. With a personalised learning experience, students enjoy:

- **A completely unique learning experience that is fully tailored to his or her individual abilities and needs.**
- **An educational approach that directly engages students in the learning activities based on their personal likings.**
- **A chance for the educators to get a better understanding of each student's learning process.**

"In this tech-savvy era, the integration of Artificial Intelligence (AI) in education emerged as a solution to enhance learning with a touch of fun."

AI For Students With Special Needs

Theoretically, this personalised data acts as the ideal solution to all the problems faced by the educators in today's era where students' attention span is too low and change of interest is quite frequent. But here's the question arises where this data will come from? AI is designed to analyse the provided data and come out with a solution for future course of action for better education and learning experience of the students as well as educators.

The primary ingredient of personalised learning is a reliable and large amount of student data. But today's students are more protective of the privacy of their data than previous generations and this is most likely because of the security breaches and data scandals they have already been exposed to. But if we are able to ensure or devise such measures through which student data could be collected and processed in a way that was ethical, secure, and transparent, it would allow AI to be used to effectively improve every area of the learning curriculum during the course of study in the institution.

Student Centred Learning Solutions

In the traditional system of education, the pivot point is the teacher who instructs the students as per the curriculum. In this system, the curriculum and instructor's pedagogy is evidently acting as the fulcrum of the entire education system.

"If a child can't learn the way we teach, maybe we should teach the way they learn."
- Ignacio Estrada.

In this modern era of AI, VARK methodology acts as the foundation of multimodal learning. AI in engineering education evidently uses the combination of visual and auditory, visual and kinesthetic, auditory and multimodal modes.

The pedagogy of the instructor in traditional mode most of the time results in monologue but with the use of AI in engineering education, learners will have better understanding by using multimodal personalised learning techniques for in-depth understanding of complex concepts.

Gamification & Interactive Simulations

In this tech-savvy era, the integration of Artificial Intelligence (AI) in education emerged as a solution to enhance learning with a touch of fun. By incorporating gaming elements and simulations into daily learning, educators can significantly boost student engagement, motivation, and retention of intricate engineering concepts. For instance, introducing gamification in engineering education through virtual simulations offers students a controlled, hands-on experience in a virtual environment.

This interactive approach enables active participation in problem-solving scenarios, experimentation with solutions, and immediate feedback, fostering a deeper understanding as students learn from their mistakes and iterate solutions.

Moreover, gamification introduces an element of competition and collaboration among students, elevating their motivation and engagement. Through features like leaderboards, badges, and rewards, students can track their progress and compare achievements with peers, encouraging them to strive for excellence.

This competitive aspect not only enhances motivation but also cultivates a drive for better results. Additionally, gamification facilitates the creation of immersive and interactive learning experiences simulating real-world engineering scenarios.

Ethical Concerns In Use Of AI

The integration of AI in engineering education opens doors for unprecedented opportunities in learning and academic growth. However, this evolution is accompanied by significant ethical considerations, primarily centred around privacy and biases.

With the introduction of AI in engineering education, there is a high risk of potential ethical concerns related to data privacy, algorithm bias, and the human-AI interaction in personalised engineering education. The leading ones are:

PRIVACY CONCERNS

The collection and utilisation of student data in AI-driven education raise concerns about safeguarding sensitive information against unauthorised access and potential breaches. The data used for analysis by AI contains sensitive information that needs to be secured and protected from phishing.

BIASES

The algorithms used by AI in providing personalised engineering education may have the potential to perpetuate existing biases or discriminate against specific groups.For example, if an algorithm is trained using a biased dataset, it may inadvertently reinforce and perpetuate those biases.

Learning Habits And Adaptability With AI

Personalised content is relevant, engaging, and targeted towards individual strengths and weaknesses. Which is why, AI-driven personalised education can have a transformative impact on fostering lifelong learning habits and adaptability in engineering professionals.

Highly Specific and Quick Feedback

- AI algorithms provide immediate, highly specific feedback on assignments, projects, or assessments.
- This feedback highlights areas for improvement and offers tailored suggestions for further study or practice.
- Real-time feedback enables engineering professionals to swiftly identify and address weaknesses.
- AI-powered platforms recommend personalised learning resources based on individual interests, preferences, and learning styles.
- For example, if an engineer aims to learn about machine learning, AI algorithms may suggest a mix of video lectures, online courses, and hands-on projects.

Personalisation in Education

- AI-driven personalised education allows continuous skill updates for engineering professionals.
- Engineering, a rapidly evolving field, demands staying abreast of the latest tools, techniques, and industry trends.
- AI algorithms analyse the changing landscape to recommend learning opportunities aligned with industry demands.
- This ensures that professionals have the most relevant and up-to-date skills.
- Through AI technologies, personalised education provides ongoing access to resources, feedback, and opportunities for skill enhancement and adaptation to professional demands.

Benefits of AI in Traditional Education

AI enables personalised learning experiences that are tailored to individual student needs and learning styles. Adaptive learning platforms adjust content and pace based on student performance, fostering better understanding.

AI optimises resource allocation by automating administrative tasks, allowing educators to focus on teaching. Smart scheduling systems use AI to efficiently organise classes, exams, and other educational activities.

AI processes and analyses vast amounts of educational data to provide actionable insights. Educators can make informed decisions on curriculum design, teaching methods, and student support.

AI identifies early signs of academic challenges or learning disabilities, enabling timely interventions. Predictive analytics help educators address issues before they impact a student's overall academic performance.

AI introduces innovative teaching tools, including virtual tutors and interactive simulations, enhancing engagement. Chatbots and AI-driven assistants provide additional support, answering student queries outside of regular hours.

AI promotes continuous learning for educators through personalised professional development recommendations. The adaptive nature of AI ensures that educational approaches remain up-to-date with evolving pedagogical trends.

Problems & Solutions of AI Implimentation

Area	Problem	Solution
Data Quality	Insufficient reliable data for personalised student recommendations and interventions.	Use data cleansing techniques to eliminate errors and enhance data quality.
Scale	Mastering scalable AI algorithms is challenging.	Design scalable AI-powered personalised learning for multiple classrooms and institutions.
Accesss	The lack of tech synchronisation and integration can hinder progress	Ensure compatibility and seamless integration between AI powered tools and existing learning management systems.
Training	Comprehensive faculty training is essential for AI-powered personalised learning.	Equip educators with the necessary knowledge and skills for effective use of AI tools in maximising classroom benefits.

Conclusion

AI technology has the potential to revolutionise personalised engineering education by enabling tailored learning experiences that cater to individual preferences and needs. AI-powered intelligent tutoring systems will play a central role in this transformation. These systems can come together and utilise AI algorithms to analyse large amounts of student data and identify knowledge gaps, which can be filled with personalised feedback and targeted interventions.

The promise of "AI for all" must be that everyone can take advantage of the technological revolution under way and access its fruits, notably in terms of innovation and knowledge. Overall, the future of AI in personalised engineering education looks promising. AI's ability to analyse large amounts of data, provide adaptive learning experiences, and enhance hands-on learning through simulations and virtual reality will undoubtedly transform the way engineering education is delivered.

RECAP

- AI tailors learning experiences based on student performance data for all-rounded and personalised education.
- Personalised education addresses challenges like disengagement, short attention spans, and high dropout rates.
- AI aids students with learning difficulties or rapid advancement, providing tailored support for holistic development.
- Incorporating gamification enhances student engagement, motivation, and retention in engineering education.
- Challenges in data quality, scalability, integration, and faculty training hinder smooth AI integration.
- AI's adaptive learning through intelligent tutoring systems promises a transformative impact.

Mr. Onkar Bagaria, CEO of Vivekananda Global University, stands as a distinguished leader, and is known for his remarkable achievements and contributions. Under his visionary leadership, VGU achieved the prestigious NAAC A+ accreditation in just 10 years.

A graduate with an engineering degree and an MBA from Birla Institute of Technology and Science, Pilani, Er. Bagaria has consistently demonstrated a passion for innovation. He has spearheaded nationwide initiatives such and has showcased his commitment to fostering a culture of creativity and entrepreneurship within the university.

Mr. Bagaria extends his influence beyond the university, actively participating in national projects like Jal Jeevan Mission and SFURTI, demonstrating his commitment to societal development. As a mentor, he plays a crucial role in guiding startups and providing seed funds to aspiring entrepreneurs, contributing to the growth of the entrepreneurial ecosystem.

Onkar Bagaria is currently pursuing research at Birla Institute of Technology and Science, Pilani. His leadership and multifaceted contributions underscore his pivotal role in shaping the success and impact of Vivekananda Global University.

The Role of Artificial Intelligence in Personalised Engineering Education

Dr. Anup K Singh
Director General, Nirma University

The author talks about the ever-evolving educational landscape, and the adaptation of personalised learning as a promising educational paradigm, and zones in on the importance of identifying the unique needs and capabilities of each student and the integration of technology in classrooms.

Personalised learning is an educational approach that tailors the instruction, syllabus, and teaching style based on an individual's needs and preferences. The classroom experience of archaic times, and the one-size-fits-all approach, doesn't suffice anymore. If we're serious about cultivating talent, we need to focus our efforts on learning experiences that have the potential of yielding the best results.

The goal of personalised learning is to provide a customised and more effective learning experience for each learner. Home tuition is pretty popular in India. The concept of having an additional teacher, at arms lengths, who is privy to the strengths and weaknesses of each student, is almost considered to be a necessity for millions of students. What if there was a way to have this level of personalisation right at school. Hundreds of student hours will be saved each year, right?

Principles of Personalised Learning

Small Classrooms (20 to 30 students)

Small classrooms, typically comprising 20 to 30 students, offer numerous benefits in education. This setting allows for personalised attention, fostering a better understanding of individual learning styles. Effective classroom management is creates:

- A focused learning environment
- Enhanced interaction among students
- Cllaborative learning
- Tailored instruction becomes more feasible.

Learning Management System (LMS)

An LMS tailored to individual learning needs leverages technology for a more adaptive educational experience. It facilitates:

- Customised learning paths
- Personalised modules based on strengths and weaknesses
- Real-time progress tracking enables continuous monitoring of achievements and identification of areas for improvement.
- Multimodal learning resources cater to diverse learning styles
- Adaptive assessments dynamically adjust difficulty.

Personalised learning puts the student first, and recognises the difference in learning styles of each individual.

4 Step Personalised Learning Process

Data Collection

- Comprehensive Student Profiles: SIS platforms provide a comprehensive overview of each student, including academic history, attendance records, and extracurricular involvement, helping educators make informed decisions.
- Student Surveys: Digital surveys help gather valuable information about students' learning preferences, interests, and strengths, forming the basis for personalised learning plans.

Data Analytics

- Learning Analytics: Technology allows educators to collect and analyse data on individual student performance, identifying areas of mastery and areas that need additional support.
-
- Real-time Feedback: Immediate feedback on quizzes and assignments helps students understand their performance, enabling them to address gaps in understanding promptly.

Teaching

- Individualised Pathways: Adaptive learning platforms use algorithms to tailor the learning journey based on a student's progress, adapting content difficulty and pacing to match their needs.
- Differentiated Instruction: Technology supports the creation of assignments that cater to diverse learning needs, allowing students to choose projects aligned with their interests while still meeting educational objectives.

Progress Tracking and Goal Setting

- Utilize AI: advanced artificial intelligence algorithms to seamlessly monitor and assess your milestones, providing real-time insights into your journey toward achieving set objectives.
- Leverage AI-powered tools: Refine and optimise goal-setting processes, offering personalised recommendations and data-driven strategies to propel you closer to your aspirations.

Personalised Learning With AI; Engagement, Motivation, & Achievement

Personalised learning offers a multitude of advantages, including higher engagement, motivation, and improved academic achievement. However, the associated costs rise as personalisation deepens, raising the question of whether students are willing to invest in tailored education. One of the most impactful applications lies in the realm of personalised learning, where AI becomes a dynamic ally in tailoring educational experiences.

This paradigm shift transcends traditional methods, focusing on engagement, motivation, and achievement. By harnessing the capabilities of AI, we embark on a journey that not only enhances the educational process but also unlocks the full potential of every student, fostering a future where learning is truly personalised and optimised for success. Through the lens of engagement, AI serves as a dynamic guide, tailoring content to captivate learners. In this educational landscape, personalised learning with AI emerges not only as a technological breakthrough but as a catalyst for a student-centric, achievement-driven future.

Benefits of Personalised Learning

Higher Engagement

- Individual Relevance: Tailoring content to students' interests and learning styles increases their engagement by making the material more personally relevant.
- Interactive Learning: The use of multimedia, interactive simulations, and real-world applications captures students' attention and keeps them actively involved in the learning process.

Increased Motivation

- Ownership of Learning: Personalised learning empowers students to take ownership of their education, fostering a sense of responsibility and motivation to succeed.
- Goal Setting: Setting and tracking personalised learning goals provides students with a clear sense of purpose and progress, enhancing their motivation to achieve those goals.

Improved Academics

- Targeted Support: Identifying and addressing individual learning needs helps students overcome challenges, leading to improved understanding and mastery of concepts.
- Flexibility in Pacing: Allowing students to progress at their own pace ensures a more thorough understanding of material before moving on, contributing to better academic outcomes.

Challenges in Implementing Personalised Learning

Implementing and adapting Personalised Learning will require immediate and overtime investment in terms of cash and effort from all parties. It can't be an overnight process, as it demands a thoughtful approach and equal parts effort from school management, educators, students, and parents/guardians.

As AI relies heavily on data for personalised learning, ensuring the security, privacy, and accuracy of this information poses a significant hurdle. Striking a balance between data accessibility for AI applications and safeguarding sensitive student details requires meticulous planning and adherence to privacy regulations.

Integrating AI into lectures and tutorials necessitates careful planning to maintain continuity and ensure that the transition enhances rather than disrupts the learning process. Striking the right balance between human instruction and AI augmentation is crucial to fostering an environment where both can coexist harmoniously.

Designing LMS that can seamlessly integrate AI functionalities while remaining user-friendly for both educators and students poses a challenge. The interface should accommodate AI-driven insights, recommendations, and adaptability, enhancing the overall learning experience without overwhelming users or creating unnecessary complexities.

This involves addressing issues such as equitable access to technology, ensuring that AI applications do not exacerbate existing educational inequalities, and considering the potential socio-economic impacts of relying heavily on technology in different learning environments.

Conclusion

Implementing and adapting Personalised Learning will require immediate and overtime investment in terms of cash and effort from all parties. It can't be an overnight process, as it demands a thoughtful approach and equal parts effort from school management, educators, students, and parents/guardians.

In essence, as personalised learning continues to shape the educational landscape, it holds the promise of revolutionising education, making it more inclusive, adaptive, and effective for students of diverse backgrounds and abilities. Balancing technological advancements, tailored instruction, ethical considerations, and widespread accessibility remains pivotal. Personalised learning yields benefits such as increased engagement, motivation, and improved academic achievement. However, the implementation requires careful strategies, including developing extensive Student Information Systems, mentoring systems, blending lectures with tutorials, and designing efficient LMS.

RECAP

- Personalised learning is anchored in small classrooms and a Learning Management System (LMS) designed for individual learning requirements. Technological advancements, including data analytics, real-time feedback, and adaptive teaching, drive the effectiveness of this educational approach.
- Personalised learning offers benefits such as increased engagement, motivation, and improved academic achievement. Successful implementation involves strategies like developing extensive Student Information Systems, mentoring systems, blending lectures with tutorials, and designing efficient LMS.
- Despite its advantages, personalised learning presents challenges, including financial investments, time commitments for educators and students.

Dr. Anup K. Singh has a robust academic background, including a PhD from the University of Allahabad and a Postdoctoral Fellowship at the University of Michigan, Ann Arbor. He has showcased a commitment to advanced research and scholarship his entire academic career. As a distinguished member of the Association of Indian Universities (AIU) Governing Council for a two-year term, he has contributed to the policy development in higher education of India.

His international exposure includes a stint as a visiting scholar at the JL Kellogg Graduate School of Business Administration, Northwestern University, Evanston. As a seasoned academician, he served as a Professor of Organisational Behaviour at the Management Development Institute, Gurugram, and held the positions of Professor, Dean at the International Management Institute, New Delhi.

Dr. Anup's leadership extends to directorial roles, having served as the Director at Jaipuria Institute of Management, Noida, and previously as the Director at the Institute of Management, Nirma University. Through his diverse roles, he has left an indelible mark on academia, showcasing a blend of research, teaching, and administrative expertise in the field of management and organisational behaviour.

Revolutionising Higher Education: The Fusion of Pedagogical Eclecticism through Advanced Technology

Prof. Dr Padmakali Banerjee
Vice Chancellor, FRSA, London

The author discusses the power of revolutionising Indian higher education by embracing technology, fostering sustainability, and promoting inclusivity. She advocates for a diversified, personalised, and skill-oriented approach, integrating emerging technologies and interdisciplinary learning.

The Indian education system has evolved from ancient Gurukuls and centres of learning to colonial-era English-based education. Since Independence, it has shaped itself to meet the needs of a developing nation. With exclusive focus on access, equity, and skill-based education across the board, Indian education is evolving and expanding at a rapid speed. While we have our pulse at the progress, it bears noting that the new age of the Indian education system must adopt a holistic approach to learning and incorporation of cutting-edge technology that aims at personal and societal transformation.

Education in the Digital Era

- Maximising Potential through Personalised Education for a Changing World.
- Leveraging Technologies for Inclusive Socio-Cultural Learning Environments
- Emphasising Flexibility and Adaptability in Educational Structures
- Encouraging Innovative Teaching Approaches and Personalised Learning

Why We Must Evolve

Previous models of education consisted of one classroom, one syllabus, one teacher, and one style of assessment. But this one-size- fits-all approach can no-longer suffice. In this digital era, we see a rapidly evolving landscape. And the only way for the education system to escape the clutches of redundancy is with experimentation, innovation, and diversification, and pedagogical eclecticism.

Technology In Education

The proliferation of e-learning has enabled remote education, allowing students to access courses and resources from anywhere. Online education platforms offer flexibility and convenience for learners of all ages. It is worth noting that the human touch remains the most crucial aspect along with skills like critical thinking can never be replaced, even by the most developed technologies. From interactive digital platforms to virtual reality simulations, these technologies offer:

New and Exciting Learning Methods

Enhanced Student Engagement

Empowerment for Educators

Personalised Learning Experiences

Inclusivity in Education

A child is shaped by their experiences, good and bad. They have their unique set of abilities, perspectives, and gifts that must be illuminated with education, and not suppressed.

Embracing diversity and encouraging inclusion helps students in building a multicultural mindset, which is reflective of a dynamic country like India.

A varied socio-cultural environment plays a significant role in shaping students' identities and viewpoints. It also prompts students to develop an environment of respect, empathy and collaboration.

By acknowledging the cultural diversity and incorporating culturally relevant content into the curriculum, educators can make learning more relatable and meaningful for students. This way, students learn to respect different cultures and traditions and also value their own cultural diversity.

Critical Thinking in Higher Education

We're faced with another burning question: Is the knowledge gained from the syllabus enough? The answer is no.

In this age of information, education needs to prepare students with skills and knowledge that do not come from books alone. New age education should aim to:

- Cultivate critical thinking, creativity, and problem-solving abilities.
- Get hands-on training and adaptability.
- Equip students with skills to pursue information analysis and innovation.
- Transform students into lifelong learners who can navigate the intricacies of a rapidly changing socio-economic environment.

Education for All Initiative

Skill based education in India, especially in the higher education arena, has become imperative to fulfil the objective of "Education for All" in an inclusive manner to comply with the guidelines of Government of India.

In the context of a skill development ecosystem, education is crucial for providing a strong foundation for continuous learning, higher knowledge acquisition, increased efficiency and efficacy, and global competitiveness. It plays an integral role in fostering a comprehensive socio-economic environment and optimising resources while meeting high standards of education.

Technology Driven Education Model

Focus on technology driven education models is expected to revolutionise the landscape of learning & development not only in India but also in the global paradigm with credible outcomes on knowledge creation and dissemination. Such skill based educational endeavours are bound to act as catalysts in propelling intellectual capital, fostering technological innovation.

In this manner the higher education institutions will become a hub of high-end research, experimentation, research & development thereby nurturing talents and facilitating robust academic pursuits. A transformative educational approach is imperative to address the dynamic landscape and prepare students to thrive in an interconnected and ever-changing world. Educators have a duty to champion a progressive approach, contributing to the creation of a formidable force for positive change in global society. Emphasizing "RUN" (Re-skill, Upskill, and New skill) directs HEIs to orient students toward entrepreneurship and equip them with future-ready skills.

Academic Indicators of Education

The New Age Learning University prioritises innovation, collaboration, and experiential learning to prepare students for the demands of a rapidly changing world. This is how it plays out:

STEP 1

Leverage the latest advances in technology to create more engaging, interactive, and personalised learning experiences.

STEP 2

Empowering the student community to take responsibilities towards innovation.

STEP 3

Gain the knowledge about various industries and world-class physical and virtual infrastructure

STEP 4

Exploring the core competency and expertise while making students adaptive to develop higher skills

NEP 2020 Foundational Reasoning

Innovations help streamline University's operations and improve efficiency. The National Education Policy of 2020 has laid down a particular emphasis on the development of the creative potential of everyone.

This can be achieved through:

- Automation
- Artificial intelligence

Start up & Entrepreneurship Promotion

Focus on technology driven education models is expected to revolutionise the landscape of learning & development not only in India but also in the global paradigm with credible outcomes on knowledge creation and dissemination. Promoting startups and entrepreneurship assumes a pivotal role in nurturing students' skill sets and expanding employment opportunities. This initiative facilitates students in comprehending market demands and exploring contemporary and global employment prospects. Moreover, it fosters a culture of creativity and entrepreneurship among students. By establishing startup ventures and enhancing the university's existing incubation centre, skill-focused educational initiatives act as catalysts for advancing intellectual capital and promoting technological innovation.

The university's innovation hub, in collaboration with the government, serves as a valuable resource, providing students with essential support for pursuing entrepreneurial ventures. This includes access to a network of experts and investors, financial resources, and mentoring programs.

The New Age Learning University

The New Age Learning University prioritises innovation, collaboration, and experiential learning to prepare students for the demands of a rapidly changing world. You just have to leverage the latest advances in technology to create more engaging, interactive, and personalised learning experiences that help students develop their skills and knowledge. This empowers the student community to take responsibilities towards innovation. Additionally, they also gain knowledge that can play pivotal roles in propelling co-creation, systemic flexibility.

Conclusion

In conclusion, the presented discourse advocates for a transformative shift in higher education, aligning with the demands of the contemporary world. Embracing diversity, sustainability, and cutting-edge technology forms the bedrock of this evolution. The call for personalised, inclusive, and skill-oriented education resonates throughout, emphasising the importance of adapting to the dynamic needs of students and society. The incorporation of sustainability principles, acknowledgment of disruptive technologies, and the unwavering commitment to the human touch underscore the nuanced approach proposed. Furthermore, the discourse champions the significance of critical thinking, adaptability, and interpersonal communication as irreplaceable components of education.

RECAP

- The National Education Policy of 2020 calls for a renewed focus on creativity, adaptability, and environmental consciousness.
- The transformative impact of technology in education, including virtual learning environments, green technology, and collaborations with industries, stressing the importance of a dynamic and inclusive learning environment.
- The focus extends beyond traditional syllabi, emphasising critical thinking, creativity, and adaptability to equip students for the challenges of a rapidly evolving socio-economic landscape.

Prof. (Dr.) Padmakali Banerjee, Vice Chancellor of FRSA, London, & President at SPSU, Sir Padampat Singhania University, Udaipur and Former Pro Vice Chancellor at Amity University, Haryana.

With a career spanning several decades, Dr. Padmakali has lent her expertise and experience to a number of institutions around the world. She is a pioneering fellow at the Royal Society of Arts, London (FRSA), and an advisor at the International WELL Building Institute PBC, New York, USA.

She is also the Former Founder Dean at IILM Institute for Higher Education, Gurgaon. Her work in the field of education, wellness, research, and academics has played a key role in bringing industry-academic integration to the professional space.

She has received numerous accolades for her work, and was rewarded as the “The Change Makers of Modern India by Outlook Spotlight Magazine” (2021). She is the author of "The Power of Positivity - Optimism and the 7th Sense.” She is also the renowned creator of the ‘Optimism Index’ test, the LEAPS Wellbeing Scale, and numerous other psychometric test tools.

Dr. Padmakali professes a strong commitment to social change, sustainability, and youth empowerment. Her goals are closely aligned with UN Sustainable Development Goals (UNSDG), and she aims to create a happier world by instilling hope and optimism in today’s youth.

Revolutionising Higher Education: The Fusion of Pedagogical Eclecticism through Advanced Technology

Dr. Dheeraj Sanghi
Vice Chancellor, JK Lakshmipat University, Jaipur

The author argues about the changing landscape of engineering education and the evolving nature of innovation and entrepreneurship, with further emphasis on the need for a shift in education towards experiential learning and a renewed focus on solving real-world problems, and a broader interdisciplinary approach in undergraduate education.

Historically, the goal of engineering education has been to develop computer knowledge and scientific acumen in students. The common pathway for engineering passouts has been to take up a job in a company, and then solve problems for the client of that company. But we are moving past the days of bloated tech teams. The swift advancement of technology and increased accessibility to high-tech now enables individuals or small teams to independently devise tech-based solutions for local issues. The future of engineering graduates cannot be limited to tech-sector employment. It's time to provide the new crop of aspiring engineers with options, particularly in entrepreneurship.

The Engineer Entrepreneur

KElon Musk, N. R. Narayana Murthy, and Azim Premji have one thing in common. They are all former engineers who learned the ropes of tech, and then founded companies based on their expertise. Instilling the entrepreneurship acumen through a pedagogy can be the first step towards a blooming business.

A New Vision For Education

It is crucial for universities to actively engage and empower interested students with a multifaceted approach to education. Emphasising practical projects and a focus on solving real-world problems ensures that engineering graduates are well-equipped to address the challenges they will encounter in their professional careers. This relevance enhances the value and applicability of their education. By incorporating these elements into engineering education, institutions can contribute to enhancing the global competitiveness of their graduates. Professionals who can innovate, collaborate, and adapt are in high demand in a rapidly changing global economy.

The Entrepreneurial Pedagogy

This new model requires changes to education in terms of curriculum and pedagogy, as well as creating an ecosystem to encourage students to build marketable solutions. This pedagogical approach can be implemented through a combination of strategic curriculum design, hands-on learning experiences, and the cultivation of a supportive entrepreneurial ecosystem.

This innovative model not only incurs lower costs than large corporations but also has the positive outcome of students generating employment opportunities instead of solely pursuing jobs.

Curriculum Design

- Experiential Learning Projects
- Entrepreneurship Courses
- Business Basics Courses

Supportive Ecosystem

- Entrepreneurial Incubators
- Guest Lectures
- Networking Events

Practical Exposure

- Summer Internships
- Industry Collaboration
- Collaboration

Business Knowledge

- Tax compliance requirements
- Laws and Regulations
- Finance and taxation

The Right Path for Student Entrepreneurs

Embarking on the entrepreneurial journey requires more than just ambition; it demands the right blend of influence, infrastructure, education, support, and network. Here are the top 5:

The Right Education

Recognising the legal complexities associated with starting and running a business, universities should offer support in navigating these intricacies. This could involve collaborating with professionals such as Chartered Accountants and Lawyers who can provide expertise on compliance requirements, intellectual property protection, and other legal aspects.

The Right Influence

Firstly, the institution can play a pivotal role by inviting successful entrepreneurs as guest speakers or mentors. These individuals can share their experiences, insights, and challenges, providing valuable motivation and guidance to aspiring student entrepreneurs. Such interactions can serve as a source of inspiration and practical wisdom.

The Right Resources

Moreover, the establishment of an incubator should go beyond just providing physical resources. Access to a diverse network of industry professionals is crucial for mentorship. These mentors can offer valuable advice, share industry-specific knowledge, and guide students through the practical challenges of turning their ideas into viable products or services.

The Right Supoort

Additionally, the provision of incubation support is essential for nurturing nascent ideas into viable businesses. This support should encompass fundamental infrastructure requirements such as dedicated spaces for innovation, high-speed internet, computing resources, well-equipped laboratories, and workshops.

The Right Connection

Furthermore, to bridge the crucial gap between ideation and actualisation, the incubation centre should actively facilitate connections with potential investors. By organising events or forums where students can pitch their ideas and showcase working prototypes, universities create opportunities for students to attract funding and take their projects to the next level.

Conclusion

Building a robust ecosystem for innovation and entrepreneurship requires a comprehensive approach that encompasses motivational speakers, infrastructure support, legal guidance, mentorship, and investor connections. Emphasis on interdisciplinary education and collaboration contributes to the global competitiveness of graduates. By investing in these elements, universities can empower their students to embark on entrepreneurial journeys with confidence and resilience, contributing to a culture of innovation and economic development.

To facilitate this shift, a strategic curriculum design, hands-on learning experiences, and the development of a supportive entrepreneurial ecosystem are essential. Additionally, recognising the legal intricacies of business, universities should provide support in navigating the real world. This comprehensive educational approach lays the foundation for a workforce that is not only technically proficient but also well-versed in the complexities of entrepreneurship.

RECAP

- There is transformative potential of engineering education when combined with entrepreneurship.
- Universities play a crucial role by actively engaging students in practical projects and a problem-solving focus.
- This prepares engineering graduates to address real-world challenges, enhancing the relevance and applicability of their education.
- Implementing a pedagogical shift involves strategic curriculum design, hands-on learning experiences, and the cultivation of a supportive entrepreneurial ecosystem.
- Recognising the legal intricacies of entrepreneurship, universities should provide support by collaborating with professionals like Chartered Accountants and Lawyers.

Dr. Sanghi is a distinguished academician who has made significant contributions to the field of Computer Science & Engineering. With over 28 years of association with IIT Kanpur, he has held numerous leadership positions, exemplifying his commitment to academic excellence and institutional development.

His roles have included serving as the Dean of Academic Affairs, Chairman of the Senate Under Graduation Committee, Coordinator of Industry Affiliate Programs, and heading the Prabhu Goel Research Centre for Computer & Internet Security.

Beyond IIT Kanpur, Dr. Sanghi has taken on pivotal leadership roles such as Director of LNMIIT, Jaipur, and has served as the Dean of Academic Affairs & Dean of External Relations at IIIT Delhi. Most recently, he has held the prestigious position of Director at Punjab Engineering College, one of India's oldest engineering institutions.

His multifaceted leadership and extensive experience in academia underscore his dedication to advancing education and research in the field of Computer Science & Engineering, making him a respected figure in the academic community.

Health Technology Literacy: Bridging the Gap Between Medical Science and Digital Innovation

Dr. M C Misra
Former Director, AIIMS

The author urges healthcare stakeholders to carefully assess the pros and cons of digital developments. They advocate the embrace of technology to simplify tasks but acknowledge the risks of biases and information gaps. In envisioning a tech-savvy healthcare world, the author stresses the importance of prioritising equitable solutions for universal access.

Technology in health care goes beyond the conventional benefits of internet-enabled communication and cloud storage. Digital health technologies are a potent solution to promote equity, affordability, and access to healthcare. In a 2005 paper, the WHO acknowledged the role of information and communication technology (ICT) in health and published a strategic plan 2020–2025 to ensure that eHealth will be developed and implemented in a way that promotes equity, affordability and access to healthcare.

The Engineer Entrepreneur

eHealth is the use of information and communication technologies (ICT) in the field of healthcare to improve the efficiency, accessibility, and quality of health services. India's legislative powers and law-making bodies are steadfast in their commitments towards digitised progress, and the continual quality improvements practically seen in ICTs.

eHealth in Action

eHealth stands to benefit from these developments and continuous improvement in digital tools such as mobile phones, social media and the internet, as well as the innovative application of Technology to health and medicine across disciplines. Beyond the need for quality and accessible healthcare, the rise of eHealth can be directed towards rising healthcare costs, competing interests amongst stakeholders, global clashes, and all-encompassing global inequalities.

These developments have created a broader comprehensive platform for digital health interventions such as Telehealth & Telemedicine, tele-follow-up, online support, and medical supply chain system improvements.

My Journey, At A Glance

1970s	Embarked on the medical journey as a student, with no kinds of technology in my purview.
1990s	Witnessed the advent of institutional email IDs and mobile phones.
2000s	Embraced evolving technologies: beepers, Minimal Access Surgery, HD, and 3D tech.
2020s	Experienced the surge of Telehealth during the global COVID pandemic.

Tech Wonders in Healthcare Technology

At the start of my career (1997), the only communication technology available to me was my Email. Now, I can study reports, facilitate remote consultations, track health, manage medication, issue diagnosis, and provide medical assistance to patients from around the world.

01 **Minimal Access Surgery**
Minimally invasive laparoscopic surgery for better patient care and results.

02 **Triple Chip Camera**
Advanced cameras with advanced colour resolution for better screening.

03 **K-4 Technology**
Precision and visualisation through K-4 and 3D Technology.

04 **Telehealth**
Remote consultations and follow-ups, further embraced during COVID.

05 **Video Consultations**
Saving time and expenses for patients travelling for check-ups

Technology in health care goes beyond the conventional benefits of internet-enabled communication and storage. Digital health technologies are a potent solution to promote equity and affordability to healthcare.

Internet in Healthcare

The Internet is an indispensable tool for communication, storage, and information access. Pretty much like industry in the world, no healthcare facility can be run without internet access.

From outpatient consultations to storing patient data, laboratory reports, imaging investigations, billing purposes, operation notes, and so much more. This revolutionary technology enables a smooth flow of information and stores data that can be accessed with a snap of fingers.

The Internet has revolutionised healthcare communication. From facilitating seamless communication among professionals to offering virtual consultations for accessible healthcare, it is everywhere.

From storing digitised patient records by enhancing accessibility and affordability nationwide, digitization is revolutionising healthcare delivery qualitatively by fostering accountability and precision.

It documents each and every step towards care of the patients.

The data thus generated can be used for academic, research and quality improvement.

Internet in Healthcare

The Internet is an indispensable tool for communication, storage, and information access. Pretty much like industry in the world, no healthcare facility can be run without internet access. From outpatient consultations to storing patient data, laboratory reports, imaging investigations, billing purposes, operation notes, and so much more. This revolutionary technology enables a smooth flow of information and stores data that can be accessed with a snap of fingers.

Exciting Developments in eHealth Sector

Health Information Exchange (HIE)

Blockchain in Healthcare

Remote Laboratory Services

Chatbots and Virtual Assistants

Conclusion

It's time to embrace technology in healthcare. Beyond the daily addition of new healthcare tools, our mission must be to transform hospitals and medical institutions into seamless, paperless environments. By fostering accountability and cultivating a culture of quality, we can create safe havens within these walls.

Imagine a world of healthcare that is safe from errors and human-made mistakes – that's where we should be heading. Bridging this gap is not just a need; it's a narrative of empowerment and enhanced care for all those who depend on the vital services of healthcare institutions.

RECAP

- The pandemic has catalysed significant global changes, impacting workforce, education, and healthcare.
- The World Health Organization emphasises the role of technological advancements in healthcare as a key driver of change.
- The WHO's strategic plan (2020–2025) highlights the potential of information and communication technology (ICT) to promote equity, affordability, and access to healthcare.
- The rise of eHealth addresses rising healthcare costs, global clashes, and global inequalities, providing opportunities for medical research and supply chain efficiencies.
- Embracing technology in healthcare is imperative for creating a seamless, paperless environment. The triumph of India's COVID vaccination program exemplifies technology's success in healthcare.

Professor Mahesh Chandra Misra, the former Director of AIIMS, New Delhi, dedicated an illustrious 37 years to the institution, leaving office on January 31, 2017. Notably, he played a pivotal role in the establishment and development of the AIIMS Trauma Centre, leaving an enduring mark on healthcare.

Throughout his esteemed career, Professor Misra held significant positions, including Chief of J P N Apex Trauma Centre and Head of the Department of Surgery at AIIMS, New Delhi. His expertise in surgery and leadership qualities contributed immensely to the institution's success.

Professor Misra's exceptional contributions have earned him prestigious awards and recognitions, including the Honorary Fellowship of the Royal College of Surgeons in Edinburgh and Glasgow in 2017 and 2012, respectively. He was honored with the DR B C Roy National Award by the Medical Council of India in 1996, presented by the President of India. In 2017, he became a member of the French Academy of Medicine.

His international recognition includes being a Fellow of the American College of Surgeons (FACS) and a member of the International Endohernia Society. Professor Misra's dedication to advancements in surgery is evident in his role as the Associate Editor of the International Journal of Abdominal Wall and Hernia Surgery.

Data-Driven Decision Making in Education

Mr. Ashok G Varghese
Prof. Chancellor at Hindustan Institute of Technology & Science

The author posits that traditional metrics such as grades and attendance, though time-tested, may no longer suffice in evaluating the holistic progress of students and teachers in the ever-evolving landscape of education. In the era of a technological revolution, marked by the unprecedented power of smartphones, data-driven decision making emerges as a transformative force.

A teacher is as good as the grades of their poorest performing students. For years, educational institutions in India have used grades and attendance as a way to track the progress of students, which later determines the performance of teachers. This systematic assessment, although effective, is archaic, as it doesn't take into account a wide number of factors. So, we're left with a burning question: Are grades and attendance the only way to track progress of academic learning of students?

The answer is, no. There are a host of tools and practices, and an entire world of data-driven decision making that is ready to be leveraged to measure and improve student and teacher performance.

Technology in Education

Data-driven decision making in education has the potential to revolutionise classrooms and significantly improve how teachers respond to student needs.

Moreover, it can lead to substantial time and resource savings, including the reduction of teaching hours. This technology has greatly increased educators 'opportunities to use data and analytics to track teacher performance and student understanding in real time. You can see how easily the teacher is imparting a lesson on Photosynthesis, and how well the students are comprehending it.

Data-driven decision making in education can transform classrooms and dramatically improve teacher responsiveness to students. This can also save time, resources, and crores in human labour hours every year.

Technology Advancements In the Arena

Since they are administered at the end of the year, it is difficult to use them for planning instruction. It is the stakeholders, namely Teachers, parents, students, administrators, that hold the entire responsibility and accountability in decision making.

01 **Pre and Post assessment**
Helps to plan instruction and interventions and make improvements.

02 **Formative Assessment**
Summarises the student's development at a particular time.

03 **Summative Assessment**
Includes end of year exams or state standardised tests.

Data-Driven Decision Making

In the realm of Data-Driven Decision Making (DDDM) in education, various tools and technologies play a crucial role in collecting, analysing, and interpreting data to inform instructional strategies and institutional improvements. Here are some key tools commonly used in the education sector:

- Learning Management Systems (LMS): LMS platforms like Moodle, Canvas, or Blackboard facilitate the organisation and delivery of educational content. These systems generate valuable data on student engagement, progress, and participation, providing insights into the effectiveness of online courses.
- Student Information Systems (SIS): SIS tools, such as PowerSchool or Infinite Campus, centralise student data, including demographics, attendance records, and grades. These systems enable educators and administrators to track student performance over time and identify trends.
- Data Analytics Software: Advanced analytics tools like Tableau, Microsoft Power BI, or Google Analytics are employed to process and visualise large datasets. These tools assist in identifying patterns, trends, and correlations in educational data on student behavior and learning outcomes.
- Assessment Tools: Platforms like Kahoot!, Quizizz, or Google Forms are used for creating and administering quizzes and assessments. These tools provide real-time data on student performance, helping teachers gauge comprehension levels and tailor instruction accordingly.
- Early Warning Systems: These systems, often integrated into SIS or LMS platforms, use predictive analytics to identify students at risk of falling behind or dropping out.

Benefits of Data-Driven Decision Making

Data-driven decision-making reduces the impact of personal biases and subjective opinions, ensuring that decisions are based on factual information rather than individual perspectives. Decisions are grounded in quantitative data, providing a more accurate and objective evaluation of situations, projects, or processes. Data analysis allows for more accurate predictions and forecasting. By examining historical trends and patterns, organisations can make informed decisions about future trends and potential outcomes. Data analysis helps organisations anticipate and mitigate potential risks, allowing for more proactive risk management strategies.

Collaborative Learning Materials

Educators can work together with students to co-create learning materials, enhancing engagement and tailoring content to individual needs.

Deeper Understanding

Data analysis provides a more profound insight into students' progress and results, enabling educators to identify areas where improvement is needed.

Personalised Learning

Data-driven insights allow for personalised learning experiences, addressing individual students' strengths and weaknesses.

Improved Learning

Data-driven decision-making streamlines the learning process, making it more efficient and effective.

Achievement Gap Closure

Pinpointing discrepancies in student performance and implementing targeted strategies, educational institutions can work to close the achievement gap.

Limitations of Data-Driven Decision Making

We've settled on the perks of building a data-driven organisation, which are plenty. However, transitioning from archaic systems of manual attendance, chalk-board, and percentile grading to a dynamic data-driven organisation is not a cakewalk. In fact, the road to digitalisation is paved with numerous commercial, technological, and adaptation challenges. After all, it's not just attendance and grades that need to be accounted for. The real challenge begins with the accounting of unstructured data, disconnected systems, and massive volumes of unstructured data lying across various platforms in the system.

Low Quality Data

The low data quality is one of the primary reasons behind the organisational reluctance to utilise data to support decision-making.

Limited Interpretation

Outdated systems to process real-time data to gain insights into the processes proactively makes it difficult to identify relevant data points to aid decision-making.

Insufficient Actionable Insights

Organisations lack advanced analytics capability and fail to unlock the power of artificial intelligence and machine learning to gain better insights much faster.

Lack of Data-driven Culture

Stakeholders hesitant to collaborate in the data management and analysis process which limits the adoption of data analytics tools.

Fostering A Data-Driven Culture

The connection between data-driven decision-making and continuous improvement in education is crucial, especially for educational institutions. Here are some key considerations to help foster a data-driven culture at your organisation as follows.

- **Invest in a First-Party Data Strategy**

Focus on gathering data directly from your customers to better understand their behaviours, preferences, and interactions with your business.

- **Prepare for Leadership Alignment**

Ensure top leadership understands the benefits of data-driven decision-making and aligns their strategies and goals accordingly.

- **Data Accessible For All**

Collect, organise, and maintain accurate data that is easily accessible to all relevant teams, fostering collaboration and informed decision-making.

- **Team Training And Tech Alignment**

Establish a shared vocabulary for data and provide training to equip your teams with the skills needed to interpret and leverage data effectively.

- **Turning Data Into Insights**

Transform collected data into valuable insights by analysing trends and customer behavior, then apply these insights to drive improvements and growth.

- **Connect Data Across All Channels**

Enhance existing data with additional information and create a unified view of your customers across various digital and physical touch points, facilitating tailored strategies.

Privacy Harm to Students

Social Harm

Over-Surveillance

Commercialisation

Age-Inappropriate Content

Equity Concerns

Conclusion

We've explored how effective educational leaders rely heavily on data to inform their decision-making, goal setting, and progress monitoring. They utiliSe data collected from students to identify needs, establish objectives, devise interventions, and assess progress. This information helps bridge the gap between student objectives and learning outcomes. Proficient data users employ various strategies to analyse data for enhancing teaching and learning, fostering institutional advancement. They actively involve the educational community, including teachers, parents, and students, in the process of utilising data to assess strengths, weaknesses, threats, and opportunities for the overall success of educational institutions.

RECAP

- Traditional assessment methods, such as grades and attendance, have limitations in providing a comprehensive view of student and teacher performance. Data-driven decision-making in education offers a vast array of tools and practices to measure and enhance academic progress, transforming the learning experience.
- The current technological revolution, with smartphones possessing immense computing power, empowers educators to utilise real-time data and analytics. Teachers can gauge the effectiveness of their lessons, track student comprehension, and make informed decisions, leading to substantial time and resource savings in the education sector.
- Educational disparities in India, evident in varying facilities and resources, can be addressed through data-driven tools. These innovations provide an opportunity to revolutionise approaches in impoverished regions, bridging the gap in educational quality and fostering inclusive learning environments.

Mr. Ashok is a distinguished professional with a strong educational background and notable achievements in various fields. He holds a degree in Mechanical Engineering and an MBA from Madras University, showcasing his commitment to both technical and managerial aspects. Additionally, he has enriched his knowledge through an Executive Management Program at Michigan University, USA.

As a member of several esteemed professional organisations such as MMA, IE, IEEE, SAE, ACM, and the American Institute of Aeronautics (AIAA), Mr. Ashok remains actively engaged in diverse fields, reflecting his broad interests and expertise. At an international level, he leads the prestigious IURC Panel of the European Union, representing the Circular Economy Project between Greater Chennai and Trier, Germany. Furthermore, he has been appointed as the Convenor for the FICCI Tamil Nadu Education Panel, showcasing his leadership in the education sector. Mr. Ashok's contributions have not gone unnoticed, as evidenced by his recognition as the Educational Entrepreneur of the Year, an award presented by Shri Pranab Mukherjee, Former President of India, during the ASSOCHAM National Education Summit. He is also a recipient of the IEEE Award for his significant contributions to engineering.

His innovative spirit is evident in the patents he holds, including one granted by the Government of India for an invention related to natural calamities and a German Innovation Patent titled "An IOT-based Intelligent Driver Assistance System." Mr. Ashok's impactful presence spans education, engineering, and innovation, making him a noteworthy figure in his field.

Data-Driven Decision Making in Education

Prof. (Dr.) Balvinder Shukla
Vice Chancellor, Amity University Noida

The author argues the benefits of a decentralised and secure technology like blockchain, and its possible impact on education. The advantages highlighted include creating tamper-proof records for student data, enhancing data security and privacy through decentralisation, providing open access for verification by authorised parties, and storing academic credentials securely on the blockchain.

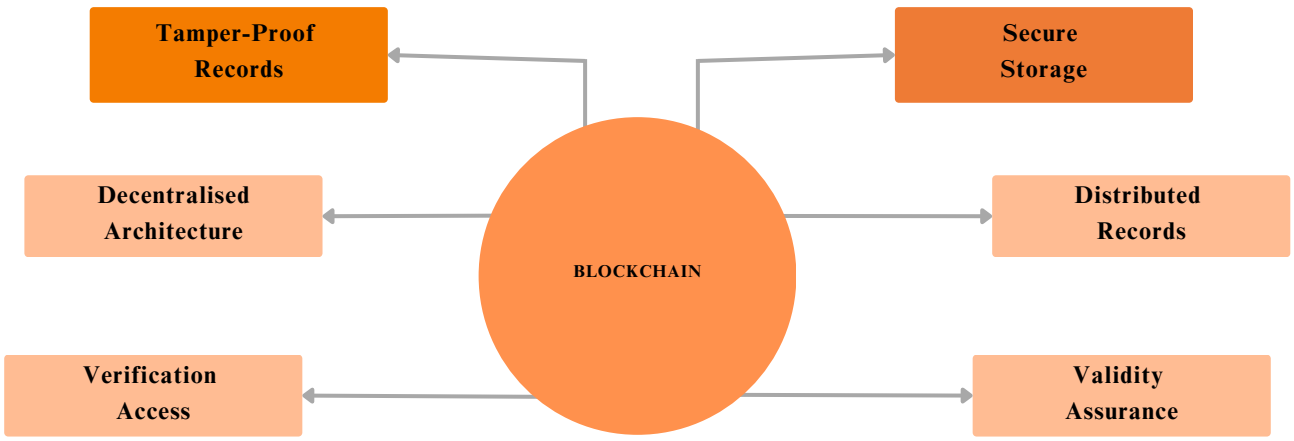
Blockchain is everywhere. It has proven to be a transformative force across various industries. From digital contracts to supply chain management, identity verification to voting systems — if you've ever sent or received money using Google Pay, you've benefited from blockchain technology. An area that stands to benefit from blockchain the most is education.

From academic certificates, degrees, and qualifications, there's tons of data that has to be taken care of in schools. How long will be hold on to the archaic ways of storing data locked in pages.

What is Blockchain Technology?

Blockchain technology is a decentralised and distributed ledger system that is used to record and verify transactions across a network of computers. Blockchain creates a permanent and secure history that's nearly impossible to change. This transparency and security can come handy when we're recording student data and education trends. But how? An education platform built on blockchain technology could revolutionise the way educational records are managed, transactions are conducted, and content is distributed.

The Multi-fold Advantages of Blockchain Technology in Education



Blockchain in Education

Transparency and Trust

Establishing transparency builds trust between job seekers and employers, reducing the risk of undetected degree fraud. A transparent and efficient solution is provided to combat this fraud, ensuring credibility in the employment process.

Reliability and Access

Blockchain in education ensures reliable systems and opens access to education is expanded to underserved populations, breaking geographical barriers. Records are securely stored and can be accessed by authorised figures.

Data Safety and Instant Verification

During enrolment, students' data is securely stored on the blockchain, allowing real-time verification and eliminating redundant data submissions. Smart contracts automate fee payments, ensuring quick and accurate transactions.

Decentralisation and Ownership

Blockchain's decentralised nature ensures education records aren't controlled by a single entity. Individuals gain ownership and control over their data, benefiting remote students with limited access to traditional institutions.

Smart Work Production and Efficiency

Integrating blockchain into educational processes streamlines tasks like enrolment and fee payment, reducing paperwork and delays. The automated workflows enhance efficiency in educational administration.

Contract Verification and Affordability

Blockchain-based smart contracts enable micro-authentication and micropayments, making education more affordable and accessible. Students can earn modular degrees and cultivate through diverse interests.

Benefits of Blockchain in Education

Information Security and Ownership	Clear guidelines must define how student information is stored, shared, and accessed on the blockchain, covering consent, data portability, and ownership of records.
Security & Verification Standards	Guidelines should establish security principles for storing sensitive educational data on the blockchain, encompassing encryption, access controls, and identity verification processes.
Interoperability & Standardisation	Policymakers should encourage the development of open standards enabling seamless interaction between various educational institutions and systems on the blockchain.
Intellectual Property Protection	Policymakers need to clarify how intellectual property rights for educational content shared on the blockchain will be preserved and enforced.

Blockchain Fundamentals To Keep In Mind

- Third-party Auditability Assurance
- Security and Verification Standards
- Information Security and Ownership
- Interoperability and Standardisation
- Accreditation Verification Procedures

Conclusion

In conclusion, the integration of blockchain technology into the education system holds immense potential for catalysing transformative change. The advantages of decentralisation, security, transparency, and accessibility can revolutionise the management of educational records and learning processes.

From tamper-proof student records to transparent degree verification, blockchain's impact on education is multifaceted.However, this transformative journey comes with challenges. The road to implementing blockchain in education requires a robust regulatory framework to address issues of data security, interoperability, accreditation verification, and intellectual property protection. Striking a balance between technological progress and ethical considerations is crucial to ensuring the integrity of educational processes.

As long as we remember that:

- Blockchain provides a decentralised and immutable ledger, ensuring that educational records, such as student credentials, certificates, and degrees, are secure and tamper-proof. This can reduce fraud and credential misrepresentation.
- Blockchain can be employed for secure and transparent financial transactions within the education sector. This includes handling tuition payments, disbursing financial aid, and tracking expenditures.
- Blockchain can be used to secure and manage intellectual property in academic research. It provides a transparent and traceable system for recording and protecting the ownership and usage rights of research findings.
- Smart contracts on the blockchain can automate various processes in education, such as enrolment, payment, and certification issuance. This reduces the need for manual intervention and ensures efficiency.
- Blockchain allows for the creation and recognition of micro-credentials, which are smaller, specialised units of learning. This promotes lifelong learning, and individuals can accumulate a verifiable record of their skills and achievements over time.

RECAP

- Blockchain technology, known for its decentralisation and security, can revolutionise education. It offers tamper-proof records for student data, enhances data security and privacy, provides open access for verification, and securely stores academic credentials, fostering transparency and reducing the risk of degree fraud.
- Blockchain addresses key issues in education, such as transparency, reliability, decentralisation, contract verification, data privacy, openness, and data confidentiality.
- It enables secure, transparent, and reliable management of educational data while promoting accessibility and addressing challenges like degree fraud.
- Implementing blockchain requires a robust regulatory framework. Key considerations include information security and ownership, security and verification standards, interoperability and standardisation, accreditation verification procedures, transparency and auditability assurance.

Prof. (Dr.) Balvinder Shukla is a distinguished academician with a rich educational background, holding an M.Tech from IIT Kharagpur and a Ph.D. from Queen's University, U.K. Renowned for her innovative contributions to academia, she is the visionary behind the unique Flexi Framework for the Choice Based Credit System and Outcome Based Education. Dr. Shukla has played a pivotal role in aligning Learning Outcomes and Operational Outcomes with the strategic plans of Amity University.

Her leadership has propelled Amity University to achieve numerous accolades and accreditations, including the prestigious NAAC (A+ Grade), WASC-USA, QAA-UK, IET-UK, FIBA-Germany, ACBSP-USA, IACBE-USA, EFMD CEL-Belgium, UNWTO TedQual, and RICS-UK.

Dr. Shukla's commitment to fostering entrepreneurship is evident through her initiatives such as Training the Trainer, Entrepreneurship Awareness Camps, Technology Entrepreneurship Development Programme (TEDP), and Women Entrepreneurship Development Programme (WEDP). These programs aim to inspire and cultivate the entrepreneurial spirit among students and budding entrepreneurs.

Her contributions have not gone unnoticed, as reflected in the numerous awards and recognitions she has received, which includes:

- Distinguished Academician and Outstanding Administrator Award (2012)
- Outstanding Leader in Education & Person of the Year Award (2013)
- Newsmakers Achievers Award (2014)
- 100 Most Influential Directors of India Award (2016)
- Peacemakers Award (2017)
- Eminent Engineer Award (2017)
- Outstanding Contribution to Education Award (2017)
- Women ENABLER Award (2018)
- Phenomenal She Award (2019)

Dr. Balvinder Shukla stands as a beacon in academia, recognised for her exceptional leadership, innovation, and dedication to education.

Blended Learning Models in Indian Schools: Enhancing Traditional Education with Digital Innovations

Mr. Abhishek Kumar Yadav
Founder & Chairman, Griffins International School

The author argues the benefits of a decentralised and secure technology like blockchain, and its possible impact on education. The advantages highlighted include creating tamper-proof records for student data, enhancing data security and privacy through decentralisation, providing open access for verification by authorised parties, and storing academic credentials securely on the blockchain.

COVID-19 was a tragedy like never before. It affected all the facets of personal, social, and educational life. The social distancing and lockdowns forced all to embrace technology like never before. At homes, and in schools. We overcome the challenges of not being able to socialise with collective effort. With remote learning, we had the chance to continue business as usual.

While online education was hailed by many as the holy grail for student learning, it quickly became clear that while online education brought in many benefits like personalised learning and a special focus on technical skills, the digital hangover became too much for the students.

Blended learning not only offers the flexibility to cater to diverse learning styles but also empowers students to take control of their learning pace and path.

Introduction to Blended Learning

Blended Learning is the literal "blending" of different methods of learning to improve the teaching and learning experiences of students. The blending could be used both offline traditional methods and digital methods. It is the best of both the traditional classroom as well as technology.

Blended learning combines the best aspects of online educational content delivery with the best aspects of classroom interaction and live instruction to personalise learning, allow thoughtful reflection, and differentiate instruction from student to student across a diverse group of students. It represents an opportunity to combine online learning's innovative and technological breakthroughs with engagement.

Benefits of Blended Learning

Before we proceed with the implementation of blended learning models, we need to understand the advantages of blended learning and how it would work in the direction of achieving quality education as desired and envisaged by NEP 2020.

In addition to fostering a more dynamic and interactive learning environment, blended learning prepares students for the digital skills required in the 21st century workforce.

Flexibility

Blended learning provides flexibility in terms of when and where students can learn. They can access online materials and resources at their own pace and convenience, accommodating different learning styles and schedules.

Personalisation

Blended learning allows for personalised learning paths. Students can receive tailored instruction and additional resources based on their individual needs and progress, promoting a more effective learning experience.

Engagement

The combination of in-person and online components can make learning more engaging. Interactive online resources, multimedia content, and digital tools capture students' attention and enhance their understanding of the subject matter.

Accessibility

Blended learning makes education more accessible to a wider range of students. Those who face geographical or physical limitations can access quality education through online components.

Cost-Efficiency

Blended learning can reduce the costs associated with traditional classroom-based education, such as commuting, textbooks, and classroom space. It can also lead to cost savings for educational institutions.

Self-Paced Learning

Online components enable self-paced learning, allowing students to progress through materials at their own speed. This flexibility helps students who need more time to grasp concepts or those who want to accelerate their learning.

Different Models of Blended Learning

The choice of blended learning models depends on factors like the subject matter, the age group of students, available resources, and educational objectives. Each of these offer unique advantages and can be tailored to meet the specific needs and goals of educators and learners. Effective implementation of a blended learning model requires careful planning, technology integration, and ongoing assessment of its impact on student learning outcomes. Here are the leading ones:

FLIPPED MODEL

Students learn content online outside of class and use in-class time for interactive discussions and activities, promoting active learning.

ROTATION MODEL

Students rotate between in-person and online activities based on personalised learning paths.

A LA CATRE MODEL

Students select online courses in addition to in-person classes, offering flexibility in curriculum.

ENRICHED VIRTUAL MODEL

Most learning is online, with regular face-to-face interactions for discussions, labs, or projects.

HYBRID MODEL

Combines in-person classes with online activities and assignments.

SELF-BLEND MODEL

Students add online courses or resources to complement traditional education.

ONLINE DRIVER MODEL

Primary online courses with occasional in-person interactions for assessments or special activities.

FACE-TO-FACE MODEL

In-person instruction with online components for support or additional resources.

The Flipped Classroom Model

The Flipped Classroom model is an innovative approach to teaching and learning that reverses the traditional educational process.

Here are its fundamentals:

- Pre-Class Learning: Students prepare by studying content before class.
- In-Class Activities: Class time focuses on interactive and hands-on activities.
- Teacher Facilitation: Teachers guide and support rather than lecture.
- Self-Paced Learning: Students learn at their own speed.
- Active Engagement: Students actively participate in discussions and projects.
- Accessibility: Materials are available online and at any time for flexible learning.
- Higher-Order Thinking: Emphasis on critical thinking and problem-solving.
- Homework as Preparation: Homework readies students for in-class engagement.

Self-Blended Model

The Self-Blended Model of learning, also known as the Self-Paced Blended Learning Model allows students to take control of their learning

Here are its fundamentals:

- Student Autonomy: Students have more control over their education, choosing online resources to meet their goals.
- Blended Components: Combines in-person instruction with online materials, including videos, simulations, and assessments.
- Self-Paced Learning: Students can learn at their own speed, revisiting content as needed.
- Customisation: Highly personalised learning, allowing students to explore topics of interest or receive extra support.
- Teacher Guidance: Educators offer support, answer questions, and facilitate activities when necessary.
- Variety of Resources: Online resources come in various formats, catering to different learning preferences.

Hybrid Classrooms

Hybrid Learning model brings the elements of both traditional in-person classroom instruction and online learning together.

Here are its fundamentals:

- Blend of In-Person and Online Learning: Combines traditional classroom sessions with online content delivery.
- Flexibility: Students can choose between attending in-person or accessing online materials.
- Online Content: Course materials, lectures, and assignments are available online.
- In-Person Interactions: Face-to-face sessions focus on interactive activities.
- Blended Instruction: Instructors combine traditional and online teaching methods.
- Student Autonomy: In the Self-Blended Model, students take on a more active role in their education. They have the freedom to select and engage with online learning resources based on their preferences and learning goals.

Blended Learning in Schools

Blended learning strategies help in making the classroom more engaging and thus motivate students to learn. Instructors and teachers could make use of the project-based approach so that students are more interested.

- Collaborative Work: Blended learning provides a virtual classroom environment that is ideal for collaborative work. It helps students to solve their problem-solving skills and benefit from new learning perspectives.
- E-learning Work: E-learning contents are being accessed by the students. To a great extent, different e- contents of similar and same topics are being accessed. That gives a clear concept regarding the topic.
- Physical Classroom: Inclusion of digital monitors in the classroom.
- Graphical Contents and illustrations: Proper illustrations with the aligned subjects are being produced to the students to make them understand.
- Hands on instruction: practical implications experience gives students the tools to face the problems in the real world.

Challenges In Implementing Blended Learning

Challenges of new educational technology for blended classrooms grows with tools such as interactive displays that help overcome hurdles by offering focal points. It's certainly not a walk in the park.

Here are the top challenges in implementing blending learning.

Buying the Right Classroom Technology

Balancing Class and Student Progress:

Lack of Awareness

Budgeting Issues

Inadequate Training

Conclusion

The success of any blended learning implementation is determined in the planning stage and taking proper follow ups of the implementation. India is moving with great success in this at par with the other developed nations. The crucial need of the hour is the active role and participation of the government in educating about the program among the Indian educators. Resisting new ideas is common but accepting and moving with a solving attitude is the foremost thing that is required to move ahead.

RECAP

- Blended learning, blending traditional and digital methods, offers flexibility, personalisation, engagement, accessibility, cost-efficiency, and prepares students for digital skills. The article discusses various blended learning models like the Flipped Classroom, Hybrid Classrooms, and Self-Blended Model, each catering to specific educational objectives.
- Challenges faced in implementing blended learning models in Indian schools include selecting the right classroom technology, lack of awareness, balancing class and student progress, budget constraints, and inadequate training for educators.
- Solutions proposed involve ensuring equitable access to technology, creating awareness and training programs for educators, redefining the roles of facilitators, monitoring participant progress, and accepting that overcoming challenges is integral to the success of blended learning.
- The success of blended learning depends on meticulous planning and active government participation.

Abhishek Kumar Yadav is a distinguished figure in the field of education and entrepreneurship, holding key leadership positions across various ventures. As the Founder Chairman & Academic Director of Griffins International School, he has played a pivotal role in shaping the institution's success.

In addition to his role at Griffins International School, Abhishek Kumar Yadav serves as the Managing Director at Scholars Den Kharagpur and holds the position of Director at GAVA Ecocrete Private Limited, showcasing his diverse interests and entrepreneurial acumen.

His contributions have been recognised through several prestigious honors and awards. Notably, Griffins International School was acknowledged as one of India's "Top 100 Emerging Brands" in April 2021 by ABP News Network & Businessworld Magazine. The school also received the "Institution of Happiness" Award from QS I-Gauge in May 2022, highlighting its commitment to happiness and well-being in education.

Abhishek Kumar Yadav himself has been acknowledged in the "40 under 40" list by Businessworld in August 2022, recognizing individuals under 40 years of age who have made significant contributions to the education sector. Further, he was honored with the "Young Alumni Achievers Award 2022" by the Indian Institute of Technology, Kharagpur, reflecting his outstanding achievements and leadership.

Innovations in Classroom Technology: Enhancing Learning in the Digital Age

Ms. Aparna Erry
Principal, DAV Public School, Gurugram

The author talks about the advantages of incorporating digital tools in education. From personalising experiences to improving student-educator collaborations, the potential of technology is unlimited and must be explored. The author also dials in on the transformative potential of AR, VR, and AI. Included also is a deep dive on the importance of creating an inclusive and accessible educational environment that promotes self-learning and growth.

Classroom Technology is a transformative force that's heralding a new era of learning in the Digital Age. As traditional teaching methods evolve, these technological advancements play a pivotal role in enhancing the educational experience for both educators and students. In the pursuit of fostering adaptable and engaging learning environments, classrooms are now equipped with cutting-edge tools and resources, embracing a digital paradigm that goes beyond textbooks.o much for the students.

Initiatives At DAV, Sector 14, Gurugram

At DAV, Sector-14, Gurugram, our primary mission is to empower students with the latest technology, ensuring they remain abreast of advancements in the ever-changing digital landscape. Encouraging adaptability in the face of a dynamic world, we prioritise maximising the benefits of an advanced learning experience.

Recognising the indispensability of digital learning tools for both educators and students, we have embraced innovative technologies wholeheartedly. These tools excel in engaging students, fostering collaboration, and efficiently streamlining administrative tasks. Students, in turn, derive immense value from interactive and personalised learning experiences tailored to their unique needs and preferences.

The digital tools we employ not only provide easy access to a wealth of educational resources but also significantly reduce the time spent on material searches, ensuring that students always have access to the most up-to-date content. In this digital era, our commitment is underscored by the belief that education should be dynamic and adaptive.

Augmented and Virtual Reality in Teaching

AR and VR technologies serve as dynamic tools, transporting students to otherwise inaccessible places. Educators integrating these technologies empower students with immersive and interactive lessons, enhancing their ability to explore, interact, and comprehend complex subjects. This approach not only prepares them for a technologically driven future but also fosters a deeper understanding of intricate concepts in both education and beyond.

Advantages of Digital Tools for Educators and Students

Flexible Learning Tools	Digital tools empower a blended learning approach, granting students the flexibility to access materials and engage at their convenience.
Inclusive Education Tech	Ensuring equal access to educational content, digital tools create an inclusive environment catering to students with disabilities.
Personalised Learning Choices	Facilitating personalised learning, digital tools enable students to choose modalities aligning with their unique learning styles and needs.
Dynamic Interactive Environments	Digital tools contribute to dynamic and interactive learning settings, fostering improved understanding and productivity among students.
Educator's Personalised Toolkit	Educators leverage digital tools for personalised instruction, incorporating adaptive quizzes, personalised content, and self-paced learning modules.
Seamless Collaboration Tools	Collaboration tools like Microsoft Teams, Flipgrid, and Wakelet facilitate seamless communication, fostering a sense of community and enhancing class discussions.
Real-time Feedback Systems	Assessment and feedback platforms such as Edpuzzle and Nearpod provide real-time insights, enabling immediate feedback for students and informing teaching strategies.
Creative Expression Platforms	Creative expression tools like Sway and Inklewriter encourage students to express themselves creatively, nurturing critical thinking and problem-solving skills.

Educational Technology Learning Curve

Understanding one's position on the learning curve is essential for effective education. Platforms such as Khan Academy, Duolingo, and CoursEra offer educators valuable insights into students' progress through their content.

In the realm of educational technology, these platforms act as invaluable tools, empowering educators to fine-tune their approach and foster a more responsive and tailored learning environment.

Digital Tools for Equity in Education

Digital tools emerge as allies in crafting a more inclusive and accessible educational environment. They serve as equalisers, accommodating students with diverse needs and transforming the learning journey to ensure an equitable playing field. Moreover, digital tools play a crucial role in promoting equity in education. They can address various learning styles, preferences, and abilities, making education more adaptable to individual needs. Here are some ways in which digital tools contribute to equity in education:

Teaching with Data-Driven Insights

Recognising the diversity in student learning, data-driven insights empower educators to craft personalised assignments aligned with each student's proficiency level and learning pace. These insights provide a comprehensive overview of student performance over time, allowing teachers to track grades, attendance, and participation trends. Identifying struggling students or those in need of additional challenges becomes more precise through this analytical approach.

Utilising platforms like Microsoft Teams, the "INSIGHTS" feature offers a detailed analysis of students' performance and engagement, providing educators with valuable information to refine their teaching strategies. assess class engagement metrics, and offer timely feedback. In the era of data-driven education, these platforms empower educators to tailor their approach and foster a more effective and responsive learning environment.

Tools for Kids with Learning Disabilities

Digital tools offer substantial benefits to students facing challenges in reading and writing. Others include:

Immersive Reading Tools like Microsoft's Immersive Reader or Read & Write provide features such as text-to-speech, adjustable font styles, and line spacing, significantly aiding students with dyslexia and other reading difficulties. Which include:

- Speech recognition tools like 'Dictate' assist those with writing difficulties and motor skill limitations, enhancing efficiency in reading and writing tasks.
- Apps like OneNote or Evernote empower students to take notes while recording audio, catering to those struggling with traditional note-taking methods.

Challenges and Considerations in the Digital Era

This journey into the digital era brings forth complexities that, if left unaddressed, can overshadow the advantages technology brings to the realm of education. From navigating a learning curve to ensuring equitable access, and from safeguarding privacy to promoting responsible use – understanding and overcoming these challenges are integral to harnessing the full potential of educational technology.

Balancing Advantages with Challenges

While digital tools offer myriad educational benefits, they come with challenges. Distractions from internet and social media, excessive screen time, and the pressure to adapt to evolving technologies can induce stress and anxiety among students.

Educators Facing the Digital Transition

Teachers encounter a learning curve in adopting and effectively using digital tools, with challenges such as unequal student access to technology and potential privacy concerns. Balancing traditional teaching methods is more crucial than ever.

Responsible Use of Technology

Mitigating challenges involves promoting responsible use of technology. This includes providing students with digital literacy skills, striking a balance between traditional and tech-based education.

Educational Technology Learning Curve

Understanding one's position on the learning curve is essential for effective education. Platforms such as Khan Academy, Duolingo, and CoursEra offer educators valuable insights into students' progress through their content.

Digital Transformation: The Future of Education

Digital tools offer extensive educational benefits, understanding and addressing associated challenges and concerns is essential for a balanced and effective learning environment. The future of education embraces innovation, personalisation, and a harmonious integration of technology into traditional teaching methods.

Digital transformation in education represents a significant shift in the way learning is approached, delivered, and experienced. It encompasses the integration of technology into all aspects of education, from teaching methods and curriculum development to administrative processes and student engagement. Digital tools enable personalised learning experiences tailored to individual student needs and preferences. Adaptive learning platforms, data analytics, and artificial intelligence contribute to creating customised learning paths, allowing students to progress at their own pace and focus on areas where they need additional support.

The rise of online and blended learning models provides flexibility in education. Students can access course materials and engage in discussions from anywhere, fostering a more inclusive learning environment. Blended learning combines traditional classroom instruction with online components, offering a balance between face-to-face interaction and digital resources.

The future of education involves a shift towards lifelong learning. Digital platforms offer opportunities for individuals to acquire new skills and knowledge throughout their lives, and micro-credentials provide a flexible way to validate and showcase specific competencies.

Digital transformation facilitates global connectivity in education. Students can collaborate with peers and experts from around the world, gaining diverse perspectives and cultural awareness. Virtual exchange programs, online collaborations, and international partnerships contribute to a more interconnected and globally aware educational experience.

KEY TRENDS AND SHIFTS

The future of education is poised for transformation driven by digital tools and blended learning approaches. Key trends include innovation, personalisation, a shift from lecture-based teaching to experiential learning, and a focus on real-world applications of knowledge.

GLOBAL CONNECTIVITY

Digitalisation connects students globally, fostering cross-cultural collaboration and exposure to diverse perspectives. Virtual classrooms transcend geographical boundaries, enriching the learning experience.

DATA ANALYTICS

Education will harness data analytics, with predictive analytics identifying student needs for early intervention and personalised support. Digital tools will facilitate continuous skill development and career adaptability in an ever-evolving job market.

SELF-DIRECTED LEARNING

Digitalisation intensification will streamline administrative processes, enhance communication, and optimise resource allocation. Teachers will transition into facilitators and guides.

Conclusion

At DAV Sector 16, Gurugram, the integration of digital tools has been pivotal in shaping a modern and effective educational environment. The institution has embraced the transformative power of technology to equip students with the necessary skills and knowledge. The emphasis on innovation and adaptability is evident in how digital learning tools have become indispensable for both educators and students.

Considering everything discussed, it's clear that the future of education is heading towards innovation, hands-on learning, and practical instruction, all fueled by increased reliance on digital technology. This shift aims to prepare students with the skills needed to thrive in our rapidly changing world, placing emphasis on continuous learning and adaptability. As digital tools keep evolving, they won't just be tools but catalysts for transforming the educational landscape. In essence, we're looking at a future where education isn't static but a dynamic force, empowering individuals to confidently navigate the complexities of the modern world.

RECAP

- Recognition of diverse learning needs is facilitated by data-driven insights that empower educators to create personalized assignments based on individual proficiency levels and learning paces.
- Teachers face a learning curve in adopting digital tools, dealing with challenges like unequal student access to technology and potential privacy concerns.
- Balancing traditional teaching methods becomes more critical than ever as educators navigate the integration of digital tools into their teaching practices.
- While digital tools offer numerous educational benefits, challenges such as distractions from the internet and social media, excessive screen time, and the pressure to adapt to evolving technologies can induce stress and anxiety among students.
- Addressing these challenges is crucial for harnessing the full potential of educational technology, including navigating learning curves, ensuring equitable access, safeguarding privacy, and promoting responsible use.

Mrs. Aparna Erry, the Principal of D.A.V. Public School, Sector-14, Gurugram, brings over 22 years of rich administrative and managerial experience in the education sector. Her noteworthy contributions and leadership roles have significantly impacted the educational landscape.

Mrs. Erry has been entrusted with key responsibilities by CBSE, serving as the City Co-ordinator for Teacher's Eligibility Tests and taking on roles such as DLC (District Level Coordinator) for the National Achievement Survey (NAS) in November 2021. Her diverse roles include Chief Nodal Supervisor, Centre Superintendent, Inspection Committee Member, and more, showcasing her multifaceted expertise in educational administration, standards and initiatives.

Demonstrating her commitment to collaborative educational efforts, Mrs. Erry chaired the Gurgaon Progressive Schools Council from May 2019 to July 2021, highlighting her leadership in the educational community at the local level. Additionally, she served as an Executive Committee Member of the National Progressive Schools Council (NPSC), contributing to educational initiatives on a broader, national scale.

How Practical Learning is Strengthening the Connection Between Education and the World of Work

Mrs. Mamta Nanda
Principal, Ryan International School, Rohini

The author presents the significance of practical learning in education, stressing its application in real-world contexts. Using Ryans as a case study, the G-6 Learning Program, adapted during the pandemic, illustrates the value of hands-on experience in developing skills and fostering adaptability. The school's commitment extends to environmental stewardship, disaster management, and STEAM education, promoting creativity and critical thinking.

Practical learning is an educational approach that emphasises on application of knowledge and skills in real-world contexts. Unlike traditional classroom learning, which often focuses on theoretical concepts and abstract ideas, practical learning is centred around direct, firsthand experiences. Across different schools, one may see the concept of practical learning spoken about differently. Some schools refer to work-integrated learning or WIL, some connect everything to "co-op" opportunities. Practical learning and work-integrated learning can be used synonymously. They're opportunities for students to build their skills, and community partners to get student support.

> ***"We learn by example and by direct experience because there are limits to the adequacy of verbal instruction."***
>
> ***~Malcom Gladwell***

Case Study
Ryans Practical Learning Program

Keeping up with this dynamic and fast-moving world requires us to equip our students with practical and first-world knowledge and experiences. What students presently learn in the classroom today is crucial to build their foundations, but it nowhere suffices their total academic needs.

Especially when it comes to building a life and a career out in the world. Hence more than textual knowledge, the focus should be that the learners should be able to adapt, learn and evolve at any point.

We, at Ryans, understand that the essence of true learning is through doing. Our G-6 Learning Program, heralded by esteemed mentors Dr. A.F. Pinto and Madam Dr. Grace Pinto, aims to achieve just that. In our flagship program, students are divided into a group of six, and each group is tasked with various worldly and relevant activities.

As the pandemic ensued, we, along with our students quickly adapted to a digitised version of the G-6 program. Our online mega event RISTHETICA, handled solely by the students, sought to empower our young learners with tasks such as website design, brochure making, building registration forms, certificate design, etc.

Practical Learning Activities

Living by our promise for an all-around education that is rooted in practical lessons, we launched the Community Transformation Project that aims to empower our local community through collaborative efforts and sustainable initiatives. From education to skill development, and social engagement, we aspire to create a positive and lasting impact on our students. Our commitment is evident in our efforts.

Community Transformation At Ryans

The community actively engages in various initiatives aimed at creating a positive impact and fostering a sense of responsibility. Regular clean-up drives contribute to maintaining a pristine environment, involving activities such as picking up litter, planting trees, and ensuring cleanliness in the surroundings. Additionally, the community organizes food drives, collecting non-perishable items to support families in need, particularly in Pansali village and neighboring areas. The commitment extends to mentorship programs that foster connections between students and community members, providing guidance and support. Environmental campaigns play a crucial role in raising awareness about pressing issues like recycling and water conservation. Furthermore, initiatives promoting health and wellness prioritize both physical and mental well-being within the community. The community's dedication is further demonstrated through the organization of fun-loving and educational activities tailored for underprivileged children, aiming to enrich their lives and provide valuable learning experiences.

Environment Initiatives

Our school is committed to fostering environmental stewardship through a multifaceted approach. Recycling programs for plastic, glass, and other materials encourage active participation from both students and staff in waste sorting and recycling.

Tree-planting events not only enhance our surroundings but also contribute to combating climate change and supporting biodiversity. Additionally, our school organises eco-friendly events and competitions, fun and educational platform to express their environmental concerns and creativity.

STEAM Education

STEAM (Science, Technology, Engineering, Art, aND Mathematics) is an interdisciplinary approach to foster students' creativity, critical thinking, and problem-solving skills. We integrate this in our school through diverse disciplines, and encourage students to explore, create, and solve real-world problems. This prepares them to become well-rounded and adaptable individuals in an increasingly complex and interconnected world.

It is also important to acquaint students with cultures of different worlds. Exposing them to various exchange programs is a real solution to this question. At Ryans, we host the annual International Theatre Festival, with guests pouring in from more than 20 countries. The foreign exchange program is a unique way to bring children from different countries together.

Safety Training

We prioritise the safety and preparedness of our students through various initiatives. This includes regular fire and emergency evacuation drills to ensure that students are familiar with evacuation routes and assembly points in times of immediate danger. Earthquake drills teach the "Drop, Cover, and Hold on" technique for protection during seismic activity, while annual fire safety training sessions conducted by experts emphasise fire prevention and appropriate responses.

Students actively participate in creating emergency response plans for diverse scenarios, including severe weather or medical emergencies.

Conclusion

Practical learning emphasises hands-on experiences, allowing students to apply theoretical knowledge in real-world contexts. This approach bridges the gap between classroom learning and the skills needed in the professional world. It encourages collaboration between students from different disciplines. This interdisciplinary approach mirrors the diverse and collaborative nature of many workplaces, preparing students for cross-functional teamwork.

We are proud of our work at Ryan's, and understand that we're just getting started and there's much to explore. By integrating these practical learning initiatives, schools can ensure that children are not just learning from textbooks but are actively engaged in meaningful, real-world experiences that prepare them for the challenges and opportunities they will encounter in their future endeavours. By strengthening the connection between education and the world of work, practical learning equips students with the skills, knowledge, and mindset needed to navigate the complexities of their chosen professions. This approach not only enhances employability but also contributes to a more seamless transition from academia to the professional realm.

RECAP

- Practical learning provides students with a hands-on experience that goes beyond traditional classroom instruction. It involves applying knowledge and skills in real-world contexts, fostering a deeper understanding of concepts through direct experience.
- Cultural exposure through international events and language proficiency exams enriches students' global perspectives. Practical learning, as demonstrated by Ryan's Practical Learning Program, extends beyond the local context, exposing students to diverse cultures, ideas, and opportunities.
- Exposure to international projects, exchange programs, and language proficiency exams further broadens students' horizons, making them well-rounded individuals prepared for the challenges of the modern world.

Mrs. Mamta Nanda is the current Principal of a K12 school, a role in which she brings a wealth of experience and expertise. Her extensive teaching background spans from Kindergarten to 12th grade, providing her with a comprehensive understanding of the educational journey at various levels.

Navigating the administrative landscape, she possesses expertise in meeting the requirements of both CBSE and the Directorate of Education. This ensures that the school operates in compliance with regulatory standards, fostering a conducive learning environment.

As a visionary leader, she integrates past experiences to shape the future of the school. A staunch advocate for teamwork and collaborative leadership, she believes that collective efforts lead to greater success. Values such as integrity, organisational prowess, and effective communication form the foundation of her leadership approach, contributing to a positive and transparent school culture.

Committed to the school's mission, she aligns her strategies with management goals to ensure a unified and purposeful direction. Embracing the philosophy of "leading by example," she strives to inspire and motivate both staff and students to reach their full potential.

Empowering Educators: Strategies for Teacher Professional Development and Well-Being

Dr. Sujeet Eric Masih
Principal, Apeejay School, Saket

The author discusses the transformative impact of artificial intelligence (AI) on education, particularly in the context of the Indian educational system. The author emphasises the need for educators to adapt to the changing landscape of education driven by technology.

Educators are grappling with the imperative to realign themselves with the ever-evolving needs and roles of education. The infusion of technology, particularly AI, is at the forefront of this revolution, reshaping traditional paradigms and offering new possibilities for learning and collaboration. Education stands at the precipice of a profound transformation, propelled by the integration of artificial intelligence (AI). The influence of AI extends across critical dimensions of education, including accessibility, quality, pedagogy, and global integration. As we navigate this landscape, we delve into the intricate dynamics of remote learning, the interactive essence of technology, and the pivotal role educators play in this digital era.

Global Impact of Technology on Education

Technology acts as a catalyst, enabling students worldwide to transcend geographical boundaries. It facilitates participation in standardisation exams such as SAT, GRE, GMAT, IELTS, and TOEFL, fostering a global community of learners. This interconnectedness extends to educational partnerships across the globe.

The recent upheavals, such as the COVID-19 pandemic, underscore the essential role of remote learning in maintaining educational continuity. Digital classrooms, with their adaptability and focus on student needs, became a lifeline, demonstrating the resilience of education in the face of adversity.

New Learnings & New Ideas: Interactive Learning and Technology

Efficient Use of Technology

Efficient and effective use of technology is paramount to maintaining a balance between perceptions, feelings, and motivation. When wielded adeptly, technology transforms regular learning into a highly interactive and impactful experience. Class projects, role discussions, group games, presentations, and research skills thrive in this dynamic environment.

Educator's Role in Interactive Learning

Educators serve as architects of interactive learning experiences, leveraging technology to enhance traditional teaching methods. The integration of technology is not a replacement but a complementary force, amplifying the effectiveness of educational initiatives and fostering continuous learner engagement.

Role of Educators in a Digital Classroom

Professional Development Through Technology

Teachers, as the architects of the educational experience, wield immense influence in shaping the learning journey of students. In the contemporary educational landscape, the integration of technology has become pivotal, transforming traditional classrooms into dynamic digital spaces. For this transformation to be effective, teachers must not only embrace technology but also be equipped with the necessary skills to navigate the intricacies of a digital classroom.

The evolution of education towards a technology-infused paradigm necessitates a paradigm shift in the way teachers approach their roles. Beyond traditional teaching methods, educators must integrate digital tools seamlessly into their pedagogical practices.

Managing School Processes with Technology

In the ever-evolving landscape of education, the integration of technology is not confined to the classroom alone; it extends to the efficient management of school processes. Recognizing the need for streamlined and tech-enabled administrative functions, educators are increasingly turning to Education Management Systems (EMS) to create seamless dashboards that revolutionize the way schools operate.

Education Management Systems (EMS) serve as comprehensive platforms designed to optimize and centralize various administrative tasks within a school. From attendance tracking and grade management to communication and resource allocation, these systems bring efficiency and transparency to school processes.

Techcholog & Access to Quality Education for All

Breaking Down Barriers

The intersection of technology and education has the potential to revolutionize access to quality learning experiences for all. By leveraging technology, educators can create inclusive learning environments that cater to diverse learning styles and accommodate individual needs. This section explores how technology can be a powerful tool in ensuring equitable access to education and fostering a culture of continuous learning.

Digital and online platforms serve as equalisers, breaking down socio-economic barriers to education. The narrative of a farmer's son reaching Harvard is not an anomaly but a testament to the transformative power of technology. Education, once reserved for the socially advantaged, now transcends all barriers of life chances.

Change Across Sectors

Technology acts as a bridge, narrowing the gap between urban and rural educational opportunities. Through online platforms, learners in remote areas gain access to the same quality education as their urban counterparts, breaking down geographical barriers and creating a more equitable educational landscape.

Intertwining narratives of breaking down barriers and the transformative impact of technology across sectors underscore the pivotal role technology plays in reshaping our societal fabric. Technology has been a transformative force, not just in education but across various sectors. As we navigate this transformation, a cautious approach is paramount to ensure the responsible use of technology.

Conclusion

In the exploration of technology's profound impact on education and beyond, we witness a narrative of transformation that transcends traditional boundaries and reshapes the fabric of our society. The tale of a farmer's son excelling at Harvard is emblematic of the democratization of education, made possible by the equalizing power of digital and online platforms. What was once an anomaly now stands as a testament to the vast potential of technology to break down socio-economic barriers, offering educational opportunities to individuals irrespective of their background.

As we celebrate the achievements facilitated by technology, it is imperative to tread carefully on this transformative journey. With the power to shape societies with a simple click, responsible use of AI and technology ensures a future where education remains a beacon of empowerment, unlocking the world of learning for all.

RECAP

- The integration of technology, particularly artificial intelligence (AI), is revolutionising education, offering new possibilities for learning and collaboration. Educators are urged to adapt to this changing landscape driven by technology.
- Recent upheavals, such as the COVID-19 pandemic, highlight the essential role of remote learning in maintaining educational continuity. Digital classrooms demonstrate adaptability and student-focused approaches, serving as a lifeline during challenging times.
- Digital platforms serve as equalisers, breaking down socio-economic barriers to education. The transformative power of technology is evident in narratives of students overcoming traditional limitations and create a more inclusive educational landscape.

Dr. Sujeet Eric Masih, an esteemed educator and the dedicated Principal of Apeejay School, Saket, stands at the forefront of transformative educational leadership. With a rich tapestry of experience in the field, Dr. Masih has emerged as a beacon of innovation, focusing on empowering educators and fostering a culture of continuous professional development and well-being.

As the Principal of Apeejay School, Saket, Dr. Sujeet has cultivated an environment that encourages creativity, collaboration, and ongoing learning. His leadership style is characterized by a rare blend of empathy and strategic foresight, creating a space where teachers feel supported in their professional growth and personal well-being.

Beyond his administrative role, Dr. Sujeet Eric Masih is a passionate advocate for the dissemination of effective strategies in teacher professional development. His upcoming book, "Empowering Educators: Strategies for Teacher Professional Development and Well-Being," promises to be a comprehensive guide for educators, school administrators, and policymakers seeking to foster a culture of continuous learning and wellness within educational institutions.

How Technology is Reshaping the Future of Indian School Education

Mrs. Arti Bahadur
Principal, Ryan International School, Vasant Kunj

The author argues for a proactive stance in response to global economic shifts, emphasising the anticipation of India's growth and the changing economic landscape. The document underscores the imperative for a diverse skill set to meet evolving demands. The author asserts education's pivotal role in character building, aiming to nurture ethical, rational, compassionate individuals ready for gainful employment.

The National Education Policy (NEP) 2020, that came after three decades of assimilation and compilation, has emerged as a landmark initiative in redefining India's educational trajectory. Rooted in the principles of accessibility, equity, quality, and inclusivity, this policy is poised to shape the education landscape as India approaches its 100th year of independence.

The NEP 2020 was developed with the desire to promote an equitable and just society, through the means of quality universal education. India will have the highest population of young people in the world over the next decade, and our ability to provide high-quality educational opportunities to them will determine the future of our country, and the world.

National Education Policy; Learning How To Learn

A Look Back At Previous Policies

The evolution of the Policy of 1986/92 has given the green light to the Right of Children to Free and Compulsory Education Act 2009 which laid down legal underpinnings for achieving universal elementary education. The unfinished agenda of the National Policy on Education 1986, which was modified in 1992, has been appropriately dealt with in this Policy.

Previous Academic Structure	New Pedagogical & Curricular Structure	
2 Years (Ages 16 - 18)	4 Years (Class 9 to 12) (Ages 14 - 18)	SECONDARY
10 Years (Ages 6 - 16)	3 Years (Class 6 to 8) (Ages 11 - 14)	MIDDLE
	3 Years (Class 3 to 5) (Ages 8 - 11)	PREPATORY
	2 Years (Class 1 & 2) (Ages 6 - 8)	FOUNDATIONAL
3 Years (Ages 3 - 6)	3 Years Anganwadi/pre-school/Balvatika) (Ages 3-6)	

National Education Policy; Learning How To Learn

Learning how to learn is essential in our evolving world. Advances in technology and global challenges reshape the job market and give the rise of need for multidisciplinary skills. Education should focus on critical thinking, problem-solving, creativity, and adaptability. A holistic approach, including arts, humanities, and ethics, prepares learners for a well-rounded, fulfilling life. The aim must be for India to have an education system @ 100 years 2047 must include equitable access to the highest-quality education for all learners regardless of social or economic background.

The Foundation of NEP 2020

NEP 2020 establishes its foundation on the pillars of foundational literacy and numeracy, universal access to quality education, and the development of critical skills. These pillars collectively address disparities, enhance foundational learning outcomes, and foster a culture of excellence. This National Education Policy envisions an education system rooted in Indian ethos.

The Indian ethos contribute directly to transforming India, that is Bharat, sustainably into an equitable and vibrant knowledge society, by providing high-quality education to all, and thereby making India a global knowledge superpower. The Policy envisages that the curriculum and pedagogy of our institutions must develop among the students a deep sense of respect towards the Fundamental Duties and Constitutional value.

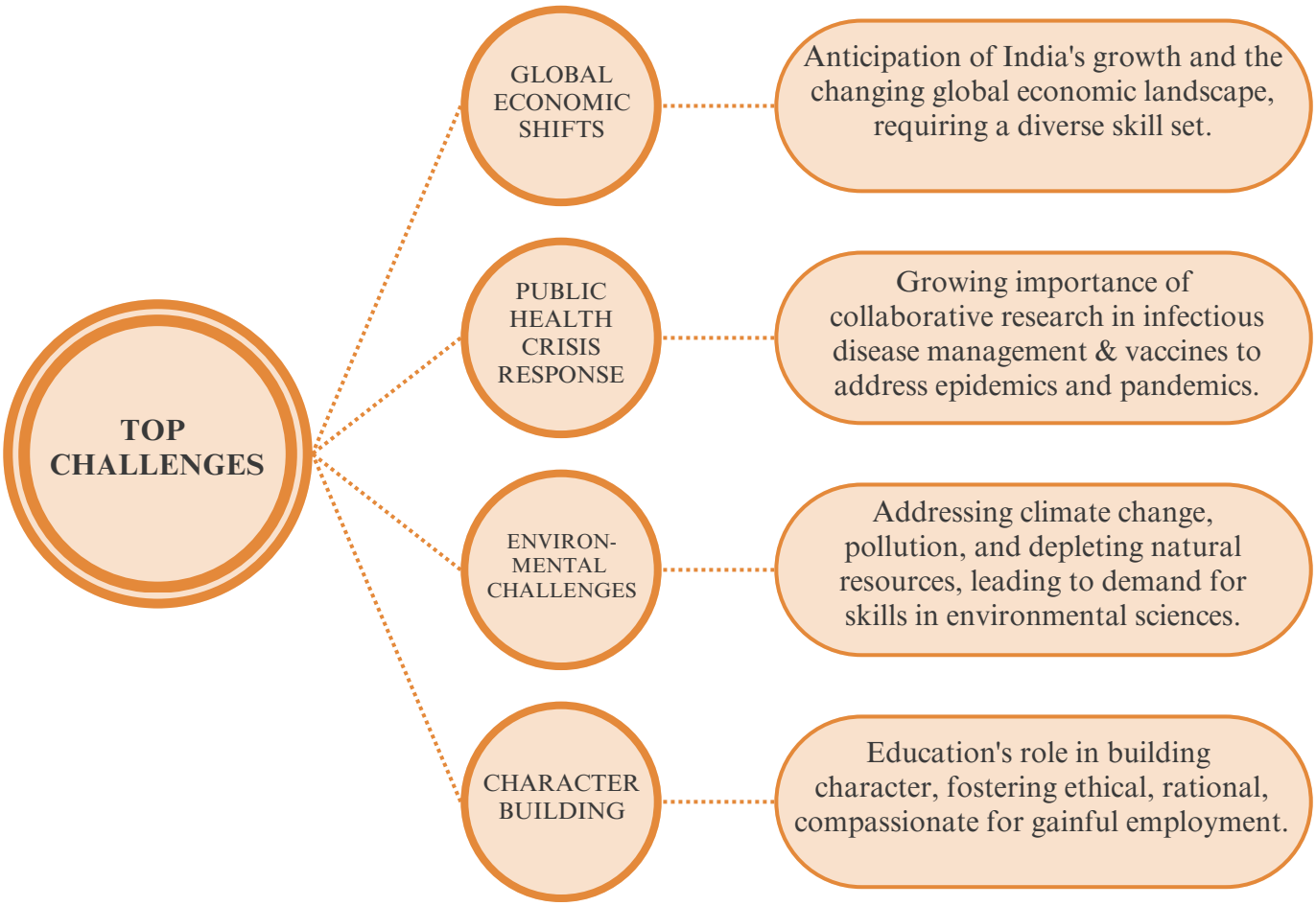
Foundations

- **Student Development** — *Recognising capabilities and fostering holistic development in students is a priority for education.*
- **Foundational Literacy** — *Achieving foundational literacy and numeracy by Grade 3 is given the highest priority for all students.*
- **Flexibility and Autonomy** — *Providing flexibility and autonomy for learners to choose their trajectories and shape their paths based on talents.*
- **Teachers and Faculty** — *Recognising teachers and faculty as the heart of the learning process highlights the importance of recruitment.*
- **Multilingualism** — *Promoting multilingualism recognises the power of language and its role in effective teaching and learning.*
- **Formative Assessment** — *Shifting focus to regular formative assessment for learning reduces the emphasis on today's coaching culture.*

Addressing The Challenges

Addressing higher education amidst global economic shifts presents a multifaceted set of challenges. Economic disparities exacerbate the affordability gap, hindering access to quality education in economically disadvantaged regions. The rapid pace of technological advancements poses a continual challenge for educational systems to stay relevant, potentially leaving graduates ill-equipped for evolving job markets.

Skill mismatches arise as economic shifts alter the demand for specific competencies, creating a gap between educational offerings and workforce needs. Globalization necessitates a more diverse skill set, including cultural competence, which traditional models may struggle to provide. Uncertainties in job markets due to economic fluctuations affect graduates' employability and job security, while the need for continuous skill development underscores the importance of lifelong learning.



Higher Education Reforms

NEP 2020 aspires to transform higher education institutions into vibrant centres of learning and research. It introduces measures to promote autonomy, innovation, and excellence in higher education, aligning with global standards. A key focal point of the NEP is the promotion of autonomy, innovation, and excellence within higher education, aligning India's educational landscape with global standards.

In tandem with autonomy, the NEP emphasizes the cultivation of innovation and creativity within higher education. It encourages institutions to establish incubation centers, promote interdisciplinary studies, and integrate practical, hands-on experiences into the curriculum. This approach seeks to equip students with not only theoretical knowledge but also practical skills, enhancing their readiness for the demands of the modern workforce.

The Vision of National Education Policy 2020

A Holistic Approach to School Education	• A holistic approach to school education that's beyond memorisation and quarterly examinations • Doubling down on experiential learning and critical thinking • Advocating for a multidisciplinary curriculum that prepares learners for the challenges of the 21st century
Early Childhood Care and Education	• Emphasis on early childhood care and education • Recognizing the formative years as building blocks for the future • Nurturing holistic development right from the start
Convergence of Skilling Efforts	• Onboarding of schemes from 10 central ministries/departments and 6 state governments on the Skill India Portal • 12 Ministries implementing 1,166 NSQF-aligned courses
Flexibility in Curriculum and Choice-Based Credit System	• Flexibility in curriculum design to accommodate diverse voices • Introduction of a choice-based credit system in higher education • Empowering students to tailor their education based on personal interests, strengths, and aptitudes
Teacher Empowerment	• NEP 2020 recognises teachers as pivotal to the educational ecosystem • The policy outlines measures for their continuous professional development, mentorship, and support • The policy is committed to nurturing a skilled and motivated teaching force
Multilingualism and the Promotion of Indian Languages	• NEP 2020 places a strong emphasis on multilingualism and the promotion of Indian languages • It's crucial to acknowledge language as a tool for learning • The policy seeks to preserve and revitalise regional languages and promote linguistic diversity
Assessment Reforms	• The assessment reforms signal a paradigm shift from summative to formative assessment • The policy encourages assessing not just what students know but also how they think and apply knowledge • It aligns assessments with real-world applications
Global Engagement and Collaboration	• NEP 2020 encourages global engagement and collaboration in education • The policy envisions India as a global knowledge hub • The policy actively promotes international partnerships to foster a cross-cultural exchange of knowledge and ideas

Conclusion

The National Education Policy 2020 emerges as a forward-looking blueprint for the transformation of India's education system. By fostering critical thinking, problem-solving skills, and responsible citizenship, NEP 2020 positions itself as a catalyst for preparing learners to navigate the challenges and opportunities of the 21st century.

The Policy envisages that the curriculum and pedagogy of our institutions must develop among the students a deep sense of respect towards the Fundamental Duties and Constitutional values, bonding with one's country, and a conscious awareness of one's roles and responsibilities in a changing world.

RECAP

- NEP 2020 focuses on accessibility, equity, quality, and inclusivity, guiding India's education towards its 100th year of independence.
- The policy advocates a holistic approach to school education that goes beyond memorisation and examinations. It promotes experiential learning, critical thinking, and a multidisciplinary curriculum to equip learners with the skills necessary to meet the challenges of the 21st century.
- It advocates for an education system that develops critical thinking, problem-solving, creativity, and adaptability. The policy encourages a holistic approach, incorporating arts, humanities, and ethics to prepare learners for a well-rounded and fulfilling life in the 21st century.

Mrs. Arti Bahadur is a visionary educator and the esteemed Principal of Ryan International School, Vasant Kunj. With a wealth of experience in the field of education, Mrs. Arti has dedicated her career to pioneering advancements that shape the future of Indian school education.

Her journey in education spans across diverse disciplines, where she has consistently demonstrated a passion for innovation and excellence. Mrs. Arti is renowned for her unwavering commitment to enhancing the educational landscape, and her impactful contributions have left an indelible mark on the realm of academia.

In her role as an author, Mrs. Arti Bahadur explores the intersection of technology and education, offering valuable insights into how these dynamics are shaping the future of Indian school education. Her forthcoming book, "How Technology is Reshaping the Future of Indian School Education," promises to be a comprehensive guide for educators, parents, and policymakers eager to navigate the evolving landscape of education in the digital age.

Mrs. Arti Bahadur's exemplary career and profound impact on the educational sector make her a respected figure in the field, and her contributions continue to inspire positive change and progress in Indian school education.

Conclusion

The Higher education sector in India has the potential to play a crucial role in the country's development and growth as it approaches its 100th year of independence in 2047. A well-educated workforce is essential for driving economic growth and innovation, as well as addressing the many challenges facing the country, such as poverty, inequality, and environmental degradation. However, there are several challenges that must be addressed in order to fully realise the potential of the higher education sector in India.

One of the key challenges is the lack of access to quality institutions. Despite the significant growth of the higher education system in recent years, many students are still unable to attend institutions that provide a high-quality education due to a variety of factors, such as lack of access to schools, inadequate funding, and the digital disparity among income groups.

Another challenge is the lack of focus on practical, job-oriented skills in higher education. Many students graduate from institutions without the necessary skills and knowledge to succeed in the workforce, leading to high levels of unemployment among recent graduates. Lastly, a growing pain of Indian education is the limited emphasis on practical, job-oriented skills in higher education. Graduates often lack essential skills, resulting in elevated unemployment rates among recent graduates.

In order to address this issue,

- It is important for higher education institutions to collaborate with the private sector and focus on providing practical, job-oriented education and training to their students.
- In addition, the higher education sector in India must prioritise the integration of technology into the classroom. This will not only enhance the learning experience for students but also prepare them for the increasingly digital world.
- The use of technology in education can also help to address some of the systemic challenges facing the sector, such as lack of access and inadequate funding, by providing new and innovative ways of delivering education to students.

Finally, the government must play a central role in driving the transformation of the higher education sector in India. This will require increased funding and support for the education system, as well as strong leadership and collaboration among all stakeholders, including educators, policymakers, and the private sector. The Government can also help to create a favourable regulatory environment that encourages innovation and entrepreneurship in the education sector.

Overall, by reimagining and modernising the higher education sector in India, the country can ensure that its future generations are equipped with the knowledge and skills they need to succeed in the 21st century. This will not only benefit the individual students but also drive the economic and social development of the country as a whole.

COLLEGEDUNIA IN MEDIA

Hindustan Times
Collegedunia Organizes India's Largest Education Fair 2023
Brand Stories
Published on May 15, 2023 06:53 PM IST
The Collegedunia Education Fair '23 proved to be a tremendous success, attracting an overwhelming footfall of over 6500 students

Collegedunia emerges as a market leader with revenue crossing 70 Cr in FY 2020
1 min read . Updated: 19 Nov 2020, 05:52 PM IST
Brand Post
The remarkable growth of Collegedunia started in December 2014, when Sahil Chalana, a BITS Pilani alumnus decided to launch a portal which offers a college search engine along with reviews.

कॉलेज दुनिया एजुकेशन फेयर का आगाज
स्टूडेंट्स को पसंद का कॉलेज चुनने का एक शानदार विकल्प

Collegedunia Organizes India's Largest Education Fair 2023
New Delhi : Collegedunia, country's leading education portal, once again revolutionized the way students explored their academic options. With the successful launch of the Collegedunia Carnival '23, held at Pragati Maidan, students across the NCR region were seen flocking to this extravagant event. Over 6500 students participated from more than 70 universities and Institutes.One of the standout features of the event was the on-the-spot admission/ application facility provided by many participating universities. The Carnival enabled students to compare universities, fees, infrastructure, facilities, and placement records, empowering them to make informed decisions regarding their future.

Hindustan Times
Collegedunia expands its strategic partnerships in Andhra Pradesh
By HT Brand Studio
Aug 02, 2021 07:05 PM IST
Collegedunia has partnered with multiple institutes of Andhra Pradesh in a short span of time proving the increasing interests and need of the educational institutions to shift towards digital platforms

Collegedunia has established itself as a successful partner of the Duolingo English Test in India
April 22, 2022 06:22 pm | Updated 06:22 pm IST
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duolingo english test | collegedunia
Collegedunia, India's leading admission-assistance portal has partnered with Duolin English Test recently. Within 5 months, afte activating campaigns with Collegedunia, Duolingo English Test has observed that the partnership has enabled a higher number of study abroad aspirants, to accelerate their application process with the help of Duolin English Test and its fast, reliable and widely accepted results.

White Paper Launch @Collegedunia Connect 2.0
December 05, 2022 05:48 pm | Updated 05:48 pm IST
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Collegedunia Connect : An Annual for Edtech Leaders

dunia & SP Jain Join Hands to Launch "Executive Programme in Business Analytics & Data Science" for Professionals
April 29, 2023 11:11 pm | Updated 11:11 pm IST
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Collegedunia Learn & SP Jain Join Hands to Launch "Executive Programme in Business Analytics & Data Science" for Professionals
Collegedunia, a leading ed-tech platform, has partnered with SP Jain School of Global

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nia, a search engine for students, d all other education domain rs who are seeking information on cation in India and abroad, has d the launch of a new initiative called in India Programme.' The programme volutionise and streamline the nal student admissions for Indian

Collegedunia hires from 14 IIM'S, 4 NIT'S, IIT's, and other Tier-1 colleges
By HT Brand Studio
Aug 10, 2021 07:01 PM IST
The fresh batch of incoming talent has been hired for various verticals insi Collegedunia inclusive of product, operations, sales, and marketing.

Collegedunia to power college exam queries on Amazon Alexa
1 min read . Updated: 17 Feb 2021, 04:50
HT Brand Studio
Collegedunia is India's leading college
Customers can access Collegedu Amazon Echo smart speakers, E displays, as well as on smartpho Amazon shopping apps.

Collegedunia Excellence Awards
November 22, 2022 08:48 pm | Updated 08:48 pm IST
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Collegedunia Excellence Award 2022

ABOUT COLLEGEDUNIA

Collegedunia is a one - stop destination for the students, parents and education industry players who are seeking information on the higher education sector in India and abroad. Collegedunia is among the top 100 websites in India.

#1 Category Rank

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1,00,000+ Admissions Delivered

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27,000+ Listing Colleges

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1,000+ **Reviews** on a Daily Basis

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20+ Dedicated Individuals to **Verify Reviews**

- **68%** of consumers say positive reviews make them **more likely to use a business.** *(Source: BrightLocal)*
- **70%** of consumers trust online reviews as much as **personal recommendations.** *(Source: Trustpilot)*
- **90%** of **consumers read online reviews** before making a purchase. *(Source: Statista)*
- Reviews can **increase conversion rates** by up to **270%.** *(Source: Search Engine Journal)*

Where do Students and Guardians go to make the most pivotal life decision of choosing the right career path

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CONTACT US

Collegedunia Web Private Limited
4th Floor, 418 - 419, AIHP Signature Tower, Udyog Vihar Phase - 4
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