DATA SCIENCE IS THE KEY TO FUTURE p. 78

DRIVING TECHNOLOGY-LED INNOVATIONS p. 80

OBITUARY: FAKIR CHAND KOHLI p. 83

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Shubhendu Parth

Tech in education: **what pandemic has taught us**

It has been over eight months since India went for the first phase of lockdown and educational institutions, like several other sectors, have since then been at their wit's end, trying to create a feasible mechanism for business continuity.

While most education institutions are back on track, with online teaching and evaluation becoming the new normal, this still seems to be a stop-gap arrangement as policymakers are not yet clear on the way forward and the approach to final examinations; offline still seems to be the first choice for evaluation.

There are other unaddressed concerns too: How do we replace practical, lab-based training and learning for core engineering fields? How to handle the studio-based design assignments and practical group projects? This still seems to be the blind men's elephant with each institution offering its own version of solution that may never sum up to the whole.

It also highlights the lack of emergency protocol and business continuity framework for this sector, something similar to the flash floods in Jaipur. The city was not prepared for the onslaught since rains are a rarity in Rajasthan. The point we missed in both cases is that dealing with emergencies is part of strategic planning and we must be prepared to deal with the impact of both the 'known unknown' and 'unknown unknown'; in this case the lockdown triggered by the pandemic (unknown unknown). A plausible lockdown situation, however, is a known unknown.

The National Education Policy 2020, unveiled months after the COVID-19 outbreak, seems to have missed this critical component despite a thrust on the use of technology and its integration with the education sector. It recommends pilot studies for online education, creating open, interoperable, evolvable, public digital infrastructure in education, the approach to bridging the digital divide, as well as blended models of learning and online assessment.

The document also proposes a National Educational Technology Forum (NETF) with the mandate to provide independent evidence-based advice to central and state government agencies on technology-based interventions. However, it falls short on disaster management. It is also surprising that it does not mention cybersecurity threats and the role that NETF may play in enabling decision-makers to deal with the 'known unknown'. A specific reference to this could go a long way in creating a future-ready, digital infrastructure for education in India.

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TECH-ENABLED T-SCHOOLS: **CHANGING PARADIGM**

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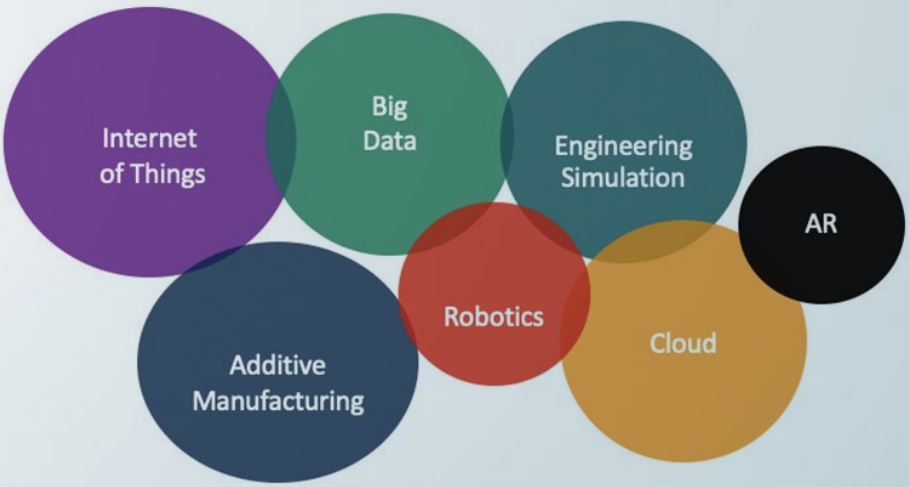
Over fifteen years now, the Dataquest ranking of engineering colleges has been widely recognised and highly sought after for deep insight on the state of tech education. With the pandemic-led lockdown driving more usage technology by the education sector, DQ-CMR has launched India's first digital index survey highlighting ICT adoption among the T-Schools

As the work-from-home becomes the new normal, the adoption of digital has become an imperative for most sectors. The field of education has not remained untouched in this trend. This has apparently created myriads of challenges for the students, faculties and educational institutes. Ensuring fairness in conducting online exams and assessing the acquired skillset of the students through virtual medium throws the biggest challenge to the virtual system of education.

The new National Education Policy (NEP) has paved the way for transforming the education sector in a big way, emphasising skillset development based on the concept of accessibility to quality education for all. The incredible speed of technological change, as evident from the breakthroughs in Industry 4.0 – comprising, internet of things, smart sensors, big data, automation, robotics, and additive manufacturing, and permeated by artificial intelligence across all these domains – among others, puts engineers and engineering expertise right at the centre of action, more than ever before.

As new technological cycles emerge and bring forth new innovations in the coming decades, the global circular economy will emerge as transformed, better equipped with IT revolutions for the betterment of the society. Making these scientific discoveries and technological transformations will be possible only by engineering skills, developed and driven by the students graduating from these engineering colleges in India.

Key Elements of Industry 4.0



THE RESEARCH METHODOLOGY

The Dataquest-CMR Digital Index Survey 2020 survey was conducted in two phases, including Initial desk research and groundwork, as well as primary research.

Phase 1: Initial desk research and groundwork phase

In the initial preparatory groundwork phase of the survey, the edutech practice at CMR scanned its rich knowledge base and updated it via an exhaustive desk research.

The objective of the initial groundwork phase was to identify and list all the tech schools in India. Government-run higher educational institutions and private institutes of learning were listed separately. Those colleges were considered for the survey who were established before 2016, and offered a BE, B.Tech or similar graduate-level technical courses.

At the end of the desk research phase, an invitation was extended to all shortlisted institutions on behalf of Dataquest and CMR to participate in the nationwide survey.

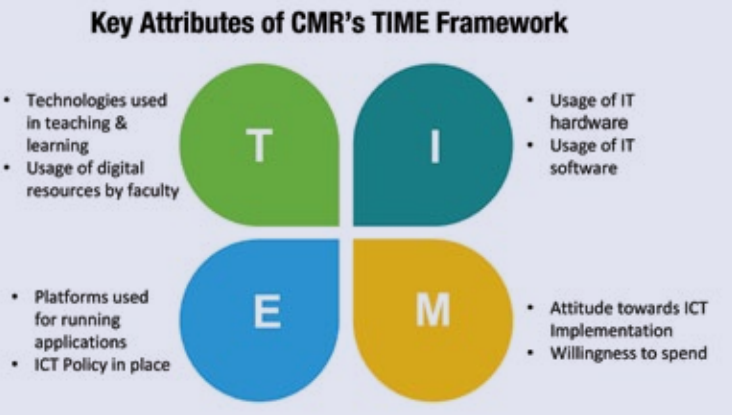
Phase 2: Primary research

The engineering colleges shortlisted in Phase 1 were approached by at CMR. Both online and face-to-face interviews were scheduled with the institutions. The information collected was covered under the CMR's proprietary TIME (teaching, infrastructure, motivation and environment) framework. Based on the framework, the different parameters were assigned the following weights – environment (40), infrastructure (30), teaching and learning methodology (20), and motivation of institute for IT (10).

It is important to note that the lowest weight to motivation does not reflect the parameter's low relevance; it has been given the lowest weight due to the difficulty in capturing it objectively.

The TIME framework

The CMR TIME framework comprised a set of 40 questions that was shared with the engineering colleges. These questions enabled the Dataquest-CMR team to build a comprehensive and cohesive digital picture of each institute.



Adequate time was allocated for the engineering colleges to share their filled-in nominations, either online or via physical mode. The submissions were checked by the CMR team for completeness and veracity of information shared, and scrutinised through a random check process, with >30% of the submissions cross-checked, as per the market research code of ethics. Analysts also reached out to key stakeholders for further deliberations, enabling a holistic snapshot of the engineering college.

The quantitative inputs received and verified from various engineering colleges were then analysed wherein the absolute data was normalised to relative data in order to compare the parameters across the participating institutions.

For each of the above parameter segments, a final score was calculated which was then factored with the pre-defined weights to arrive at the overall score of each participating engineering college. The institutes were then ranked with the highest score across all parameters ranking at the top. The rankings were also made by category and region.

Apart from ranking of institutes, aggregated analysis was also done to understand the state of digitisation in the engineering colleges and to map the challenges faced by the engineering colleges in ICT deployment. Analysis was also done to identify the areas of focus of engineering colleges in the coming year. Here are the key findings from the Dataquest-CMR Digital Index Survey 2020.

> IT INFRASTRUCTURE ADOPTION CALLS FOR CONTINUOUS UPDATION OF SOFTWARE. SEVEN IN EIGHT ENGINEERING COLLEGES WOULD FOCUS ON INFRASTRUCTURE UPDATES AND UPGRADES.

With the paradigm shift, the engineering graduates of today are far more tech-savvy with global access to the research publications in every domain. This new generation is ever ready to face challenges and bring in their creative ideas to become more productive, efficient, compassionate and avid problem solvers, thereby reforming the work culture and the way a problem can be addressed.

It is in this context that Dataquest conceptualised the study on digital index that the magazine plans to conduct every year to evaluate digital readiness of engineering colleges that has become essential for imparting holistic higher education in the hyper-connected Digital India.

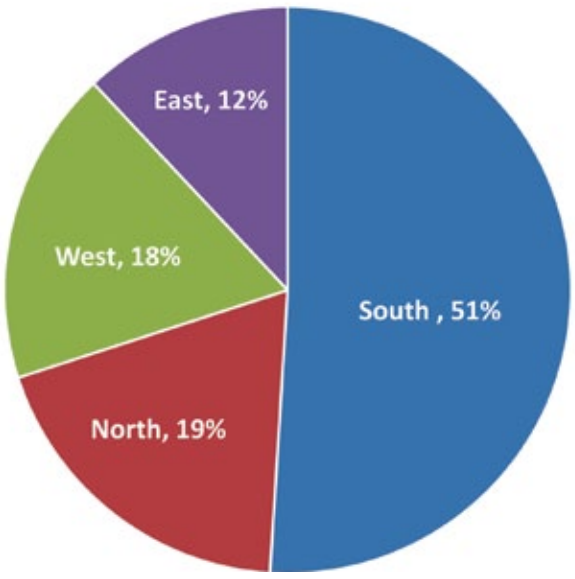
HOW WE PREPARED THE INDEX

The Dataquest-CMR Digital Index Survey 2020 witnessed participation from across the various tiers of engineering colleges in the country. It had participation from some of the prestigious NITs, IIITs and other tier-III government and private institutes.

Private engineering colleges proactively participated in the exercise with more than 80% representing this category. Government institutes need to engage more actively as their strengths could also get highlighted through this annual exercise. In fact, the Top 100 ranking has been prepared strictly based on the nominations received for participation.

Engineering colleges based in south India took lead in participating in the survey with 52% of the institutes coming from this region. This was followed by the north, west and east in that order.

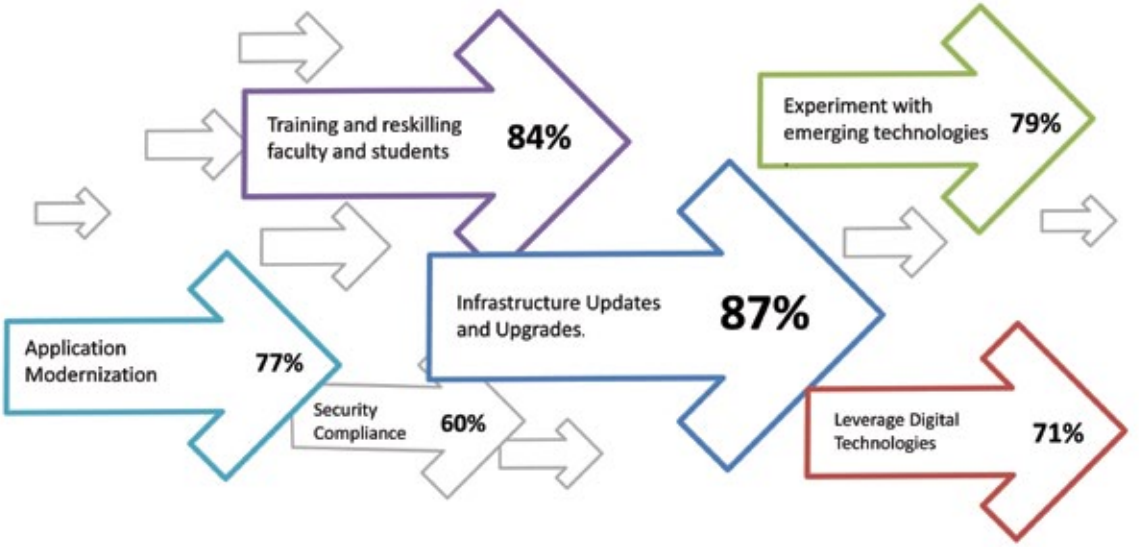
Zone Wise Distribution



THE FOCUS AREAS

- **Infrastructure updates and upgrades:** In the current pandemic situation, when there is a transformational shift towards adoption of virtual medium and operation from remote location, the major thrust would be on infrastructure updates. With the IT infrastructure adoption, it calls for continuous updation of the relevant software.Seven in every eight engineering colleges would focus on infrastructure updates and upgrades.
- **Training and re-skilling faculty and students:** The reskilling and training of the drivers of the education system is a major thrust area. Five in every sixengineering colleges wouldfocus on enabling faculties and familiarising them with IT adoption measures for their smooth transition to the virtual platform, keeping in mind that there is no lapse in imparting knowledge to the students.Once the faculties are well versed with the virtual classroom, they can guide their students effectively.
- **Experiment with emerging technologies:** With the internet flooded with so many options for use of the technology in imparting quality education to the students, the educational institutes are also

Focus Areas in IT



experimenting with emerging technologies such as cloud, AI andblockchain to improve their efficiency and quality of education. More than four in every five engineering colleges would focus on experimenting with emerging technologies.

- **Application modernisation:** To work in a customised environment, most of the educational institutes have moved to in-house app development and management. Four in every five engineering colleges would emphasiseindigenously built app development software and its management. It gives an easy access to the data management, whether that of student or teacher. These apps can be easily used by the students too.
- **Leverage digital technologies for next level of digital transformation:** In the coming years,access to anything and everything will be available in digital platform. To thrive in the industry, virtual presence is a must. So, 77% engineering colleges would focus on leveraging digital technologies to have a dynamic presence in the social media and be the forerunners in the next level of digital transformation.
- **Security compliance:** Three in every five engineering colleges would focus on security so that the vital data is not leaked to the competitors. Security concern is one important grey area which cannot be overlooked by any academic institution and hence it features as one of the main factors to be addressed in this financial year when all the academic activities have moved online.

CHALLENGES FACED IN IT DEPLOYMENT

- **High cost of deployment**

  Educational institutes have readily moved on to the virtual mode of operation through the online classroom platform but the high cost of its deployment is crippling the system as can be seen from our survey. Two in every threeinstitutes have cited the high costof IT deployment as a challenge. The authorities are upfront with the challenge that the existing infrastructure and other operational cost is redundant in present scenario and they have to incur huge costs for IT deployment in a bigger way so that there can be smooth transition from actual classroom to virtual classroom without compromising on the quality of education.

- **Collaborating with remote students**

  One in every two engineering colleges facesa challengein collaborating with remote students which otherwise was not of much concern in the earlier, conventional mode of education. Remote students are facing challenges related to poor internet connectivity that becomes quite bothersome for institutes to collaborate.

- **Data security concern**

  Another major challenge faced by engineering colleges

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Challenges Faced in IT Deployment

is the data security when every detail of the institute is fed online. As many as 45% institutes have termed this as an area of concern as any tampering or fraud can harm their reputation.

- **Lack of customised solutions**
  The pandemic and the lockdown forced educational institutes to go online in no time, but no customised solution is readily available for them and everyone is experimenting. The whole system of virtual education is running on trial-and-error basis. If anything proposed is well accepted by the stakeholders, it is continued, otherwise it gets replaced. Three in every seven colleges have stated that a customised solution is not available.

- **High running cost**
  The running cost is also too high with IT-dependent mode of teaching. Regular updates of software, good internet speed and Wi-Fi connectivity are prerequisites for adoption of IT. Internet connectivity with high bandwidth calls for higher costs on the whole, apart from maintenance costs. One in every three engineering colleges has stated the running cost in IT to be too high as a challenge.

KEY TRENDS

Based on the Dataquest-CMR Digital Index Survey findings, the broad characteristics of each engineering college were mapped on the CMR's TIME Framework. The TIME Framework highlighted the state of digitisation of engineering colleges.

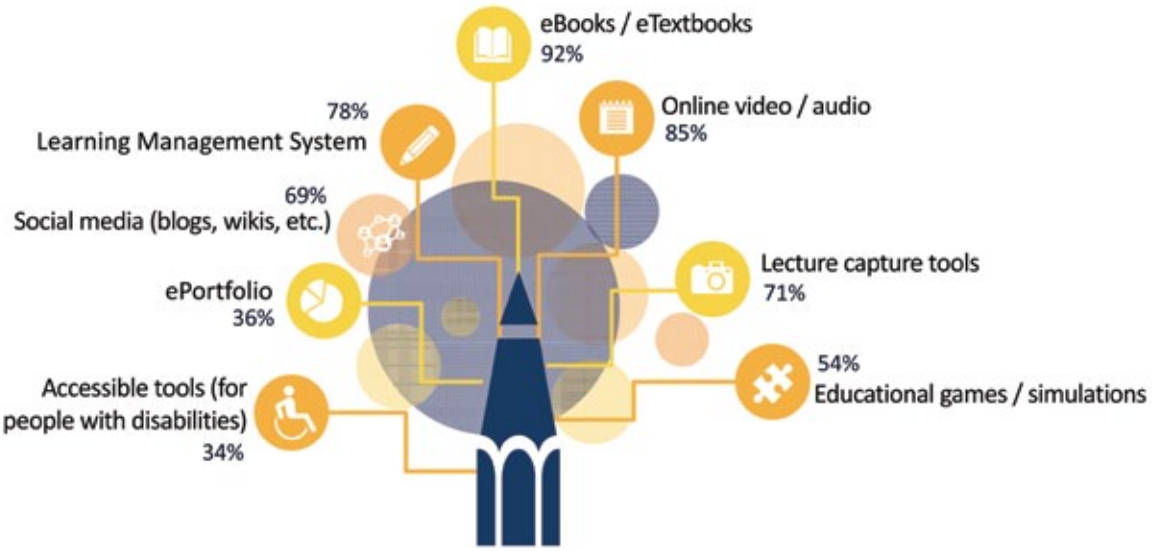
TEACHING AND LEARNING

In the few months, the virtual system of education has taught many lessons to everyone including the faculty and students. Its positive aspect is that education has continued despite the lockdown and mobility restriction. But it has its share of drawbacks too. The new pedagogy enabled by IT adoption had not gone well with students in the initial stage but in due course they have understood it's imperative to adopt it as they are left with no other option.

In the online mode of teaching, the physical proximity of students and the faculty is missing. But the new teaching methodology has prepared our future engineers well to work globally even when stationed locally. They are groomed well with technology to deliver online presentation, work on Google forms, be more patient and technologically learned professionals. This can bring forth new technologically savvy global engineers, addressing problems of the society from the far end.

Engineering colleges integrate various technologies in teaching and learning process. More than 90% engineering colleges use eBooks/eTextbooks. Nearly

Technologies Used in Teaching & Learning



four in every five (78%) engineering colleges use some learning management system (e.g., Moodle) and most of those have the feature of Lecture Capture.

The faculty of engineering colleges use various digital resources and platforms in their teaching. In seven out of every eight engineering colleges, presentations (e.g., PowerPoint, including from online sources) is used in the classroom on a regular basis. Digital films and video (e.g., from YouTube) or simulations and 2D/3D animation are used mostly in the teaching process in around half of the institutes.

The faculty in two in every three engineering colleges use open educational resources (OER) regularly. Following OERs are used by faculty of majority of colleges:

- National Programme on Technology Enhanced Learning (NPTEL) (74%)
- Study Webs of Active-learning for Young Aspiring Minds (SWAYAM) (68%)
- AICTE Online Courses (62%)
- Virtual labs (58%)
- The Spoken Tutorial (54%)
- National Digital Library of India (NDL) (52%)
- Free and Open Source Software in Education (FOSSEE) (52%)

Top three software used by engineering colleges to enhance students' learning are MATLAB (95%), R/Python (92%) and machine learning/AI (88%). Libraries in most of the institutes provide subscription-based e-resources. Top three library resources are e-Journals, e-Books and e-Newspapers (77%).

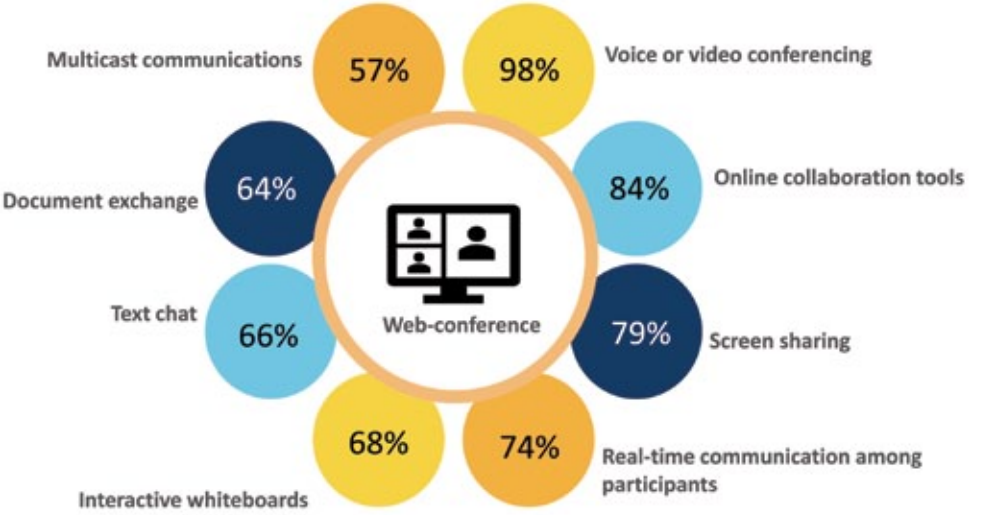
INFRASTRUCTURE

When it comes to the technology infrastructure, today's engineering colleges are facing strong tailwinds that are enabling foundational shifts in terms of both, pedagogy as well as campus infrastructure. With the proliferation of smartphones and tablets with leading specs at affordable price points, there is a strong shift amongst students seeking to access and collaborate on learning content anytime, anywhere on campus and beyond. Alongside, there is a stronger focus on bringing external subject matter experts into the classroom through videos.

By harnessing power of technology, engineering colleges have the potential to transform existing pedagogical approaches, and impart more personalised learning through blended and virtual learning. In the case of blended learning, engineering colleges can provide access to students to technology-enabled learning spaces, wherein they benefit from collaborative and informal learning approaches. On the other hand, virtual learning spaces focus on blending digital and physical environments for continuous learning.

While engineering college leaders have adopted some of these pedagogical approaches, many are yet to fully

Usage of Web Conferencing Solutions



leverage the power of digital. Without having access to high-speed bandwidth and device infrastructure, the full potential of these pedagogical approaches is far from realised. In the absence of reliable network and speed, technology cannot be effectively leveraged in the classroom, and learning disruptions become common, potentially impacting future technology usage. For technology-based pedagogical approaches to be effective, adequate bandwidth along with suitable scalable infrastructure is essential.

Engineering colleges access the internet mostly through leased line. Five in every six institutes have wi-fi enabled campus being highest in the south (86%). Similarly, five in every six institutes have e-Classroom facilities (e.g., computers, projection systems, lecture capture systems, SMART boards) being highest in the northern zone (92%).

Almost all the institutes have CAD / CAM. Two in every three institutes have 3D printing. Moreover, more than three in every four colleges have plagiarism detection software, data visualisation software and citation/ reference management software.

Engineering colleges use various web conferencing solutions. Almost all use voice or video conferencing. Online collaboration tools are used by six in every seven colleges.

MOTIVATION

Motivation deals with the attitude of engineering colleges towards ICT and their willingness to spend. To feature as one of the leading T-Schools in the region as well as globally, motivation forms the underlying factor

Attitude towards ICT

> EDUCATIONAL INSTITUTES ARE ALSO EXPERIMENTING WITH EMERGING TECHNOLOGIES SUCH AS CLOUD, AI AND BLOCKCHAIN TO IMPROVE THEIR EFFICIENCY AND QUALITY OF EDUCATION.

for driving the management to provide an ICT-enabled global environment to the faculty as well as students. This helps them surpass their inhibitions and bring positive outcomes in terms of research publications, innovations, creativity and much more. Every institute has taken care of this factor in some or other way and the same has been reflected in their vision and mission statement.

Almost all the colleges feel that their teachers find it easier to teach by using ICT. Teaching makes learning more effective if done through ICT as perceived by 90% of colleges. However, 22% colleges feel that students pay less attention when ICT is used in teaching. One in every five college feel that students make hardly any effort to learn their lessons.

The average IT budget of all engineering colleges that participated in the survey is Rs 1.8 crore. That comes to around Rs 6,400 per student. This amount is the highest in case of colleges in the north (Rs 8,100) and the lowest in colleges in the east (Rs 4,200).

ENVIRONMENT

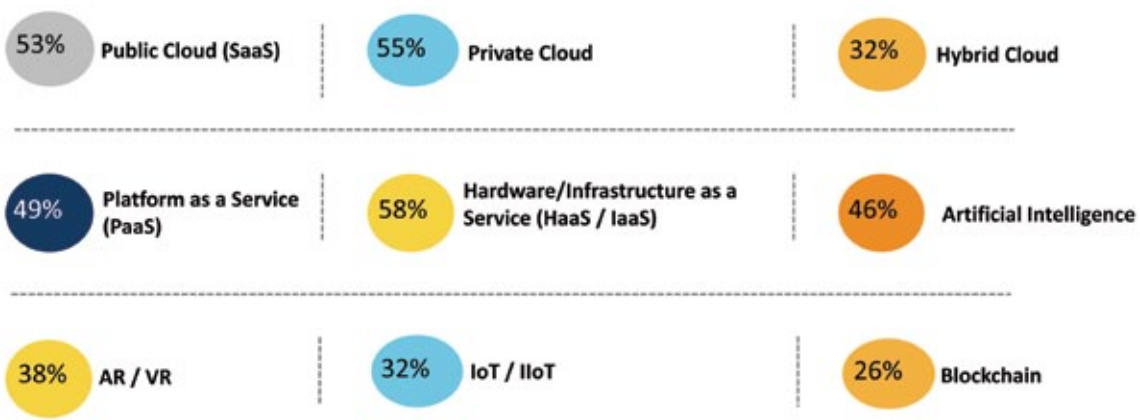
The IT environment plays the biggest role in ensuring the readiness of engineering colleges.

Rather than investing heavily for acquiring technologies, colleges have preferred to use those in cloud which ensures pay-per-use model. More than four in every five colleges use cloud. Adoption is the highest in case of colleges in the south (90%) and the lowest in the east (74%).

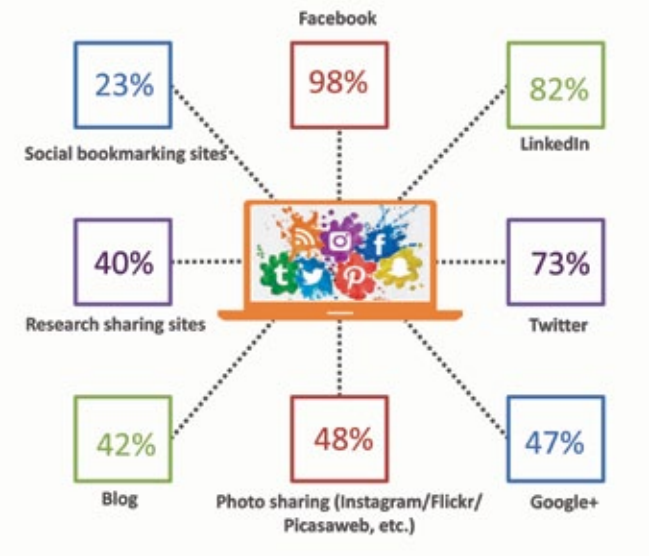
Engineering colleges have also understood the benefit of AI, AR/VR, IoT/IIoT and blockchain. Nearly half of the colleges have used AI in some form or the other.

Social media usage: Social media usage is not a new concept while dealing with IT deployment in technology institutes. It was always there but in the current situation

Emerging Technologies Used



Social Media Used



it has become forefront and widely used. Whether for promotion of the institute or for imparting quality education, the social media is highly used and recommended by the faculties and authorities. Students even get access to multiple versions of the same topic and thus social media is quite popular among the student community. Moreover, all the tutorials from the reputed institutes are available online and both the faculties and students use the content immensely to get benefits in multifold ways.

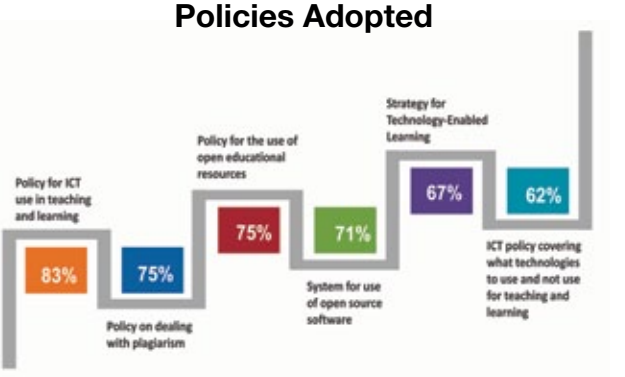
Top three social media sites used are Facebook, Linkedin and Twitter. Social media usage in Technology institutes gives wings to students to explore various aspects and hence their creativity is nurtured. This has opened gates to various opportunities for the students.

Two in every three colleges use social media for digital marketing of institutes. A similar proportion of colleges use social media to stream live lectures. It is also used for declaring results and communicating with students.

Policies adopted: Engineering colleges have policies in place for the use of ICT.

Purposes of Using Social Media

Policies Adopted



Around four in every five colleges have a policy for ICT use in teaching and learning. Moreover, colleges have policies for dealing with plagiarism and for use of open educational resources. Usage of open source is also guided by a protocol of colleges.

Tomorrow's engineers will be increasingly called upon to adopt comprehensive approaches to problem-solving, leading large teams to define and solve problems, and in the process, build a proactive innovation culture. For us to prepare for this inevitable and exciting future, today's engineering education will have to foster a thriving culture that encourages out-of-box thinking, emphasises creativity and innovation skills, and essentially a learning environment where divergent ideations are encouraged. As a foundation layer of fostering innovation, engineering colleges must emphasise engineering education alongside technical research. In the decades to come, the engineering challenges will be multidimensional and complex enough, and would require new skills and mindsets, going beyond the conventional pedagogy of today.

Mohanty is Head, User Research Practice, CMR

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Top 100 Tech-enabled T-Schools

INSTITUTE NAME	CITY	RANK
Birla Institute of Technology	Pilani	1
International Institute of Information Technology, Hyderabad	Hyderabad	2
College of Engineering Pune	Pune	3
Dr B R Ambedkar National Institute of Technology	Jalandhar	4
Maulana Abul Kalam Azad University of Technology	Haringhata	5
Indraprastha Institute of Information Technology	New Delhi	6*
International Institute of Information Technology, Naya Raipur	Raipur	6*
National Institute of Technology Silchar	Silchar	7
Chitkara University Institute of Engineering & Technology	Rajpura	8
R.M.K. Engineering College	Chennai	9
Reva University	Bangalore	10
DIT University	Dehradun	11
Koneru Lakshmaiah Education Foundation	Vaddeswaram	12
Galgotias University	Greater Noida	13
Maharaja Agrasen Institute of Technology	Delhi	14
National Institute of Technology Hamirpur	Hamirpur	15
KCG College of Technology	Chennai	16
Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology	Chennai	17
Hindusthan Institute of Technology	Coimbatore	18
Dr D Y Patil Technical Campus Ajeenkya D Y Patil University	Pune	19*
G L Bajaj Institute of Technology & Management	Greater Noida	19*
D J Sanghvi College of Engineering	Mumbai	20
Velalar College of Engineering And Technology	Erode	21
Gandhi Institute for Technological Advancement, (GITA)	Bhubaneswar	22
Sreyas Institute of Engineering and Technology	Hyderabad	23
The Oxford College of Engineering	Bengaluru	24
Sanjivani College of Engineering	Kopargaon	25
Hindusthan College of Engineering and Technology	Coimabtore	26
Amity School of Engineering & Technology, Amity University, Jaipur	Jaipur	27
Sri Manakula Vinayagar Engineering College, Puducherry	Puducherry	28
BMS Institute of Technology and Management	Bengaluru	29
Thiagarajar College of Engineering	Madurai	30
Velagapudi Ramakrishna Siddhartha Engineering College	Vijayawada	31
NMAM Institute of Technology	Nitte, Karkala	32
Amity School of Engineering & Technology, Amity University, Lucknow	Lucknow	33

INSTITUTE NAME	CITY	RANK
Amity School of Engineering & Technology, Amity University Chhattisgarh	Raipur	34
Lakireddy Bali Reddy College of Engineering	Mylavaram	35
Sri Sairam College of Engineering	Bangalore	36
Vaagdevi College of Engineering	Warangal	37
GMR Institute of Technology	Rajam	38*
Yeshwantrao Chavan College of Engineering	Nagpur	38*
Erode Sengunthar Engineering College	Erode	39
Sir M.Visvesvaraya Institute of Technlogy	Bangalore	40
Matrusri Engineering College	Hyderabad	41
K. D. K. College of Engineering	Nagpur	42
MVJ College of Engineering	Bangalore	43*
Sri Indu College of Engineering and Technology	Hyderabad	43*
Dr.N.G.P. Institute of Technology	Coimbatore	44
Vidyavardhaka College of Engineering	Mysore	45
BGS Institute of Technology	Mandya	46
Kanpur Institute of Technology	Kanpur	47
Kalinga Institute of Industrial Technology	Bhubaneswar	48
Gharda Foundations Gharda Institute of Technology	Ratnagiri	49
KLS Gogte Institute of Technology	Belagavi	50
Model Institute of Engineering & Technology	Kotbhalwal, Jammu	51
Trident Academy of Technology	Bhubaneswar	52
Lendi Institute of Engineering & Technology	Vizianagaram	53
SJ BGS Polytechnic	Mandya	54
Government College of Engineering Karad	Karad Maharashtra	55
Camellia School of Engineering And Technology	Barasat	56
Institute of Aeronautical Engineering	Hyderabad	57
G H Patel College of Engineering & Technology	Vallabh Vidyanagar	58
PSIT College of Engineering	Kanpur	59
Sri Venkateswara College of Engineering	Tirupati	60
RMD Sinhgad School of Engineering	Pune	61*
S. B. Jain Institute of Technology, Management & Research	Nagpur	61*
Shri Ram Murti Smarak College of Engineering & Technology	Bareilly	62
Amity University	Noida	63
Symbiosis University of Applied Sciences	Indore	64
Mohandas College of Engineering And Technology	Thiruvananthapuram	65

INSTITUTE NAME	CITY	RANK
Srinivasa Ramanujan Institute of Technology	Ananthapuramu	66
Priyadarshini Institute of Engineering And Technology	Nagpur	67
Aditya College of Engineering, Surampalem	Peddapuram	68
Atria Institute of Technology	Bangalore	69
VNR Vignana Jyothi Institute of Engineering And Technology	Hyderabad	70
Madanapalle Institute of Technology & Science	Madanapalle	71
Mepco Schlenk Engineering College	Sivakasi	72
Institute of Infrastructure Technology Research and Management	Ahmedabad	73
PES Modern College of Engineering	Pune	74
Budge Budge Institute of Technology	Kolkata	75
Annamacharya Institute of Technology and Sciences	Tirupati	76
Annamacharya Institute of Technology & Sciences	Rajampet	77
Govt. Model Engineering College, Thrikkakara	Ernakulam	78
ABES Engineering College	Ghaziabad	79
Anil Neerukonda Institute of Technology & Sciences (Anits)	Visakhapatnam	80
Maharana Pratap Engineering College	Kanpur	81
Anurag University	Hyderabad	82
SASI Institute of Technology & Engineering	Andhra Pradesh	83
Tataysaheb Kore Institute Of Engineering & Technology	Kolhapur	84
Chameli Devi Group of Institutions	Indore	85
Sinhgad Institute Of Technology And Science (SITS)	Pune	86
Mahendra Engineering College	Namakkal	87
KIET Group of Institutions	Ghaziabad	88
Maharaja Institute of Technology Tandavapura	Mysore	89
Amity University Kolkata	Kolkata	90
Government Women Engineering College Ajmer	Ajmer	91
St.Ann's College of Engineering & Technology	Chirala	92
Driems Autonomous Engineering College	Cuttack	93
Chettinad College of Engineering And Technology	Karur	94
Skyline Institute of Engineering and Technology	Greater Noida	95
Sri Vasavi Institute of Engineering & Technology	Nanadamuru	96
Dr J J Magdum College of Engg	Jaysingpur	97
Govt. College of Engineering & Textile Technology	Berhampore	98
QIS College of Engineering and Technology	Ongole	99
Sreenidhi Institute of Science and Technology	Hyderabad	100

** These institutes share the same rank due to identical scores*

Top 10 Zone Wise Institutes

East

NAME OF INSTITUTE	CITY	RANK
Maulana Abul Kalam Azad University of Technology	Haringhata	1
International Institute of Information Technology, Naya Raipur	Raipur	2
National Institute of Technology, Silchar	Silchar	3
Gandhi Institute for Technological Advancement, (GITA)	Bhubaneswar	4
Amity School of Engineering & Technology, Amity University Chhattisgarh	Raipur	5
Kalinga Institute of Industrial Technology	Bhubaneswar	6
Trident Academy of Technology	Bhubaneswar	7
Camellia School of Engineering & Technology	Barasat	8
Budge Budge Institute of Technology	Kolkata	9
Amity University, Kolkata	Kolkata	10

West

NAME OF INSTITUTE	CITY	RANK
College of Engineering Pune	Pune	1
Dr D Y Patil Technical Campus Ajeenkya D Y Patil University	Pune	2
D J Sanghvi College of Engineering	Mumbai	3
Sanjivani College of Engineering	Kopargaon	4
Yeshwantrao Chavan College of Engineering	Nagpur	5
K. D. K. College of Engineering	Nagpur	6
Gharda Foundations Gharda Institute of Technology	Ratnagiri	7
Government College of Engineering, Karad	Karad	8
G H Patel College of Engineering & Technology	Vallabh Vidyanagar	9
RMD Sinhgad School of Engineering	Pune	10

Top 10 Zone Wise Institutes

North

NAME OF INSTITUTE	CITY	RANK
Birla Institute of Technology	Pilani	1
Dr B R Ambedkar National Institute of Technology	Jalandhar	2
Indraprastha Institute of Information Technology	New Delhi	3
Chitkara University Institute of Engineering & Technology	Rajpura	4
DIT University	Dehradun	5
Galgotias University	Greater Noida	6
Maharaja Agrasen Institute of Technology	Delhi	7
National Institute of Technology, Hamirpur	Hamirpur	8
G L Bajaj Institute of Technology & Management	Greater Noida	9
Amity School of Engineering & Technology, Amity University, Jaipur	Jaipur	10

South

NAME OF INSTITUTE	CITY	RANK
International Institute of Information Technology, Hyderabad	Hyderabad	1
R.M.K. Engineering College	Chennai	2
Reva University	Bangalore	3
Koneru Lakshmaiah Education Foundation	Vaddeswaram	4
KCG College of Technology	Chennai	5
Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology	Chennai	6
Hindusthan Institute of Technology	Coimbatore	7
Velalar College of Engineering And Technology	Erode	8
Sreyas Institute of Engineering and Technology	Hyderabad	9
The Oxford College of Engineering	Bengaluru	10

Top 10 Government Institutes

	NAME OF INSTITUTE	CITY	RANK
Government	International Institute of Information Technology, Hyderabad	Hyderabad	1
	College of Engineering Pune	Pune	2
	Dr B R Ambedkar National Institute of Technology	Jalandhar	3
	Maulana Abul Kalam Azad University of Technology	Haringhata	4
	Indraprastha Institute of Information Technology	New Delhi	5
	International Institute of Information Technology, Naya Raipur	Raipur	5
	National Institute of Technology, Silchar	Silchar	6
	National Institute of Technology Hamirpur	Hamirpur	7
	Thiagarajar College of Engineering	Madurai	8
	Vaagdevi College of Engineering	Warangal	9
	SJ BGS Polytechnic	Mandya	10

Top 10 Private Institutes

	NAME OF INSTITUTE	CITY	RANK
Private	Birla Institute of Technology	Pilani	1
	Chitkara University Institute of Engineering & Technology	Rajpura	2
	R.M.K. Engineering College	Chennai	3
	Reva University	Bangalore	4
	DIT University	Dehradun	5
	Koneru Lakshmaiah Education Foundation	Vaddeswaram	6
	Galgotias University	Greater Noida	7
	Maharaja Agrasen Institute of Technology	Delhi	8
	KCG College of Technology	Chennai	9
	Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology	Chennai	10

Digital Index Team
maildqindia@cybermedia.co.in

RANK 01 BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

A Deemed University, BITS Pilani was granted the status of Institute of Eminence for higher education and research in India in 2018. Ranked #2 in the Dataquest T-Schools listing in March 2020, the institute has a well-structured digital infrastructure to support its 11,270 BE and B Tech students and faculty across the campus, including the cloud infrastructure.

While it is already using artificial intelligence, and done blockchain, IoT, IIoT, and AR/VR pilot projects, the institute is exploring options of introducing robotic process automation in the campus. On the infrastructure front, it has done pilot projects to explore benefits of Platform as a Service (PaaS), hardware/Infrastructure as a Service (HaaS/IaaS) implementation. Spread across 328 acres, the institute with four established campuses and 15 academic departments focuses primarily on higher education and research in engineering and sciences. The institute is backed by the Aditya Birla Group.

Established: 1964

Status: Deemed University

RANK 02 IIIT, HYDERABAD

An autonomous university, the International Institute of Information Technology, Hyderabad (IIIT-H) is the first IIIT set up under the not-for-profit public private partnership (N-PPP). It has evolved strong research programmes in various areas, with an emphasis on technology and applied research for industry and society.

On the digital infrastructure front, IIIT-H has its cloud infrastructure in place, including public, private and hybrid cloud, and has plans to deploy hardware/Infrastructure as a Service (HaaS/IaaS) implementation soon. It also plans to introduce Robotic Process Automation in the campus. The institute also has several world-renowned centres of excellence as part of its research portfolio and has established various collaboration and innovation models with an industry outreach spanning significant national and multinational companies. IIIT-H also allows undergraduate students get to participate in ongoing research and technology development.

Established: 1998

Status: Deemed University

RANK 03 COLLEGE OF ENGINEERING, PUNE

The College of Engineering, Pune (COEP) that was initially set up as Poona Engineering Class and Mechanical School got its autonomous status in 2003, thus giving it the freedom to set its own curricula and manage its own finances. This has been the biggest change as far as pedagogy at COEP is concerned. The institute offers nine UG and 24 PG programmes, and has total of 2,344 students enrolled in its various courses during the fiscal.

Ranked #5 in the Dataquest T-Schools listing in March 2020, the institute has a well-structured digital infrastructure and has consistently made it to the top 20 technical colleges list in India. The institute has been focusing setting up two industry-partnered incubation centers for encouraging entrepreneurship. It also aims to become a multi-faculty campus by establishing five multidisciplinary research centers and five interdisciplinary academic programs.

Established: 1854

Status: Autonomous (Govt.)

RANK 04 DR BR AMBEDKAR NIT, JALANDHAR

Ranked #8 in the Dataquest T-Schools listing in March 2020, Dr. B R Ambedkar National Institute of Technology has done pretty well in the Dataquest-CMR Digital Index 2020 rankings. It was founded as a joint venture between the governments of Punjab and the central government, originally as Punjab Regional Engineering College, Jalandhar (PREC). It was granted the status of National Institute of Technology in 2002 and has also been declared as an 'Institute of National Importance' by the Government of India. The institute offers B Tech, M Tech, M Sc, PhD, and PGDM programs in Management and Engineering.

On the digital infrastructure front, the institute has a fully equipped digital lab with over 1,500 systems and 157 e-classrooms. It also operates fully on cloud environment, is already using artificial intelligence, robotic process automation, blockchain, IoT, IIoT, and AR/VR in the campus.

Established: 2002

Status: Autonomous (Govt.)

RANK 05 MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, HARINGHATA

Maulana Abul Kalam Azad University of Technology (MAKAUT) is a state university which provides degrees in engineering, management and other professional courses through its various affiliate institutions and departments. The institute has its cloud infrastructure in place and is also reaping benefits of Platform as a Service (PaaS), Hardware/Infrastructure as a Service (HaaS/IaaS). On the implementation of high-end technology, it already has artificial intelligence, robotic process automation, IoT, IIoT, and AR/VR in place. It has also done pilot projects to test use of blockchain and remote collaboration.

The University has introduced new courses in emerging areas to develop, enhance and higher education. The University is steadfast in its twin objectives – to serve as a centre of excellence in teaching and research in technology and management area, and to provide framework of industrialization based on knowledge economy.

Established: 2001

Status: Autonomous (Govt)

RANK 06 INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY, NAYA RAIPUR

Dr. Shyama Prasad Mukherjee International Institute of Information Technology, Naya Raipur (IIIT-NR) is an autonomous institute of higher education set up as joint venture of Chhattisgarh State Government and National Thermal Power Corporation (NTPC). The institute is focused in research and development in Information Technology and associated disciplines and offers B Tech and PhD program in various disciplines.

IIIT-NR provides state-of-the-art research and education facilities for over 588 students and nurtures a campus culture that fosters high energy and enthusiasm in every individual, clubbed with the highest standard of professionalism. On the infrastructure front, the institute is well ahead in using SaaS model – Platform as a Service (PaaS) and Hardware/Infrastructure as a Service (HaaS/IaaS) – it has also deployed artificial intelligence, IoT, IIoT, and remote collaboration. It has also done pilot implementation of robotic process automation, blockchain, and AR/VR.

Established: 2015

Status: Autonomous (Govt)

RANK 06 INDRAPRASTHA INSTITUTE OF INFORMATION TECHNOLOGY, NEW DELHI

Indraprastha Institute of Information Technology, Delhi (IIIT-D) is a state university located in Delhi, India. It is research-oriented with a focus on Computer Science and allied areas. The institute began with its first batch of 60 B Tech students in 2008, and presently has 1,543 BE and B Tech students, including those in the final year.

Ranked as #6 in the March 2020 Dataquest T-Schools listing, IIIT-D has managed to retain the same position in the Digital Index 2020. The institute with its main campus in Okhla has an operational private cloud, it has implemented artificial intelligence and AR/VR project and done a pilot project to explore remote collaboration. It is a member of the Association of Indian Universities (AIU), has been accredited 'A' grade by the National Assessment and Accreditation Council, and accorded 12-B status by the University Grants Commission.

Established: 2008

Status: Autonomous (Govt)

RANK 07 NATIONAL INSTITUTE OF TECHNOLOGY, SILCHAR

National Institute of Technology Silchar (NITS) is one of the 31 NITs of India that were established in 1967. Set up as a Regional Engineering College in Assam, it was accorded the NIT status in 2002 and was declared as an Institute of National Importance in 2007.

The institute offers undergraduate and graduate programs in engineering, science and humanities with 11 departments and aims to produce skilled and trained industry-ready professionals by imparting quality technical education and by serving as the center of excellence for engineering and scientific research.

Ranked at #9 in the Dataquest T-Schools listing of March 2020, NITS has scored fairly well in the Digital Index 2020 and promises to provide cutting-edge technology infrastructure to its over 3,000 students and faculties across the campus. It has 32 well-equipped e-classrooms.

Established: 1967

Status: Autonomous (Govt)

RANK 08 CHITKARA UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY, RAJPURA

Chitkara Institute of Engineering and Technology that ranked #26 in the March 2020 Dataquest T-Schools listing has made a quantum jump in the Digital Index 2020 status with its best-in-class infrastructure. The institute lays strong emphasis on networking and collaborating with regional technical corporations and offers under-graduate and post-graduate courses, including BE, BCA, MCA, ME, and PhD.

The institute has a total of 5,640 in the current fiscal and its engineering programs have been consistently ranked within top 50 of the country that speaks a lot about its strong academic heritage, innovative teaching methodology and proactive industry collaborations. On the infrastructure front it has 286 e-clasrooms, public and hybrid cloud, and implemented Platform as a Service (PaaS), and hardware/ Infrastructure as a Service (HaaS/IaaS). It is already introduced artificial intelligence, blockchain, IoT, IIoT, AR/ VR, and robotic process automation in the campus.

Established: 2002

Status: University Department

RANK 09 RMK ENGINEERING COLLEGE, CHENNAI

RMK Engineering College (RMKEC) is a private engineering college under the Lakshmikanthammal Educational Trust. Ranked #26 in the March 2020 Dataquest T-Schools listing, this is another college that has performed extremely well in the Digital Index 2020, thanks to its well-planned, campus-wide infrastructure for 3,078 students and faculty. It has 25 e-classrooms and has already deployed public cloud and Hardware/ Infrastructure as a Service (HaaS/IaaS). It has also introduced artificial intelligence, IoT, IIoT, and remote collaboration in the campus.

It is affiliated to Anna University, Chennai, and accredited by AICTE with A+ Grade. Besides, all its seven departments are accredited by the National Board of Accreditation. It is also considered among the top engineering colleges of Anna University in Tamil Nadu and a Tier-I institution among self-financing colleges. RMKEC offers BE, B Tech), ME and doctoral courses in different areas.

Established: 1995

Status: Autonomous (Private)

RANK 10 REVA UNIVERSITY, BANGALORE

Spread across 45 acres, Reva University, Bangalore is a constituent of the Reva Group of Educational Institutions and is governed by the Rukmini Educational Charitable Trust. It has more than 15,000 students with over 600 highly-qualified faculty members on its campus. The University has six faculties offering 75 courses in engineering, architecture, and science, among others. Of these, 33 courses are offered at undergraduate and 26 at postgraduate level. The University also facilitates research leading to doctoral degrees in approximately 20 disciplines.

Ranked #29 in the March 2020 Dataquest T-Schools listing, Reva University has made it to the Top 10 in the Digital Index of the year, thanks to its well-structured infrastructure to meet the needs of 5,443 BE and B Tech students, including fully-equipped 230 e-classrooms, remote collaboration, public cloud and Platform as a Service (PaaS) implementations.

Established: 2013

Status: State Private University

RANK 11 DIT UNIVERSITY, DEHRADUN

Set up by the non-profit Unison group, Dehradun Institute of Technology was accorded the autonomous status in 2012 and was declared as DIT University (DITU) in 2013. It offers undergraduate, postgraduate, and doctoral programs in engineering and technology, architecture and design, and applied science, among others to 5,264 students.

Spread across 21 acres, DITU has more than 270 core faculty members, of which 50% have PhDs. On the digital infrastructure front the university has 126 e-classrooms, laboratories for mobile apps development and internet of things (IoT). While the institute has also introduced robotic process automation, blockchain, IoT, IIoT, and AR/VR in the campus, it is chalking out plans to introduce artificial intelligence soon. It is also planning to implement private and hybrid cloud and to explore benefits of Platform as a Service (PaaS) and Hardware/Infrastructure as a Service (HaaS/IaaS).

Established: 1998

Status: State Private University

RANK 12 KONERU LAKSHMAIAH EDUCATION FOUNDATION, VADDESWARAM

Set up in 1980, KL College of Engineering was granted the autonomous status in 2006 and later declared as a KL Deemed to be University in 2009 by the UGC. In 2012 the institution was accredited by NAAC with A Grade and later in 2018 and re-accredited with A++ grade. In 2019 UGC declared it as a Category I Institution.

Spread across 100-acre, it offers industry-focused programmes at undergraduate, postgraduate, doctoral, and post-doctoral level. It has a state-of-the-art data centre and a campus wide network compete with hi-speed fibre optic back bone. The institution is also a member of All India Virtual Class Room initiated by the MHRD. This network enables the students to make use of virtual class rooms, virtual laboratories, online journal sharing, video conference lectures and many more with the help of 1 Gbps bandwidth

Established: 1980

Status: Deemed to be University

RANK 13 GALGOTIAS UNIVERSITY, GREATER NOIDA

Set up in 2011, Galgotias University has been approved by the UGC, Association of Indian Universities, All India Council for Technical Education, and Council of Architecture. It offers undergraduate, postgraduate, polytechnic and doctoral level programmes in collaborations with international universities and tailored to meet the needs of the industry demands with emphasis on theories and their applications. It presently has 3,484 BE and B Tech students.

The University has a 52-acre campus that is fully Wi-Fi enabled. It has digital libraries, well-structured 86 IT-enabled classrooms, and 180 student laboratories. Galgotias University also boasts of laboratories for AI, data science, languages, and data base, and has introduced robotic process automation, IoT, IIoT, remote collaboration and AR/VR in the campus. The university has already deployed public, private and hybrid cloud, Platform as a Service (PaaS), and Hardware/Infrastructure as a Service (HaaS/IaaS).

Established: 2011

Status: University Department

RANK 14 MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY, DELHI

Established by Maharaja Agrasen Technical Education Society, the institute is approved by AICTE and affiliated to Guru Gobind Singh Indraprastha University. It offers undergraduate courses in computer science and engineering, electronics and communication engineering, electrical and electronics engineering, information technology, mechanical and automation engineering, and mechanical engineering.

As an institute that was ranked #8 in the Dataquest T-Schools listing in March 2020, Maharaja Agrasen Institute of Technology (MAIT) may not have maintained its score on the digital front, but it still stands tall among the peers with adequate infrastructure to meet the needs of its 4,500 students, including 30 e-classrooms. MAIT has also it has also introduced remote collaboration, IoT, and IIoT in the campus, it has also implemented AR/VR pilot project. Going ahead, it is exploring options of introducing artificial intelligence, blockchain and robotic process automation in the campus.

Established: 1999

Status: Private College (university affiliated)

RANK 15 NATIONAL INSTITUTE OF TECHNOLOGY, HAMIRPUR

Established as a Regional Engineering College, the National Institute of Technology, Hamirpur (NIT-H) was accorded the status of a Deemed University in 2002 and later upgraded to the National Institute of Technology status in 2007. NIT-H offers Bachelor, Master and Doctoral programmes in engineering, sciences, and architecture among others. NIT-H presently has 2,754 BE and B Tech students. It has a close interaction with industry and lays strong emphasis on research. It also has the flexibility to evolve and change in response to requirements of the industry and happenings in the technology sector.

On the infrastructure front, it has already deployed private cloud and Hardware/Infrastructure as a Service (HaaS/IaaS). It also plans to implement Platform as a Service (PaaS), and exploring options of introducing robotic process automation, blockchain, IoT, IIoT, remote collaboration, and AR/VR in the campus.

Established: 1986

Status: Autonomous (Govt)

RANK 16 KCG COLLEGE OF TECHNOLOGY, CHENNAI

KCG College of Technology, formerly known as National Institute of Technology and Science, is affiliated to Anna University and approved by AICTE. It offers 13 undergraduate and four postgraduate programmes.

While its undergraduate programmes in mechanical, electronics and communication engineering (ECE), computer science and engineering (CSE), information technology (IT), electrical and electronics engineering (EEE) and aeronautical engineering have permanent affiliation under Anna University, the courses in CSE, ECE, IT and mechanical engineering are also accredited by the NBA. The college is accredited by NAAC with A+ Grade.

The college has a 38-acre campus at Karapakkam which is Wi-Fi-enabled to meet the needs of the existing 2,412 students and the faculty. It also has 74 e-classrooms, cloud infrastructure, and has already introduced artificial intelligence, robotic process automation, IoT, IIoT, remote collaboration and AR/VR in the campus.

Established: 1998

Status: Private College (University affiliated)

RANK 17 VEL TECH RANGARAJAN DR SAGUNTHALA R&D INSTITUTE OF SCIENCE AND TECHNOLOGY, CHENNAI

As an institute that was ranked #38 in the Dataquest T-Schools listing in March 2020, the institute has done pretty well on its digital infrastructure front. It has been recognized as an 'A' Grade institution by the NAAC, is accredited by the NBA, and recognized by the AICTE. Vel Tech has been affiliated to the Anna University since 2001. The institute offers over 50 programmes at undergraduate, postgraduate, and PhD level in engineering, technology, and science among others.

The institute, which has a 103-acre campus in Chennai, has adopted a new pedagogical process Conceive-Design-Implement-Operate that aims to help its 7,904 students acquire professional, personal and inter-personal skills systematically. It provides broadband access across major parts of the campus, has 133 e-classrooms, and has introduced artificial intelligence, robotic process automation, IoT, IIoT, remote collaboration and AR/VR in the campus.

Established: 1997

Status: Deemed to be University

RANK 18 HINDUSTHAN INSTITUTE OF TECHNOLOGY, COIMBATORE

Hindusthan Institute of Technology (HITECH), started by the industrialist and philanthropist TSR Khannaiyann, is an autonomous institution. It aims to educate and prepare students for leadership in industry, government, and educational institutions, and to advance the knowledge base of the engineering professions. HITECH also aims to influence the future directions of engineering education and practice.

Since its inception, the College has been providing world-class facilities and infrastructure including well-furnished classrooms, state-of-the-art laboratories, computer centres and a well-stocked library. While the instate boasts of over 30,000 books and 1,500 journals in its library, it also has 30 e-classrooms to provide best learning environment for its 1,583 students. It also has 24/7 Google Classroom to facilitate paperless communication between teachers and students and streamline educational workflow. The classroom allows teachers to create classes, post assignments, organize folders, and view work in real-time.

Established: 2007

Status: Autonomous (Private)

RANK 19 DR DY PATIL TECHNICAL CAMPUS AJEENKYA DY PATIL UNIVERSITY, PUNE

Dr DY Patil Technical Campus (DYPTC) is one of the largest constitute college of Savitribai Phule Pune University under the Dr DY Patil Educational Enterprises Charitable Trust. The college aims to provide technical education though its state-of-the-art infrastructure, excellent academic and socio-technical facilities along with a team of well qualified faculty members. The college offers undergraduate engineering courses in electronics and telecommunication engineering (E&TC), mechanical engineering, civil engineering, computer engineering, automobile engineering, and computer engineering (CE), besides postgraduate courses in E&TC, mechanical, and CE.

The institute also boasts of a well designed Training and Placement Cell that plays a pivotal role in counseling and guiding the students for their successful career placement. The Cell also organises Professional Development Programs like mock interviews, group discussions, pre-placement talks, interactive sessions with industrial experts, covering communication and presentation skills, as well as career planning.

Established: 2010

Status: Private College (University affiliated)

RANK 19 GL BAJAJ INSTITUTE OF TECHNOLOGY & MANAGEMENT, GREATER NOIDA

GL Bajaj Institute of Technology and Management is the 6th institute under Rajiv Memorial Academic Welfare Society. The institute is approved by AICTE and is affiliated to Dr APJ Abdul Kalam Technical University. It offers various undergraduate and postgraduate engineering courses with a total of 2,790 students in the current session.

On the infrastructure front, it has a fully-enabled Wi-Fi campus and broadband access in all major areas including classrooms, library and labs. The institute has rolled out private cloud project on pilot basis and implemented Hardware/Infrastructure as a Service (HaaS / IaaS). It plans to deploy hybrid cloud and Platform as a Service (PaaS) in the campus very soon. While it has already introduced artificial intelligence, robotic process automation, remote collaboration, and AR/VR in the campus, the institute has also done blockchain, IoT, and IIoT pilot projects to explore its benefits.

Established: 2005

Status: Private College (University affiliated)

RANK 20 DJ SANGHVI COLLEGE OF ENGINEERING, MUMBAI

Dwarkadas J Sanghvi College of Engineering (DJSCE) is an autonomous institution that offers eight undergraduate programmes, three postgraduate programmes and 3 PhD courses, permanently affiliated to the University of Mumbai. All its undergraduate programs are accredited by NBA. The college has state-of-the-art facilities, including classrooms spread across 1,90,192 sq. feet, well-equipped laboratories and workshops, new-age computer facilities and a well-stocked library. It has received A grade certificate from the Directorate of Technical Education, Maharashtra.

The college has 50 e-classrooms and a well-stocked library with over 17,000 books, 70 printed journals and magazines and four online databases – IEEE, IEL Online, ASME, ACM, and Springer Link. The library also has reprography and Wi-Fi network connection. DJSCE also has an innovation centre and in-house technical journal that support faculty and students in coming up with quality research publications and novel projects.

Established: 1994

Status: Autonomous (Private)

Digital Index Team
maildqindia@cybermedia.co.in

"NEP DETAILS THE VISION OF EDUCATION FOR FUTURE GENERATIONS"

AJAY KUMAR SHARMA
National Academic Director (Engineering),
Aakash Educational Services Limited

Do you think NEP 2020 will help and empower the future of education?

The National Education Policy is comprehensive in every sense. It effectively tackles the shortcomings in our current education system and paves the way for an even better future. The key aspect of this policy is the interplay of education and technology. Over the last few years, India has transformed itself into an information-heavy society and with the outbreak of the COVID-19 pandemic the requirement for usage of technology in the field of education has increased more than ever.

One of the policy's focus points to drive the education system will be the 'extensive use of technology in teaching and learning, removing language barriers, increasing access as well as education planning and management'. In the current scenario, both students and teachers are forced to reimagine the traditional, in-person teaching by making use of virtual classrooms. The introduction of this policy at such a critical juncture is even more significant, as it details the vision of education for future generations and will be a critical tool for students and teachers to embrace the new normal and build a 'self-reliant' India.

How have you responded to the lockdown and how might it affect the way engineering coaching is taught in future?

Students of class XII were in the midst of their board exams when the news of the first lockdown came, leaving them in a tizzy. There was uncertainty and the students were unsure about the impending pandemic situation. The government acted timely and the confusion about board exams eventually faded away.

> THE EXPERIENCES ACQUIRED DURING THE LOCKDOWN PERIOD WILL DEFINITELY PROMPT INSTITUTES TO CHANGE THEIR COACHING MANUALS TO EXPLOIT ONLINE PLATFORMS.

The JEE (Main) 2020 was originally scheduled for April 2020 and our institute like any other was ready for executing what was already planned in terms of revision classes, conducting revision tests through Final Test Series (FTS), mock tests etc. We went ahead with our plans and academic managers huddled to foresee and anticipate the situation. Within a couple of days of brainstorming, multiple plans were made ready depending upon the timings of the exams like JEE (Main) followed by JEE (Advanced).

The month of April is the time when new batches join and the students studying in class XI move to class XII. Plans were laid down and prompt instructions were issued to branch heads across all India. Multiple online teaching platforms were purchased and the teachers were equipped with laptops, digitisers and webcams. Quick instructional workshops were organised by IT teams for the teachers through scores of batches and the teachers were made ready to take classes. While the teaching was resumed through online platforms, R&D teams were busy framing new questions for an elongated academic session.

It is worth mentioning that the best of the questions were framed during this time. It may have happened because of the fact that everybody worked painstakingly and were guided by an exemplary leadership while working from home (WFH). PTMs were also conducted online. The experiences acquired during the lockdown period will definitely prompt institutes to change their coaching manuals to exploit online platforms.

Some of the manuals may go 'partly online partly offline mode' and preparatory tests may be conducted online where a students do not have to come to the centre to write their exams, thus saving their precious time in commutation and preserving their energy as well.

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"INTEGRATION OF TECHNOLOGY IN EDUCATION WILL BE NEW NORMAL"

DR. AMIT JAIN
Pro Vice Chancellor, Amity University Rajasthan

When it comes to remote learning, do you think engineering can be taught effectively online?

Online education is very much beneficial in the engineering stream. The faculties are being asked to adapt to new teaching environments quickly and that requires taking a realistic look at what learning outcomes are achievable. At Amity University Rajasthan (AUR) each faculty is highly recommended to communicate clearly with the students about what this transition means for their class. At Amity School of Engineering and Technology (ASET) of AUR, all the online classes and webinars have been carried out using multiple platforms like Microsoft Teams (MS Team), WebEx and Zoom.

Several pedagogical innovations were made by using remote and virtual labs, online simulations, blending with MOOCs to ensure that online classes are as exciting and rewarding as physical classrooms. It has been observed that the students were more engaged and eager to learn in the comfort of their own homes than when on the campus. Labs were creatively adapted so that students get the full benefit of lab practice and get practical exposure. Innovation and adaptability are the ways for success in virtual world.

Do you think NEP 2020 will help and empower the future of education?

Yes, NEP 2020 is a big milestone in Indian education as it is based on multidisciplinary and holistic education which will give emphasis on conceptual understanding. NEP 2020 made some significant amendments by making structure of education more supple and submissive for the student fraternity. Students will be offered a wide range of choices and options to select the course and subject of their choices. As the prime minister had said, the policy is based on the pillars of access, equity, quality, affordability and accountability.

Besides providing academic flexibility, this new policy focuses on continuous assessment and practical learning. This will allow institutions to promote R&D culture and integrate its programmes with the industry. The policy has empowered academic fraternity with a digital way of teaching, learning and evaluation.

How much of an impact did the lockdown have on educational institutions?

Yes, COVID-19 has had an impact on academics, it was not very easy for colleges and universitiesto go for quantum jump from conventional teaching-learning to ICT-based teaching and evaluation within a very short time. Institutions having adequate IT infrastructure like Amity were able to cope with this new teaching, learning and evaluation. These IT-enabled institutions also connected with relevant industries and nicely organised several webinars and guest lectures to ensure industry integration. However, hands-on practice in respective laboratories got restricted, and institutions were forced to adopt remote labs and virtual labs as part of pedagogy. I believe, going forward, blended learning and integration of technology in education will be the new normal.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

All the classes have been organised in online mode for each student of engineering in an effective manner at Amity School of Engineering and Technology (ASET) of AUR. Theoretical as well as practical aspects have been covered in online mode of teaching at Amity University. Several webinars have been organised to connect with industry and society during COVID times by inviting experts from industry and eminent scientist including Nobel laureates.

The impact of online teaching on the engineering education system will be a shift from live teaching to the teacher developing online content for students. Online

> THERE IS NO NEED TO CHANGE THE COURSES, FOCUS ON BUILDING IT SKILLS AND ABILITY TO MANAGE AND CONTRIBUTE TO REMOTE TEAMS IS REQUIRED.

teaching has benefits of flexibility, accessibility and cost effectiveness. Blended teaching and remote/virtual labs will be the new order in engineering education.

The Coronavirus has not just caused a health crisis but an economic crisis as well. With the job market being hit severely, do you think the courses students choose will also change?

There are two ways in which young people are affected in the current crisis. These are job disruptions in the form of reduced working hours and earnings, and job losses. Although, every sector is affected adversely, largely the blue-collar workers and professionally qualified managers working at middle level are much affected.

However, for budding managers or those pursuing the professional courses, there is no need to panic, they still have a lot of scope in industry. As soon as economic revival will start there will be a plenty of opportunities. Several government schemes like Aatmanirbhar Bharat and the focus on building self-reliance will further improve entrepreneurship and job opportunities for new graduates. There is no need to change the courses, focus on building IT skills and ability to manage and contribute to remote teams is required. The programmes and curriculum at AUR are continuously updated with the support of industry advisory boards to keep the courses contemporary and relevant.

> DOMAIN KNOWLEDGE, SKILLS, ATTITUDE AND FUNCTIONAL COMPETENCIES CAN NEVER BE CHANGED. THE NEED IS TO UPDATE (NOT TO CHANGE) GENERIC TECHNICAL COMPETENCIES.

The pandemic has forced the world to be more and more digital. Will graduates require fundamentally different competencies?

The post-COVID world will require every organisation to transform digitally. Domain knowledge, skills, attitude and functional competencies can never be changed. The need of the hour is to update (not to change) their generic technical competencies only. For youth it is not a challenge, they are young, energetic and tech-savvy. The online classes, which include case study, experiential learning, simulation games, group dynamics are good platforms to learn those competencies. Graduates need to adapt to the new normal of working digitally, from home and with remote teams. AUR has always focused on building behavioural competencies, communication skills, presentation skills, analytical ability and decision-making skills of its students.

Do you think that the examination and evaluation system will change eventually?

AUR has successfully conducted continuous evaluation and end-semester examinations using its unique intranet portal, completed an even semester in the COVID-19 pandemic and is now running an odd semester smoothly. The university has enhanced ICT-based evaluation in the COVID times and trained its staff accordingly. We would like to continue ICT-based evaluation to some extent after the pandemic also as besides reducing the carbon footprint it will give diversity tothe evaluation scheme.

With a looming recession, now might seem like a bad time to graduate. Is it time to apply for a postgraduate degree?

Every challenge and constraint brings a new possibility and opportunity. The COVID-19 time has succeeded in building

> EMERGING TECHNOLOGIES AND NEW WAYS OF ENGAGEMENT HAVE CROPPED UP WITH INVENT OF NEW TECHNOLOGIES AND UNIQUE MODELS IN VARIOUS SECTORS.

new thoughts and accepting new opportunities amongst the young graduate. The times have proved that the world is shut for a while, but opportunities are abundant with the advent of the new normal.

Emerging technologies and new ways of engagement have cropped up with invent of new technologies and unique models in various sectors. So, yes, students may contemplate to pursue PG degrees immediately after the graduation; and there has been the change in trend in support of the same. But what is more interesting to notice is the inclination of domain experts to explore fields for PG degrees, either to become super domain experts and upgrade to acquire skills in technology, law, hospitality, biotech, microbiology and food technology. They are also open to pursue their passion and interest to do career-oriented PG courses in management, mass communication, travel and tourism management, psychology and so on.

How are you providing skills in new areas such as Deep Technology, AI, ML, robotics and IoT?

At AUR, we strive to produce industry-ready practitioners by training them in the areas of analytics, data science, big data, machine learning, deep learning, AI and IoT. The programme is designed in collaboration with industry experts and focuses on building solid foundation and exposes to advanced data science and AI application building. The main tool used is Python and R with additional exposure to Keras and TensorFlow.

The course content includes modules on machine learning algorithms, Python for ML, R for ML, feature engineering, logistic and linear regression, random forest, gradient boosting machines, recommendation engines, clustering, deep learning concepts and tools such neural networks, CNN, natural language processing, blockchain etc. These are delivered using online/offline lectures and practicals including learning through case study, workshops, hands-on contests and projects.

We believe that students can only get the right skills if they are trained by domain experts. Therefore, our faculty members have expertise in these domains and some of them are even providing consulting services to industries and have completed government projects. We expose our students to some of the most innovative ideas by conducting guest lectures, which are delivered by industry experts. Our objective is not only to develop certain skill sets so that students can get good jobs, but also to prepare future entrepreneurs so that we have sustainable development and prosperous societies.

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"EDUCATION 4.0 HAS BECOME A REALITY"

WG. CDR. DR. ANIL KUMAR
Assistant Pro Vice Chancellor & Director, ASET

The pandemic has made remote learning a new normal, but do you think engineering can be effectively taught online?

In certain branches of engineering, especially in computer science and information technology and to an extent in electrical and electronics engineering, online learning can be highly effective at graduation level, while in other branches like mechanical, civil and aerospace engineering, the current efficacy of online learning tools is limited.

Tools like virtual lab, multimedia training kits and NPTEL lectures can assist in self-learning and accelerated absorption of concepts. However, at the current technological level of sophistication, the conduct of hands-on practical courses in core engineering branches is limited.

As the technological inroads are made towards augmented reality, virtual reality tools and AI-based adaptive digital learning, the scenario will change dramatically in favour of technology driven learning, in very near future. Use of tools like JIO Glass, Google Glass and holographic presentation by faculty assisted by digital tools will create a virtual classroom. These tools in the hands of trained expert faculty will create and enhance learning outcomes. Nonetheless, a teacher will still hold an important place in building engineering concepts, resolving doubts and blended mode of experiential learning through virtual and real lab experiments.

How much of an impact did the lockdown have on educational institutions?

The lockdown has had a very profound impact on educational institutions in terms of adopting technological tools for teaching learning and evaluation. Institution have been using MS Teams, Zoom, Webex and Google platform to conduct online classes. Institutions have also adopted AI-based proctored tools to conduct online examinations and evaluation.

NPTEL, virtual labs, digital knowledge repository have been used effectively. In fact, time and space have lost their relevance to give place to 24-hour learning at your own pace, anytime anywhere. Technology induction has been accelerated in education sector and a distant future

> AS TECHNOLOGICAL INROADS ARE MADE TOWARDS AUGMENTED REALITY, VIRTUAL REALITY TOOLS AND AI-BASED ADAPTIVE DIGITAL LEARNING, THE SCENARIO WILL CHANGE DRAMATICALLY.

has dawned too quickly and rapidly. Education 4.0 has become a reality. Innovation has become the buzzword and it has opened tremendous opportunity in bringing world-class talent and expertise within an arm's reach.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

As a technology-driven, future-ready university, we have responded very rapidly and timely to the lockdown. Without wasting anytime, the university leadership adopted the best technological solution in online learning. All assignment and evaluation was conducted online. The faculty rose to the occasion, and absorbed and implemented technological solution with a high degree of ease and comfort. The higher leadership left no stone unturned in giving the best and resources were optimised developed and appropriated for an efficient course delivery.

The lockdown has created a plethora of new experiences which will change engineering education. Power of resources like virtual lab has been demonstrated beyond doubt. Online simulators are likely to become a new norm. As AI-based technology storms the education sector, along with VR and AR tools, 3D animation, holographic projection and smart evaluation tools, the transformation is going to be revolutionary.

> SELF-DRIVING CARS, ELECTRICAL VEHICLES, DRONE TECHNOLOGY, AI IN HEALTHCARE, 3D MANUFACTURING AND QUANTUM COMPUTING WILL TRANSFORM HUMAN LIVES FOREVER.

The post-COVID-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

The new normal will certainly demand new competencies and new skillsets. Management law, human resource development, tourism industry, digital marketing, medical diagnostics and healthcare industry will be greatly impacted by new and advanced tools. It is estimated that a large number of low-skill jobs will go to robotics. Self-driving cars, electrical vehicles, drone technology, AI in healthcare, 3D manufacturing, quantum computing and legal software are disruptive technologies that will transform human lives and our governance forever.

New competencies and new skillset to exploit these technologies will become very important. Short-period certification courses to equip one with fast-changing technology will become the norm. Life-long learning will be the new mantra.

How are you providing skills in new areas such as Deep Technology, AI, ML, robotics and IIoT?

We are providing skills in new areas by collaborating with the industry. We frequently revise our course curriculum to confirm to industrial norms. Leading industrial experts sit on the board of studies to advice on the best practices. The faculty are being motivated to upgrade their skillset by clearing industrial grade courses and advanced technology refreshers through well-designed faculty development programmes. The course has been redesigned to be essentially taught by industrial experts. National and international guest lectures, sponsored industry projects, MoUs with research labs across the globe and strong focus on innovation have helped us to touch new heights.

Digital Index Team
maildqindia@cybermedia.co.in

"INDIA'S JOBS MARKET HAS STARTED RECOVERING ALREADY"

ANIL KUMAR SINGH
Head of Talent Acquisition – India, Capgemini

The pandemic has already affected many jobs and careers. How do you see this crisis and how will a candidate become resilient in this situation?

Due to COVID-19, the Indian IT industry did see a slowdown in growth; however the impact was not drastic, and soon the industry was on a road to recovery. After the initial disruption of business processes, IT as a sector quickly transitioned into a digital way of work life. This crisis hastened digital transformation andenabled us to quickly adapt to the new normal and create new working model to address to the client requirements.

From a candidate resilience perspective, first and foremost, there is a need to have an understanding that this situation is one of its kind with no precedent to fall back on for everyone concerned.Individuals, families and communities, businesses and governing bodies are all adjusting to the norm of the day and trying to establish sustainable processes. Under such circumstances, a candidate is required to have an ability to be agile and open to new possibilities, to remain flexible and continue their learning journey and most of all-patience- to dig in for the long haul and see things through.

India's jobs market has started recovering already and weare seeing a positive up trend of demand in New Age Technologies like Digital, Cloud, Data Management and Cyber Security.At Capgemini, we have a robust hiring plan. In H1 2020, we have hired 9,500 which includes both freshers and laterals. We will continue to hire 13,500 experienced professionals and young professionals in H2 2020.

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?

As we are entering to a new normal, all graduates need to continuously reskill and upskill themselves on new technologies that will open a lot of avenues in the times ahead.With most of the prestigious universities across the globe throwing open their virtual doors to their vast learning resources, courses and materials and with the advent of online platforms self-learning platforms, it has never been easier to embark on a continuous and sustainable learning journey. An opportunityto understand the business model and culture of organisations should also be explored. Also, there should be ability to look ahead constantly and keep ourselves updated with changes happening across the industries and learn from those changes. Capgemini has enabled a pre-onboarding learning programme, ADAPT, for our selected candidates to enable themto take maximum advantage of the time before joining.

It is also natural to be anxious and worried about the future, it is therefore, necessary that students are counselled and made cognisant of the importance of mental health wellbeing. It is essential that they have access to the necessary channels and safe spaces to express their issues and angst.They need to stay motivated, mentally strong, confident and stay the course.

How do you build a strong employer brand?

During these times, it is essential to address the uncertainties that plague an employee's or a prospective candidate's mind and boost their morale. A clear and transparent communication mechanism, building robust business continuity processes enabling smooth transition to a virtual workplace and leveraging existing partner ecosystems to ensure safety, work-life balance and support mechanisms should feature in building a strong employer brand.

At Capgemini, we have launched a structured employee engagement programme in order to keep the morale and spirits of our employees high while working from home during these times.Fun as always been a core value at Capgemini, and we continue to live it in the changed times as well. We had launched 'Capgemini Bigg Bosss challenge' in which employees along with their family or friends can take up exciting series of tasks or contests to participate. Along with this we have also started various

> AT CAPGEMINI, WE HAVE A ROBUST HIRING PLAN. WE WILL CONTINUE TO HIRE 13,500 EXPERIENCED PROFESSIONALS AND YOUNG PROFESSIONALS IN H2 2020.

online quiz contests and have seen great participation from our employees. Nearly 85,000 employees have been engaged through this pan-India level programme.

We also engage with tech enthusiaststhrough our flagship hackathon, Tech Challenge. It is a unique hackathon designed to identify the best programmers from across India. This hackathon invites passionate developers and tech enthusiasts to leverage their coding skills to design innovative solutions for a sustainable future.Since its inception, Tech Challenge has received over 5 Lakh registrations including almost 30% of women participation each year.

How do you expand the candidate reach and build recruitment strategy?

Digital medium enables us to reach candidates in every nook and corner of our country. We have completely transitioned our fresher hiring process from on-the-ground events to virtual hiring. Be it preplacement webinars or pre-buzz engagements, be it bite-sized information about Capgemini or guest lectures, remote proctored and customised assessments ensuring maximum talent coverage geographically to virtual interview schedulers and live scheduling; we have changed it all into a digital landscape.

Along with our partner ecosystem, we have taken our hiring virtually to the students in an effective manner. Our strategies have transformed to ensure a streamline, seamless and accessible process.

What challenges do you face in attracting the right job candidates?

COVID-19 has accelerated the speed of change and cross function innovation is also becoming big. With technology transforming at an exponential rate, it has become difficult to define job profiles within clear cut boundaries. A right candidate for any job entails a need to be able to effectively perform at the intersection of these changes and be open to cross skilling-based profiles. It is quite assertion that going forward Phygital – both physical and digital combination – is going to be the new normal. Hence the ability to do cross-sector innovation and bring both global and local innovation together will be the way forward and every candidate should have the capability to think in that level.

What are the skills you look for when hiring new employees, which often can be discovered in the first interview?

A candidate needs to be high on learning ability – especially proficiency and technology preparedness, open and flexible to new opportunities, confident in demeanour and effective in communication.The structure of the ecosystem within ensures that candidates ranking high on these parameters have a better chance for a premium salary and profile.

Do you provide skilling programmes and certification to find the best match for a profile?

We invest extensively to train and groom the talent that we hire from campuses. We launched a comprehensive digital learning platform, NEXT, that every employee of Capgemini leverages to build proficiency in diverse technologies. The learning journey is customised for freshers based on the technologies needed for customer projects. The training is fully immersive in nature where the individual learns and masters technology by working hands-on with the help of dedicated faculty and practitioners from business teams. This approach enhances self-learning ability and makes the freshers more adaptable to ever changing technologies. This requires mindset change in freshers and we enable this through our pre-onboarding learning programme, ADAPT. Also, we collaborate with few our strategic colleges to impart the required technology trainings in the last semester of their engineering. This helps the academia also to understand what the industry expects.

Digital Index Team
maildqindia@cybermedia.co.in

"360-DEGREE CHANGES ARE EXPECTED DUE TO THIS PANDEMIC"

DR. ANIL R ACHARYA
Dean, Industry Institute Interaction,
Govt. College of Engineering, Karad

When it comes to online learning, do you think engineering can really be taught effectively, virtually?

Education – not only engineering, but all – does not mean passing the information. It is giving the right and correct information, concepts with right explanation and motivation so that knowledge sinking and thinking will be there for student. It is really difficult to answer the question if taken as generalised. There are some engineering courses and subjects which can be well explained online. Especially circuit branch subjects can be taught online.

Programming, coding, algorithm building can be well taught online. This is not applicable to core branches like civil, mechanical, and chemical engineering where a lot hands-on experience matters. Often a concept cannot be explained by visualisation alone and actual feel of it is important. Many terms like viscosity and density cannot be demonstrated online. Physical handling, actual doing is important. So, generalised acceptance is not possible in online engineering education.

Do you think NEP 2020 will help and empower the future of education?

The NEP 2020 will bring the until the uncovered age group of 3-6 years, recognised as the best age for development of mental faculties of a child, under the school curriculum. NEP 2020 focusses on foundational literacy and numeracy, interdisciplinary education between academic streams, extracurricular, vocational streams in schools. It gives more importance to teaching in the mother tongue orthe regional language and this makes some sense in understanding the concept which usesthe colloquial language. Any system's success depends on a right and closed-loop feedback system. Assessment reforms with 360-degree evaluationand tracking student progress for achieving learning outcomes will be good practice.

How much of an impact the lockdown had on educational institutions?

Education with fear is not useful as it does not give

MENTAL HEALTH ASSESSMENT AND REMEDIAL ACTIONS ARE HIGHLY RECOMMENDED FOR A BETTER FUTURE OF THE PANDEMIC-AFFECTED STUDENTS.

any opportunity to radical thinking and innovation. The lockdown to some extent created fear amongst student community and its impact will be observed after four-five years. Mental health assessment and remedial actions are highly recommended for a better future of the pandemic-affected students.

How did you respond to the lockdown and how could impact the way engineering is taught in the future?

We tried to keep students busy in academic activities, participating in creative competitions like mathematical model building for the pandemic, innovative thinking and idea sharing on corona issues and remedial actions through product development. One of our student groups has developed a small, tiny steamer which works on a cigarette lighter to create steam.Some students tried to build mathematical model on pandemic cycles with predictions of the likely end of the pandemic using mat-lab software.

We also encouraged students to enrol in online courses offered by Coursera, Tata Steel, Udemy, Swayam and they also responded well. For the 300 intake capacity of my institute, about 3,000 certifications were completed by students.

The Coronavirus has not just caused a health crisis but an economic crisis as well. With the job market being hit severely, do you think the courses students choose will also change?

AUTOMATION AND MINIMUM HUMAN INTERVENTION WILL NOW BECOME PRIORITY FOR INDUSTRY AND THIS WILL BOOST PROGRAMMING, CODING AND IoT RELATED JOBS.

Surely, the Corona has made a large impact on industry. The automation and minimum human intervention will now become priority for industry for product development and this will boost programming, coding and IoT related jobs. Its immediate effect will be more importance to computer science and electronics. Other core branches will restructure their syllabus and will become more interdisciplinary. For the survival of a course or an institute, these changes will be required.

The post-Covid-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

As said earlier, to minimise human intervention in many activities to avoid touch and spread of any kind of virus, there will be a shift from conceptual knowledge to innovation. The number of patents, attempts for patents, and creativity will gain edge over old competencies.

The next biggest worry for students is exams. Do you think that the examination and evaluation will change eventually?

360-degree changes are expected to occur due to this pandemic. Earlier many competitive exams began with online mode. Observing their success about results, such pattern will be used for routine examination to be done with online mode. AspiringMinds conducts aptitude tests for many job recruitment processes where the exam can be given from the mobile phone keeping its camera on. Such an examination pattern can now become new normal. Online assessments are fast and give results faster. The time of two to three months in a year spent on examination can be curtailed down to a week or two,freeing more time to learn many other essential things.

Digital Index Team
maildqindia@cybermedia.co.in

"EXPECT FASTER AND WIDER TECHNOLOGY ADOPTION"

ANIRUDDHA KANNAL
Academic Council Member, Atria University and CEO, Xcelerator

When it comes to remote learning, do you think engineering can be taught effectively online?

If you had asked me this question three months ago, I would have answered with an emphatic Yes! The first few days during the lockdown were hard for all institutions and educators as they settled into the 'new normal'. But once they found their groove, the initial results were amazing. Some might even tell you that the virtual mode of delivery was better suited for some subjects. But, the tide has turned over the last couple of months.

We are all social creatures, and learning especially is a social exercise. Students are exhausted, and professors are thirsting for a boisterous classroom. I believe we will need a healthy mix of virtual and physical learning experiences. The digitisation of content and delivery will continue, but the importance of physical learning spaces and human interaction will find new importance.

What was the impact of the lockdown on educational institutions?

The pandemic and the lockdown have compelled educational institutions to digitise content as well as delivery. In many ways, it has helped push institutions forward by a few years. Educators were forced to reinvent. They had to rethink knowledge delivery, student engagement, evaluations, and even their roles! Institutions had to digitise support processes too. Adversity begets innovation. I think despite the economic hardships ensuing from the pandemic and the lockdown, the overall impact on the education industry has been quite positive.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

At Atria University, we have been in the process of digitising our content and delivery processes. The lockdown created a level of urgency that helped us prioritise the initiative. At Xcelerator, we saw the lockdown as an opportunity to speed up the content and delivery modernisation process at engineering institutions. We provided the platform for free to a large number of institutions in an attempt to help them deal with the lockdown.

As for the long term, I believe the overall impact is on the positive side. We have been forced to innovate. The education industry is traditionally slow to change but adversity of this scale has made us reinvent,

> A NEW SET OF SKILLS AROUND WORKING INDEPENDENTLY WHILE UNDERSTANDING THE BIG PICTURE, UNDERSTANDING UPSTREAM AND DOWNSTREAM DEPENDENCIES WILL BECOME CRITICAL.

innovate, and even reimagine what knowledge delivery might look like. Going ahead, I expect faster and wider technology adoption, focus changing from content to student experience, evaluations evolving to provide a true representation of what a student can do and better industry alignment of curriculum and content.

The Coronavirus has not just caused a health crisis but an economic crisis as well. With the job market being hit severely, do you think the courses students choose will also change?

The courses students choose have been changing for a while now. The total numbers of engineering admissions have been falling for the last few years. Large numbers of seats are left empty in traditional bastions of engineering like Andhra Pradesh and Tamil Nadu. Alternative careers are emerging and private universities are doing a good job of addressing the market need. Parents are also realising that forcing their kids to take on engineering will only lead to unhappiness.

As alternative career choices become increasingly viable in our country, alternative academic programmes will also grow and prosper. Coronavirus will probably make the trend accelerate. If parents and students believe choosing engineering will not ensure financial stability, they will be more inclined to make different choices. It's easier to take an alternative path when the fear of missing out is low.

> THE INDUSTRY EXPECTS EXAMS AND ASSESSMENTS TO BECOME BETTER INDICATORS OF STUDENTS' CAPABILITIES. IF EVALUATIONS DON'T EVOLVE, THEY WILL BECOME IRRELEVANT.

The post-COVID-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

There's absolutely no doubt about that. The nature of the workplace has changed for the foreseeable future. Skills like communication, collaboration, curiosity, and self-awareness were always important but will become harder to master as companies transform digitally. How do you listen and empathise when you can't meet somebody in person? How do you collaborate with a team that you never get to meet? How do you resolve differences without having the opportunity to have a brainstorming session or a team outing? Graduates will need to be creative, and stay curious and agile through the learning process.

Apart from these, a new set of skills around working independently while understanding the big picture, understanding upstream and downstream dependencies, and taking ownership will become critical to an organisation's success.

The next biggest worry for students is exams. Do you think that the examination and evaluation will change eventually?

I sure hope so. Exams and evaluations as we know them were fast getting irrelevant. A large number of students with great academic records find it hard to perform in the real world. What does that tell us about our exams? They are an inadequate indicator of what the student is capable of. The industry expects exams and assessments to become better indicators of students' capabilities. We are at a point of reckoning. If exams and evaluations don't evolve, they will become irrelevant.

Digital Index Team
maildqindia@cybermedia.co.in

"RESILIENCE, AGILITY, COMMUNICATION SKILLS ARE PARAMOUNT NOW"

BRIJESH BALAKRISHNAN
SVP, Global Head - Talent Fulfillment, CSS Corp

The pandemic has already affected many jobs, and careers. How do you see this crisis and how will a candidate become resilient in this situation?

The pandemic has accelerated the needto invest in and be aware of various digital literacies. There is an increase in the skills required to navigate through this emerging new-age technology ecosystem and utilise them to their utmost potential. We undertake extensive analysis of thetechnical skillsets that employees possess and generate insights towards futureproofing them and bolstering their knowledge. Amidst this technological shift, candidates need to build resilience by training, upskilling, learning, and developing their understanding and expertise in emerging technologies. Taking up courses to sharpen their skills and continually building on their knowledge of various disruptive technologies such as AI, ML, automation, cloud computing and the like, will be critical for them to ensure they are relevant to the new business needs.

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?

The IT and ITeS industry has witnessed significant headwinds due to the pandemic, where resilience, agility and communication skills have become paramount. While the current workforce is mitigating the challenges and rigours predisposed by the situation, fresh graduates are venturing into the domain with an array of new opportunities that require disruptive thinking, problem solving and the ability to be flexible.

Candidates must carve a niche for themselves within the industry by maximising on the skillsets that organisations seek. Graduates should acquire and become adept atvarious new-age technologies such as cloud skills, which entail multiple functions like administrator, DevOps, security. It is imperative for an individual to possess hands-on experience across Linux, Windows, Python, Ansible, Jenkins, Database, Containers, Kubernetes and Serverless, along with multi-cloud (AWS, Azure, GCP) exposure. This builds their expertise and gives them an edge while entering the workforce.

How do you build a strong employer brand?

A brand that fosters and invests in continuous learning across new and cutting-edge technologies as well as emphasises on bolstering employee well-being and healthcan sail through any challenging scenario. Having the foresight to navigate through and embrace constant change builds agility and consistency, which aligns with the ethos of creating a strong employer brand that resonates our core principles. We believe in empowering our employees through our culture of innovation and collaborative work. We place significant value in the solutions developed by our employees and strengthen their focus through enriching skill-building programmes, knowledge-sharing sessions, and ad-hoc projects.

Our holistic approach renders immense opportunities towards growth and receiving a global exposure to kindle their passion and learning. Our expertise in innovation and development constantly gives our employees the edge to explore and push boundaries in learning, growing and succeeding across fields. Employee well-being forms the foundation of our company, and we espouse a culture that safeguards and promotes their holistic well-being and growth, as a precursor to the company's overall progress.

How do you expand the candidate reach and build a recruitment strategy?

Being one of the first global movers to shift to a 100% WFH operation at the onset of the pandemic, we followed structured measures to streamline all our processes, making them seamless and timesaving. Our virtual onboarding process has created a hassle-free application experience for the recruitment team as well as the candidate. We have successfully hired and on boarded

> CANDIDATES MUST CARVE A NICHE FOR THEMSELVES WITHIN THE INDUSTRY BY MAXIMISING ON THE SKILLSETS THAT ORGANISATIONS SEEK.

over 2,200 new employees globally, solely through virtual hiring post pandemic.

As technology is at the core of our business, we increasingly use AI/ML guided tools to aid the recruitment process and create a robust network that enhances our search of right individuals who would add value to the company. One approach to determine the right fit amidst the increasing talent pool is by looking into their ease of using collaborative tools, ability to work in teams across geographies, knowledge of new technologies and ability to communicate and ideate. LinkedIn is another platform that enables easier access to and a strong basis to find candidates for senior positions.

What challenges do you face in attracting the right job candidates?

In an increasingly diverse pool of talent with varying expectations, skills alone do not guarantee that you will attract or hire the right candidate. Attracting the right candidates for roles requires planning and ensuring that the individuals being interviewed come with the right skills and mindset that each specific job requires. Another challenge is longevity – finding dedicated candidates who are committed to their career path, and a fruitful career within the organisation.

> IT IS IMPERATIVE FOR ORGANISATIONS TO HIRE TALENT THAT NOT ONLY DISPLAY THE RIGHT SKILL AND ATTITUDE BUT ALSO FIT INTO THE ORGANISATIONAL CULTURE.

Finally, it is imperative for organisations to hire talent that not only display the right skill and attitude but also fit into the organisational culture. This enables them to seamlessly align their professional goals with the organisation's business goal to achieve optimal success and excellence.

What are the skills you are looking for when hiring new employees, which often can be discovered in the first interview?

The first interview often provides a premise to determine the skills of a prospective employee and gauge how they will fit into the overall company ecosystem. We believe in staying ahead of the curveby learning new and diverse technologies and investing in re-skilling and up-skilling, whenever the need arises. From a technical point of view, we look for candidates who are well versed in digital technologies and agile methodologies. We take pride in our employees having communication skills, a solution focused outlook, being able to work well within large and small teams and having the ability to think fluidly and creatively.

Do you provide skilling programmes and certification to find the best match for a profile?

We have an enriching training and skilling process for new candidates that providesa comprehensive understanding of the nuances of our business. CSS Corp's learning and development wing trains employees across a wide variety of skills, enabling them to hone their talent and expand their knowledge in the field. Our virtual university framework provides a training experience equivalent to that of an experienced employee imparting his knowledge and insights. We have also partnered with LinkedIn to provide skilling programmes to our workforce, and significantly contribute towards their growth and learning.

Digital Index Team
maildqindia@cybermedia.co.in

"EFFECTIVENESS IN LEARNING DEPENDS ON SELF-MOTIVATION"

DR. C YUVARAJ
Principal, Madanapalle Institute of Technology & Science

When it comes to online learning, do you think engineering can really be taught effectively in the virtual mode?

Online learning demands greater motivation levels and self-discipline from the student than an offline course. In the classroom teachers and fellow students can hold a student accountable for their coursework. In contrast, online courses involve setting our own goals, tracking progress andmeeting deadlines. When it comes to engineering, there are several courses which are technical and lab based. Teaching them requires handholding with respect to the software and the hardware associated. Effectiveness in learning in engineering depends on self-motivation of the student, access to the software and hardware and the interest taken up by the teacher.

Do you think NEP 2020 will help and empower the future of education?

Yes, definitely. Many of the grievances prevailing in the education system for decades were addressed in this policy. The flexibility given to the students, a single body for all the higher education system, granting of autonomy to as many institutions as possible are some of the key aspects of the policy that would empower the future of higher education.

What was the impact is the lockdown on educational institutions?

The impact of the lockdown is very phenomenal on the educational institutions. The faculty's and students' adaptation to the online classes has its effect on the key understandings of the students. Further, the overall development of the student which would be a routine thing that takes place in the offline teaching-learning is definitely awry.

How did you respond to the lockdown? How might it affect the way engineering is taught in the future?

As per the directions of the central and state governments, we announced a lockdown to the entire staff and students

CERTAIN LABS IN MECHANICAL, CIVIL AND ELECTRICAL ENGINEERING ARE DIFFICULT TO BE CONDUCTED ONLINE. A METHODOLOGY FOR SUCH TEACHING IS TO BE EVOLVED.

on March 22. It was panic time for everyone and after two-three weeks we started the online classes for the students. Thanks to the infrastructure, the Microsoft Teams platform, and technical expertise of the faculty and the students, online classes have been going on successfully till today.

Our experience says that the faculty and students have already adapted themselves to any kind of theoretical courses in online mode. When it comes to the practical mode, the laboratories concerning the software tool learning, new methodology of teaching is being envisaged and soon, we believe we would be able to adapt to this. But, as far as the hardware tool learning is concerned, certain labs in mechanical, civil and electrical engineering are difficult to be conducted and explained in online mode. A methodology for such teaching is to be evolved.

The Coronavirus has created a health crisis as well as an economic crisis. With the job market being hit severely, do you think the courses students choose will also change?

With the economic crisis brought along by the Coronavirus, there are new jobs that are created and students may automatically get attracted to such jobs. These could be in the field of data science, AI, Robotics etc. The students opting for these courses might show an upward swing.

THE GRADUATES MAY NEED TO ADAPT THEMSELVES TO WORK-FROM-ANYWHERE PATTERN. FURTHER, THEY NEED TO ABREAST THEMSELVES ON SEVERAL RELATED SOFTWARE AND MASTER THEM.

The post-COVID-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

The graduates may need to adapt themselves to work-from-anywhere pattern. Further, they need to abreast themselves on several related software and master them.

The next biggest worry for students is exams. Do you think that the examination and evaluation system will change eventually?

For the time being, most universities are conducting the examinations and evaluations in offline mode only. But usage of the learning management systems, question bank system and digital evaluation system would soon become the order of the day.

With a looming recession now might seem like a terrible time to graduate. Is it time to apply for a postgraduate degree?

Every crisis brings with it a new set of jobs and COVID-19 is not an exception. The job market would have a fast recovery. However, students interested in research and building of knowledge may pursue a postgraduate degree.

How are you providing skills in new areas, such as Deep Technology, AI, ML, robotics and IIoT?

As an institution, MITS has started new courses in Computer Science and Engineering in AI, Data Science, Cyber Security and IOT. In this connection, we are establishing the concerned laboratories and purchasing the related software. We have recruited faculty with the necessary expertise to impart the required skills in these new areas among the students.

Digital Index Team
maildqindia@cybermedia.co.in

"STUDENTS REALISE IMPORTANCE OF NEW-AGE TECHNOLOGIESSKILLS"

HARI KRISHNAN NAIR
Co-founder, Great Learning

Do you think engineering can be taught effectively in the virtual mode?

I think it depends upon the programme one is pursuing. When it comes to digital skills, with technology advancements like virtualisation and cloud computing, it is possible to deliver effective learning outcomes online. In fact, over the past seven years, we have pioneered a model of assisted learning that enables us to deliver online learning outcomes in STEM subjects that are as robust as classroom learning. Using technology, we have been able to offer highly personalised learning to our learners in new-age tech programmes like AI/ML, data science, analytics, and cloud computing by anticipating in advance the areas which they find challenging and working with them closely to help them improve. Because of this, our programme completion rate stands upwards of 91%, among the best in the world, along with exceptional learner satisfaction scores. Two out of every three learners are able to power ahead in their careers within six months of programme completion with salary hikes as high as 100%.

Do you think NEP 2020 will help and empower the future of education?

The National Education Policy 2020 is really advanced and introduces a much-needed set of reforms for the education sector in India. Specifically for higher education, we believe that the push towards making all institutions multidisciplinary is an excellent step since today all aspects of business and society are complex and cross-functional in nature. The opening up to the top 100 international universities will bring in high-quality programmes to our students and will further raise the quality bar for all our institutions.

> WE HAVE BEEN ABLE TO OFFER HIGHLY PERSONALISED LEARNING TO OUR LEARNERS IN NEW-AGE TECH PROGRAMMES BY ANTICIPATING THE AREAS WHICH THEY FIND CHALLENGING.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

The outbreak of COVID-19 has been a watershed moment for us. Over the last few months, we have seen 5x growth in the learner base on our platform with the launch of the Great Learning Academy and Great Learning Corporate Academy. This growth has been achieved on the back of increasing demand for programmes in emerging technology competencies. Over five lakh learners have benefited from our programmes including employees from 700 leading global MNCs and PSUs as well as students from over 1,000 universities and colleges including IITs, IIMs, and NITs.

The pandemic has given students the opportunity to experience and benefit from online learning. Having experienced the quality of learning at platforms like Great Learning, we expect that this will be the new normal. While students will start going back to physical classrooms, their involvement and participation in online learning will continue because it provides everyone with access to high-quality learning. Even with the educational institutions that we work with, there are clear indicators that while they will slowly resume physical classroom sessions, their belief and confidence in online learning continue to exist.

> WE HAVE PIONEERED A MODEL OF ASSISTED LEARNING THAT ENABLES US TO DELIVER ONLINE LEARNING OUTCOMES IN STEM SUBJECTS THAT ARE AS ROBUST AS CLASSROOM LEARNING.

The Coronavirus has caused a health crisis as well as an economic crisis. As the job market is hit severely, do you think the courses students choose will also change?

Despite the slump in the job market, we have seen that the enthusiasm and optimism in digital functions like data science, analytics, AIML, cloud computing, and cyber security functions in India continue to remain high. Students are realising the importance of honing skills in new-age technologies and, thus, are looking for avenues to learn, upskill, and accelerate their careers. They are opting for programmes that not only offer them robust pedagogy but also help them to be industry-ready post their programme completion.

The post-Covid-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

A lot of businesses worldwide have been gravitating towards disruptive technologies to remain competitive amidst the COVID outbreak. With the fast increasing digital requirements of the industry, the demand for tech talent is also increasing by the day. According to the National Employability Report, most Indian engineering graduates cannot write compilable code, making it necessary for employers to conduct training programmes for new recruits from engineering universities. However, the inability to write code isn't the only obstacle standing in the way of Indian engineers. The problem runs much deeper and includes the fact that they lack skills that employers currently are generally looking for. To combat this challenge, young graduates must upskill in career-relevant programs, and commit to becoming life-long learners.

Digital Index Team
maildqindia@cybermedia.co.in

"CANDIDATES WILL HAVE TO HONE THEIR DIGITAL CAPABILITIES"

JAMES JOB
Senior Vice President – Talent Acquisition India, HGS

The pandemic has already affected many jobs and careers. How do you see this crisis and how can a candidate become resilient in this situation?

Albert Einstein had said that in the midst of every crisis lies a great opportunity. And I'm so much able to relate to this statement with the current scenario. COVID-19 has impacted businesses and individuals alike. While the pandemic has affected jobs and careers temporarily, there have been a whole lot of new developments that have come in bringing in new opportunities too. Businesses and functions within are operating differently than before… they've have gone virtual.

The entire concept of remote working or work-from-home (WFH) has given a new dimension to recruitment, training and other functions. This transformation will bring in new demands which will be digital in nature. In order to become resilient to the new norm of WFH, candidates will have to hone/upskill their digital capabilities.

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?

To be able to work in a remote environment will be a key ask from employers to fresh graduates. They must train well in video/audio conferencing, instant messaging tools/apps, cloud storage, etc. Having a hands-on knowledge on these technologies will enable smooth remote working experience. Another aspect will be upskilling in digital technologies. Global leaders have been predicting that 'digital is the future' and now the prediction stands true – that too in such short time span, thanks to COVID-19. Being equipped with the latest digital technologies such as AI, Automation and Analyticswill keep the graduates current and relevant.

The overall soft skills to manage in a digital environment become important which is why fresh graduates also need to work on their behavioural skills. Additionally, conflict

> WFH HAS GIVEN A NEW DIMENSION TO RECRUITMENT, TRAINING AND OTHER FUNCTIONS. THIS TRANSFORMATION WILL BRING IN NEW DEMANDS WHICH WILL BE DIGITAL IN NATURE.

management and how to be more productive in remote environment will be the key.

How do you build a strong employer brand?

HGS is a people first company and we see our employees as important stakeholders as our clients. We've tried to enable a friendly and comfortable environment to our employees both in terms of our policies and infrastructure. We're also a diverse and inclusive company and believe in providing equal opportunities to women, persons with disability, LGBTQ+, etc.

We also encourage a lot of CSR volunteering work. Through various communication channels, we make our employees aware about all these policies and environment. Our employees who've lived the culture of HGS become our brand ambassadors to the external world. We also make extensive use of social and digital platforms to showcase our culture. Moreover, we also make use of popular platforms such as LinkedIn and Facebook to attract young talent.

How do you expand the candidate's reach and build a recruitment strategy?

We have expanded our reach by digitising our overall recruitment process. The applicant base has increased due to our sourcing strategy that is both outbound and inbound. We have also developed a 'BOT' that does the screening of the candidates. We've automated the entire process… we're using AI in Fit Index, early warning systems and recruitment management. This has enhanced the candidate experience and the recruiter's efficiency. The recruiters can now dedicate more time in doing complex tasks.

> WE'VE DEVELOPED A 'BOT' THAT SCREENS CANDIDATES. WE'VE AUTOMATED THE ENTIRE PROCESS… WE'RE USING AI IN FIT INDEX, EARLY WARNING SYSTEMS, RECRUITMENT MANAGEMENT.

What challenges do you face in attracting the right job candidates?

It is always challenging to adapt to changes. As an organisation, we had to shift to the remote working environment after spending years in the brick and mortar setup, and this was not an easy transformation. Bandwidth concerns, availability of systems and proctoring of assessments are some of the challenges we face while attracting candidates.

What are the skills you look for when hiring new employees, which often can be discovered in the first interview?

Being one of the pioneers in the services industry, communication skill is very important; this includes both verbal and written along with listening and comprehending ability. Also, with remote working becoming the need of the hour, ability of the candidate to work in a remote environment is a key skill that we look for.

Do you provide skilling programmes and certification to find the best match for a profile?

We're developing skilling programs for healthcare to find suitable match for a profile considering it is one of our key strengths and focus areas. Moreover, HGS has partnership with NasscomFutureskills and lot of our employees are using the platform to upgrade their knowledge in various technical skills.

Digital Index Team
maildqindia@cybermedia.co.in

"MY ADVICE TO CANDIDATES: BE PREPARED TO UNLEARN, RELEARN"

JASNEET KAUR
Chief Human Resources Officer, BharatPe

The pandemic has already affected many jobs, and careers. How do you see this crisis and how will a candidate become resilient in this situation?

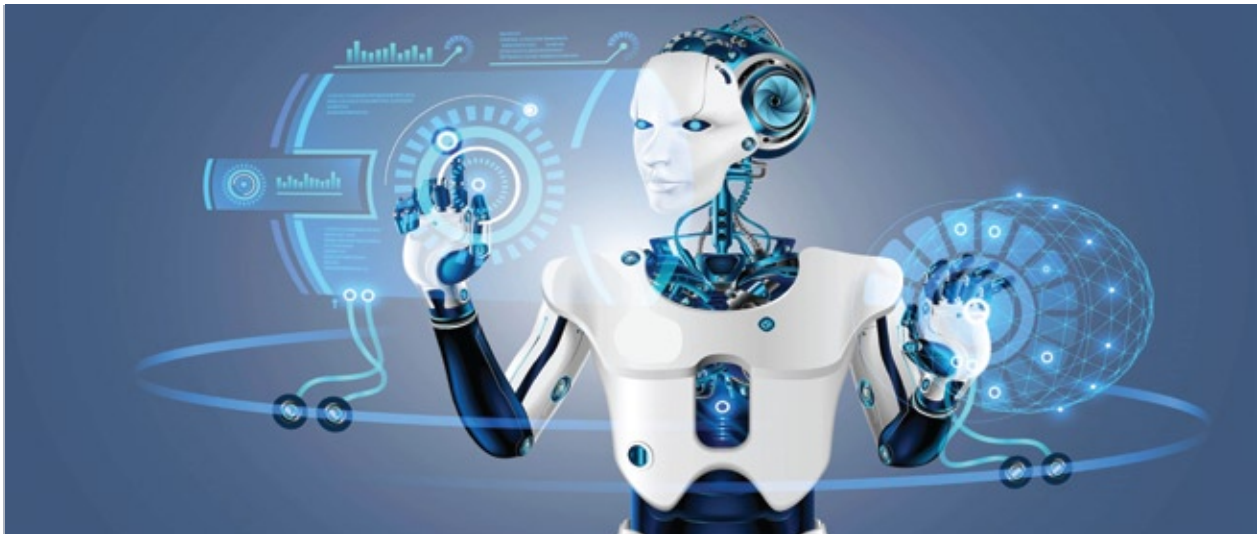
This has been a fairly unpredictable year and an extremely challenging one for businesses, across industries. Businesses had to rehash priorities, revisit budgets and, most importantly, totally change the way they operate. It has been also been a challenging year from a people standpoint. Work from home has become a norm across industries.

There have been some tough decisions that had to be taken including pay-cuts, layoffs and hiring freeze across companies. I see this crisis as an opportunity for professionals to reassess priorities, deep-dive on their short-term as well as long-term goals, and learn a new skill or two, so as to be better prepared for the fluid environment. Resilience is a skill that is becoming increasingly important and more so in the current scenario. My advice to candidates will be simply to be prepared to unlearn and relearn.

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?

A fresh graduate or someone who is preparing for the challenging times ahead should be open to gather exposure on the ground. On-the-job experience in a fast-paced company or being a team member in a strategic project has huge value in today's times. Companies value employees who have practical experience. If one can gather experience in more than one industry, it is even better.

At BharatPe, we are committed to provide an opportunity to young talent to harness their skills. Earlier this year, we launched a first-of-its-kind programme called BharatX designed for the development and experimentation of radical ideas to solve the next set of merchant and business problems with innovative product solutions. The BH1 2020 internship programme invited participation from premium colleges across the globe to work in the fields of AI, human-computer interaction, econometrics, data science, etc. The idea was to rewire the DNA in financial services by going beyond the current ecosystem. We will be launching similar



> I SEE THIS CRISIS AS OPPORTUNITY FOR PROFESSIONALS TO REASSESS PRIORITIES, DEEP-DIVE ON SHORT-TERM AS WELL AS LONG-TERM GOALS, AND LEARN A NEW SKILL OR TWO.

programmes in the future with the objective of giving exposure to graduates to enhance their skill-set.

How do you build a strong employer brand?

A strong employer brand can be built via two key stakeholders: existing and former employees. I believe that existing employees are the key brand ambassadors for an organisation. They are the flag-bearers who can push information around the attractiveness of a brand. It is important to share such information with the external world and showcase how a brand is not just offering a job but building a career. Also, to build a strong employer brand, it is important to showcase the key values. Leadership should take the lead and share success stories around this from time to time. Success, no matter how small it is, needs to be celebrated.

Another important component for building a strong employer brand is former employees. If a company is able to leave a positive impact on the lives of its ex-employees, I believe half of the task is done. Like it or not, ex-employees are also mouthpieces of your culture and the value you bring to their CV. Hence, it's important to nurture them.

How do you expand the candidate reach and build a recruitment strategy?

I believe that the era of only offline-led recruitment is over.

> LIKE IT OR NOT, EX-EMPLOYEES ARE ALSO MOUTHPIECES OF YOUR CULTURE AND THE VALUE YOU BRING TO THEIR CV. HENCE, IT'S IMPORTANT TO NURTURE THEM.

The need of the hour is to have an omni-channel approach to recruitment that also leverages the digital channels well. In today's times, building a strong employer brand digitally can be the game changer for companies. To expand reach, one can build a strong alumni community, run employee specific campaigns as well as publish success stories of employees.

What challenges do you face in attracting the right job candidates?

Honestly speaking, we do not face much challenge in attracting the right candidate. The primary reason for this is that professionals are now keen to take the risk and be a part of a young startup like ours. We are in the fintech space that is always buzzing and hence, experienced professionals as well as freshers are willing to join us and be a part of the journey as we build BharatPe. The agility and pace of business growth at BharatPe makes it even simpler.

What are the skills are you looking for when hiring new employees, which often can be discovered in the first interview?

First and foremost, it is about culture and fitment in the organisation. Also, for a fast-paced and growing brand like ours, it is important to employees are open to the concept of unlearning and relearning. Agility is another skill that we look for as it is critical for an evolving brand like ours.

Do you provide skilling programs and certification to find the best match for a profile?

No, we do not provide skilling programmes as of now. We are a fairly young organisation and are currently focussing on getting the right talent on board and we believe that the everyday growth of business is the best learning ground. We may look at providing structured off-the-job programmes at a later stage.

Digital Index Team
maildqindia@cybermedia.co.in

"NEW SET OF SKILLS LIKELY TO EMERGE TO AID TRANSITION"

LOKESH ANAND
Associate Director, Organisational Excellence, Harappa Education

The pandemic has already affected many jobs and careers. How do you see this crisis and how can a candidate become more resilient in this situation?

According to a survey conducted for the World Economic Forum's 'Jobs Reset Summit', 57% of Indians fear losing their jobs due to the COVID-19 pandemic. A virtual working model has further added to the challenge, as employees are unable to experience the psychological safety of 'belonging' that comes with a physical workspace. So anxiety is certainly high, even for people whose jobs are relatively stable.

A report by McKinsey highlights the challenges of maintaining output with a virtual team. As companies contemplate returning to the workplace, a new set of skills are likely to emerge to aid the transition. According to the report, companies must create a talent strategy that develops employees' critical digital and cognitive capabilities, their social and emotional skills, and their adaptability and resilience to change.

For job seekers, recruitment cycles are certainly becoming longer, as companies are being cautious in hiring. Patience and optimism along with selective company targeting will certainly help in becoming more resilient. Dedicating energy to customising job applications, rather than mass applying is likely to give better results.

Many business models are changing dramatically during the pandemic, so understanding the hiring managers' mindset can give candidates an extra edge. They are inundated with mass applications, so a customised cover letter/email will help get you noticed. Because business demands are very dynamic, hiring managers will place a premium on candidates who have demonstrated their capabilities in uncertain environments. That's because the roles they are looking to fill have a lot of implicit uncertainty in them due to the pandemic.

This is also where learning and upskilling can become a differentiator. Addition of skills aside, it signals to a recruiter that you are adaptive. You may not have had control over the circumstances created because of the pandemic, but if you are able to demonstrate that you adapted to the best of your ability, it will always catch the eye of a good recruiter.

What is the best approach for a fresh graduate to prepare for a challenging time ahead?

Fresh graduates not only have very limited practical industry skills, but more often, since most colleges in India do not teach basic foundational skills, they are not adequately prepared for the nuances of the workplace. To address this core gap, we introduced a unique curriculum of five habits and 25 skills, delivered through an engaging online-first approach: the cognitive, which is about how one thinks, reasons and solves problem; social in terms of how to communicate, influence and build relationships; and behavioural that relates to how to grow, act and lead. These are the skills that employers seek at the workplace.

Our courses are designed to help fresh graduates to upskill for the new world of work. For instance, our Speaking Effectively online course will help them speak with clarity during interviews, and improve their public speaking and presentation skills. Similarly, our Thinking Critically course will help students simplify complex problems, ask the right questions to move a discussion forward, and argue better. Our flagship course, Embracing Change, is meant to enhance one's ability to adapt to change and reframe failures and setbacks into opportunities – a much needed skill today and always.

We believe these habits and skills can be very valuable for fresh graduates to focus on.

How do you build a strong employer brand?

A strong employer brand has many elements but good talent looks for organisations that adds value to career

> SINCE MOST COLLEGES IN INDIA DO NOT TEACH BASIC FOUNDATIONAL SKILLS, FRESH GRADUATES ARE NOT ADEQUATELY PREPARED FOR THE NUANCES OF THE WORKPLACE.

in terms of compensation and exposure, values one as a contributor, and is driven by values. So we try and work on these three broad principles, by offering competitive compensation and benefits, a challenging work environment that stimulates personal and professional growth, and a great work culture based on empathy, transparency and respect.

As a learning and development brand, we also invest in many internal training programmes on skills like management excellence, working with data, compelling writing etc.

How do you expand the candidate reach and build a recruitment strategy?

We liberally use our networks along with the usual platform based hiring. Referrals are an underrated channel for attracting the right talent, and we run a very lucrative referral programme. We have also started working with multiple top tier educational institutions, which gives us access to some of the best alumni networks in India.

What challenges do you face in attracting the right job candidates?

Companies today need employees to be self-starters, identify possible opportunities to collaborate cross-functionally, and build daily habits that will enable them to work seamlessly and create business leverage. According to various reports, talent professionals and hiring managers across industries feel that foundation skills are just as important as, or more important than, hard technical skills. However, owing to a core gap in our education system, the candidates are often not well-versed in foundation skills.

> TALENT PROFESSIONALS AND HIRING MANAGERS ACROSS INDUSTRIES FEEL THAT FOUNDATION SKILLS ARE JUST AS IMPORTANT AS, OR MORE IMPORTANT THAN, HARD TECHNICAL SKILLS.

Apart from foundational skills, the other challenge is screening and filtering candidates as the volume of applications is very high. All applications at Harappa are screened personally by a recruiter – we don't use any resume parsing. This is very time intensive, but has also helped us in making many 'inspired hires' – people who are not a good match on paper but do exceedingly well on the job.

What skills do you look for when hiring new employees, which often can be discovered in the first interview?

We are always looking for the five Harappa Habits during our rigorous interview process – a candidate's ability to think critically, solve problems, communicate with impact, collaborate effectively, and lead themselves and others. We believe someone who demonstrates these skills will be able to succeed in any job role, provided they already possess the technical expertise. Each candidate is also evaluated by at least three-four members of the team to ensure that we are bringing the best talent to Harappa.

Do you provide skilling programmes and certification to find the best match for a profile?

Harappa does offer certificates to learners completing our courses. Employers have started paying attention to these certificates. Our hope is for Harappa's certificates to become the gold standard for establishing proficiency in these foundational skills.

Digital Index Team
maildqindia@cybermedia.co.in

"POST COVID-19, THE WORLD WILL BE MORE DIGITAL"

DR. MADHU CHITKARA
Pro Chancellor, Chitkara University

When it comes to online learning, do you think engineering can really be taught effectively, virtually?

Education in any given field primarily is the outcome of three building blocks: faculty, learning content and the learning pedagogy. If the faculty teaches the subject with utmost competence, with relevant and industry-aligned content through a student-centric learning pedagogy, it really does not matter whether the subject is taught in-person or online. Therefore, in my opinion, the mode of teaching – either online or in-person – is just a medium of imparting education.

In case of engineering education, it is primarily the competency of faculty member which matters the most. How he/she is able to correlate conceptual knowledge with the real-life industry use cases is the most critical aspect of learning. The learning content needs to be application-oriented mainly addressing the W-W-W-H (why-what-where-how) of any technology subject. And if the teaching pedagogy is designed in such a way that it is student-centric, engaging and it encourages two-way communication among the teacher and students, it is practically immaterial if this knowledge dissemination happens online or in-person.

So, in my opinion, engineering can be taught very effectively either virtually or in-person if we do a proper cohesion of faculty, learning content and learning pedagogy.

Do you think NEP 2020 will help and empower the future of education?

Definitely yes! The framework of NEP2020 is so beautifully drafted to empower the future of education, whether it is primary or secondary or higher education.

NEP2020 is going to help India empower youth with employability and entrepreneurial skills which will be the most critical building block of Aatmanirbhar Bharat. It will also ensure a harmonious, happy and ethical Indian society built on social and life skills, values and ethics, being developed in students under NEP2020. Therefore, NEP2020 is indeed a welcome step from the Government of India which will set the future of education in India.

How was the impact of the lockdown on educational institutions?

We have experienced a tangential change post Covid-19. How we learn as students, how we teach as teachers and how we practise the applications of technical education has taken a full-circle shift. The education fraternity across the globe has experienced the inevitable impact during the current pandemic situation. Orthodox classroom teaching has been totally replaced by online teaching. This sudden change has challenged all the stakeholders – students, faculty and university – on campus.

The scenario is grimmer during the current pandemic situation because of the programme curriculum that has typically around 50-60% of the syllabus focused on hands-on and project-oriented learning. This requirement of more of hands-on exposure to the engineering students has in fact put a lot of onus on the universities to handle such a situation by providing technology-based solutions.

When we try to evaluate the impact of current pandemic situation on educational institutions, I am of the view that the current time is purely a blessing in disguise for Chitkara University. Our university was online-ready from the first day of the lockdown. This was possible only because of the fact that we had embraced online teaching in our ecosystem a few years back and this mode of teaching was not at all a new pedagogy for our faculty members. The content delivery was also very smooth because of the rugged LMS and ERP system already in place for the whole university.

Therefore, our proactive futuristic alignment of IT systems a few years back, supported by our online-

> THE FRAMEWORK OF NEP 2020 IS SO BEAUTIFULLY DRAFTED TO EMPOWER THE FUTURE OF EDUCATION, WHETHER IT IS PRIMARY OR SECONDARY OR HIGHER EDUCATION.

learning pedagogy ready faculty, ensured minimum impact on the students learning and aligned programme outcomes during the lockdown.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

Engineering schools which have been known for their state-of-the-art expensive infrastructure in terms of high-end industry labs, expensive equipment of mechanical, electrical, electronic engineering are the worst affected schools during the current pandemic situation.

We have taken this challenge head on and converted most of the existing labs into virtual labs complimented by online demonstrations of experiments by the respective faculty, and suitably supplement the learning ecosystem with augmented and virtual reality technology. This has helped our students gain requisite knowledge during the time of total lockdown and they are able to keep a steady pace with the learning outcomes required for their engineering courses.

We have closely experienced during the last few months that the Covid-19 has in fact become a catalyst for our students and teachers to build innovative technology solutions focused towards social needs in a relatively short period of time. With technology solutions available around us and becoming more prevalent in coming time, we are fully equipped to embrace the 'learning anywhere, anytime' concept of digital education in coming times. We have ensured our traditional in-person classroom learning is complemented with new learning modalities – from live broadcasts to 'educational influencers' to virtual reality experiences.

For us, learning during the current pandemic times has become a habit that is integrated into our daily routines either on-campus or 'Learning from Home' (LFH) which is a true lifestyle in new normal.Blended learning is the new mantra of knowledge dissemination going forward.

> ALL OUR ENGINEERING PROGRAMMES ARE ALIGNED WITH INDUSTRY 4.0 SKILLS. WE OFFER 10 SPECIALISATIONS IN DIFFERENT FIELDS WHICH ARE INDUSTRY ALIGNED AND ENDORSED.

Along with the health crisis, Coronavirus has also caused an economic crisis. With the job market hit severely, do you think the courses students choose will also change?

The coronavirus has indeed caused a big economic issue apart from health crisis. Almost all job sectors have been severely hit by the current pandemic. This has forced the society to look for disruptive solutions when it comes to employability opportunities.

We are of the opinion that if the students are enabled and aligned towards 21st century job-skills with the help of industry focused progressive curriculum, they will not face any challenge or crisis in terms of finding a suitable job in current pandemic situation also. This is what we have experienced during the current recruitment cycle for engineering students. All our programmes have been duly aligned and endorsed by industry to meet the demands of 21st century skill-set and almost all the students have been placed or got internship in reputed organisations. This has been made possible only because of our progressive curriculum, designed under the guidance of industry experts.

POST COVID-19, THE WORLD WILL BE MORE DIGITAL IN TERMS OF HOW BUSINESSES WORK, HOW ECONOMY OPERATES, HOW SOCIAL LIFE WORKS, AND HOW EDUCATION IS DELIVERED.

So to answer your question, at Chitkara University, we don't think students' choices will change much in terms of course selections. The students' choices will be more aligned towards those programmes which are 21st century skill-set ready.

The post-Covid-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

Absolutely yes! Post Covid-19, the world will be more digital in terms of how businesses work, how economy operates, how social life works and, last but not the least, how education is delivered and learnt. In this context, graduates will need to align their skillsets with digital transformations at the forefront. So core competencies will be aligned more towards digital technologies irrespective of the domain and stream students belong to.

Graduates need to align themselves to the blended mode of learning going forward. This new normal will force universities to make the whole learning system student-centric with a clear focus on individual learners. We have already added digital technology exposure as one of the primary learning components in our pedagogy with a clear focus on weak, average and fast online learners. This has helped us to enhance the students' engagement and ensure meeting of programme outcomes in the times of lockdown also.

The next biggest worry for students is exams. Do you think that examination and evaluation will change eventually?

Yes, the whole examination ecosystem is going for a major overhaul post Covid-19. The invigilator-based examination system will be replaced by AI-based online examination system. Closed-book exams will be replaced by open-book exams based on application oriented real-life-based problems. Manual evaluation of answer sheets will be replaced by automation driven online evaluation.

This new system will definitely stretch faculty members to prepare innovative and new problem statements whose solutions are not available on the web. We have aligned our examination system on the above lines and ensured a system and process driven evaluation system with utmost transparency.

With a looming recession now might seem like a terrible time to graduate. Is it time to apply for a postgraduate degree?

We have not experienced recession as far as current placement cycle is concerned under the lockdown period. We have so far done very well in placing our majority of current batch students in reputed organisations across the country.

To answer your question, we are of the firm opinion that it is still a personal choice to either opt for PG degree or join industry after completing UG degree. The current situation has nothing to do with students opting for PG programmes.

How are you providing skills in new areas, such as Deep Technology, AI, ML, robotics and IIoT?

All our engineering programmes are aligned with 21st century and Industry 4.0 skills. We have offered around 10 specialisations in different fields which are industry aligned and endorsed like AI/ML, data analytics, cloud technology, cyber security, IoT, robotics, full stack development, UX/UI, mobile development and game development to name a few.

These technologies are taught to the students under the integrated curriculum completely in line with industry requirements so that the graduating engineers are Day 1 'industry ready' once they pass out from the university. This is one of our flagship initiatives where each and every BE programme is co-designed, co-taught and co-evaluated by the faculty along with industry experts.

Digital Index Team
maildqindia@cybermedia.co.in

"TEACHERS AND STUDENTS HAVE BECOME MORE ICT SAVVY"

DR. NIRANJAN N CHIPLUNKAR
Principal, NMAM Institute of Technology, Nitte, Karkala

When it comes to remote learning, do you think engineering can be taught effectively in the online mode?

No. Even though the purely theoretical subjects can be taught virtually, practice-based courses cannot be taught effectively.

Do you think NEP 2020 will help and empower the future of education?

Definitely, yes! There is a great emphasis given in NEP to the skill development initiatives and multidisciplinary approach of education.

What was the impact of the lockdown on educational institutions?

It had a very large negative impact on our existing education delivery and evaluation system. However, the new challenge gave us a way forward to work with new opportunities. Teachers and students have become more ICT savvy. More students and faculty have completed some very useful online certifications, which otherwise they would not have done.

How have you responded to the lockdown? How will it affect the way engineering is taught in the future?

We could quickly respond to the situation and now we are ready to go ahead even if such situations arise in future. Earlier we were only talking about blended learning but now we have started effectively using this concept.

> EVEN THE SO-CALLED NON-CIRCUIT CORE BRANCHES OF ENGINEERING HAVE STARTED TO SHIFT THEIR FOCUS TO IT ENABLED TOPICS, WHICH IS BEING TRIED IN THE INDUSTRIES TOO.

The Coronavirus has not just caused a health crisis but an economic crisis too. With the job market being hit severely, do you think the courses students choose will also change?

There seems to be more inclination towards courses with IT components now. Even the so-called non-circuit core branches of engineering have started to shift their focus to IT enabled topics, which is what is being tried in the industries too (like Industry 4.0).

The post-Covid-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

Present-day students are already digital-era generation individuals. Only the teachers/professors need training to get themselves ready with new competencies, which is now happening automatically through 'on-the-job training'.

With a looming recession now, this might seem like a terrible time to graduate. Is it time to apply for a postgraduate degree?

In fact, due to the present recession, the job market may not be that stable. So it's advisable to apply for a postgraduate degree so that at least by the time students complete their PG course, the job market may start an upward trend, and due to higher qualification, the postgraduates may have better openings then. However, these are all speculations and no one can tell for sure what the future is going to be like. One must be ready for everything.

How are you providing skills in new areas, such as Deep Technology, AI, ML, robotics and IIoT?

We have started two new BE programmes in AI, ML and Computer and Communication Engineering. Apart from this, in all the existing non-circuit BE branches, we have introduced IT-related elective streams as applicable to their branch of engineering. All these electives will be with sufficient hands-on training.

Digital Index Team
maildqindia@cybermedia.co.in

"DIGITAL ORIENTATION IS IMPERATIVE FOR PROFESSIONALS TODAY"

PROF PARIMAL MANDKE
Vice President at NIIT University

When it comes to online learning, do you think engineering can really be taught effectively, virtually?

Yes, it is possible to teach engineering virtually. If the spacecraft can land on Mars and do some experiments, if robots can perform remote surgeries, if smart devices can monitor all kinds ofindustrial operations remotely, engineering courses can also be taught online provided an Institution has built the capability to conduct education digitally. This cannot happen overnight. Institutions should have invested their effort in building the capability over long time.

Do you think NEP 2020 will help and empower the future of education?

The NEP is a step in the right direction and will herald directional change and sectoral reforms in education. NEP is expected to open fresh avenues for India's education sector in the 21st century. It is really encouraging that NEP focuses on the use of technology for seamless learning, holistic, multidisciplinary education from the under-graduation level itself. Institutional and academic autonomy as well as an independent National Research Foundation are also welcome moves. However, while NEP lays down the policy, it all depends on how purposefully we implement it in our respective domains.

How much of an impact did the lockdown have on educational institutions?

Educational institutions are among the worst hit institutions. Majority of the institutions were not equipped to shift to online education in a short time. They had to grapple with issues of adequate IT infrastructure, training of teachers and adaptation of pedagogy and assessments to suit online education. Not an easy task. They have struggled to cope with the sudden requirement and are somehow trying to manage it.

To deal effectively with this situation effectively, NIIT University introduced NU Digital – a digital platform and much more. This was possible for us because we have been offering courses online in our PG programmes. NU's Digital platform provides easy access to all the required learning resources to students with single sign-on. We have integrated multiple platforms for this purpose which includes industry standard learning management system, video conferencing system, assessment management system, virtual lab, digital library and academic ERP system. We ensure a holistic approach to digital teaching practices which go beyond just using an online video conferencing tool. It is a comprehensive approach to do everything with a digital mindset and in a digital fashion. As technology has always been a focus at NU, we were able to launch this platform at a record time.

How have you responded to the lockdown and how might it affect the way engineering is taught in the future?

We responded to the lockdown by launching NU Digital in a record time – a comprehensive platform that provides easy access to all the required learning resources to students with single sign-on.

The Coronavirus has not just caused a health crisis but an economic crisis as well. With the job market being hit severely, do you think the courses students choose will also change?

Students are understandably going to opt for programmes that will fetch them better jobs in the industry post-COVID. However, if an institution is already offering programmes and curricula that make students Industry 4.0 ready, the institution does not have to be concerned.

The curriculum at NU focuses on ensuring that the graduates are a part of exciting careers of the future.

> IT IS ENCOURAGING THAT NEP FOCUSES ON THE USE OF TECHNOLOGY FOR SEAMLESS LEARNING, HOLISTIC, MULTIDISCIPLINARY EDUCATION FROM THE UNDER-GRADUATION LEVEL ITSELF.

NU's 4 core principles – Industry-linked, Technology-based, Research-driven and Seamless education – are a critical part of achieving this. We offer B.Tech in CSE, ECE and BT programmes that demand and encourage the students to explore and connect with the multiple dimensions of today's technology and business environment.

Through a transformational process that involves multidisciplinary courses of engineering, humanities and social sciences, well-equipped laboratories, and project-based courses such as R&D project, Capstone projects, and the final semester of 6-month industry practice at industry locale, in addition to other co-curricular components, the programmes seeks to create exceptional professionals trained to lead in tomorrow's complex technology-oriented business environment.

NU's B.Tech CSE, with emphasis on digital transformation technologies, is designed to provide students an overview of computing, an understanding of the concepts, principles and skills in their application and extension, and a practical experience in applied computing. The programme offers specialisation in big data engineering, data science, cyber security, artificial intelligence and cloud computing.

Further, NU's B.Tech ECE programme in electronics and communication engineering aims to create professionals who can engineer large, relevant and robust electronics and communications systems. The programme offers a strong foundation in the fundamentals of electronics and communications engineering through courses such as analog and digital communications, digital logic and circuits, coding and information theory, etc.

NU's B.Tech Biotechnology programme is driven by the development of theoretical knowledge base as well as the business needs of the biotechnology sector. It comprises a flexible model where the course content continuously evolves with the rapid changes occurring in the biotechnology industry. The course provides competence in biotechnology through training in the areas of microbiology, biological chemistry, analytical techniques, molecular biology and bioinformatics. The programme offers specialisations in industrial biotechnology, plant biotechnology, food biotechnology, environmental biotechnology and bioinformatics.

The post-Covid-19 world will require every organisation to transform digitally. Will graduates require fundamentally different competencies?

The world is becoming digital faster than it was pre-COVID and therefore having an orientation or a foundation which is digital is imperative for any professional today. No matter what your job role, you need to be well versed with digital methods and tools. However, it is important to remember that basic competencies will not change.

The next biggest worry for students is exams. Do you think that the examination and evaluation will change eventually?

Yes, examinations will change eventually, and NEP is a step in that direction. With focus on flexibilityand seamlessness in higher education, open resources exams, take-away exams, projects, and many more will assume importance. Going forward, project-based learning should get primacy.

With a recessionlooming,it seems like a terrible time to graduate now. Is it time to apply for a postgraduate degree?

Jobs are available for those who have the right skills. At NU, we assure placements of students who wish to be placed. This year too, NU has placed all eligible students. The students have been placed with leading organisations like IBM, PwC, EY, Airtel, HCL Technologies, Cognizant, Big Basket and Byju's, to name a few.

Digital Index Team
maildqindia@cybermedia.co.in

"CYBERSECURITY PROFESSIONALS ARE IN GREAT DEMAND"

RAJESH MAURYA
Regional Vice President, India & SAARC, Fortinet

The pandemic has already affected the job and career scenario. How do you see this crisis?How can a candidate become resilient in this situation?

According to the 2019 Cybersecurity Workforce Study conducted by (ISC), over four million new cybersecurity workers are currently needed to meet global demand. And forecasters predict that thisgap will only continue to widen – and just as the cyber threat landscape grows more complex. While the cybersecurity industry grapples with a growing shortage of skilled professionals, FortiGuard Labs monitors one-hundred billion cyberattacks and at least two million attempted virus penetrations per day.

With such a large number of cyber threats to deal with, targeting every inch of the network's potential attack surface, strained security teams can feel overwhelmed. The cybersecurity skills gap is one of the biggest challenges for organisations. It's not unusual for organisations to have up to 30 different security vendors on their networks. That's really hard to manage. You need to bring on more people or focus more on technology and automation and cybersecurity professionals are in great demand. Cybersecurity as a career option will continue to grow along with digitalisation.

Roles such as cybersecurity architect, cybersecurity analyst, and security engineer are essential for modern organisations and require specialised skillsets. And the candidates that fill these roles are also collaborating more than ever with different departments and divisions, calling for an expanded set of soft skills such as leadership and communication.

What is the best approach for a fresh graduate or a graduate to prepare for the challenging time ahead?

One unexpected benefit of the COVID-19 crisis is the increased opportunity for at-home, self-guided education. Fortinet made more than 30 advanced security courses available for free that cover topics ranging from Secure SD-WAN, public cloud security and secure access, among others. The majority of courses are from the official NSE Training Institute curriculum, which was previously available to Fortinet partners for free, but has now been open to anyone who is interested.

How do you expand the candidate reach and build a recruitment strategy?

Candidates generally spend less than 60 seconds reviewing job descriptions to see if they are a match. And in such a competitive market, that means that CISOs need to ensure that the job descriptions they distribute not only clearly and succinctly state the skills needed, but also sell the opportunity. The goal is to get the right candidates interested in working at your organisation specifically. A side benefit of clearly defining the roles of prospective workers is that the job description also helps team members internally organise which responsibilities will fall to the new hire. And, finally, given the highly competitive nature of hiring experienced and skilled cybersecurity professionals, if the salary is a gating factor due to budget constraints, be prepared to offer options that appeal to today's candidates, such as flex time, leadership opportunities and paid training.

While you want your listing to be posted on as many channels as possible, it is important that you are posting to job boards that attract professionals with the right background. Don't ignore general job sites, but make it a point to find and post on niche sites as well. Beyond job boards, leverage your network to spread awareness of the opening through word of mouth, social media and other tactics.

What challenges do you face in attracting the right job candidates?

Closing the cybersecurity skills gap is becoming increasingly challenging for organisations across industries. Intense competition means many companies are priced out of hiring

> CISOs NEED TO ENSURE THAT THE JOB DESCRIPTIONS THEY DISTRIBUTE NOT ONLY CLEARLY AND SUCCINCTLY STATE THE SKILLS NEEDED, BUT ALSO SELL THE OPPORTUNITY.

experienced talent because candidates can often find a role with a higher salary elsewhere. Moreover, because the security space, and the responsibilities of those working within it, are changing so rapidly, it is becoming increasingly difficult for CISOs and hiring managers to articulate exactly what they need in a candidate.

To close that workforce gap within their organisation, CISOs need to amend their strategies for finding, interviewing, and onboarding talent. Doing so will enable them to fill gaps on their team faster, while addressing the essential and evolving skillsets required for managing today's complex, distributed networks.

What are the skills are you looking for when hiring new employees, which often can be discovered in the first interview?

One of the biggest issues in cybersecurity hiring has to do with the sets of skills and attributes hiring managers believe are mandatory in a 'qualified' individual. All too often, these wish lists grow much longer than what any individual could have possibly attained over the course of a 5-, 7-, or even 10-year career in the industry. Worse, hiring according to a set list of qualifications tends to rule out some of the most talented and capable fresh graduates– those who are eager to learn and most excited about the profession.

By restructuring the hiring model to prioritise innate strengths over 'X years of experience', organisations will end up with employees who are happier to do their jobs and fit in more seamlessly with the rest of the team. Interviewing for, say, communication skills and leadership ability, analytic sharpness, level of comfort with abstract ideas, mathematical and modelling skills, independence and autonomy, and other such 'soft' skills may reveal much more about a candidate's chances for long-term success than his or her resume alone.

Then, organisations must put programmes in place for on-post training, whereby talented and new hires pick up the technical, hands-on skills they need to monitor networks and mitigate threats. But this should not be the sole focus of these cybersecurity training programmes. Even tenured employees appreciate and benefit greatly from opportunities for continued education, whether via in-person or online courses, seminars, or conferences.

Do you provide skilling programmes and certification to find the best match for a profile?

Nineteen new universities in India have joined Fortinet's Security Academy Program, including Annasaheb Dange College of Engineering & Technology, Bennett University, Institute of Advance Management & Research, Shri Venkateshwara University, Sri Sairam Engineering College, SASTRA Deemed University, Seacom Skills University, St Xavier's Catholic College of Engineering and Sri Sairam Institute of Technology.

As part of the Security Academy Programme, they will offer Fortinet's Network Security Expert (NSE) training and certification content to their students in India. The nineteen universities add to the growing success of the programme that is available in more than 80 different countries and is comprised of over 300 authorised security academies.

The programme, which is part of Fortinet's NSE Training Institute, focuses on creating a diverse, equitable and inclusive pipeline of security professionals. It does this by partnering with academic institutions and non-profits worldwide. Through the Security Academy Program, institutions around the world have incorporated Fortinet's NSE training and certification content into their students' curriculum.

Now, the 19 new universities based in India will also be able to prepare students for career success in network security, allowing them to obtain both theoretical lectures and hands-on laboratory practice offered through the Security Academy Programme.

Digital Index Team
maildqindia@cybermedia.co.in

"CANDIDATES SHOULD CONNECT WITH LARGER TECHNICAL COMMUNITIES"

SAVITA HORTIKAR
Head, Talent Acquisition at ThoughtWorks

The pandemic has already affected many jobs and careers. How do you see this crisis?How can a candidate develop resilience in this situation?

Many candidates have had to reimagine their careers in light of the pandemic. Our recommendationto help a candidate stay resilient during this difficult time is to focus on their learnability quotient. This is possible by taking up relevant skill trainings like cloud, DevOps etc.. We'd recommend that candidates connect with the larger technical communities across platforms like github and social networks. And finally, we'd also suggest being mindful of the dynamic and unprecedented market and that candidates look after their health and mental wellbeing.

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?

There are many online platforms that host multiple competitions through which employers are searching for fresh graduates. Being active on such platforms helps candidates get through the interview process of organisations. Also, a lot of organisations are open to recruiting from different cities and towns across the country. So, we'd suggest keeping an eye out for remote-friendly job posts.

It's essential for fresh graduates to keep practising what they have learned by experimenting or working on their pet projects. Additionally, open source contribution is another way of upskilling themselves.

How do you build a strong employer brand?

In an effort to continue being an employer of choice for technologists, ThoughtWorks has employed several initiatives during the last year. Our objective has been to keep connecting with job seekers, and create a consistent, integrated and engaging candidate-centric strategy in this socially distanced world. For instance, we've recently launched the first virtual Vapasi edition

> OUR ROSTER HAS BEEN BUSY WITH VARIOUS ONLINE TECH EVENTS AND WEBINARS SUITED FOR TECHNOLOGISTS WORKING FROM HOME WHO ALSO WANT TO UPSKILL AND RESKILL.

– a bootcamp that's usually in person and specifically designed for women who have been on a career break and want to get back to work. We've also been organising several hackathons – retail and BFSI themed – where technologists can participate and interact with our tech leaders and external folks who have been invited to judge such events. Our roster has been busy with various online tech events and webinars suited for technologists working from home who also want to upskill and reskill, as the pandemic shifts business and tech priorities.

How do you expand the candidate reach and build a recruitment strategy?

Our recruitment team has been active across various tech communities, platforms and channels with the intention of connecting with both, active and passive candidates. Our strategy, apart from conventional sourcing, has also included community events that focus on sharing collective knowledge and learnings on relevant topics and areas where we are seeking candidates. Information on regular tech events and webinars and panel discussions are published across various social media channels to interest potential candidates whom we also have an opportunity to nurture with more information about ThoughtWorks and potential roles.

> WE'VE LAUNCHED THE FIRST VIRTUAL VAPASI EDITION – A BOOTCAMP SPECIFICALLY DESIGNED FOR WOMEN WHO HAVE BEEN ON A CAREER BREAK AND WANT TO GET BACK TO WORK.

What challenges do you face in attracting the right job candidates?

We actively look for strong technologists with hands-on experience. This isn't easy find, especially after a certain level of experience, say, eight years and upwards.

What are the skills are you looking for when hiring new employees, which often can be discovered in the first interview?

Different roles require different skillsets that are valuable to the role. The initial interviews usually focus on identifying if candidates are strong in such 'must haves'. Additionally, we value intrinsic behaviour, meaning we place emphasis on learnability as a skill versus knowledge of top three programming languages that makes someone 'project-ready from Day 1'. We also appreciate candidates' openness, empathy and their interest in being socially impactful.

Do you provide skilling programmes and certification to find the best match for a profile?

We regularly conduct hiring workshops. These are two-day hands-on training sessions for potential candidates. These workshops have been designed with the latest tech trends in mind. During such sessions, candidates learn about ThoughtWorks' best practices and also have the opportunity to showcase their own expertise. Such sessions also give our trainers a practical arena in which to assess potential candidates. Shortlisted candidates from such workshops are usually put through a fast-track interview process.

Another initiative called Vapasi is designed to upskill women who have taken a break and wish to resume their careers. The six-week intensive training programme ends with a certification forparticipants that is valuable when they apply for jobs at ThoughtWorks or other organisations.

Digital Index Team
maildqindia@cybermedia.co.in

"OUR RECRUITMENT STRATEGY IS DATA-DRIVEN"

SRINIVAS RAO K
Director, Human Resources, SAS India

The pandemic has already affected many jobs and careers. How do you see this crisis and how can a candidate become resilient in this situation?

The spread of the Coronavirus has undoubtedly resulted into a crisis, affecting jobs and careers of many in India. This has forced organisations to explore innovative ways to ensure business continuity by redefining the future of work. The outbreak has definitely impacted the way we work from in-person meetings to a virtual landscape, but in spite of this our business needs, to a large extent, are fulfilled.

As a result of this virtual environment, hiring competent staff continues to remain crucial in order to provide strong business outcomes and value. But the COVID situation is a temporary phase and will hopefully drift by soon. During a time like this, it becomes important for candidates to stay resilient by investing their time to reskill and upskill themselves – be it soft skills like communications or in-demand technical skills like data science, AI/ ML, digital and so on.

What is the best approach for a fresh graduate or a graduate to prepare for the challenging time ahead?

My suggestion to both fresh graduates and others would be to utilise time to their advantage and upgrade their soft skills. They should identify the core skills and competencies that employers are looking for, develop and train themselves in relevant and trending technical skillsetsand continuously work on enhancing these skills, so that they are ready for the job once they come across a potential opportunity. Some of the top technology skills that the industry is looking out today are in the areas of artificial intelligence, NLP, deep learning and blockchain, amongst others.

How do you build a strong employer brand?

A brand is measured by its workplace – people,culture, employee-friendly policies and most importantly advancement opportunities. At SAS, creating a positive employer brand is of strategic importance to attract and retain the right talent. Year-on-year, SAS has been recognised as one of the best places to work in India by 'Great Place to Work'. From the salary to benefit packages to advancement opportunities, we always endeavour to provide employees the best in the industry.

Millennials today don't judge an organisation by its tenure alone but are looking for organisations that have flexible work environments, vibrant work cultures and opportunities that will help them advance both their skillsets and careers.

At SAS, our culture and employee-friendly policiesgive us an edge over others in retaining and attracting talent. Last but not the least, employee communication is a must to ensure transparency within the organisation for effective brand building.

How do you expand the candidate reach and build recruitment strategy?

At SAS, our strategy for recruiting is similar to our customer strategy, which ideally means our candidate experience is similar to our customer experience. Our talent acquisition strategy is to 'engage, inform, and transform'.

We continuously believe in upholding our brand image and history of 44 years. Our recruitment strategy is data-driven to help us hire effectively. We continuously strive to do something new and pertinent in our hiring process. We have an elaborate employee referral policy, reach out to passive candidates and also make full use of different job boards present. We engage in meet-ups as well as recruitment marketing in order to reach out to the vast talent pool in the market. We also use our career blog to write about our company culture and present everyday life at the office. That way, potential candidates will be

> SOME OF THE TOP TECHNOLOGY SKILLS THAT THE INDUSTRY IS LOOKING OUT TODAY ARE IN THE AREAS OF AI, NLP, DEEP LEARNING AND BLOCKCHAIN, AMONGST OTHERS.

able to select themselves in or out of our hiring process by themselves.

What challenges do you face in attracting the right job candidates?

In today's pandemic times, attracting and convincing candidates for a job change could be tough. Some of the reasons for this are volatility, technology and compensation.

Today, there are not enough candidates in the job market looking for a change and convincing them for a change is not that easy. The positions that we have at SAS are very niche and we being a technology-driven company are continuously changing. It becomes extremely difficult to find an exact match for the profile of a right candidate with right technology background and skillsets for the positions that we have. Since our requirement is very niche, the kind of monetary expectations that the candidates have are sometimes very difficult to meet.

What are the skills you look for when hiring new employees, which often can be discovered in the first interview?

Every job requires different technical knowledge and abilities, but beyond that, there is a set of essential job skills and competencies that we look for in our candidates, which often can be discovered in the first round. The first round is usually a telephonic round for SAS and the skillsets we look for are communication skills, stability, teamwork, ability to work collaboratively and initiative.

To elaborate, we hire people who can communicate effectively. To us, the way a candidate communicates brings out their strengths and this is what they bring to the table in. Secondly, we invest in our people and consider them our biggest assets. We want people to come, learn, grow and stay with us. Stability is an important criterion for SAS. The third point is, in today's time, calling oneself a 'team player' is a cliché, but it has become a cliché for a reason. We want to hear 'we' more than 'I' when we speak to a candidate because we believe it is always a team effort. We want people who can get along with others in a professional setting. Working well as a member of a team requires a combination of qualities – communication skills, being open to collaboration, a generally positive attitude, and an ability to deal with diverse personalities. Lastly, Victor Hugo once said it best, "Initiative is doing the right thing without being told."

In today's competitive and fast-moving business environment, we are always looking for an edge over competition. To be an ideal hire for us, we need to see that a candidate will go above and beyond the job description and really contribute.

Do you provide skilling programmes and certification to find the best match for a profile?

Of course, at SAS we believe in staying relevant and updated. Our industry is very dynamic and so it is equally important for the hiring team to be trained and certified in order to understand the industry, market, current trends, talent pool, competitors and so on. The hiring team goes through an extensive level of training programmes to stay modernised and pertinent as well as programmes to 'hire effectively without bias' and focus on 'diversity and inclusion' while hiring.

From a candidate's perspective, SAS places a lot of emphasis to learning and development. A candidate who is onboarded goes through a series of trainings and certifications to ensure proficiency in skills and domain knowledge. We endeavour that employees continuously learn and upgrade their skills in order to stay relevant in industry.

Digital Index Team
maildqindia@cybermedia.co.in

"PROACTIVE UPSKILLING IS EXTREMELY CRUCIAL TO STAY RELEVANT"

SUSHANT PATNAIK
Head-HR, Aeris Communications

The pandemic has already affected many jobs and careers. How do you see this crisis? How can a candidate become resilient in this situation?

Absolutely, the pandemic has had severe impact on our working lives and the crisis it has created can be correlated with that of a recession. Though bearing from a different cause, it should be looked at in a similar way. The daily operations are severely impacted, making organisations lose money which is often followed by employees losing jobs.

A key thing to note here is that, while many lost their jobs, several have emerged stronger than ever. Resilience, in my opinion, is a standalone quality. An ideal employee must always know or learn how to survive in any situation. We should always strive to be the best, more so in this competitive world. This not only means being the best in a team, but also being a better version of yourself than you were before.

Proactive upskilling is extremely crucial to keeping oneself relevant and having a future-proof career. Actively participating in internal training sessions, keeping abreast with the latest technologies at work and even social networking are the most effective ways to stay relevant. I always advise people to think of themselves as a brand – your position at a company does not make you 'you'; it's your skills, knowledge, dedication and grit that defines you and adds on to your personal brand and the addition to the former two cannot be done without the latter two.

What challenges do you face in attracting the right job candidates?

These times are witnessing professional networking platforms being flooded with job opportunities in different fields, and unfortunately, all the recruiters are reaching out to the same pool of candidates. It makes connecting with a candidate fit for the role and the organisation more challenging than earlier. Here, the organisation's brand value in the industry plays a critical role as it leads candidates chasing the employers for the vacancy.

As Aeris serves a niche technology area, we have a definite advantage. In India particularly, IoT as an industry is still emerging and has a long way to go – and

> IN INDIA PARTICULARLY, IoT AS AN INDUSTRY IS STILL EMERGING AND HAS A LONG WAY TO GO – AND IS SOMETIMES PERCEIVED AS AN INDUSTRY THAT HINGES THAT HIGH ON VUCA.

is sometimes perceived as an industry that hinges on the VUCA (volatility, uncertainty, complexity and ambiguity) factor. In addition, after the pandemic, organisations are considering the attributes that were pre-COVID overlooked in candidates.

In these remote-working days, the candidates having the ability to transform every challenge into a new opportunity will be suitable for our organisation. Candidates who are well-groomed, have the ability to build trust, work with least guidance, manage ambiguity, and are empathic are greatly valued by us. However, culturally, candidates in India tend to prefer stability and certainty over an opportunity to take risks and try new things. That sometimes makes it difficult for us to attract the right talent.

What are the skills you look for when hiring new employees, which often can be discovered in the first interview?

Assessing a candidate's skills and hiring new employees can be very tricky. For an organisation like ours, having both technical and leadership qualities is a must. Therefore, I always try to pose questions that not only reflect a candidate's technical and soft skills but also ensure whether the candidate will be a good cultural fit for the organisation or not.

> YOUR POSITION AT A COMPANY DOES NOT MAKE YOU 'YOU'; IT'S YOUR SKILLS, KNOWLEDGE, DEDICATION AND GRIT THAT DEFINES YOU AND ADDS ON TO YOUR PERSONAL BRAND.

A question can be as simple as 'If the work demands, can you work irregular hours?' which will have either a yes or a no answer, or as complex as 'How do you cope with change?' – both these questions, however, reflect the candidate's agility and adaptability – which, in these VUCA times, are desirable traits. When candidates talk about their past experiences and responsibilities, they are not only revealing their knowledge and skills, but also their versatility and pro-activeness. Did they lead an initiative, do something by themselves? Are they versatile enough to pick up the cudgel and get things done and be comfortable to have a conversation with a CXO?

We look for 'doers' and it is extremely important to identify a 'talker' from a 'doer'. This precisely is the reason why interviewees often find themselves in the middle of detailed problem-solving interview processes. Here, applying a strategic approach to solve a problem helps the recruiter assess how the candidates might approach other things in life.

Do you provide skilling programmes and certification to find the best match for a profile?

Skill building and talent developments have been an important area of focus for a technology company like Aeris. We continuously encourage our employees to build new skills by reskilling and upskilling. This is done through multiple direct and indirect interventions along with commitment from the management that we will reimburse expenses relating to training and development.

We realise that training and capacity building programmes help companies meet evolving business needs and gives employees skills required to rise to new heights. Within the organisation we have ADO – Aeris Data Office – which regularly conducts machine learning and artificial intelligence workshops to strengthen the thought leadership. Our HRMS has an integrated learning platform with over 100 eLearning courses.

Digital Index Team
maildqindia@cybermedia.co.in

"BEST ENGINEERS ARE ALWAYS GOING TO BE IN HIGH DEMAND"

PRAVIN S BHANDARKAR
Founder and CEO, RtBrick

The pandemic has already affected many jobs and careers. How do you see this crisis and how can a job candidate become resilient in this situation?
It is clearly a difficult time for anyone looking for a new job. But what I would say is that there are still companies hiring, and for anyone hiring, then, they have a problem, and those candidates should all see themselves as potential solutions to that problem. For people with desirable skillsets there are still opportunities and things will ease during next year. Keep going and don't give up!

What is the best approach for a fresh graduate or a graduate to prepare for a challenging time ahead?
I would suggest getting any kind of experience, even if it is not graduate-level work. And that could include thinking alternatively, such as working on your own project, or trying to set something up from scratch. As a tech startup we value the sort of entrepreneurial experience that you'll learn along the way, even if it is just an experiment.

How do you build a strong employer brand?
We are a small company, so building a well-known brand is difficult. But we need specialist skills – like internet engineering expertise – that are only available from a small number of companies. So for us, it isn't about reaching wide, it's about reaching deep. We make an effort to get our name known in the technical publications, blogs and social-media sites that are of value to the sorts of people we want to attract. And then, of course, we need to be attractive as an employer. Fortunately for us, we are doing something very pioneering in the networking space, so that's always a good hook for the right sort of talent.

> "AS A TECH STARTUP WE VALUE THE SORT OF ENTREPRENEURIAL EXPERIENCE THAT YOU'LL LEARN ALONG THE WAY, EVEN IF IT IS JUST AN EXPERIMENT.

How do you expand the candidate reach and build a recruitment strategy?
We use a combination of tools to find candidates, from LinkedIn to Google Adwords through to the word of mouth. And whilst we are primarily looking to recruit in India, we also have positions available in other parts of the world, so it is quite a diverse approach.

What challenges do you face in attracting the right job candidates?
We have a clear idea of what we want. And what we don't want. We need people who are willing to challenge the status quo, rather than work the same way as everyone else, which can be difficult. And, of course, we want to attract the best engineers out there, who are always going to be in high demand.

What are the skills are you looking for when hiring new employees, which often can be discovered in the first interview?
Ideally, we are looking for specific engineering and software expertise. But on top of that, we need people with the right attitude. We are a small entrepreneurial company and we need people who can thrive in that sort of environment, along with its pace of change and levels of uncertainty. If someone is looking for a nice steady job with limited personal reward, then they're not for RtBrick!

Do you provide skilling programmes and certification to find the best match for a profile?
There are some industry accreditations that are applicable, but we are at the cutting edge of our space in networking, so more often it's about identifying people with the right capabilities, and the right attitude, rather than the right certificate.

K N Murali
maildqindia@cybermedia.co.in

Tech poised for a job market boom: right skills is the key

NTT brings together three key business entities, opening up more opportunities for employees to thrive and grow on an even bigger stage

Technology is dynamic, and the skills required to support it are ever evolving. At NTT, we help our customers adopt and derive value from emerging technologies. This requires a workforce that is well-versed with the latest technical skills related to artificial intelligence, machine learning, natural language processing, robotics, blockchain, cybersecurity, datacentre management, edge and cloud computing. Gauging by the pipeline of projects pertaining to these advanced technologies, we are sure to witness a steady stream of demand for fresh graduates and experienced professionals with hands-on experience in such areas.

NTT recently announced the bringing together of three key business entities as a single organisation. The new operating company will be built on the foundations of NTT India Pvt. Ltd., NTT Com India and Netmagic. This implies that our employees will also have more opportunities to thrive and grow on an even bigger stage and can serve and engage more meaningfully with the communities.

At NTT, we value our employees the most and we ensure that this is communicated through the 'Our People First' initiative. It hinges on the three pillars of growth, development, and engagement. Through the first pillar of growth, we assure our employee that their growth is our responsibility as much as it is theirs. The second pillar, development, enables the first through various programmes aimed at facilitating employee growth. These include learning credit systems, functional and soft development programmes.

The third and final pillar is that of engagement, which comprehensively covers various aspects such as rewards and recognitions, CSR initiatives, wellness programmes and connect sessions, to name a few. Through this initiative, we are investing back in our people in a meaningful way. Additionally, we strongly believe that the future of the workplace must be designed with the employee at the centre. We are committed to delivering and constantly improving the employee experience across the organisation which in turn casts us as an aspirational employer for potential industry professionals.

Murali is Senior Director - Human Resources & Alliances, NTT Ltd. (India)

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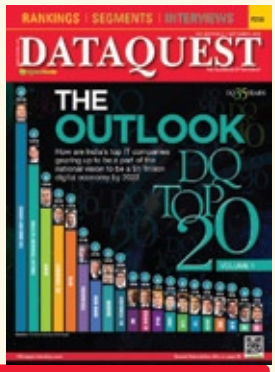

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Dhananjay Arora
maildqindia@cybermedia.co.in

Making sense of it: **Why data science is the key to future**

Data science, powered now with advances in machine learning, helps decode trends, making it an indispensable part of any business strategy

American writer and computer programmer Daniel Keys had once said that you can have data without information, but you cannot have information without data. This is more apt in today's time. With more than eight billion devices connected to the internet network, more than 2.5 quintillion bytes of datais generated by consumers today. Customers today are extremely mindful ofthe usage and exposure of their personal data.

Tracking, analysing and sorting such information is only possible through the right usage of data science and proliferation. Different segments and industries of businesses are using data science to configure, understand and use data for their growth and benefits. The future of data science isn't just bright and impactful but also infinitely huge.

Data science and analysis is the only qualitative and quantitative method to scrutinise available data in-depth, address various difficulties and help intensify improvements and developments in processes, products, systems, services and society. Characterisation, segregation and the resulting of such data of different segments require talented analysists to derive informative value and applications of such data.

Data science isn't basic anymore. It is growing rapidly being influenced by a number of factors. The three-tier integrated module of revised machine learning and understanding algorithms followed by newer improved computing assets clubbed with the building mountains of data evolving every day is forming the strong foundation of data science and its functionality and applications.

> DATA SOFTWARE AND COMPUTATIONS ARE EVOLVING AT A RAPID RATE, WITH EFFECTIVELY NO NEED FOR DATA ANALYSTS' ROLE TO UNDERSTAND CONCLUSIONS AND OPERATIONS OF DATA.

Today, it has turned into a mammoth data pool of multiple operations and systems. Machine learning (ML) and statistics is an imperative tool of data science and analytics. Dashboards, artificial intelligence, data engineering, data-driven solutions, data integration and data visualisations are the other tools of data science.

ML: THE FUTURE OF DATA SCIENCE

Data science in the future will be able to compute and take over censorious and complex challenges for businesses to facilitate exceptional leaps. Due to its great functionality and usage, data operations are set increase and grow. One of the major reasons for the growth and usage of data science is machine learning and its innumerable contributions to data operations and computations.

Here's how tech businesses can benefit and grow with the usage ofdata science:

#1

Transformative search engine results: Algorithms run by ML are capable of making search engine results and analysis more vital to businesses. These results help to understand business consumer behaviour and purchasing power better. ML algorithms can get new content and behavioural understanding based on previous search history. Thanks to the revolution in the field of ML, predication and speculation are set to get better and stronger.

#2

Quantum evaluations: ML facilitates and processes data efficiently due to its accelerated learning and advanced features and functionalities. Due to such features, the assisted time needed to troubleshoot complex problems is reduced and redirected to better resources. Such troubleshooting computations are effective in the medicinal and finance industries. As it is said, the scope and impact of quantum evaluations is indeed extremely prodigious in the future of data science.

#3

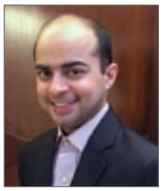
Customised advancements and options: Millions of humans today use smart gadgets, smartphones, tablets and watches. Such devices are a boonfor companies and businesses to pool and use data to their benefit in gaining better understanding and knowledge of their target audiences. Such power is furthermore strengthened with ML processes. Presence of such technology enables companies to personalise their user base more coherently.

#4

Code-free systems: Today, data software and computations are evolving at a rapid rate, with effectively no need for data analysts' role to understand the conclusions and operations of data. Such advancements are facilitated by ML tools and their constant improvement and development. Expeditious prototyping of data solutions can be performed with platforms like Keras, TensorFlow and Docker.

The introduction of data-driven plans will be on the rise.More and more users will customise and utilise information, gaining knowledgeable titbits of information from it, making the utilisation of data more imperative and indispensable part for any business or profitable company. On the other hand this may increase and gradually add to the edgy competitiveness to get to the top.

The data science capabilities and abilities are yet to be utilized to their full potential. Business will not only benefit but boom due to the positive implications and benefits of data sciences and operations. The future is shining bright and growing with the ever evolving armour of data science and information processing.



Arora is the Founder and CEO, Kwebmaker

Aanchal Ghatak
x-aanchalg@cybermedia.co.in

RAJIV AHUJA
President, Startek

Work at home agent (WAHA), AI and automation had been on the cards for digitally transforming BPM companies, but after the outbreak we have been witnessing their adoption at high levels. Such options are of course important for companies looking to optimise manpower and reduce opex and capex while enhancing their service delivery. Startek President ***Rajiv Ahuja*** *shares details of his company's digital transformation – and how it adopted WAHA for 55% of its global customer engagement workforce. Excerpts:*

How has Startek and Aegis integration been? How have they complemented each other?

The consolidation of Startek and Aegis under a unified global brand –Startek– isvalue accretive as the consolidation expanded the length, breadth and depth

A KEY DIFFERENTIATOR FOR US IS DRIVING TECHNOLOGY-LED INNOVATIONS

of our service offerings, thus presenting an even more compelling value proposition for our customers.

The integration is in line with our strategy of building robust technology capabilities and omni-channel solutions to achieve future synergies and transformation goals. One of the key propositions of this merger has been the access to global markets – from an Aegis perspective it got us to relaunch its BPM operations in North America and the Philippines whilst it also provided Startek access to major growth markets of Asia Pacific, Middle East and Africa, where Startek did not have a major presence. Essentially, we were two halves of a company searching for a partner to make us whole.

A key differentiator for us is driving technology-led innovations around digital and omni-channel, AI enabled CX and an integrated technology solution to help deliver personalised, seamless, and effortless customer experiences. This will essentially provide our clients with an integrated view of their customers' digital journey and help conceptualise, strategise and drive the digital transformation strategy.

This consolidation has also helped us present an even stronger value proposition for many of our customers, by introducing global best practices at local and economical commercials. Startek has built strong legacy systems, practices, and customer-centric programmes for many of the Fortune 500 brands across telecommunication, automotive, BFSI, e-commerce, travel and hospitality, among others.

Together, Startek is now one global enterprise with over 40,000 employees operating across 46 locations in 13 countries. The resultant scale allows us to offer a mix of diverse skills across language, experience, capability, and performance parameters while allowing us to be nimble and flexible enough to deliver to the business requirements of the marketplace.

What measures have you taken in response to the pandemic?

We used to employ hundreds of WAHA professionals with bilingual capabilities across North America and Australia. But as the COVID-19 crisis played out, it became clear that the pandemic will have lasting ramifications on how we operate.

We have over 55% of our workforce now WFH with state of the art information security protocols in place, to protect customer information, layered with webcams with an AI-based application that are deployed for real-time tracking of performance. It was imperative for us to maintain a secure, scalable, and flexible work-from-home cloud-enabled omni-channel operation over the long term.

A virtual command centre has been functional, consisting of functional and business leaders to enable real-time monitoring of business continuity across geographies.

We employ over 40,000 engagement specialists globally, out of which a third of our global workforce is based across a multi-city presence in India. Startek partners with some of the leading BFSI, telecom, e-commerce, consumer durables and emerging tech companies in India.

We anticipate that tier 2 and 3 towns are a market segment that is set to explode in our country, especially in sectors like e-commerce and food delivery, for example. With that view, we are now engaged in digitising their supply chain and are seeing a pivot to cater to these emerging markets and verticals.

How can a unified campus be built on the cloud for remote teams?

There was no playbook to refer to in the first few weeks of the nationwide lockdown. But we were quick to realise that this pandemic was going to be redefining the future of work. Therefore, it was important to leverage cutting-edge cloud-enabled AI platforms and predictive analytics to monitor performance to ensure business continuity for our remote teams. Our StarCloud proprietary technology allows us multiple functionalities, like a unified, secured and scalable solution for collaboration, task reporting, detection, monitoring and managing performance remotely.

StarCloud increases the value of tele-working further by integrating applications, services, and digital platforms using a common software framework or stack. This enables a work-from-anywhere model that helps companies maximise performance and productivity, especially critical for BPM companies and their clients.

Apart from AI-based predictive and behavioural analytics, it includes features such as gamification and cognitive capabilities. It also includes features such as effective collaboration, monitoring productivity, data privacy, facial, gesture and object detection and intrusion dashboards.

What is the AI-based solution that you have developed or adopted? Where are they being used?

AI for BPM has never been so critical – it helps create

> INTEGRATION IS IN LINE WITH OUR STRATEGY OF BUILDING TECHNOLOGY CAPABILITIES AND OMNI-CHANNEL SOLUTIONS TO ACHIEVE FUTURE SYNERGIES AND TRANSFORMATION GOALS.

a multi-speed human and machine workforce with virtual and WAHA capabilities, unified and secure work-environments and integrated touch-points. It ensures business continuity and thus offers an on-demand real-time scalable service. We have adopted AI-based technologies to win client confidence, build maximum controls, demonstrate systems and business resilience such as blocking of files and downloads onto the desktops, disabled print screen options, gesture and posture detection, facial recognition and disabling usage of USB ports for the devices as we now centrally control most of these activities.

We are successfully using AI-based predictive and behavioural analytics to monitor performance and the trust quotient of the WAHA teams, masking and blurring of confidential information, detection of foreign objects and unauthorised persons, monitoring browsing history and idle time performance.

The focus therefore is to leverage AI-based algorithms to learn more about every engagement and every engagement specialist, so that we can assess and predict which touchpoint is the most vulnerable or the most effective. For a number of our programs, an AI-enabled application was mandated to monitor if the specialist is bringing any device near the system which in turn sends a real-time alert to the supervisor in the event of a violation. Startek has also migrated to a cloud-enabled virtual desktop with centralised control and AI enabled dual-or multi-factor authenticity to ensure information security and compliance.

How are the AI-based algorithms being used, and where?

In a customer contact centre operations set-up, AI algorithms are usually leveraged to automate intent decipher from contact, mails and other channels, virtual assistance like multi-lingual chatbots and voice bots, automating email responses and after call work (ACW), social media engagement, speech and sentiment analytics and lastly making RPA solutions more cognisant and intelligent.

Has Startek invested in deploying conversational AI BOTs?

We have multiple partnerships with technology partners with an expertise in delivering automated conversational AI chatbots and voice bot's capabilities. We have deployed AI chatbots for various clients across BFSI, Telecom and automotive industries.

Which are the key sectors and the key cities from where you expect a surge in demand in future?

For us, the future of work would be a hybrid model of multi-site strategy, cloud-enabled WFH and transitioning to tier 2 and 3 towns. It also fits well with the hub-and-spoke strategy to transition businesses that require rigorous customer compliance and risk management. These tier 2 and 3 centres are operating with maximum safety protocols such as social distancing, mandatory use of masks, split shift working schedules and regular sanitation of workplaces.

Startek already has campuses in Chindwada, Bhopal and Lucknow, and would be looking at scaling up our tier 2 and 3 operations. E-commerce and consumer durables are now digitising their supply chain and we are seeing a pivot to cater to these emerging markets. There will be a pickup in demand from semi-urban and rural areas, which will translate into an increase in volumes of customer enquiries, supply chain management and back-office services.

As a part of our overall growth strategy in India, we have decided we will go to where the talent is, unlike the earlier model where we tried to acquire talent from outside city limits. These cities and towns have been relatively less impacted by the outbreak and will therefore provide a good alternative to driving revival of operations.

Dr. Ganesh Natarajan
maildqindia@cybermedia.co.in

The **'Bhishma Pitamah of IT'** falls

As pioneer and as mentor, Kohli played a titanic role in Indian tech sector's epic saga. And he lived a joyful life too. An industry veteran pays tribute

It was a desert morning on the route from Jodhpur to Jaisalmer in the late nineties. The NASSCOM Executive Council had arrived the previous day for an exotic retreat under the leadership of the irrepressible Dewang Mehta and both the industry doyens, Fakir Chand Kohli (FCK) of TCS and NR Narayana Murthy of Infosys along with Srini Raju of Satyam were in attendance. After the first day's meetings and a rather elaborate dinner at the Fort, the next day presented the opportunity for a morning desert sojourn before the meetings started.

My wife Uma Ganesh, Mr and Mrs Kohli, a fellow industry CEO and I drove an hour out and spotted an enormous sand dune. While both us, in our late thirties, were still thinking if we had the ability to start the climb up, a sprightly sixty-plus FCK scampered from the car and was halfway up the dune before he turned around and yelled, "Come on young men, follow me."

> EVERY VALUE THAT WE HOLD DEAR WAS ENSHRINED IN FCK AND HE TRULY LIVED A LIFE OF JOY, GRACE AND PERSEVERANCE THAT SHOULD INSPIRE ALL OF US.

In that one phrase lays the story of an industry now nearing USD 200 billion in revenue, which was created by a man, who left Tata Consulting Engineers to start TCS. Industry chiefs, employees, academicians, and government officials have all experienced the golden leadership of FCK and have emerged stronger and more resolute with every interaction. Alas, he is no more. The industry and the country mourn the passing of a king among men, an industry-creator, and a role model for many generations.

It would be doing injustice to the man if one were to just speak of him just as a software company CEO. He did that with pride and many legendary CEOs of the next generation – Lakshminarayanan and Chandrasekharan of Cognizant, Rajesh Nambiar of IBM, Kiran Deshpande of Mojo Networks, and Aruna Jayanthi of Capgemini, to name just a few, speak fondly of his tutelage and their terror at the final encounter with him when they decided to leave TCS.

Ram and Chandra, his worthy successors have nothing but praise for him and Harish Mehta, founder and leader of the Chairmen's Council of NASSCOM, spoke fondly just after FCK's death of his being the force behind the creation of what is arguably the world's most successful and representative industry association.

One could write a book to describe the virtues of the man – and indeed, many tomes will be written which will motivate generations of future professionals – but for me what stands out after multiple interactions and mentoring sessions with him over three decades are his candour, his vision, and his ambitions for India.

No chairman of NASSCOM would have escaped a lecture from the man that we should address the need for natural languages as the medium of computing in India and his lament that India had missed successive buses in the electronic hardware journey.

Today, when computing is truly in multiple languages and the government has announced the productivity linked incentive (PLI) schemes in an attempt to accelerate the pace of growth of the Indian hardware sector to the position of eminence that China has galloped to in the last ten years, FCK would have been justified in saying "I told you so" but his thoughts would have been on education, employability and the future opportunities to deploy technology for better agriculture, rural services and opportunity creations in 'Bharat'.

He became a mentor to Uma and me after Jodhpur and was always fascinated by my innovations in the software industry and Uma's track record across NIIT, APTECH, ZEE Education, and Global Talent Track in Education and Skills. He would always exhort us to do our bit for the millions who needed to be trained for better livelihoods.

Apart from all this, he and his wife had a zest for life that would always be infectious. On a moving boat in Sri Lanka on another NASSCOM retreat two years ago and again at last year's Varanasi Retreat, they would be the first on the dance floor and his energy and *joie de vivre* always defied his age. They were an inseparable couple and a role model for all of us with their graciousness at home and his insistence on going to his office even till the beginning of 2020. Every value that we hold dear was enshrined in FCK and he truly lived a life of joy, grace and perseverance that should inspire all of us who had the good fortune to have our lives touched by his.

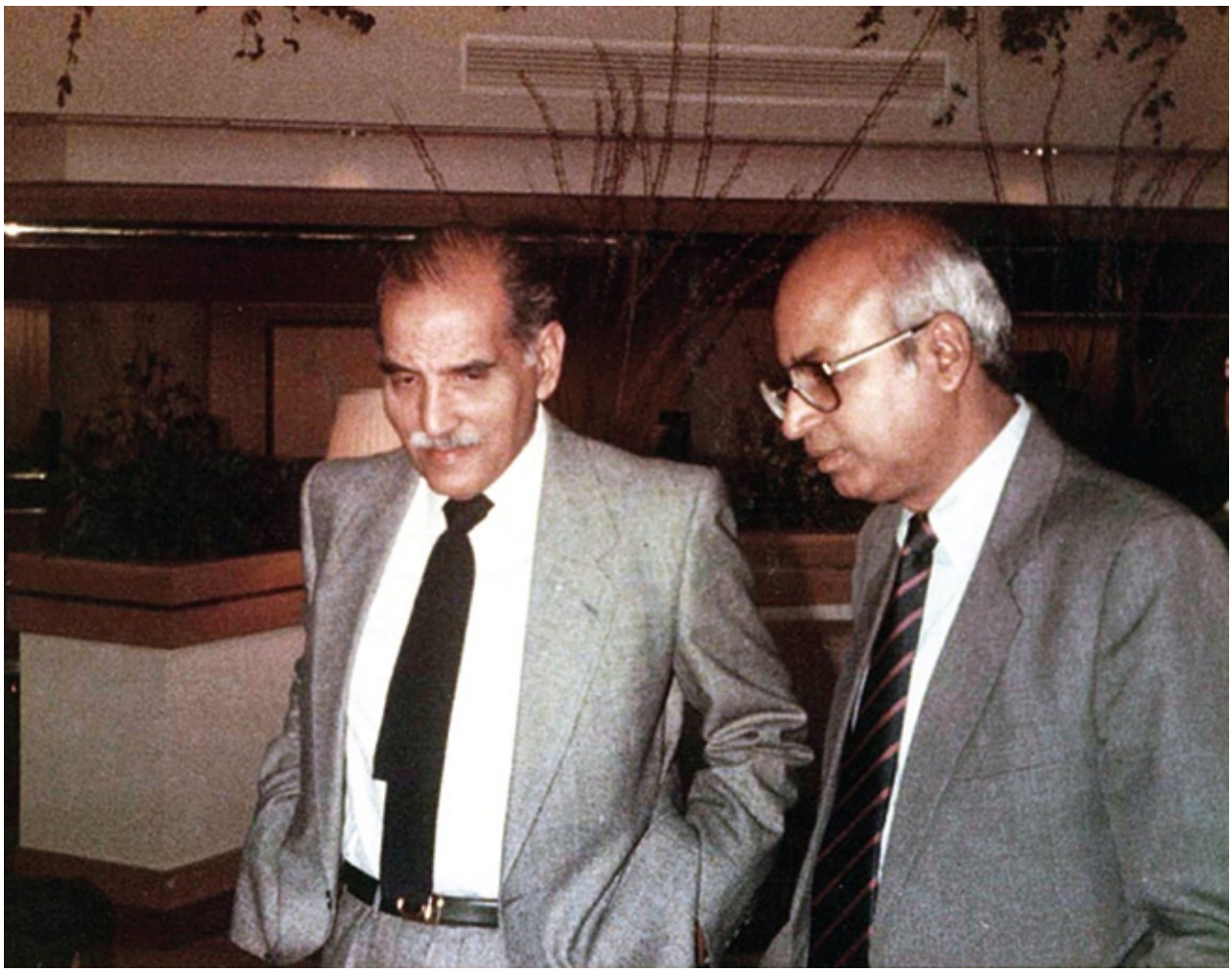
It was probably appropriate that we heard of his passing during a strategy discussion at the 2020 virtual retreat, giving an opportunity for all of us to observe a minute's silence and share our memories of FC Kohli – the man, the institution, the legend. Rest in Peace!

Natarajan is Chairman of 5F World, Lighthouse Communities Foundation and a member of NASSCOMChairpersons' Council

S Ramadorai
maildqindia@cybermedia.co.in

Visionary, titan, mentor, guide

The extraordinary industry leader was a great mentor too. How was it working with him? How did his dream of a tech-empowered India evolve? A veteran pays homage



The hallmark of a great leader is that they throw challenges and help you to perform at your best. Fakir Chand Kohli was one such professional who saw early the best in every individual, and I had the great benefit of his mentoring.

During my initial days, I started to learn more about him and realised that he was very quick to grasp issues and was rather forthright when it came to telling us what the right thing to do was. However, if one was sure of being right,they could counter him with a logical explanation,

KOHLI WAS A VISIONARY WHO FORESAW THE BOUNDLESS OPPORTUNITY FOR INDIA IN TECHNOLOGY SERVICES DECADES AGO WHEN THE TECH SECTOR WAS ALMOST NON-EXISTENT IN INDIA.

and he would respect that. Kohli was certainly not known for his patience, but as I learned later, he was good at heart.

When Kohli spoke, you listened, which taught me the importance of being a good listener; but he was also a man of few words and his instructions were often quite crisp, which trained me toguess what was required to be delivered. Today, it is quite common to have an open and frank discussion between a subordinate and his boss, but in those days, managements were very hierarchical and it was difficult for a junior to communicate with a senior without appearing to be questioning or challenging him.

Having a free and frank discussion with my boss was against the ethos of the time and against the upbringing I had. As a result, I often communicated with Kohli by writing memos to ensure that I had understood what he wanted and correcting it if I had got it wrong. More importantly, it provided me with the opportunity to disagree in a non-confrontational way.

I still recall that he would always challenge me by presenting me with different situations and new opportunities in my early days. This was something I learned from him and imbibed as I grew to build my teams at TCS later. I personally believe that the mark of a great teacher is one who inspires, motivates and opens up minds to the endless possibilities of what one can achieve. A mentor also builds strong interpersonal connections with his peers and teams through the course of his journey.

Kohli always wanted India to be part ofthe computer revolution that was beginning in the West. His electrical engineering degree and MIT training coupled with his voracious appetite for reading books on technology gave him the confidence to try new things in India and to create value.

Throughout his career, a visionary leader who was also the chairman of NASSCOM in 1994-95, he maintained close ties with academicians – from designing India's first course on control systems to being incharge of establishing the IITs in Mumbai and Kanpur. Even after his retirement, Kohli continued to be an integral part of India's IT story but then he took it upon himself to use technology to tackle the problem of adult illiteracy in India.

He strongly advocated that India needed bright young people with good education – something the country had in abundance. He firmly believed in education for the masses and thus developed the adult literacy programme. He felt that multiple language competencies for the Indian IT industry would be a game-changer in the future. He always encouraged the teachers/professors in engineering colleges to upgrade their knowledge base, keeping pace with the changes technology was bringing to the industry. He believed that a graduate armed with the latest knowledge of the tech world would be more job-ready and deliver well at his or her job too.

Kohli was a visionary who foresaw the boundless opportunity for India in technology services decades ago when the tech sector was almost non-existent in India. His leadership and passion was the key to establishing India as a trusted quality partner for global corporations as he propagated the importance of technology adoption and stressed on the importance of local language and the hardware industry in India.

While I have personally lost a teacher, mentor and guide, the nation has lost a legend.

Ramadorai is Chairman, Tata Institute of Social Sciences, and former CEO and Managing Director of TCS

DQ Bureau
maildqindia@cybermedia.co.in

How to deliver value **with intelligent data**

Industry leaders discuss emerging trends at a webinar hosted by Dataquest along with VMware and Hitachi Vantara

Mobility restrictions due to COVID-19 have forced us to take shelter in the digital world. The new normal is pushing digitisation to unprecedented levelsin most sectors and economies. This has led to a massive growth in data that can be an asset if utilised properly. It was in this context that, as part of its capacity building initiative, Dataquest along with VMware and Hitachi Vantara hosted a webinar on 'Delivering Value with Intelligent Data'.

Delivering the welcome address, Sunil Rajguru, Editor, PC Quest and CIOL, spoke about how the new normal is driving rapid digitisation, enabling work-from-home (WFH) and remote working cultures as well as boosting the collaboration industry.

"Everything is becoming digital. There is online and remote education, training is being conducted via XR, and there are no-touch technologies such as drones and connected cars, and 5G that will enable smart cities. Data has taken a life of its own now. It is still the new oil," he said, adding that there will be more data centres, devices, and cloud operations. "The upper limit for IoT devices will be 500 billion by 2030. Data analytics will get better, and AI will be the key. We are now in the decade of complete digital transformation."

Nilesh Goradia, Pre-sales Leader Systems Engineering Partner and SI, India, VMware, talked about building a foundation for digital business. Applications need to drive infrastructure strategies. Apps are getting more complex, diverse and heterogeneous. As per the IDC, enterprises will build 500 million apps using cloud-native tools and methods over the next five years.

"VMware has a vision of an essential, ubiquitous digital foundation. There will be millions of devices over any app, over any data centre and/or cloud. There will be software-defined everything. There will be single management platform for all of these. We are promising software-defined everything in the future," Goradia said.

There are three requirements for delivering a great app experience: robust infrastructure, always-on network, and ubiquitous access. There will be an intrinsic security and lifecycle automation. VMware has the Cloud Foundation services with Tanzu.

"There is the app-focused management, and Dev and IT Ops collaboration. There are runtime services, such as Tanzu Kubernetes grid service, automation services, including, pipeline, cloud IaaS, template, and custom, and infrastructure services, such as vSphere pod, storage, registry, and network. We are bringing the infrastructure and development on a single platform," he said.

VMware Cloud Foundation with Tanzu is delivering enterprise-grade Kubernetes at cloud scale. There is full stack HCI platform for VMs and containers. This modern infrastructure provides agility, flexibility, and security for modern apps. There is also the modern infrastructure for modern apps. You can rapidly deploy new apps and microservices. There is consistent infrastructure and operations with cloud agility, scale, and simplicity.

HORIZON FOR UBIQUITOUS ACCESS TO APPS

VMware Horizon provides ubiquitous access to any app. VMware Workspace ONE empowers the digital workspace

> VMware has a vision of an essential, ubiquitous digital foundation. There will be millions of devices over any app, over any data centre and/or cloud.
>
> — **Nilesh Goradia,** Pre-sales Leader Systems Engineering Partner & SI, India, VMware

> We have made hyper-convergence easy. There is integrated HCI appliance and HCI operation is on the auto pilot. There is common management for edge-core-cloud.
>
> — **Sudharsan A,** APAC Solution Lead, Business Critical Apps and Converged Solution, Hitachi Vantara

for your business needs. This is industry's first digital workspace platform. Desktop and apps can be accessed from a single platform. There is the ability to efficiently and cost-effectively deliver, manage, and monitor virtual desktops and published apps to end users, without the need to access the full desktop.

Horizon makes desktop and apps management easy. It centralises the end-users' desktops and apps in the data centre; so that the IT can efficiently provision new clients, centralise desktop management, and improve the security and compliance. This is based on seven key pillars. These are: desktop and apps from a single platform, JMP technologies, great user experience, smart policies, complete environment management, SDDC integration and flexible delivery.

Workspace ONE brings it all together. It is a unified solution that delivers great app experience. There is the ubiquitous access, always-on network, and robust infrastructure, all secured by design.

ENABLING THE HYPER-CONVERGED WORLD

Sudharsan A, APAC Solution Lead, Business Critical Apps and Converged Solution, Hitachi Vantara, said that there has been the Hitachi data infrastructure evolution. It is from storage, to converged, to hyper-converged, and on to cloud foundation.

Hitachi and VMware are bringing various solutions to the table, with simplified consumption, and infrastructure portfolio – across hybrid and private clouds, digital workspace, SDDC and Big Data analytics.

"We have made hyper-convergence easy. There is the integrated HCI appliance, and the HCI operation is on the auto pilot. There is common management for edge-core-cloud. We provide full lifecycle management, and flexible consumption. HCI will accelerate cloud transformation," Sudharsan said.

Key use cases for hybrid cloud include DC modernisation and cloud extensibility, and SQL and Oracle for faster query responses. Chief use cases for VDI include secure remote workspace in hours, and enterprise app on enterprise HCI. The unique value proposition includes automated provisioning, unified management, turnkey, and hybrid cloud. There is accelerated time to production. This is the best of both worlds. All infrastructure is managed through the UCP-A, integrated into the vCenter.

"We are abstracting away complexity, and that is over time and everywhere. There has also been the evolution of the consistent infrastructure from x86 to IaaS, and beyond," he added.

There are multiple approaches to implementing the software-defined data centres (SDDCs). The SDDC Manager is used for centralised lifecycle management. Hitachi Vantara offerings include a fully integrated system, UCP-Advisor, and VSP as a principal storage VMFS, vVOL, cloud native and supplemental storage. There are flexible storage options with the VMware Cloud Foundation storage.

Hitachi is the first Intel Select Certified HCI for VMware Horizon VDI. There is the secure digital Workspace solution co-engineered with Intel and VMware. You can get on-demand desktop in hours, with secure self-service data access. There are multi-site high-availability desktops, and they are tailored for end-user experiences.

There are intelligent data management VDI solutions powered by Hitachi, which are on-demand and cloud ready, allow smart data sharing and provide policy-based analytics with backup-less protection. One can move the data services from the edge to the cloud. The need of the hour is to profile the VDI users. Profiling the user VMs is the key to the right sizing of the VDI infrastructure.

DQ Bureau
maildqindia@cybermedia.co.in

Find out your cyber security gaps **(before attackers do)**

More digitalisation means more vulnerability of the organisation to cyber threats, which are also becoming more complicated by day. That calls for expert help

Increasing digitalisation brings with it new challenges too. Arguably the most important among them is security. Cyber attacks are on the rise, and Indian citizens, commercial and legal entities faced almost seven lakh of them this year till August, going by what the Ministry of Electronics and Information Technology told the Parliament.

Of course, data and information security have always been crucial, COVID-19 and the aftermath, including the work from home and adoption of digital technologies on a massive scale, have unleashed a security nightmare. The threat has assumed even the shape of hybrid warfare: Hackers based in China have attempted over 40,000 cyber attacks on India's IT infrastructure and banking sector, even asrogue companies deploy artificial intelligence and big data analytics to profileand monitor influential citizens and organisations.

As part of its information dissemination and training initiative, Dataquest together with Keysight Technologies hosted a webinar on 'Reactive vs. Proactive Cybersecurity' in November.

Initiating the discussions, Shubhendu Parth, Editor, Dataquest, pointed out that one of the common problems that many organisations face is the lack of ability and tools to effectively evaluate the security threat and their preparedness to deal with it. "And if you can't measure something, how can you manage and improve it? What this also means is that you can't quantify the risks to your business and therefore cannot calculate the return on your security investment, or understand how to optimise it," he said, adding that the solution lies in proactive approach.

Rohit Naik, Application Engineer, Keysight Technologies said the recent spurt in cyber attacks in India indicates several facts. "One, we probably lack something on the cyber security front, or we are probably improving, and adding new tools. We are also adopting newer technologies. We are also talking about the remote workforce, where the way of handling data traditionally, has completely changed. Complexity has also been added in the network," he said.

"When you are doing something new, there will be some challenges. We have to change, going forward. NITI Aayog has found that India is the third most attacked country; behind the USA and China. We have to change the way we lookat cyber security. We are in the right direction, and adopting some new technologies," Naik added.

Keysight conducted a research survey among global leadership positions. It found that there has been lack of insight, leading to breaches. About 57% of the respondents are confident that the security solutions are reducing risk. Only 35% can prove that their security solutions are correctly configured. Also, in 50% of the breaches, it was discovered that a solution wasn't working as expected –

> NITI Aayog has found that India is the third most attacked country; behind USA and China. We have to change the way we look at cyber security.
>
> — Rohit Naik, Application Engineer, Keysight Technologies

If you can't quantify the risks to your business, you cannot calculate the return on your security investment, or understand how to optimise it.

— Shubhendu Parth, Editor, Dataquest and Voice&Data

only after facing a breach.Once a breach has happened, half the companies realise their solutions are not enough.

"We have always kept on adopting newer technologies. SecOps teams are always on the defensive. When there is an incident, you really can't expect two teams to collaborate. SecOps never really took off, as more focus is on the defensive side. SecOps are bombarded with alerts. Many tools are being added on the network. It is about monitoring the tools, looking at reports," Naik pointed out.

"Threat intelligence has many approaches and many users. You are trying to gather intelligence and improve your action. Threat intelligence is strategic, operational, and tactical. There is threat hunting and incident response, which is followed by block, detect, and remediate. Finally, there is breach and attack simulation. You need to look at the history of the different kinds of attacks in the past. The teams have to consume it in different ways to respond to the incident."

Highlighting that the traditional use of threat intelligence has been reactive, Naik said that Keysight aims to take it to the next level. "We need the right visibility to the events happening on their tools, etc. You have to get proactive to complete the threat intelligence lifecycle."

The SOC team has to understand how to think like an attacker or a hacker, and theyhave to be the soldiers in the network. They also need to understand what is happening in the market from an attacker's framework and try to figure outif there is a pattern.

Attackers are likely to have certain locations and particular techniques. They may change the machines but changing the technique may be a little difficult for them, experts believe. Security operations centres (SOCs) should then seek to understand attackers' techniques.

So, organizations need to rethink the way they are using threat intelligence. Butit is not easy to do threat hunting. That is where the expertise comes into play. "Keysight offers complete SecOps testing and visibility. We help our customers stay ahead. With branch locations across the globe, we have a global team of security researchers and application protocol engineers," Naik said.

He further elaborated that the company has a threat intelligence database that is continuously updated, cataloguing millions of known and emerging threats, while the Keysight ATI Research Centre gathers threat intelligence from different sources. "You need to set up global honeypots. We have our own products set up on live networks. We also develop the evasion techniques. If a malware changes its pattern, it may be difficult to defend. You have to train devices on those evasion techniques. We have to refine and analyse the feeds."

Security assessments today include vulnerability assessments, breach and attack simulations, pen-testing and red teams, and pre-deployed security tests. One needs to find a balance between validation frequency of attacks and validation thoroughness. There is no one-size-fits-all solution for cyber security.

"You can run vulnerability assessments frequently. You can segregate the risks that you expect. The gap between getting these is also dependent on how long you need to patch up your tool. They may try to find out whether there are vulnerabilities to your end points. These are a snapshot of time. How do you validate if there are no errors in your reports? Gartner is talking about the breach and attack simulation. You need to adopt a technology that addresses the gaps," Naik said.

Breach-and-attack simulation tools are becoming popular, but there are different types of attacks. Moreover, misconfigurations cause breaches, and organizations need to have a tool to find out if it has been configured wrongly. "Organisations can reduce risks using threat simulator, to get automated, safe and continuous assessment. They can improve the security before purchasing new tools, easily remediate gaps in the coverage, and safely simulate the entire kill chain."

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Rajiv Pathak | rajivp@cybermedia.co.in | 8010757100

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