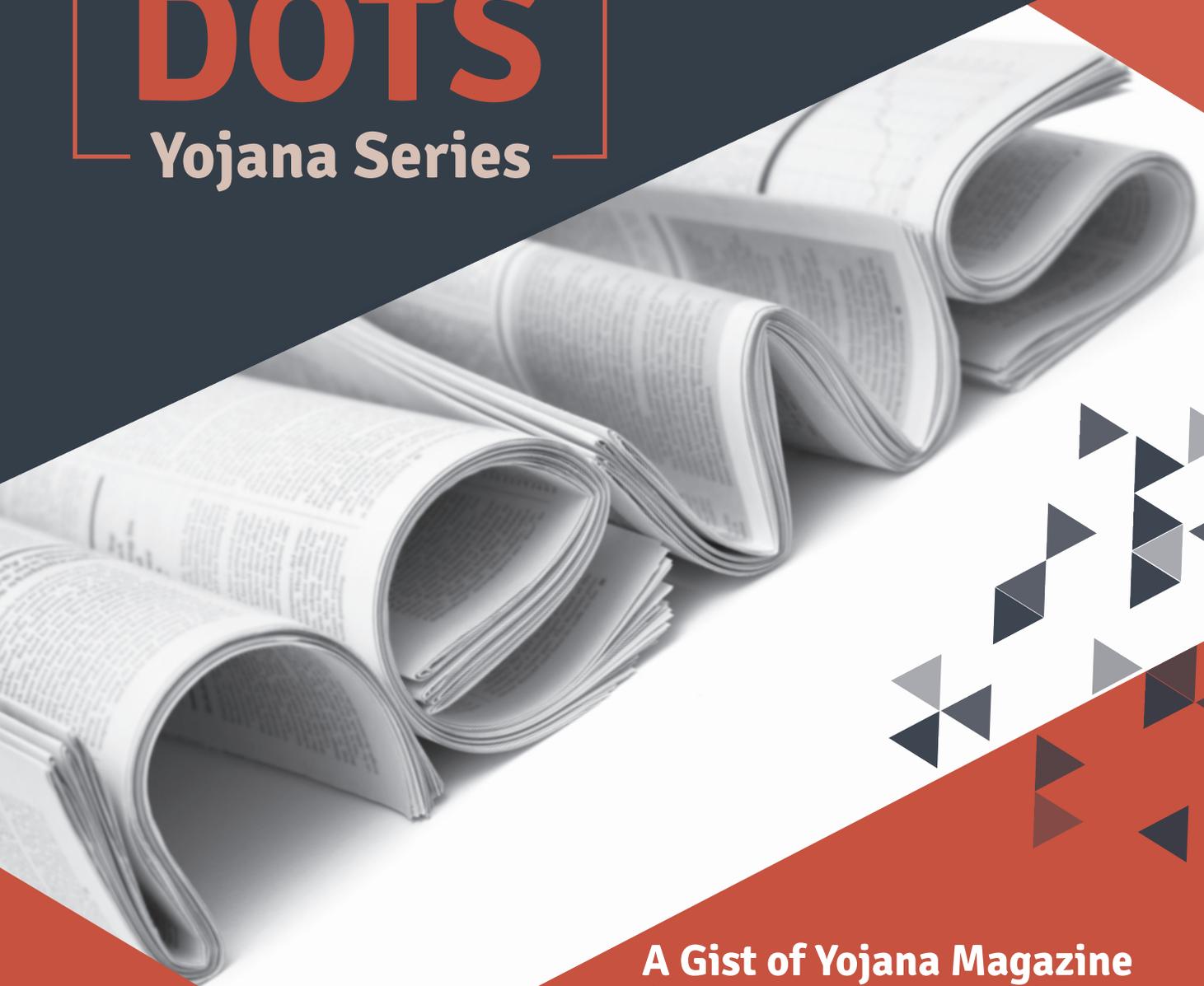


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A Gist of Yojana Magazine (February 2020 issue)

- Artificial Intelligence: Challenges and Opportunities for India
- Ethics in AI
- Leadership in Science
- Cyber Security: Issues & Challenges

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February, 2020

Innovation in Education

Artificial Intelligence: Challenges and Opportunities for India

Artificial Intelligence

- The system's ability to learn and interpret external data via software/algorithms or machines/devices for problem solving by performing specific roles and tasks currently executed by humans.
- The term AI has been used interchangeably with other closely related challenges, particularly focusing on elements of policy that could act as a major roadblock for development and further diffusion of AI-based systems.

Opportunities and Applications:

- A multitude of opportunities have been presented for the application and use of AI-based systems in various domains particularly to assist where structured decision making is needed.
- The ability of AI to the computationally intensive, intellectual and perhaps creative limitations of humans opens up new application domains within manufacturing, law, medicine, healthcare, education, government, agriculture, marketing, sales, finance, operations and supply chain management, public service delivery and cyber security.
- Within the education sector, AI can be deployed to improve teacher effectiveness and student engagement by offering capabilities such as intelligent game-based learning environments, tutoring systems and intelligent narrative technologies.

AI can impact education in three ways:

- Firstly, AI-enabled hyper-personalisation helps in developing student specific learning profiles and in developing customised learning environments based on ability, preferred mode of learning and experience.
- Secondly, the use of smart assistants (Amazon Alexa, Google Home, Apple Siri, and Microsoft Cortana) and associated technologies offer significant potential to help students.
- Thirdly, AI systems can assist educators with secondary tasks such as grading activities, providing personalised responses to students, handling routine and repetitive paperwork and dealing with logistics-related matters. AI-based analytics can help with academic research within various disciplines and potentially transform library processes and staffing requirements with aim to provide a richer user experience.

How India can use AI effectively

- AI technology can be used within several other sectors for enhancing both efficiency and effectiveness. Specifically, AI can help in achieving good health and well-being goals within rural and remote areas in developing countries where access to medical care is limited. In such scenarios, AI-based systems can be utilised for conducting remote diagnosis supporting doctors to help improve health service delivery.
- AI-based systems can also help achieve the "Zero Poverty and Zero Hunger" (SDG 2) by assisting in resource allocation for predicting adverse environmental conditions, diagnose crop diseases and identify pests in a timely manner to mitigate the risk of catastrophic agricultural events. Similarly, AI-based systems can be used to predict energy and utility demand to help in achieving SDGs such as "Clean water, sanitation" and "Affordable clean energy".

Application of AI in India:

- Within the Indian context, a number of key indicators from health, education and agriculture sectors are important to highlight as AI is further adopted.
- India has 0.8 per thousand doctor-to-patient ratio (UK: 2.8, Australia: 5, China: approximately 4).
- This low ratio implies a heavy workload on Indian doctors. In India, doctors spend just 2 minutes per patient, whereas in the US it is close to 20 minutes. AI could be a valuable assistive tool for doctors in helping reduce their workload and assisting in diagnosis.

- AI-assisted diagnostics can provide access to quality healthcare for people in remote areas. The per hectare cereal productivity in India is almost half that of China and UK (3000 kg/ha vs. over 6000 kg/ha).
- There is a significant loss of productivity due to pests and diseases. The Tamil Nadu e-Governance Agency has partnered with Anna University to launch a Tamil smart assistant called Anil”.
- This NLP-based smart assistant provides a step-by-step guide to people in helping them apply online for scores of critical government services. The Tamil Nadu Government has been one of the pioneers in using AI for public service delivery.
- The agency has recently launched an AI-based agricultural pest and disease identification system and made it available to over half a million farmer families through a mobile app.
- The farmer clicks an image of diseased crop or a pest and the system processes the image through an AI algorithm to identify the pest or disease and sends a message to the farmer advising the remedial measure.
- This system is gaining a good field response in which nearly 400 farmers are posting identification requests and getting answers every day.

Challenges and Shortcomings:

- There exists a number of challenges and limitations of successfully implementing and utilising AI in both public and private sector organisations. Some of the key challenges are briefly outlined here.

Lack of explain ability

- Generally AI operates effectively as a black-box-based system that does not transparently provide the reasoning behind a particular decision, classification or forecast made by the systems. This is a major limitation of this technology as it has direct impact on transparency, hence trust and confidence of using decisions made.

Lack of contextual awareness and inability to learn:

- AI-based systems are good at performing with given parameters and rules. However,
- This poses a critical question: how can the inferences delivered by different AI components be integrated coherently when they may be based on different data and subject to different ecosystem conventions (and the associated quality differences) Furthermore, organisations face challenges on how to ensure AI and human work together successfully.

Lack of standardisation:

- AI-based systems that may have utilised different types of technologies/techniques are increasingly being embedded in a variety of products and services (for example, smart assistants, modules for enterprise products, widely available cloud libraries and bespoke data science-driven applications).
- The Tamil Nadu Government is implementing an innovative use of AI through face recognition for recording attendance.
- The system is saving more than 45 minutes per day and is freeing up extra time for core educational activities in schools. Within healthcare, AI solutions such as radiographic diagnostics like “detection of internal bleeding in the brain from CT scans” are being tried to assist doctors and increase their reach to serve remote areas of India.

Job losses:

- Increasing automation will lead to significant job losses particularly at operational and lower skill levels for repetitive tasks. This critical consequence of AI Use will continue to impact all sectors and countries across the world but particularly developing economies where employment opportunities are already limited.
- This emphasises the need for strategic management of AI transition requiring organisations to carefully consider a number of major challenges: how to select tasks for automation; how to select the level of automation for each task; how to manage the impact of AI-enabled automation on human performance and how to manage AI-enabled automation errors.

Lack of competency and need for re-skilling and up-skilling workers:

- A large number of organisations still lack in-house competency to successfully develop and implement AI-based systems. In such a scenario, organisations utilise specialised consultancy firms which can be very resource intensive.
- But this restricts organisations having limited resources in using such systems. Similarly, using or working with AI-based systems requires workers to be equipped with a new and advanced set of skills, which is a challenge for government, organisations and individuals.

Lack of trust and resistance to change:

- To predict its impact and inability to draw boundaries. We have identified six key public policy challenges of AI.

Ethics in AI

- Ethics for machines has been an area of immense interest for the researchers. However, defining has proven to be problematic and difficult to make it computable.
- To tackle this, we need to deal with ethics purely from an AI perspective.

There are two dimensions of ethics in AI: Privacy and data protection and Human and environmental values.

1. Privacy and Data Protection:

- Privacy is possibly the top-most concern while using AI systems.
- Users' sensitive and highly granular data is likely to be stored and shared across the AI network (for example, a person's location for the day based on face recognition and CCTV feeds, food habits, shopping preferences, movies, music etc.).
- Due to the above mentioned issues and negative media coverage on the consequences of AI, people are generally apprehensive about its implementation.
- This poses a major challenge on how to establish trust among workers and stakeholders in the management of resistance to change in adopting AI systems.
- Public policy is facing unprecedented uncertainty and challenges in this dynamic world of AI. The velocity and scale of impact of AI is so high that it creates an interesting dynamics in terms of the need

2. Human and Environmental Values:

- Any AI system has to conform to the human value system and the policymakers need to ask: Has the AI system been sensitised to human values such as respect, dignity, kindness, compassion, equity or not? Does the system know that it has a preferential duty towards children, elderly, pregnant women, sick and the vulnerable? An important aspect which needs to be built into AI systems is the overall cost of their decisions on the society.

Know! the steps to be taken to overcome the challenges

Transparency and Audit:

- In the future, many of the AI-based systems could be interacting with humans in fields such as finance, education, healthcare, transportation and elderly care. The technology providers must explain the decision-making process to the user so that the AI system doesn't remain a black box.
- There exists a legal need to explain the decision taken by such systems in case of litigation. These AI systems must provide an audit trail of decisions made not only to meet the legal needs but also for us to learn and make improvements over past decisions.

Digital Divide and Data Deficit:

- Since the entire AI revolution has data at its foundation, there is a real danger of societies being left behind. Countries and governments having good quality granular data are likely to derive maximum benefit out of this disruption. Countries where the data is of poor quality or of poor granularity would be left behind in harnessing the power of AI to improve lives of its citizens adversely affecting low-resource communities.
- AI can disrupt social order and hierarchy creating new social paradigms, which could damage the social fabric exposing people lower in the bargaining hierarchy with a real threat of exploitation and unfair treatment.

Accountability and Legal Issues:

- Without AI, any system designed by a human is only a machine under the control of the operator. Therefore, accountability has not been an issue.
- Almost all civil and criminal liability laws of the world fairly unanimously attribute accountability to the operator, owner and manufacturer of the machine in varying degrees depending upon the facts of the case. However, once machines are equipped with AI and take autonomous decisions, the question of accountability becomes very hard to answer, more so when the algorithms are unknown to the designer.

Misuse Protection:

- Internet proliferated across the globe benefitting billions but also carried along with it a wave of cybercrime, malware, viruses and violent online games which resulted in loss of innocent lives of teens around the world. Autonomous AI systems must be designed for misuse protection. It cannot be an afterthought.

Conclusion:

- AI as a technology holds tremendous potential for a country like India, which is data rich and has the requisite technological capability to create AI solutions for many of its problems.
- Public roll-out of AI systems needs to address issues of ethics, transparency, audit, fairness, equity, accountability and misuse prevention.
- An effective public policy framework for AI along with a practical scorecard would be needed to make this AI revolution work towards an equitable prosperity.

Leadership in Science: Need to Challenge Existing Assumptions

- An ability to question basic assumptions in any situation is fostered by probing the frontiers of science, whatever field one may be engaged in, whether it is Biology, Genetics, Atomic Science or Space Research.
- It is this ability rather than an 'empirical hit-and-miss approach which proves most effective in tackling the day-to-day problems of the world. It follows from this that for its nationals to do front-rank research within, the resources which are available.
- It is equally necessary; having produced the men who can do research, to organise task-oriented projects for the nation's practical problems.

Inevitable consequences of modern technology:

- One of the inevitable consequences of the introduction of modern technology is a gradual erosion of existing values—a drift towards a man centred world substituting another in which man is only one element in all of nature.
- Hinduism has a substratum of philosophy which is fascinating to the modern scientist. The life of the common man reflects many of the values related to this philosophy, unconsciously imbibed through literature, the arts and social traditions.
- We recognise that perception involves the outside object as well as the observer. We appreciate the subjective character of personal experience. We accept that there are a thousand paths to enlightenment.
- In relativity we learn of the importance of the frame of reference of the observer and how the results of observation depend on the relative state of his frame with respect to that which he observes.' Absolute right and wrong do not exist in the 'values of those who have understood the Upanishads or those who have followed the concepts of relativity.

Science and National Sovereignty:

- Concerning science and human values - by tiding an example which is related to the implications of science and technology to modern warfare and how these affect national sovereignty.
- As soon, as hydrogen bombs could be delivered with inter-continental ballistic missiles capable of hitting a target to an accuracy of a few miles at a distance of six to eight thousand miles, the implications of a war between adversaries possessing such weapons were too grave for anyone to contemplate armed conflict as a means of solving international disputes.
- If coexistence between nations formed a part of the "Panchsheel" adopted by Asians from Buddhism, it was also advocated by Premier Khrushchev from an appraisal of the consequences of the balance of terror that exists between the East and the West.
- At all times social change has been related to technological developments and in each era new constraints, social and political, are imposed on those who partake of the change. Just as an individual who chooses to live in a community voluntarily renounces the right of throwing a stone anywhere he pleases, which he undoubtedly could exercise in the jungle, so in the atomic age, nations are forced to accept a self-discipline where the freedom of settling disputes through the use of force on a grand scale is no longer meaningful.

Application to Real Problems:

- To create conditions for the application of science and scientists to the real problems of society, we have to encourage scientists to interest themselves in problems outside their fields of specialisation. Sure enough, one does not expect to give to the opinion of a scientist special weight in fields other than his own.

- But a person who has imbibed the ways of science injects into a situation a new way of looking at it, hopefully perhaps, a degree of enlightenment with regard to the approach to problems and thus provides leadership which is very valuable.

Way forward:

- Moreover, we can secure acceptance of the notion that such task oriented activity, seriously undertaken and with a well-defined objective to be realised in a given period, should receive financial reward which will ameliorate the total situation in least one important aspect.

Innovation in Higher Educational Institutions

- The Innovation centres in institutions fosters team spirit and the ability to work beyond classroom lectures.
- They prepare the students to take collective ownership of outcomes and work on multigenerational products.
- Centre for Innovation (CFI) is one such platform for students in Madras which is encouraging them to generate ideas to innovate and invent.

Innovation as a Catalyst:

- These innovation centres also fosters team spirit and the ability to work beyond classroom lectures.
- It prepares the students to take collective ownership of outcomes and work on multi-generational products. While individual merit brought them to these institutes, working on innovation and bringing complete products to life prepares these students for the real world.
- Innovation comes to life when their inventions are developed further in the context of the societal needs and wants. Similarly, higher educational institutes such as the IITs are also gradually transforming themselves in to research and development powerhouses catering to the needs of the country.
- The quantum of students pursuing post baccalaureate degrees are now more than those entering at the undergraduate level. Further, many centres of excellence in various domains of national importance have been set up at these institutes.
- The National Centre for Combustion Research and Development (NCCRD) originally set up with interdisciplinary faculty to promote advanced research in the domain of combustion has already started producing niche startups in areas like micro-gas turbine, emission sensors, electric planes etc.

Way forward:

- It is heartening to see the rapid pace of the deep tech innovation ecosystem in India. Institutes of higher education, such as the IITs, are adapting to the evolving trend of rapid experimentation and development of technology for the society where it is embedded in. For these institutions, it is no longer sufficient to train and produce good employees.
- It will be the mandate of these institutions to produce good employers in large numbers that will cater to the aspirations of the next generation India. Our institutions will have to imbibe the spirit of entrepreneurial thinking, which includes rapid adaptation to the societal needs, developing and scaling in resource constrained environments and serving as local points or nodes of innovation and entrepreneurship, to reach our national goal of a \$5 trillion economy.

Quality Education for Weaker Section and Disadvantaged Groups

- The Right of Children to Free and Compulsory Education (RTE) Act, 2009, entitled every child of age 6 to 14 years to a right to free and compulsory education in a neighbourhood school till completion of elementary education. Section 8(c) of the RTE Act, 2009 provides that the appropriate government would ensure that the child belonging to weaker section and belonging to disadvantaged group are not discriminated against and prevented from pursuing and completing elementary education on any grounds.
- Further, Section 12(1)(c) of RTE Act, 2009 provides that all specified category schools and unaided schools shall admit at least 25% children belonging to weaker section and disadvantaged group in the neighbourhood in class I and provide free and compulsory elementary education till its completion.

Steps Taken to Ensure Education of Children with Disability:

- Samagra Shiksha, an overarching programme for the tire school education sector extending from pre-school to class XII, aims to ensure inclusive and equitable quality education at all levels of school education.

- It envisages the 'school's continuum from Entitlements include free uniforms, text books, special training of out-of-school children etc., provision for inclusive education of Children with Special Needs (CWSN) and vocational education among others.
- The 'Padhe Bharat Badhe Bharat' (PBBB) is a sub-programme of erstwhile Sarva Shiksha Abhiyan (SSA) which is continued under the new integrated scheme Samagra Shiksha to ensure quality at the foundational years of schooling.
- The objectives of the programme are to promote early reading and writing with comprehension skills in children, and also basic numeracy skills. States/UTs are implementing PBBB in their respective States/UTs using multiple strategies and approaches.
- These include adoption of NCERT model of early reading, provision of supplementary reading material, and development of State specific models for early Maths and early reading.
- The Navodaya Vidyalaya Scheme provides for the opening of one JNV in each district of the country to bring out the best of rural talent. Its significance lies in the selection of talented rural children as the target group and the aim to provide them quality education comparable to the best in a residential school system, pre-school, primary, upper primary, secondary to senior secondary levels. Bridging gender and social category gaps at all levels of school education is one of the major objectives of the scheme.
- The scheme reaches out to girls, Children with Special Needs (CWSN) and children belonging to Scheduled Castes (SC), Scheduled Tribes (ST), minority communities and transgenders. Tire focus of major interventions under the Scheme includes provision of RTE.

Promoting Vocational Education in Backward Regions:

- The government has recognised the requirement for spreading vocational education throughout the country including backward regions.
- Presently, there are 188 Community Colleges, 289 Institutes and 68 DDU Kaushal Kendras functioning under University Grants Commission (UGC) and operating vocational education in various sectors. State governments can offer vocational education through their institutional network as per UGC guidelines.
- There are various steps already been taken by the government to promote vocational education throughout the country, including backward regions.
- Developing internship/apprenticeship based degree courses in sectors like Retail, Logistics, Media and Entertainment, etc.
- Aligning the content of existing skill courses with National Skill Qualification Framework (NSQF).
- The Draft National Education Policy 2019 is presently under consideration. The revision of curriculum, syllabi and textbooks for school education would depend on the finalisation and approval of the New Education Policy.

Key Initiatives in Education

- The Government of India initiated the process of formulating a New Education Policy. It aims to meet the changing dynamics of the requirements of the population with regard to quality education, innovation and research to make India a knowledge superpower by equipping its students with the necessary skills and knowledge.

Key Reforms in School Education

NISHTHA:

- A National Mission to improve learning outcomes at the elementary level through an Integrated Teacher Training Programme called NISHTHA - National Initiative for School Heads' and Teachers' Holistic Advancement was launched. This integrated programme aims to build the capacities of around 42 lakh teachers and heads of schools, faculty members of SCERTs and DIETs, Block Resource Coordinators and Cluster Resource Coordinators.
- The initiative is first of its kind wherein standardised training modules are developed at national level for all states and UTs. However, states and UTs can contextualise the training modules and use their own material and resource persons also, keeping in view the core topics and expected outcomes of NISHTHA.

DHRUV:

- The Pradhan Mantri Innovative Learning Program (DHRUV) was launched to identify and encourage talented children to enrich their skills and knowledge.

- The Programme 'DHRUV' will act as a platform to explore the talent of outstanding and meritorious students, and help them achieve excellence in their specific areas of interest may it be science, performing arts, creative writing, etc. These talented students apart from realising their full potential are expected to contribute to society in a big way.

SHAGUN

- One of world's largest Integrated Online Junction for – School Education 'Shagun' is an overarching initiative to improve school education system by creating a junction for all online portals and websites relating to various activities of the Department of School Education and Literacy in the Government of India and all States and Union Territories.
- About 1200 Kendriya Vidyalayas, 600 Navodaya Vidyalayas, around 20000 CBSE affiliated schools, 30 SCERTs, 19000 organisations affiliated with NCTE among others are integrated with Shagun. Report cards of 15 lakh schools all over the country will be available on the newly created junction.
- The portal seeks to connect approximately 92 lakh teachers and 26 crore students. Common people can directly give their feedback about schools which will further increase the public participation and will ensure accountability and transparency.

Unified District Information System for Education Plus (UDISE+)

- To ensure quality, credibility and timely availability of information from all the schools in the country the revamped UDISE has been launched. The GIS based mapping portal gives information about the location of more than 15 lakh schools in the country along with some salient highlights. The Data Analytics portal gives information about the aggregate position of the school.

Digital Infrastructure for Knowledge Sharing (DIKSIIA) 2.0:

- DIKSHA Portal was launched in 2017 for providing digital platforms to teachers giving them an opportunity to learn and train themselves and connect with the teacher community. This initiative has been taken forward to enhance coverage and improve the quality of e-content for teachers.

Operation Digital Board (ODB):

- The aim is to provide by March 2023, two smart classrooms for every Secondary/Senior Secondary schools in 1,01,967 Government and 42,917 aided schools in all States/UTs and 1704 KVs and NVs

Key Reforms in Higher Education Five-year vision plan:

'Education Quality Upgradation and Inclusion Programme' (EQUIP):

- The Department of Higher Education of MHRD has released a five-year vision plan named 'Education Quality Upgradation and Inclusion Programme (EQUIP).
- This report sets out to deliver further on principles of access, inclusion, quality, excellence and enhancing employability in Higher Education.
- EQUIP is a vision plan aiming at ushering transformation in India's higher education system by implementing strategic interventions in the sector over five years (2019-2024). EQUIP has been prepared based on reports of 10 expert groups constituted to deliberate upon important aspects of Higher Education.

Institution of Eminence (IoE):

- Ten institutions in the public sector and 10 institutions in the private sector have to be declared as IoE. Each public institute (IoE) will be eligible to receive Rs. 1000 crore during the next 5 years.

SWAYAM 2.0:

- SWAYAM 2.0 is initiated with enhanced features and facilities to offer online degree programmes through SWAYAM by top ranking universities. SWAYAM PRABHA- DTH Educational Channels It is a project to telecast high quality educational programs through 32 DTH channels on 24x7 basis to reach out to student/learners of India with wide reach and minimal cost.
- It aims to support those students who do not have good learning options like lack of teacher or internet etc. It also aims to provide dedicated channels 'IITPAL' to assist the students of XI and XII standards aspiring to join premier educational institutions in the country.

Deeksharambh:

- A guide to Student Induction Programme has been launched. Total 319 HEIs have implemented the Student Induction Programme.

Learning outcomes based curriculum framework (LOCF) revision:

- New curriculum in 16 subjects which is based on LOCF has been uploaded on UGC website to facilitate universities to revise the curriculum.

Use of ICT based learning tools for effective teaching learning process:

- 125 universities have come on board for accepting credit transfer done through SWAYAM platform.

Scheme for Trans-disciplinary Research for India's Developing Economy (STRIDE):

- Launched for promoting quality research by faculty and creation of new knowledge.

PARAMARSH:

- A scheme to mentor institutions seeking National Assessment and Accreditation Council accreditation.

Cybersecurity: Issues and Challenges

- The world we live in is highly connected and digitally exhaustive. Of the 7.6 billion humans on earth, around 3.6 billion are online.
- Today, social networks have become one of the main communication channels. Within relatively short time social media has empowered people and connected them. But, at the same time, they have also provided platforms for some decidedly unhealthy and destructive behaviour. Social media platforms have become just one of the endless data

Terrorist Attacks:

- Terrorists have always sought attention and that is what they receive from social media. Whenever there is any terror attack, as a response to the horrific events, people share images and videos of the devastating attack on social media. Social media thus spread the horror far and wide and unknowingly amplify the chaos that the terrorists intend to spread. In the process, misinformation and fear spread. It further traumatises the families of the victims and also the public at large.
- Extremists use social media to make an impact. They even use it to recruit, propagate and to connect. Moreover, they rely on the regular social media users to spread the impact of terror further to a greater degree than what they themselves could have done in addition to confusing authorities with misinformation. Misinformation, the rapid spread of false information through social media is among the emerging risks identified in Global Risks Report. Fake news and rumours spread like wildfire in the social media and it is also increasingly used for militancy.
- Social media sites have now initiated reporting procedures that allow users to flag any kind of content that supports terrorism which can be then removed. Also, the social networking sites today are playing an important role in counter terrorism operations

Mobile Technologies:

- Accelerator, microphone, camera, location, contacts, gyroscope (for orientation), heart rate, proximity, light, temperature, pressure, barometer (for altitude) are some of the information that are collected from your phone.
- All the apps that you use let your smartphone know who you are, where you are, where you have been, who you know, where the people you currently are, what you bought, where you bought, what you ate, whether you went and even your current mood.
- Internet of Things (IoTs) is another such challenge posed by the new technology whereby every object we use is equipped with the capabilities to identify, locate, sense its surroundings, compute and communicate.
- Now what will happen if all these objects could talk to each other and share information? It is said that soon there will be one billion IoT devices and they will all be talking to each other. Imagine what a rich attack surface it is going to give the hacker and the number of attacks that can happen with IoT devices.

Ransomware:

- This ransom demanding malware is a virus which gets into your computer, either when you download an attachment containing the virus or when you visit any such website and click on a link. Once it gets into your computer, it starts to encrypt all your files thereby rendering them useless.
- The only way to unlock your files is to get a secret key from the hacker by paying a ransom. And this ransom is usually demanded through bitcoin which keeps the payee anonymous. There has been a 600% increase in ransomware variants since 2016. Major universities, hospitals, businesses and even individuals have been target of such attacks.

Big Data:

- We are actually living in exponential data times. In just 60 seconds 149,513 emails can be sent, 3.3 million FB posts can be made, 3.8 million Google searches can be performed, 500 hours of YouTube videos can be uploaded. 29 million WhatsApp messages can be sent and 448,800 Tweets can be made and millions of other online activities can be performed leaving incredibly large digital footprint.
- Unfortunately, humans are the weakest link in the cyber security chain. Amateurs hack systems but professionals hack people. It is way easier to con people using social engineering techniques and make them reveal information rather than using tools and technology.
- The weakest link happens to be our password with which social accounts, mail accounts and millions of bank accounts have been hacked. An analysis of 32 million breached accounts has revealed that people most often use insecure passwords.
- While all these make cyberspace a huge threat in the socio-economic environment of the present times, it has become imperative to create awareness in the use of digital platforms through digital literacy. Digital literacy is an essential requirement for safe and secure use of digital resources which can contribute to efficiently tackle cyberspace.

Bots:

- Bots and fake followers are a big concern in the social media environment.
- Bot programs target specific hashtags and work by auto commenting and auto-liking in order to attract followers who are mostly other fake bot accounts. These are automated systems which can on their own get engaged with other users without any active presence.
- Developed primarily for companies to engage with their users automatically for increasing customer engagement, bots are now being used much beyond their harmless cause and are misused for manipulating a conversation to creating a mirage of someone's personality and much more.

Protection against Cyber Attacks:

- As the channels and networks for data sharing continue to evolve and grow, so do the risks.

For securing information on the social networking sites, following guidelines can be followed:

- Limit the amount of information that you disclose on the social networking sites;
- Do not establish friendship with strangers;
- Do not believe online information blindly as it can be misleading;
- Customise your system settings according to your needs by changing the default settings. Learn how to use privacy settings on your social profiles properly;
- Beware of third-party applications. Avoid applications that seem suspicious, and make sure to modify your settings to limit the amount of information which the applications can access;
- Secure your system, because unsecured network can lead to loss of your personal data;
- Choose a suitable authentication scheme so that no one can access the details. Two-factor and multi-factor authentication should be in place. In two factor authentication along with username and password, another form of identification, often a security code in the form of a "Captcha", is used.
- In multi-factor authentication, more than in one form of authentication to verify an identity is used. Some examples are facial recognition, iris recognition, voice ID and finger scanning. Today's digital world necessitates people to know the network security implications and spot suspicious activities. Oversharing helps hackers steal PII and sell it to the dark web.

Conclusion:

- Digital literacy is a broader concept that consists of developing new skills and knowledge which provides awareness and advanced level thinking skills. It is extremely essential to be digitally literate for appropriate utilisation of digital information resources.
- Therefore, it is the responsibility of each one of us to understand and help others to understand and use cyberspace sensibly and responsibly. This will definitely ensure that the netizens are not only techno-savvy and socially existent but also digitally safe.

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