TATA CONSULTANCY SERVICES

Building on belief

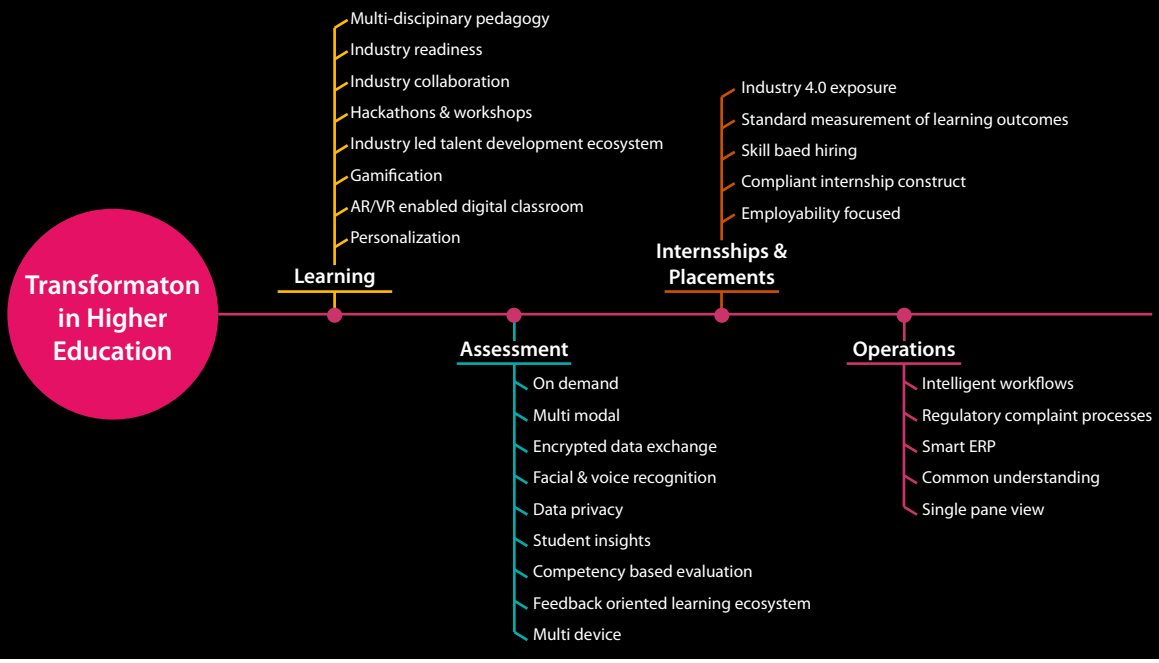
Technology in education to help students drive better outcomes

Abstract

The higher education system in India is the third largest in the world based on the number of students. The total enrolment in higher education has been estimated to be around 40 million with a Gross Enrolment Ratio of 27[1]. With employability hovering around 46%[2] means that only 13 out of 100 people in 18-23 years age group are employable. Much of this can be attributed to legacy curriculum, inflexible intra-disciplinary pedagogy, and institutional silos with highly complicated intricacies, leading to decelerated digitalization -- a critical precursor for the sea change anticipated in this segment. Meanwhile, the industry is experiencing a tectonic shift toward digitization where skills gap is a major barrier in achieving the same. Higher education has a big role to play in bridging this skill gap in the near future.

The National Education Policy of India 2020 (NEP 2020) and ironically, the COVID-19 pandemic has been a major cause for accelerated digitization in the education sector in recent years. Institutions need to leverage digital capabilities to bring standardization and meaningful automation for helping them with audits and related accreditations as well as driving productivity and efficiency. Digital online infrastructure can make institutes' administration, learning, assessment, and placement processes much more flexible, simple, and transparent. We believe higher education institutions are best placed to adopt a mix of Blue Ocean strategies to capitalize the abundant opportunities in a post-pandemic world. With digital forces at play, they are well-placed to fulfill the expectations from the industry while making the learning experience of their students' life changing.

This paper delves into the transformational dimensions that institutions could leverage not only to drive this change holistically but also to emerge better equipped to fulfil the commitments toward a progressive society.



[1] *All India Survey on Higher Education 2019-20, 2019, Retrieved on Feb 23, 2022, https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/aishe_eng.pdf*

[2] *Wheebox, India Skills Report 2021, 2021, Retrieved on Feb 23, 2022, https://indiaeducationforum.org/pdf/ISR-2021.pdf*

The influence of digital transformation in learning

In recent times, several industries such as information technology, banking, and manufacturing prefer students with hands-on practical exposure and industry-ready knowledge. Industry 4.0 has brought in demand for rapid upskilling in the fields of cloud, machine learning, artificial intelligence, cyber security, internet of things etc. from fresh graduates. Unrevised older subjects are failing to keep pace with the new and evolving skill requirements in the real business world. Collaboration with the industry has become a norm for higher education institutes. Industry-focused internships, workshops by industry SMEs, and joint industry-academia hackathons and bootcamps are being introduced to give students an essence of the expectations of the corporate job sector, thereby preparing them to face real-world challenges. Today, high-impact learning systems and training programs by industry experts are being actively explored. Corporates partnering in such initiatives with the academia also get the opportunity to spot top talent from these institutes early, thus creating a win-win ecosystem. Industry stalwarts such as Microsoft, Ernst & Young, and GitHub partnered with the Ministry of Electronics and Information Technology, NASSCOM (trade association and industry advocacy group) and AICTE (national-level council for technical education, Department of Higher Education, Government of India) to empower India's youth with technology skills to make them job-ready[3]. NITI Aayog, a Government of India entity, has created Atal Tinkering Labs[4] in partnership with Dell and set up training centers to enable teachers to be trained on modern, emerging IT technologies and foster an environment of innovation and entrepreneurship among students through their innovation ecosystem in India.

Learning remotely needs the support of technology to keep students motivated throughout the program – gamification, peer-to-peer networks, and learning powered by AI and virtual reality are helping to create transformative experiences. Virtual reality is actively leveraged to recreate experiences that would otherwise be difficult, expensive, or practically impossible for students to experience in the real world. For example, teaching medical students the social skills required for consulting where using real patients would be unethical and hiring simulated patients is expensive. AI is actively leveraged in open and distance education in Nigeria. Computer vision is used to validate students' identity to prevent malpractice in examinations and pick up potential mental health problems from students' responses[5]. Gamification transforms the classroom environment and regular activities into a game that requires creativity, collaboration, empathetic understanding, and teamwork to promote learning and deepen students' understanding of the subject as well as prepare them to thrive and excel in a high-performance world[6].

The NEP 2020 has brought in inclusivity in the education system -- students are able to attend courses from outside streams which further adds to the complexity of teaching in a traditional setup. Classroom teaching expects a predefined learning pace -- students are expected to match their learning speed with the instructor regardless of their individual learning pace. In the event of missing lectures or attending a given subject with no background, classroom-led teaching can put students taking cross stream courses at a disadvantage. Interestingly, technology is again providing us a solution to fulfill this gap - digital teaching and learning can be paced flexibly and be more personalized for each learner. AI-based methods are being used to assess student pace, identify weak areas, and provide required intervention through different channels of interaction.

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[3] Future Ready Talent, 2021, Retrieved on Feb 23, 2022, https://futurereadytalent.in/index

[4] ATAL INNOVATION MISSION, ATL Overview, 2021, Retrieved on Feb 23, 2022, https://aim.gov.in/atl-overview.php

[5] University of London, Virtual Reality and Artificial Intelligence: Higher Education Disrupters? Apr 2020, Retrieved on Feb 23, 2022, https://london.ac.uk/news-and-opinion/centre-distance-education/virtual-reality-and-artificial-intelligence-higher#:~:text=centre%20distance%20education-,Virtual%20Reality%20and%20Artificial%20Intelligence%3A%20Higher%20Education%20Disrupters%3F,carried%20out%20at%20a%20distance.

[6] University of Chicago, Introduction to the Use of Gamification in Higher Education: Part 1, Nov 2021, Retrieved on Feb 23, 2022, https://academictech.uchicago.edu/2021/11/23/introduction-to-the-use-of-gamification-in-higher-education-part-1/

Transformation of the evaluation methods

Learning and assessment go hand in hand. Digital intervention makes it feasible to integrate evaluation with the learning process. The effective usage of technology in assessment processes ensures that the evaluation methods and systems are fit for purpose. Digital technologies enable end-to-end processes for undertaking assessments online, on-demand, anywhere, anytime, and on any device. New methods of evaluation are more powerful and versatile as compared to traditional methods that lack flexibility in scope and timeline changes. Technology-led, improved encryption policies coupled with AI capabilities, such as face and voice recognition, help mitigate fraud and malpractices making remote proctoring of online assessments secure and easy. The integration of technology and Machine First™ processes helps to protect the integrity of the assessment content, delivery, and data. All this under the preview of advanced data privacy and protection ensures compliance with data laws around the globe.

Furthermore, new age digital textbooks integrated within course assessments empower faculties to assess student progress and connect with students on a need basis. Faculties can easily view performance insights, and contact lagging students to help them get back on track. In addition, faculties can reward student accomplishments and mastery of a concept through digital skill badges, which go beyond grades to motivate students. The NEP 2020 also emphasizes on transforming assessment for optimizing learning and development of all students with a focus on competency-based exams with a focus on analysis, critical thinking, and conceptual clarity. This necessitates for a feedback-oriented learning ecosystem to continuously track the learning outcome of a student with a flexible examination schedule.[7] Digital enablement helps institutes to deliver an engaging blend of content, media, and assessments that improves and enables all stakeholders (teachers, parents, and students) to measure learning outcomes. Technology seamlessly creates a win-all strategy beneficial to students as assessments become an extension of teaching and learning.

Linking with the outcome

Higher education is capital-intensive. A large number of parents struggle to meet ends to cover for the financial expenses incurred on their children's education. Students spend a lot of time and effort to complete and meet the curricula needs set by the academic bodies. A well-developed curriculum delivers knowledge, develops skills, defines attitudes, and inculcates behaviors that help students to prosper both in their professional and personal lives. Teachers toil hard to ensure that students learn, pass the assigned courses, and meet the requirements of a suitable job or higher studies. While each group works so hard, observable gap remains in standardizing and measuring learning outcomes for the student. As a result, it is no news that most of corporates visiting campuses conduct exams on aptitude or specialized skills before taking interviews and rolling out offer letters.

Digital boom has created huge opportunities in the job market. Corporates are struggling to fill these positions with the right candidates. On other hand, a huge number of higher education institutes have poor placement records. While skill-based education can bridge the expertise gap, challenges remain in areas such as assessing talent and matching it with the right job. The remote location of institutes along with the impact of the pandemic has adversely impacted the job market worldwide, including India. On other hand, many employers are looking to adopt skills-based hiring to fill up their open positions by matching core skills that will be required from a pool of qualified job seekers. Trust-based digital platforms accessible to students and corporates are a necessity. These platforms can assess candidates on job-readiness and certify them, thereby helping corporates to take fact-based decisions.

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[7] NEP, 2020 ASSESSMENT REFORMS, Retrieved on Feb 23, 2022, https://www.education.gov.in/shikshakparv/docs/Examination_and_Assessment_Reforms.pdf

Breaking the information silos through integration

Achieving transformation in learning, assessment, and placement needs a digital-savvy culture enabled through end-to-end transformation in running the operations for any institute. As technology becomes more pervasive, it has become imperative to understand institutional operational data holistically. There is no doubt on the benefits of better understanding and managing of institutional data. An intelligent ERP software would allow the institutions to tap into real-time data from different departments and gain accurate insights helping them take fact-based decisions. AI, coupled with ERP data, can help effectively plan the pedagogy considering students' performance and cognitive abilities. ERP systems enable integrations with external entities and streamline many internal functions such as finance, human resources, procurement, and operations.

Creating automated workflows improves accuracy and saves time by eliminating human intervention in managing data, thereby increasing operational effectiveness. Centralized data creates a common understanding of the business objectives and goals. It provides the ability to run an agile organization with improved productivity that leads to resource optimization and facilitates accurate reporting. Getting accreditations from NBA and NAAC against present and future audit requirements introduced through NEP 2020 would be many folds easier for any academic body in presence of such digital platforms. However, implementing a software platform also requires robust change management process, which can be enabled mostly by seasoned ERP partners experienced in the education space. An accomplished partner is needed to alter the academic/organization mindset, structure, and operations so that people, technology, and processes work in harmony.

Conclusion

To stay relevant and competitive in a post-pandemic world, educational institutions need to bring in a change in mindset, adopt new age tools and technologies, and add the element of empathy to ensure students derive better outcomes. Such changes do not happen overnight, and the institutions need to keep their personnel motivated and boost their confidence. This will help expand their horizon to see where untapped opportunities lie by asking a different set of questions that are more relevant today. This may sound too ambitious even for some of the established and progressive institutions but, those who dare venture into the untested waters of the blue ocean, could possibly uncover unlimited growth opportunities.

About the authors

Pradeep Singh

Pradeep Singh is the Delivery & Operations Head of the Higher Education segment at TCS iON, working closely with customer and cross-functional teams to create superior customer experience. In more than 20 years, Pradeep has worked across delivery, consulting and product streams for education, banking, and healthcare domains. He was instrumental in conceptualizing some of the top grosser learning products and managed large teams for transformation programs with a focus on innovation and teamwork. A business consultant by nature, Pradeep has led more than 20 assignments with consistently high CSS. Pradeep has done his B-Tech from IIT Kanpur and MBA from Rotterdam School of Management, the Netherlands. In his spare time, he likes to watch movies, read books, and listen to Hindi music.

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Chiranjib Bhattacharjee is a Managing Consultant at TCS iON, a strategic EdTech unit of TCS. Chiranjib is a thought leader and loves to solve real-life problems in the higher education segment with empathy, creativity, and teamwork. Earlier, he has been a Domain Consultant with the Open Banking Strategic Initiatives group under the TCS Banking, Financial Services, and Insurance (BFSI) business unit. He was a part of a small digital native team operating as a startup within TCS and was responsible for conceptualizing next-gen digital propositions for global banking customers. He has over 15 years of experience in IT consulting and solution development across education, banking, and insurance sectors. Chiranjib is an alumnus of XLRI, Jamshedpur, and Jadavpur University, Kolkata, India.

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