



**MAIT**

# *EduVision 2015*

Developing Employability through IT powered Education in 21st Century

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## Foreword

MAIT is pleased to launch the report, 'Developing Employability through IT powered Education in 21st century' that is a part of the bigger initiative - 'EduVision'. This report highlights the pressing need to leverage IT in the education system so that it can transform the lives of millions of students who currently struggle to get quality education and employment due to lack of industry ready skills and knowledge. "The case studies covered under this note, highlights the ground reality and calls for action to bridge the gaps that can harness the potential of young India by nurturing their digital capabilities through smart education. It is technology that assist in delivery of education to young people to develop necessary skills."

It is also to be acknowledged that the problem of unemployment is deep rooted and the genesis of it emanates from K12 education level where we find maximum student dropouts. In their present form, the schools and institutes are an incubation ground to develop theoretical and unrealistic aptitude that has no place in the industry. "This grave problem calls for holistic solution, involving all the stakeholders like government, industry, citizens and academia". We are confident that if delivery of quality education through IT is integrated in schools and institutes for accessing, constructing and disseminating content and curricula, through teacher-student participation - then the results would be concrete and rewarding. The partnership between IT and education has the potential to fuel India for the next level of growth.

We solicit your participation in this journey of transforming education system in India that can help it realize the true potential of its manpower and leap frog ahead of many digital economies of the world. We also look forward to bring together the stakeholders and ignite many other discussions, initiatives and programs emanating out of EduVision, which will perpetually fuel the noble objectives of 'Digital India' program.

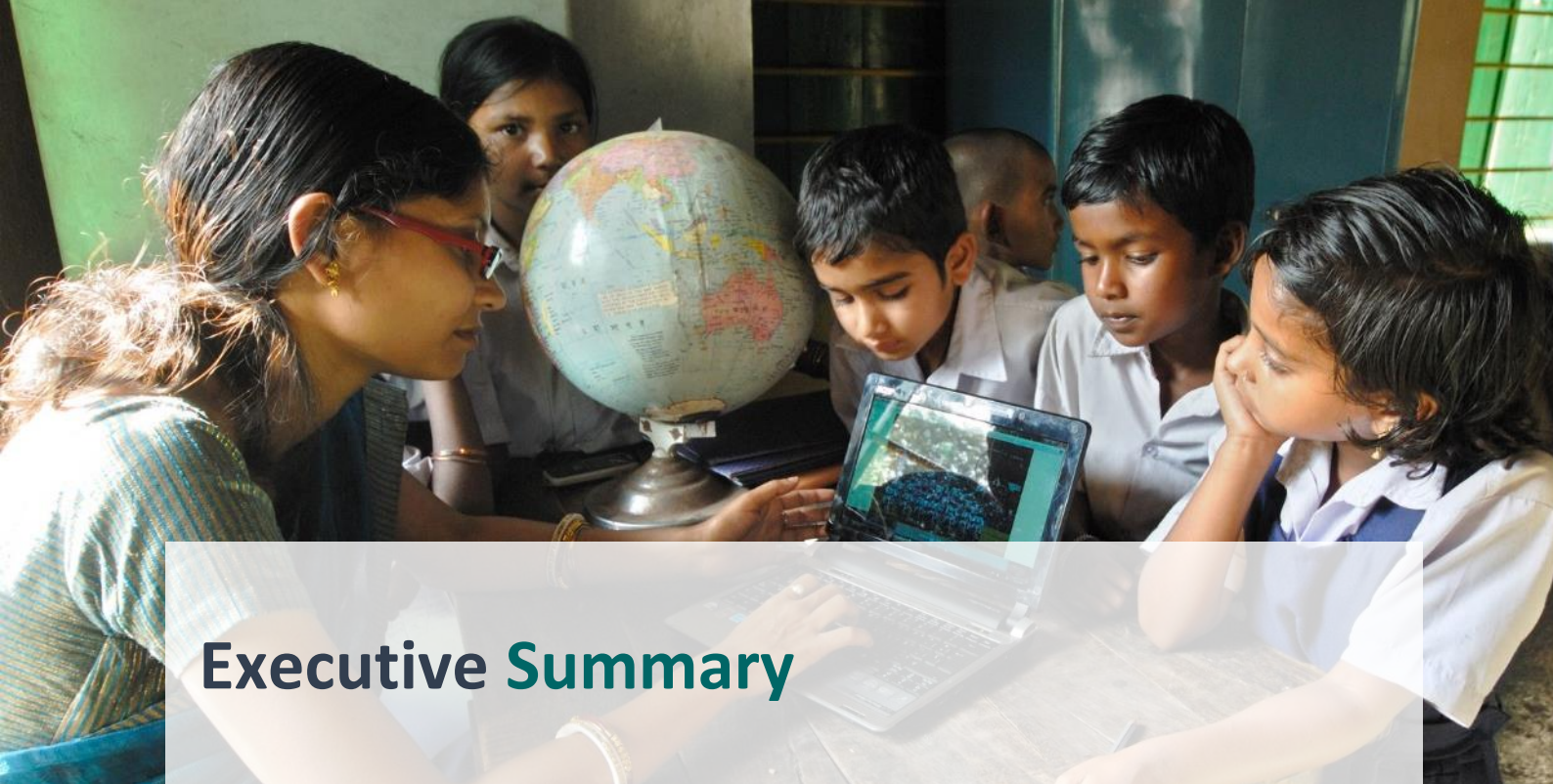


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# Table of **Contents**

<i>1</i>	Executive <b>Summary</b>
<i>3</i>	<b>Education</b> is thy name
<i>5</i>	Decay begets <b>Transformation</b>
<i>14</i>	<b>Technology</b> is the Fulcrum
<i>21</i>	<b>Case</b> in Point
<i>27</i>	The <b>Way Forward</b>
<i>32</i>	<b>Conclusion</b>



## Executive Summary

Education is considered to be one of the most important factors for ensuring competitiveness and prosperity in the age of globalization. In the world economy today, education forms the very core of economic development and ending poverty by uplifting the standards of living. Every nation's success depends on the education of its people and how best they are contributing back to the economy after being employed. For equity in employment, it is necessary to bring in a uniform and high standard of education for the entire population, across the length and the breadth of the country – this being one of the toughest, yet important challenge facing the nation. However, this does not mean that it is insurmountable, use of IT in education offers a new way to achieve this goal. Use of IT in education improves the overall efficiency and effectiveness of the process.

In a resource-poor setting, it is important to bring many key elements together to effectively integrate technology into teaching practices and fulfill its great potential for improving students learning. Reliable connectivity, a consistent power supply, and teacher's training for leveraging IT are among the key elements for getting started. Designing new curricula that combines online and classroom learning is another high priority. New IT public-private partnerships can help close the student achievement gap with key investments; policies and programs that can be scaled from local to national levels to make this a reality.

The two case studies at K12 level, based at the opposite end of the spectrum, indicate that integration of IT in the school for learning and engagement has been instant success with the students. However, due to lack of infrastructural support – the IT initiatives

could not be extended to every student. Nevertheless the potential is enormous if teachers can be trained and roped in for this buildup.

It has been further observed that emphasis on well-researched and properly aligned IT enabled vocational education leads to economic participation from even the underprivileged groups harnessing their productive potentials as these offer high levels of accessibility. Leveraging technology for skill development offers a magnitude of benefits for better employment opportunities through focused training, applied knowledge, objective evaluation and credible certification at a fraction of cost compared to that of traditional classroom training methodologies.

In near future, IT would increasingly occupy a center stage in the educational process. Leveraging IT in education can dramatically transform the classrooms everywhere (from KG to PG), offering the best of teaching methodologies from both the worlds (offline & online) thereby increasing the quality of the education imparted and finally implemented in the workplace. The role of technology, therefore, in driving 'Education for All' is immutable.

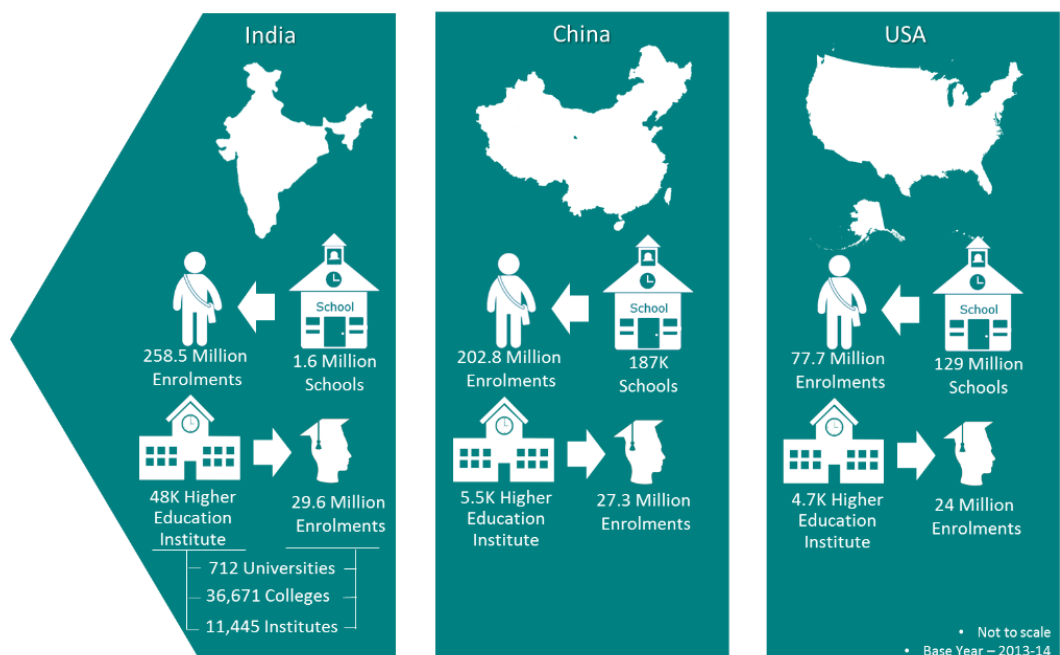




## Education is thy name

The diversity of India when measured by sheer volume of 1.3 billion population spread across 3.3 million square kilometers, split over 18 major languages with 49 education boards – the number seems to be over-whelming that offers much opportunities and many challenges for providing uniform yet high standards in education.

India is an important educational center in the global education industry. India has more than 1.6 million schools with 258.5 million student enrolments and more than 48,000 higher education institutes with 29.6 million student enrolments. It is one of the largest education systems in the world along with US and China in terms of enrolments, schools and higher education institutes.



In spite of the high enrolment at the K12 & higher education level over the last decade, challenge remains on both the fronts. Firstly, the dropouts throughout the K12 levels remain a point of concern and then at higher education level the remaining students that graduate remain unemployable and this trend is increasing every year.

The 360<sup>0</sup> assessment of education system suggests that the decay in terms of low engagement and subsequent dropouts starts from primary level of education and snowballs into a massive churn until secondary education. The problem becomes exponential when only 20 percent of students, who are not industry trained and lack relevant skills, enrol for higher education thereby, resulting into poor results of absorption in the industry. To highlight the gravity of problem, around 10.8 million remain unemployed while majority of them are employed at levels that are not commensurate to their education level.





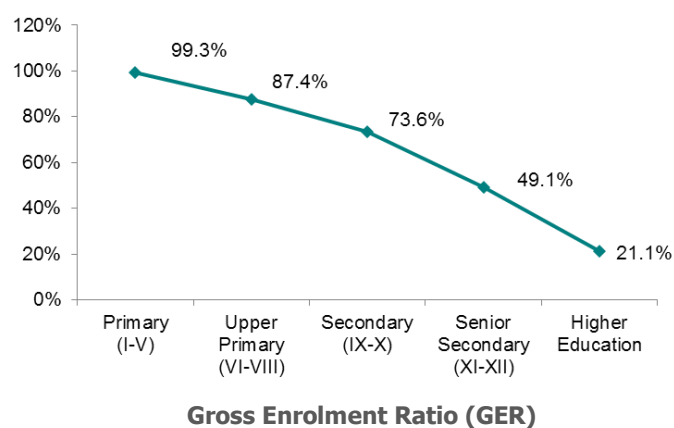


## Decay begets transformation

Gauging the root-cause of the problem is already half the battle won. Both primary education and higher education have a similar set of problems with few unique elements while their fallout is different. Therefore, a deep dive into the common areas resulting into different outcomes is required. This calls for a detailed inspection that can help in catalyzing the transformation.

While core concern at the K12 level is to be able to provide meaningful education that has impact on the retention of the school students and avoid dropouts, the other spiraling problem is to provide consistent quality of education - absence of which results in heavily skewed enrolments in private institutes when compared to government owned.

Of late, increased enrolments at private higher education institutes are creating challenge and this phenomena is more prominent with the higher education when compared to K12 level. Only handful institutes are considered premier that witness rush for admissions while others are considered less favourites. The premium attached to the institute is proportional to their placements in the industry. This calls for deliberation on the health of non-competence of the other institutes as they are not able to provide employment to their students in 21st century.

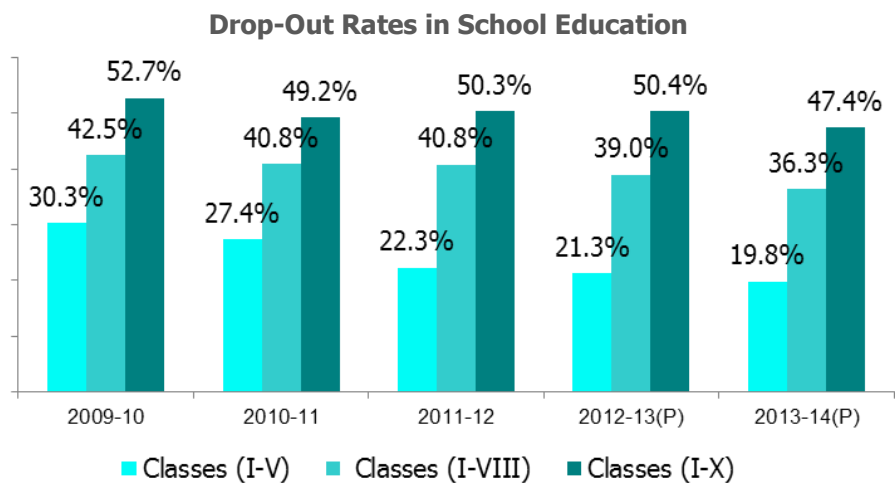


## Problems & Root Cause

The three main metrics of performance for education system can be considered as:

### 1. Enrolment vis-a-vis Dropout ratio

The mass sensitization and enablement by the Government, especially in remote areas, has been a success in primary school enrolment. In 2013-14, the enrolment reached 99.3 percent that indicates problem of 'Access' has been addressed by the government schemes and through ground level mobilization, that also took care of apt increase in number of schools and teachers. However, despite the increase in enrolments - retaining children in education through graduation still remains an issue as dropout rate continues to be high. Nationally 47 percent of the school children drop off before finishing upper primary school (I-X standard).

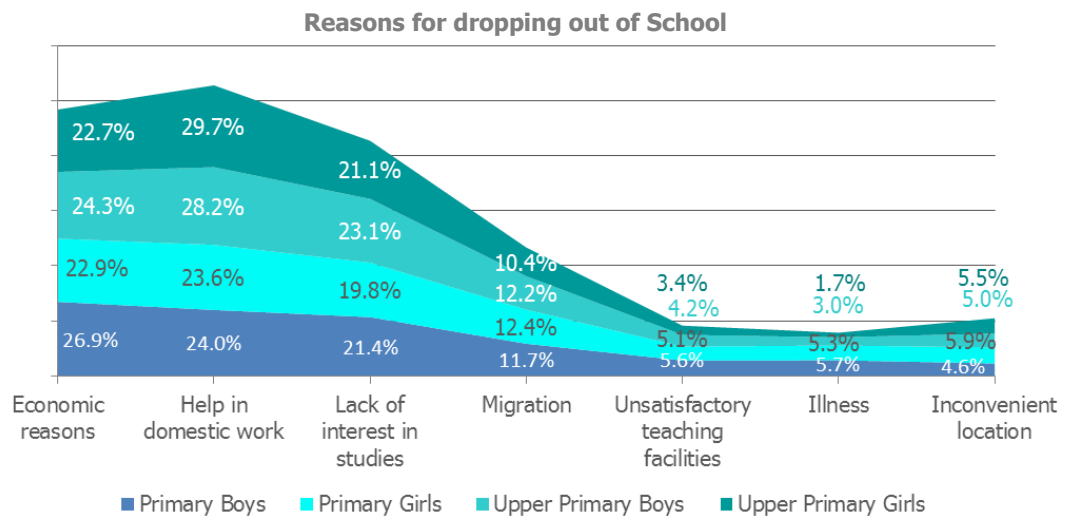


The inherent problem of dropouts emanating from the K12 snow balls into lesser candidates opting for higher studies – by the end of schooling only 20 percent of the students remain in the main stream who apply for admission in higher studies for both generic and specialized courses. Based on the latest statistics, India's GER in higher education is very low with an average growth rate of around 7% over the last decade, that is well below the international standards.

## 2. Absorption Ratio

### i. At K12 Level – Student seeking higher education

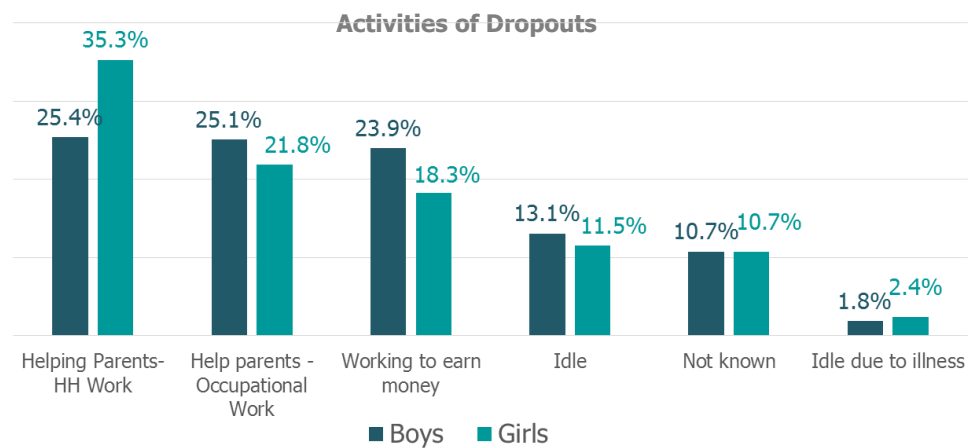
Across India around 99 percent children enrol for primary education and only 42 percent complete their primary school. This number further decreases through secondary education and only 20 percent enter for higher education or vocational training. The performance of K12 is far less from a reasonable expectation.



A detailed study on the dropouts from the school indicate array of reasons ranging from financial constraints to lack of interest in studies, providing help on domestic chores, migration of the family or unsatisfactory teaching facilities, etc. However these reasons vary as the child progresses from elementary to high school.

In the case of children from high school, they primarily drop out to help in domestic work of the family while majority of children in primary schools drop out due to financial constraints. Therefore, the above statistic reiterates the need for consistent quality and unfettered access to education that can generate the confidence for employment among students and parents alike.

It would be important to note that most of the dropout - both at primary and upper primary level; the boys (nearly 1/5) and the girls (1/3) are helping their family in household work that is considered as replacement to the monetary earnings while their parents are out to make a living. It is disheartening to observe that around 23 percent of boys and close to 18 percent of girls drop out at primary stage who are idle at home, this lot is unemployed who is not being able to contribute to their family in any manner. It is also important to note that higher proportion of dropouts (both boys and girls) are involved in economic activities, clearly indicating the need of employability taking precedence over necessity for education. However, it is yet to be realised that education in the longer run can enable better skills and promise for better employment.

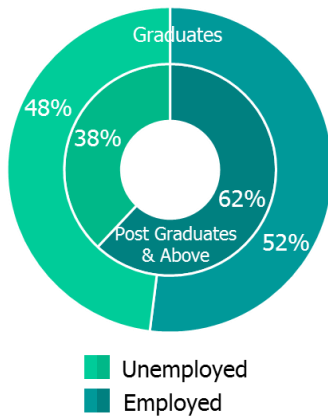


## ii. At Higher Education level – Student seeking Employment

With the proliferation of higher education, the entry threshold across universities and colleges is falling while the number of people graduating every year is rapidly rising. However, the bigger concern is that only 18 percent of the graduates are employable in the industry. Though the number of colleges have grown at a CAGR of 9.6 percent in the period 2001-2014 as against 5.7 percent in the period 1951-2001 – more than 3,500 colleges have been added in the four years alone. The industry across India, despite the glut, are struggling to meet the man power requirements. The key concern that plagues across industries is being able to produce man power with an employable skill sets as companies need to retrain and spend resources on the graduates before they can be put to work in the mainstream.

Weak linkage of education with market requirement and opportunity is a cause of concern for majority of the graduates when they realize that the education they have gained over the years does not necessarily

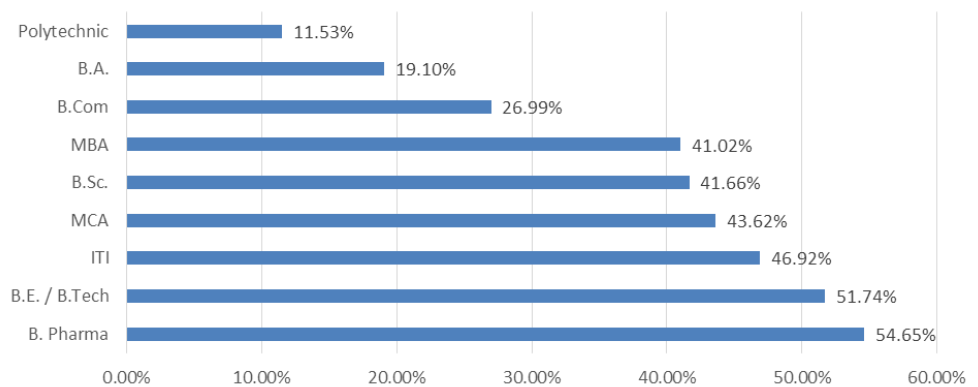
**Unemployed labour force (2012-13)**



help them find ready employment. Majority of the employers in India observe that lack of technical competencies and lack of experience amongst candidates is the root cause of the manpower shortages that they face. Other key attributes that employers seek but they find missing in fresh graduates are interpersonal skills, professionalism, lack of enthusiasm and motivation. These are the skills that needs to be honed and inculcated through our education system other than the academic rigour.

In one of the recent studies, MBA graduates were subjected to 'employability test' (ranging from grammar to quantitative analysis) from 220 business schools across India, this research found that only 10 percent candidates have the required skill sets that recruiters expect while hiring. Yet in another independent study, out of 1,00,000 students who appeared for employability skill test, that gauged them on their domain knowledge along with the other three skill areas (communication skill, computer skills and Numerical / logical ability), only 34% were found to be employable. The findings of the analysis reveal that maximum percentage of employable skill was available in Pharma domain, followed by engineering, ITI and MCA. The situation with pool of students in arts, commerce and polytechnics remain grave as not even one-third of candidates were able to clear employability skill set test.

**Employable Graduates**



Hence, the focus of quality along with quantity is pertinent for the growth of India as observed by 'Dhillon & Yousef', in another study. The need to start the transformation is now, as this growth phase for India would not stay forever. Nation's success or failure in realizing the economic potential of young workforce during this "low dependency ratio" period can make the difference between sustained and faltering long-term development.

## Root Causes

### *Curriculum & Pedagogy*

Curriculum (content that is taught) and pedagogy (how it is taught) have always been challenging issues and often debated. An effective curriculum contributes to the development of thinking skills and the acquisition of relevant knowledge that learners need to apply in the context of their studies, daily life and careers. It also identifies the learning outcomes, standards and core competencies that students must demonstrate before advancing to the next level.

The analytics from the previous sections highlight the imminent need to earn livelihood broadly across all levels of society, especially by lower income strata by acquiring appropriate levels of education. Hence, the discourse of education has to take cognizance of this fact and need to be moulded to provide the immediate fit or 'occupation readiness' to the students.

The curriculum (type and quality) has to be constructed in such a manner that other than theory it should incorporate employment ready skills – a characteristic that is often expected from higher education but would be welcomed by more than 85% of the student families whose children drop out of the school to lend an extra income. Students and their families should be able to gain confidence on learning and education being imparted or rather a practical curriculum that assures increasing returns with increase in education (i.e. scope to earn more with higher level of education). While on boarding new curriculum, the education system initially needs to create success stories that proves and attract students and their families from economically backward section of the society that forms the base of the pyramid.

At higher education level, one of the root cause of student's incompetence is passive and time based syllabus rather than outcome based curriculum. This is further riddled with the loose standards among institutes who certify about the student's readiness for the industry. Many higher education institutes monetize the myth of our age old belief – that acquiring a degree also assures job. While pursuing the degree courses, students seldom give thought about what job specific skills they must acquire so that they have a better chance of employment. Though there has to be separate and parallel measure to deal with the issue of standardization to qualify for graduate degree or certificate; the curriculum should be

inclusive and accessible - tailored to ensure heightened employability prospects for those graduating. Therefore, one of the immediate area to bring improvement in short turn-around time, is to revisit the curriculum so that it incorporates subjects, field work and trainings that yield practical outcome or rather 'industry oriented' program – based on the need and interest of the student. Accordingly the quality of curriculum should also be reviewed for up-to-date knowledge and how it applies in real-time.

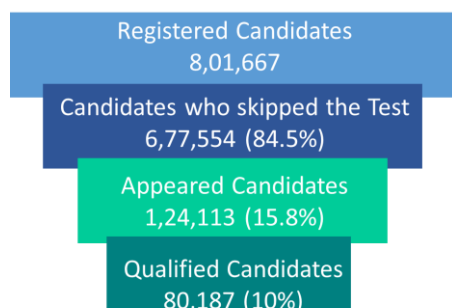
### ***Teacher Quality & Engagement***

Teacher’s capabilities and skills have been a centre piece of debate for long. One of the biggest determinants of educational success can also be attributed to the quality of teachers and the strength of their leadership. Quality of teachers affects all stages of teaching “lifecycle” from overlooking students’ development by disseminating education to engaging students by maintaining interest and mentoring for right subject streams and trainings.

However, the above can be true if teachers themselves are trained to exhibit those qualities and are provided with the tools and methods (technology, etc) to lead the students. The focus needs to be on quality apart from quantity. But paradoxically, at K12 level while the number of teachers in the government schools are increasing, the enrolment ratio of the students has gone southwards. Quality of teacher training is a matter of huge concern, mainly in government schools.

According to the Central Board of Secondary Education, last year, 801,667 candidates took the Central Teacher Eligibility Test (CTET). More than 90% of these candidates failed to pass the test. In the Teachers’ Eligibility Test (TET), conducted by the Tamil Nadu Recruitment Board, 6.5 lakh teachers had taken the test out of which only 2,448 teachers qualified the examination which is merely 0.37% of the total teachers who appeared for the examination.

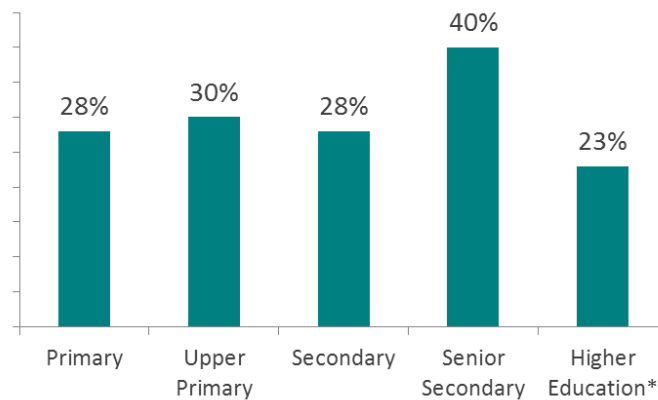
More alarmingly it was also found that 42,000 teachers out of 6.5 lakhs who appeared for the test were incapable of filling up the form correctly resulting in variety of mistakes. Another cause of concern is the 'Pupil-teacher ratio' (PTR) resulting into poor engagement and low focus on students, from primary to secondary education the PTR is in the range of 28 percent ~ 30 percent – comparatively higher as compared to the other Asian countries. It is an apt indicator to measure teacher’s workload and resource allocations in school, as well as the amount of individual attention a child is likely to receive from teacher.





The mix of poor quality teachers and high PTR results into exponential problems resulting into poor engagement and insufficient learning for the students. As political and social pressure allows poorly educated teachers to be recruited, often with no relevant qualifications - there is bound to be a ripple effect on the students crippling the overall average intellectuality of the country.

**Pupil Teacher Ratio (2013-14)**



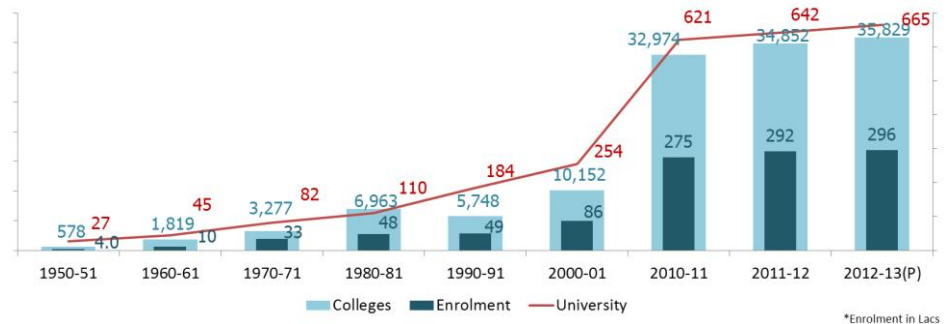
At the higher education level, situation is no different. With the exception of few institutes around 40 percent of teacher's in the institutes are hired on contractual basis and that too at pittance, many of whom are not even fully qualified. It's merely a make-shift arrangement or a check list marking activity that prompt institutes to hire teachers. Highlighting this case in point, a newspaper found that out of four members in the economics faculty of a college in Odisha - two of them get salaries of over Rs.1 lac, one gets around Rs.45,000 and the fourth just Rs.11,139. All of them take 30 to 33 lectures a month. Only the top earner were permanent getting UGC prescribed pay scale while lowest paid lecturer was under contract covered by a block grant.

Parliamentary standing committee in its report (2013) found that against 16,324 sanctioned teaching posts in central universities, 6,254 posts — 38 percent — were vacant. Information for only 47 state universities (out of a total of 297) was available showing that out of 11,645 sanctioned posts, 4,710 or 40 percent posts were lying vacant. Therefore, a matter of grave concern on how education is being managed even at the university level.

## Demand-Supply Gap

The lack of quality institute and teachers is more prominent in higher education. Irony is that in spite of small percentage of students opting for higher education, there is dearth of quality and good institutes. Even if India succeeds in its target of 30 percent GER by 2020 (as envisaged by Indian government<sup>14</sup>), 100 million qualified students will still not have places at university.

Growth of higher Education Institutions in India



Case in point is that in 2014, around 1,94,516 students appeared for Common Admission Test (CAT), each one aspiring for admission in a B-school. However, the number of seats allocated by B-schools were merely 2 percent i.e. 3,335 admissions.

In India the number of seats in quality institutes are too few and the entrance process highly competitive, implying that students with better means to go to better schools and have a competitive advantage that can assure them commensurate employment. Though meritorious students get absorbed in such institutes, the other Thousands seek admission to lower rung institutes and pay heavy fees for the courses. The majority and remaining students having left with no option, either re-appear or settle for less popular institutes. Ideally the level of the institutes should not vary if faculty, curriculum and processes are standardized but such is the current fate of education that it fails to provide parity to large section of society.

The suffering of the under-represented communities has not been appreciably alleviated as unemployment, lack of adequate access to quality education, lamentable state of pupil-teacher ratio and difficulty in securing finances for higher education continue to plague them. The distribution of higher education institutes and related facilities are lop-sided, urban- rural divide still remains a challenge that is stunting the growth.



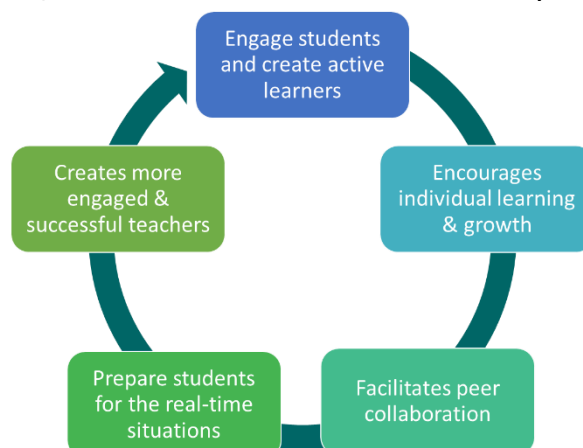
# Technology is the Fulcrum

For education to be an enabling lever that can transform the socio-economic fabric of India, technology has to be the fulcrum.

Integrating IT into classroom instruction means much more than teaching basic computer skills and software programs in a separate computer class. Through technology, a myriad of solutions available in the online world can be accessed which provide the students more interesting, diverse and contemporary learning materials. While teachers can ideate and incorporate newer and successful methods of engaging students and enable learning.

The power of technology connects local education ecosystem to experts in the real world that not only enhances presentation of content (through images, sounds and text) but the quality of content by opening up benchmarks across the world. These modules are not only available for students but for teachers as well who can hone their teaching skills and improve their marketability.

Incorporating IT into the curriculum has many benefits for teachers and students alike, mentioned below are some of the key benefits:



As the need to develop and incubate life skills and subject matter expertise is pre-requisite for meaningful career and employment, India today needs right blend of classroom and online training formats to meet the evolving learning landscape in an effective and efficient manner.

## Leveraging technology to overcome challenges in Education

Technology enhanced education is generally perceived as a way to relieve differences in various socio-economic factors and improve living standards. It is a fact that technologies can deliver educational programs with lower cost than traditional education systems and be effective at the same time. Therefore, in short span, IT can power conventional education with much needed pace and provide concrete results; it provides an opportunity to close the gaps in the conventional education system by bringing in greater access and high standards of quality education.



The adoption of IT in education facilitates the following:

- Improving the access to the system through online medium
- Improving the quality of teaching especially across remote locations
- Increasing transparency and strengthening systems, processes and compliance
- Measure students learning participation and effectiveness
- Analyse student behaviour to maximize students' involvement, optimize retentions, and improve placements
- Offer cost effective learning methods

The adoption of newer technologies requires the adaptation of IT to educational settings, as well as cultural changes in the role of teachers and other stakeholders. The effective implementation of IT in education is a multifaceted, complex process that just not involves providing the technology to institutes but also involves teachers' competencies, readiness amongst schools, long term financing and curriculum streamlining, among others. Few ground level limitation needs to be addressed before technology can be harnessed with full potential:

Infrastructure	<ul style="list-style-type: none"><li>• Cramped classrooms, power cut, sub standard quality of hardware and software can make the while deployment frustrating and unsuccessful</li></ul>
Educators	<ul style="list-style-type: none"><li>• Teachers belonging to the old and traditional school of thought and teaching, unwilling to handle computer, fear of replacement</li></ul>
Capacity	<ul style="list-style-type: none"><li>• Lack of pedagogical training and skill upgradation</li></ul>
Financials	<ul style="list-style-type: none"><li>• Cost involved in installation of computers and other technological equipment is high</li></ul>
Language	<ul style="list-style-type: none"><li>• Language spoken varies across the regions, however courses are in English language hence inability to comprehend by many users</li></ul>

To overcome these challenges in IT adoption, a multi - pronged approach is required. At the outset, it would right to consider that until simultaneous reforms in teaching, curriculum, and assessment are carried out with use of instructional technology, the whole effort would be less impactful.

### **Role of Information Technology in enabling the curriculum for employability in 21<sup>st</sup> century**

Technology when fitted comfortably with the curriculum or instructional plans of teaching is an indicative of integrated technology. Technology rather being an additional layer in the classroom is then embedded within the design of the teacher's lesson plan and the pedagogy. When technology is effectively integrated into the curriculum, technology tools can extend learning in powerful ways. These tools can provide students and teachers with:

#### **Advantages of leveraging technology in Curriculum**



By institutionalizing technology in education with regular cadence, it can make teachers and lecturers more relevant – holistic deployment of IT can provide an opportunity to teacher so that they can evolve their practices by accessing latest ideas, teaching methods and information. From such IT deployment, the benefits will transcend to students as it would improve the learning process through interactive educational materials / content that teachers will provide and also facilitate collaborative learning.

With the focused and latest digital content both around scholastic and skill based areas – the students from lower economic strata can be targeted that would help in retaining the probable dropouts. Currently, in the section of society where student dropout is prevalent, they are not able to associate with the curriculum as it's time based, while they look for purpose based education. With proper content and tracking capabilities, teachers can mentor the students for different fields based on their interest and need, and guide others for higher education where they can associate and excel.

Technology also acts as a bridge between connecting teachers and students in far flung areas who have limited means to access quality education. Geographical distance would no longer be detriment to obtain education, as standardised content would be a part of the curriculum and can be reached out to the remotest corners of the country. It overcomes the barriers of teachers and students to be physically present at a single location. With the integration of technology the critical facets like fast dissemination of standard digital content, evaluation of the learning progress, assessment of the students and certifications can be taken care. The dependency on the teachers capability would be reduced thereby, bringing parity to students as everyone would have same access, quality and evaluation criteria. While teacher would be able to focus and develop themselves as facilitators and mentors rather than teaching mechanically.

With the content, pedagogy and evaluation facilitated through technology, curriculum can be kept up to date by assessing what is working and what sections need update. Even the review and incorporation of certain ideas and content in the curriculum can be faster and effective that would suit the pace that is required for young India to grow and excel amid the 21st century peers across the globe. Current laxity on the urgency of the situation is an area for great concern as the numbers of students, both under-graduates and graduates remain incompetent and unemployed.

### **Role of Information Technology in enabling the Teacher's capability**

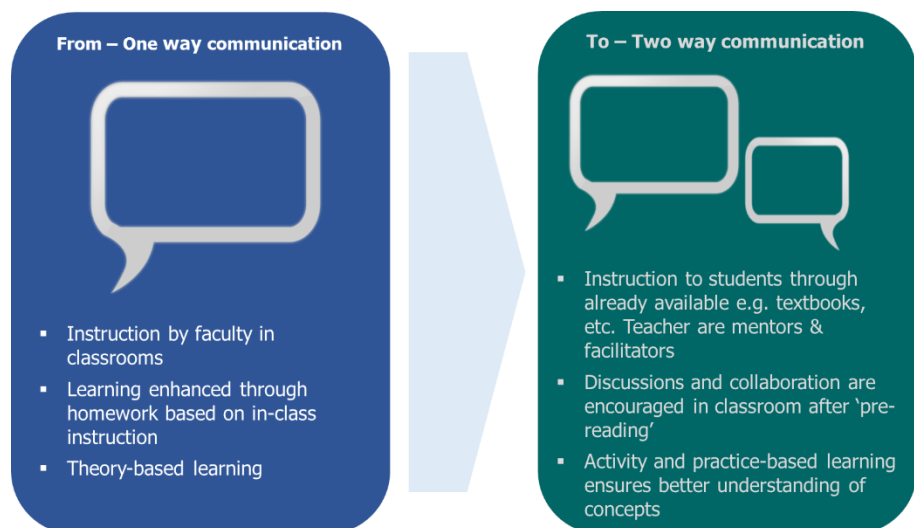
The hesitancy of accepting technology and to acknowledge it as a main medium to discourse is important. Teachers need to be trained on being sensitive to the alarming situation of school dropouts and dissonance occurring from unemployment in which they are not able to proactively contribute albeit being an important part of the education system. The need to accept technology as an enabler rather being intimidated or threatened is to be established. A sense of security about them being the 'mentors' and 'facilitators', and technology not being a replacement for them has to be inculcated. Hence, a planned approach in training the teacher is necessary for making them catalyst in the system.

Teacher-related issues are integral components to a successful educational intervention. It is necessary to ensure that future teachers are well prepared to use technologies to support educational and learning processes. While basic computer literacy and software applications need to be taught to teachers, they should be offered IT as an integral part of the teaching and learning process or as pedagogical tools rather than applications per se.

Ongoing professional development should be highlighted as the key ingredient in the success of technology-driven education in classrooms. Training teachers in technology and retraining them in delivering effective content with the help of IT is a pre-requisite to modern digital style of education and that should be incorporated in our teachers' training programs as a mandatory subject. But only providing technical skills training to teachers for the use of technology is not enough - teachers also need professional development in the pedagogical application of those skills to improve teaching and learning.

In the past, traditional one-time teacher training workshops have not been effective in helping teachers to feel comfortable using technology or to successfully integrate it into their teaching. Instead, a new pattern has to be evolved that replaces training with lifelong professional preparedness and development of teachers. With use of technology in the class room, experience for teachers and students would undergo radical transformation as IT would enable two way communication between teachers and students, a divergence from today's monologue.

Teachers remain the gatekeepers for students' access to educational opportunities afforded by IT: they cannot be ignored and should be brought under the ambit of technology based education.



### **Role of Information Technology in powering students for employability in 21<sup>st</sup> century**

Factually large part of dropouts happen with the economic backward classes who due to economic constraint opt for free education i.e. government schools. The aim of corroborating technology based education in the main stream K12 is that it helps in checking the dropouts at early stages by proactively engaging the students, gauging their progress and suggesting a corrective course. This would address



### Benefits of IT in Education

- Accessibility & equity, offering anytime anywhere delivery to any one and every one
- Training that is self-paced and matched to the learners' needs
- Full scalability
- Timely dissemination of up-to-date information
- Streamlined and effective learning delivery
- High quality content availability
- Expert faculty availability
- Low cost of training

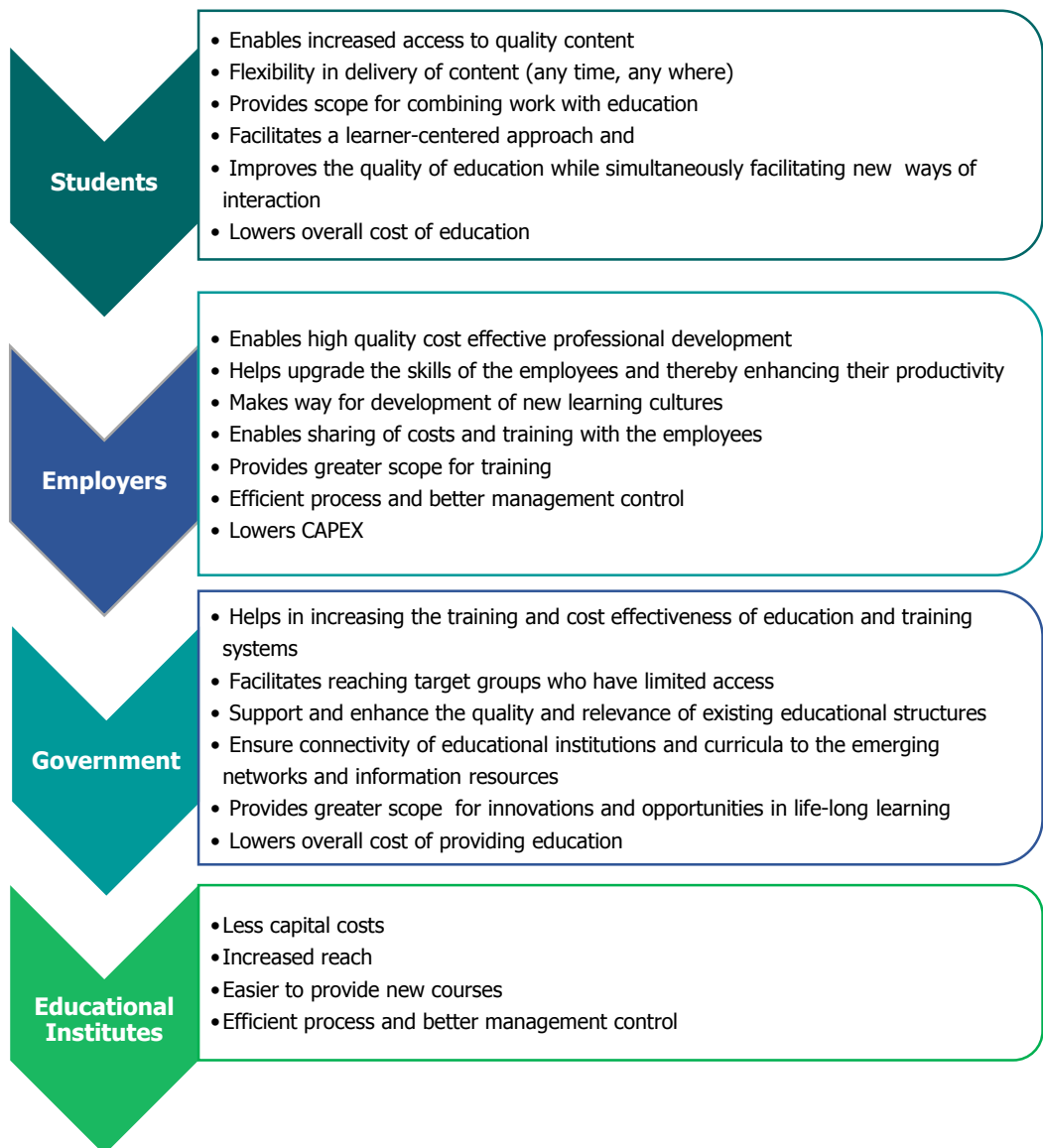
solution to one challenge area i.e. student and parents convinced to continue education so it can result in less dropouts. For the other challenge area i.e. students discontinuing education. The parallel focus needs to be on providing real-time education and training to take care and enable students in case of a dropout so that they can support their families in better manner. Taking cues from the regular vocational courses that are relatively better appreciated by the large masses the same patterns should be tuned, apportioned and synced with the primary level education (1-8th standard) so that in worst case scenario i.e. dropouts should be able to leverage the basic learning acquired during school that provides basic conditioning. Properly trained teachers with the use of IT can detect the interest and progress of the students and sync with their social and economic needs. Thereby, having power to proactively intervene and mentor students for the required skill-set, the teachers can recommend to register for further training.

In case of higher education, students either get trained in vocational courses or opt for higher studies. However, these courses do not guarantee them employment. India's labour market is facing a tough time due to the problem of skill mismatch and the companies are blaming it on lack of quality education and training. Students interested in specialized skills can be trained by leveraging IT, as students gain access to high quality content offered by expert faculty. Students can schedule their learning to match their needs at a fraction of cost compared to that of traditional class room training. Technology offers a magnitude of benefits for better employment opportunities through focused training, applied knowledge, objective evaluation and credible certification.

Education and skill development training for the masses through IT leads to economic participation from even the underprivileged groups, harnessing their productive potentials as these training programs offer high levels of accessibility. It is to be noted that people with better skills find better employment opportunities and are employed readily.

## Benefits of leveraging IT – across stakeholders:

Embedding IT in course construction, dissemination, assessment and certification offers a myriad of benefits to various stakeholder involved in the ecosystem. Few benefits of IT adoption amongst stakeholders are mentioned below.



The power of technology in education can be felt most when it is used to bring about self-reliance through digital literacy. In other words, teaching students and teachers to use technology effectively, helps them build, access and control digital content and web-based learning. This certainly increases the quality of the education imparted and finally implemented in the workplace. The role of technology, therefore, in driving 'Education for All' is immutable.





## Case in Point

### Background

To ensure a strong and resilient education structure, it is necessary to build a solid foundation i.e. primary and secondary levels. As the focus of this study has been around powering IT based education, it would apt to discuss K12 schools across India that can be enabled by use of IT. Since there is also a huge variation between the schools based in different geographies and each one has its own set of challenges, limitations, etc. Therefore, addressing common and structural impediments throughout these school will aid in moving forward.

To express the current state of how IT can help in empowering education, lead to more engagement and check the dropouts or bring them back in the mainstream; this study presents the highlights from two different schools placed on the extreme sides of the spectrum. The first case study examines a government school – ‘Dr. Rajendra Prasad Sarvodaya Vidyalaya’ based in the heart of Delhi while the second case highlights a private school – Don Bosco School, Tamenglong located in Manipur that is a remote terrain.

The observation of the school delve upon the factors that contribute to effective utilization of technology and also explores the level of usage of IT in educational institutions today.

These case studies focuses on a series of questions addressing key concerns relating to the use of IT, the factors that encourage appropriate use and implications of IT usage. The key questions can be summarized as follows:

1. What use did the educational institutions make of IT & technology?
2. To what extent was IT a catalyst in instigating the change?
3. What impact did IT have on learning of the students?

## Case 1: Knowledge Hub

### @ Dr. Rajendra Prasad Sarvodaya Vidyalaya

Dr. Rajendra Prasad Sarvodaya Vidyalaya, at the Presidential Estate in New Delhi has been serving the children of staff working at the Rashtrapati Bhavan since 1962. It has a strength of around 2,000 students getting education in both English and Hindi medium. Having recognized the importance of effective usage of technology in today's education system, the school management in participation with Intel has set up a Knowledge Hub at the school.

This hub effectively leverages technology that not only introduces IT at primary and secondary level but also help in effective learning through collaborative and pragmatic exercises. This hub was inaugurated by the Honorable President of India, Pranab Mukherjee on July 25, 2014.



### Origin of the project

The Knowledge Hub is a space for innovative teaching learning practices with the use of technology that engages students in their learning and construction of knowledge. It nurtures and fuels the imagination and creativity of students at a young age - to enable children to become the innovators of tomorrow.

The main aim of the project is to ultimately transform educational practices for building a knowledge economy across Education, Innovation, Entrepreneurship and Research & development.

## Implementation of the project

To enable student centered learning approach, a two-phase training was organized for teachers. In the first phase, teachers were taken through multiple professional development courses, a free resource for the professional development of teachers. In the second phase of training, the teachers explored the use of the Tablets pre-loaded with educational content, which children would use in the classroom. They were also motivated to shortlist and suggest the content that would resonate with the school curriculum so that appropriate content can be identified for more engaged learning.



Teachers were also effectively trained on how to engage students through project- based approaches that would not only give students a deeper understanding of content but also help them develop interest for various skills. They were also taken through sessions on how to judiciously and effectively utilize this technology in the classroom so that students could connect classroom learning to real-world issues.

In a short span of one year, the knowledge hub has attracted students from both English and Hindi medium across various levels. Students were able to comprehend the theory by conducting experiments using basic tools attached to the mobile tablet e.g. microscopic lens, thermometer, etc. Due to seating limitations, the knowledge hub can only accommodate restricted number of students from the ninth and tenth grade, but the over- whelming response from the children have led the staff to allow junior graders and few higher secondary students to access the lab on case basis. For sensitization IT in education and learning, this center also reached out to parents who showed keen interest for their children to pursue and use technology going forward.

Therefore, the integration of new technologies has seamlessly led to more learner-centered and collaborative teaching-learning practices using Knowledge Hub.

## The role of IT in the project

Mobile tablets pre-loaded with educational content were provided to the students that could also access offline controlled content through 'content access point'. Students from classes ninth and tenth used the hub and worked in groups. With access to fully-equipped tablets they could search for information, make presentations, view videos, take measurements, read the temperature and also view magnified images that helped them to associate theory with real-time practical observations. Meanwhile the teacher through a dashboard has access and the control over the content along with progress of the students to mentor them for appropriate activities.

### **Difficulties that had to be overcome**

A major problem that had to be confronted was lack of infrastructure at school and more importantly, equip teachers with the skills to learn and associate new technologies into pedagogy.

Even after tremendous response and engagement from students, teachers need to be motivated to learn the tools and leverage technology. With no mandate from higher authorities, use of technology by teachers take a back-seat. Amid their daily chores they find it difficult to proactively learn and use technology that in longer run can ease and benefit the students.

### **Outcomes**

Reactions to the Knowledge Hub project were very positive from all stakeholders involved (pupils, parents and teachers). Teachers noted that the children involved in the project developed improved attitudes to schoolwork, better articulation of ideas, increased motivation and raised awareness of the world of work. Teachers found it easier to control the content being viewed along with increased efficiency in planning and preparation of work, plan lessons more efficiently & effectively and also manage data about learners' performances. With Presidential Estate school now being in Wi-Fi zone, teachers also observed that tablets enabled the mobility and ease of conducting research outside the classrooms. The ability of students to research and observation has increased multifold.

For the first time in the school's history, it had a waiting list for the admissions. Parents were keen to admit their children in a school where such hands-on activities and IT enablement is being practiced.

This project could therefore be regarded as a first step towards equipping students with the skills to rise above tomorrow's challenge thereby enabling them to drive their personal growth and enhance their livelihoods.

## Case 2: Solar powered IT Lab

### @ Don Bosco School, Tamenglong (Manipur)

The Don Bosco School, Tamenglong was started in 1972 under the aegis of Don Bosco Foundation. It is spread across 12 acres and has around 1600 students coming from 27 neighboring villages and a small town. This school follows State board pattern of education and has facilities until senior secondary. This school is located in a remote terrain, difficult area in terms of militants' infestations, poor infrastructure, short supply of computers and power. However, the school is well maintained by the team of 45 teachers out of which 3 are dedicated for IT.



Despite the challenges, biggest being the power outages (even up to 60 days at a stretch) - this school is now self-sufficient in generating its own electricity through solar panels that can power its IT lab for up to 12 hours.



### Origin of the project

Tamenglong is not only challenged logistically that leads to its limited development resulting into stunting opportunities for employment, but this area is also an active bed for around 32 separatist and militants' groups. It is difficult for students to grow in that region without distraction and they can be easily lured by these factions for money and recognition.



Therefore, in order to make the region progressive and engage locals for the welfare of community, Don Bosco School proactively started revamping its IT lab with the help of its own funds and other private players. This solar powered IT lab is not only an attraction for the students of the school but even for the neighbouring schools. This has immensely helped local students to connect with the outside world. This lab not only opens the gateway to information but help students learn from the best practices and content. School has struggled to get a consistent connectivity so that it can increase the labs usage and functionality through internet.





## Implementation of the project

The solar powered IT lab was not how it all started. Until 2012, the school had 8 PCs when school management realized the need to connect the local student with the outside world so that they can learn and be tuned to the latest information and happenings. The ideal time in the hills could be utilized to learn and apply that in real-time.

Around 2013, school disposed-off its 8 PCs to raise the capital and pooled in money to equip the lab with 40 computers and 2 servers, the cabling and setting up of the entire lab was done with the help of Don Bosco technical institute, Maram and with the help of ex-student. However, place was still plagued by long power outages due to insurgency while connectivity was a distant wish. To overcome the challenge school management took upon itself to set-up a 3KW of solar power plant that could power its IT lab as the micro hydel plant that they have was prone to technical problems and high maintenance. The content for non-scholastic orientation is also being provided by a private company over the net but the broadband connectivity has been a cause of concern for seamless experience and learning.

Today this solar power IT lab not only helps school students and teacher to learn and incorporate newer content and methods to information and education but has attracted students from neighbouring schools. It has also awoken the interest of parents whose children study in this school, to send the other siblings so that they can get acquainted with the technology.

## Outcomes

The whole project was built on the premises that IT can empower education to provide employability. The local students are the main beneficiary of this project. The outcome within one year of its operation has been very encouraging. It has also provided the below benefits:

1. Helped students from class six to twelve to get familiar with the technology and internet world. It has helped in mobilizing and getting the students engaged.
2. The school assignments and special activities like 'Science Speech', 'Science Model Contest' and others are being conducted with the help of content available over the web. Teachers are mentoring student groups for such projects and are learning new ways to incorporate IT in education.
3. Students have gained the soft skills (non-scholastic) through the digital content that has helped them to be collaborative and solution oriented.





## The Way Forward

To provide digital infrastructure as a utility and ensure digital empowerment of citizen through **Digital India** program, government is expected to take care of few key concerns that can provide seamless experience across the country. The immediate beneficiary can be the schools and educational institutes located in remote and semi-urban areas. This structural shift would also demand the resources and users who can run and leverage the digital platform. The digital structure would need manpower to construct, feed and maintain these digital services while citizens of tomorrow would be expected to use these digital facilities. This digital circuit will only work if all of the participant i.e. government, citizens or digital platform act synchronously.

The recommendations are drawn while keeping the Digital India charter in the backdrop as it is important that we prepare the workforce and users who can effectively work and leverage the digital platform. Educational institutes that are technologically oriented or at least have started initiatives with IT would be the best incubation centre to develop such skill sets and digitally active citizens.

Based on the findings and potential in the educational institutions across India, this section introduces key recommendations for implementing IT enabled education in academic institutions. The recommendations are broken down into five key areas:

- 1 Policy
- 2 Infrastructure
- 3 Accessibility
- 4 Pedagogical Skills & Knowledge
- 5 Student Participation & Skill Development

## Key Recommendations:

### Policy

- A coherent national policy on IT in education is a necessity in order for successful IT integration and capacity building. Government must demonstrate political will and must champion the integration of ITs to improve education and training in line with national development goals and frameworks.
- Government's involvement is the key to drive additional investments in IT infrastructure, to integrate IT in the curriculum, and to facilitate the widespread diffusion of content.
- National policies need to be aligned with policies on education. Though private institutions and civil society can implement their own programs, they would not be sustainable without backing from government.
- Government needs to provide incentives to private sector investment so that affordable Internet connectivity would be possible in rural areas and other isolated regions. Easy loan schemes for procuring equipment and resources should also be considered.
- Government needs to ensure that special consideration is given to IT connectivity and accessibility for educational purposes. Part of bandwidth and spectrum of radio, mobile and television wavelengths should be allocated for education.
- Sustainable partnerships between the government, private sector and civil society (PPP) must be built to offset costs and mitigate the complexities of the integration of IT in education. Good will, dedication and flexibility are necessary from all partners to ensure agreement and progress. Due to high costs, investment made must be strategic after careful planning, finding creative ways of financing, and creating networks and synergies.

## Infrastructure

### Physical Infrastructure:

- Majority of the educational institutions lack reliable grid electricity. Unreliable electricity makes it difficult to organize IT integrated lessons. Therefore educational institutions need to consider alternative power sources to leverage IT adoption. Government can provide equipment/further subsidize equipment's for alternate power generation to be used for educational institutions.
- Educational institutes also need to have proper building/class room in place for installation of equipment. To ensure implementation of IT in education there is a need to ensure availability of government grants for creation of infrastructure. School authorities need to develop school policies for open access to computers and projectors by teachers and students. Also school authorities need to equip all classrooms for computer and projector use with appropriate electrical outlets and security.
- Government can play an active role to ensure that every classroom should have at least one computer with internet and an LCD projector in next three years.

### IT Infrastructure:

- For effective implementation of IT in education, educational institutes can provide computers and projectors in phases that align with teachers' increasing integration of IT. It is required that every classroom in the school is connected to the internet for successful IT implementation in education.
- Educational institutes need to get IT technicians out in to the classroom to provide support and to deploy, manage and store hardware/software. IT maintenance can be explored in tandem with private companies just like landline operators provide technical support.
- Software, apps and other functionalities needs to be developed in local languages to reach out to the students in far flung areas, while hardware needs to be accessible and affordable. The provision for offline content should be explored and incorporated to overcome connectivity barriers and bring down the operational cost.
- Planning for connectivity infrastructure and regulations should promote and facilitate use of IT in education.

## Accessibility

- Insufficient access to technology is one of the main obstacles in IT for education programs. This is particularly relevant for educational institutions located in rural areas where the school or training institution is the only access point for computers. Although this will require massive investments in the infrastructure, but it is necessary to guarantee equal access and overcome the digital divide.
- Trends towards convergence and new mobile platforms for internet connectivity need to be fully exploited through innovative policies and partnerships that can help lower cost and expand access. Central and regional digital libraries and resource centres should be developed which can serve institutions in their respective regions. Access to international library resources, research databases, and journals should be arranged for the regional resource centres on behalf of institutions in the region.
- Regional networks of collaboration among states where language and cultural context are similar could serve as a platform to promote educational quality and equality in an effort to bridge the digital divide. Greater exchange and collaboration in the production and management of educational resources would lower expenses in the development of materials as well as increase the amount of educational content available to teachers and students across the region.
- Public and Private sector education managements must continue to explore the applications of mobile technology in the education sector. It is essential that the ongoing proliferation of ICT devices throughout country collaborates with the education sector to effectively put to good use of the computing.
- Local software companies should be encouraged to work together with teachers to produce software program with localized content and language which would enable students from rural areas greater accessibility.
- International agencies such as the UNDP, the World Bank, among others, should work together along with the local governments to establish a global framework that can deal with emerging issues of the new internet economies and the digital divide.

## Pedagogical Skills and knowledge

- Effective implementation of IT in education largely depends on teachers, who require in-depth professional development due to lack of knowledge and skills. Authorities need to be proactive in incorporating new training material for teacher and set it as a mandatory part for new and existing faculty.
- During teacher training programs, teachers should get enough opportunities to practice using technology more practically so that they can see ways in which technology can be used to augment their classroom activities. Sharing of best practices from other nations should be considered.
- It is necessary to focus on training teachers and instructors to use IT to develop their own teaching support materials. This approach assures ownership by teachers and instructors and enhances the usability of products. Teaching fraternity, not depending upon the government push completely, should proactively work together with both public and private sectors to establish networks that support them in their transition to IT-based education.
- To implement IT in education, teachers should feel confident and comfortable using computer in classroom. Teachers must understand the value of computing in education to be able to benefit their students and to support meaningful learning. So changing teacher's attitude and aptitude is essential for increasing their IT skills.
- To implement IT in education, it is imperative to engage teachers in ongoing, practical professional development facilitated through partnerships with local universities and NGOs. These development sessions need to provide capacity-building to teachers for IT adoption.
- Teacher exchange program pivoting around use of IT in education should be promoted. Collaboration between foreign universities' schools of education with Indian teacher training institutes could help build capacity and upgrade teacher education both in terms of curriculum and pedagogy, which is much needed in Indian teacher education institutions like the District Institutes of Education and Training.

## Student Participation and Skill development

- For successful implementation of IT in education, multimedia computer software's that combines text, sound and colourful moving images need to be used to provide challenging and authentic content that will engage student in the learning process.
- Development of interactive audio and video would enable the students to listen and become involved in the lesson being delivered. IT with internet connectivity can increase learner's motivation and provide opportunity to connect with real people and to participate in real world events. Students involvement and usage of IT for educational purposes would truly determine the success of IT implementation in education
- Education and training providers, government and other youth workforce development institutes need to understand the technology skills that employers in local markets demand and need to translate this information into effective technology training content and delivery.
- Educators, governments, youth-serving organizations must work together to design, implement and manage effective, scalable and sustainable programs for youth workforce development that match employers' changing skill needs and prepare citizen for tomorrow that is in sync with programs like Digital India.
- Encouraging increased interactions between centres of excellence at top institutes and other research centres via IT can enable the students to gain knowledge and understating of the skills required to excel, increasing their demand in the workforce.
- Create open-access content repositories from which students can have the option of selecting a skill based course required and also ensure ubiquitous access to all scholarly content for all students from across the globe.
- Need to make certification processes at the private institutes more stringent and standardized so that the curriculum and certification carries credibility and weightage in the industry. Churning out superior quality workforce is meaningful in making India - a favourite destination for companies to seek talented manpower.







## Conclusion

The ultimate aim of leveraging IT in education is to facilitate effective transformation of learning and teaching practices that can lead to employability in 21<sup>st</sup> century. Technology in education affects the overall delivery mechanism, enabling wider access to people from various backward socio-economic groups at a fraction of cost.

Getting the best from leveraging technology into education for employability depends on several variables – having the right course ware and digital content incorporated in the curriculum along with the training and attitude of teachers, right infrastructure, having a national policy which encourages the adoption of IT and forming the right partnerships with schools colleges, higher educational institutes (both in India and abroad) and private public partnerships.

The use of IT in education may not be the cure for all of the problems that currently beset the education in India but working in sync with Digital India initiative might help solve the problems earlier. Embedding IT in education can greatly influence and improve the productivity and efficiency of both teaching and learning and uplift India into new trajectory. This is especially so in a global scenario when India is competing with several developed and growing economies that provide cost advantage.

The strong education foundation lapped with IT can prove to be game-changer for India among the world's knowledge economies, as it can help leap-frog the challenges of today and prepare individual who can come up with solutions to some of the greatest tasks we might face tomorrow. The use of IT in education will not only enhance learning and teaching in education, but in the long run provide a comparative advantage in coping with and competing in an ever-demanding 21<sup>st</sup> century labour market and finding solutions to some of India's developmental challenges.

# References

## For Content

1. Bakshi, AK, (2015): "ICT in Education: Need of the Hour" India Education Review, January, 21
2. Devi, Sharmila, Rizwaan, Mohammad and Chander, Subhash, (2012): "ITC for Quality of Education in India", IJPSS. Vol 2 Issue 6, June
3. Mondal, Ajit, and Dr. Mete, Jayanta (2012): "ICT in Higher Education: Opportunities and Challenges", Journal of Multidisciplinary Studies, December, 6
4. Oliver, Ron: "The role of ICT in higher education for the 21st century: ICT as a change agent for education"
5. Pegu, Uttam, Kr, (2014): "Information and Communication Technology in Higher Education in India: Challenges and Opportunities", International Journal of Information and Communication Technology, Vol 4
6. Sarkar, Sukanta, (2012): "The Role of Information and Communication Technology (ICT) in Higher Education for the 21st century", The Science Probe, Vol 1, May
7. CAT Results – Live Mint , June 2015
8. GOI, MHRD, Bureau of Planning, Monitoring and Statistics , ND – 2014
9. China Statistical Year Book 2013 (China Education Statistics)
10. National Centre for Education Statistics 2013 (US Education Statistics)
11. FY16 Outlook: Education Sector - India ratings & Research report Skilling India - Billion people challenge by Crisil
12. Understanding India: The future of higher education and opportunities for international cooperation - British Council Report
13. Higher Education in India: Vision 2030 - E&Y REPORT
14. ICT in School Education (Primary and Secondary) - PWC report
15. China Creates New Education Opportunities Nationwide
16. Quest for Quality in Higher Education, by Minister of HRD - Dr.M.M. Pallam Raju at Conference of Governors on 14th Feb, 2014
17. Educational Statistics at A Glance - Government Of India, Ministry Of HRD Bureau Of Planning, Monitoring & Statistics (2014) report
18. Abhinav International Monthly Refereed Journal of Research in Management & Technology
19. The India Skills report 2014 – People strong, CII & Wheebox
20. For School Education: U-DISE-2013-14(Provisional); Report for Higher Education: AISHE-20123
21. IT/ICT Adoption in Indian Higher Education - Calsoft report
22. Miscellaneous

## For Images

- [http://edtechsa.sa.edu.au/?attachment\\_id=4719](http://edtechsa.sa.edu.au/?attachment_id=4719)
- <http://communities-rising.org/what/atom-art-to-many/>
- <http://blog.medialabs.in/2015/01/29/can-rural-india-benefit-from-the-social-media-boom/>
- <http://www.care.org/work/poverty/child-poverty>
- <http://blog.ei-india.com/2012/12/spot-them-young-help-them-bloom-better-%E2%80%93-gifted-students-are-a-part-of-every-class/>
- <http://intoconnection.com/author/jeroen-offerijn/>
- <http://preparatoria18.uanl.mx/?p=558>
- <http://www.dealcurry.com/20130226-Weber-Shandwick-Acquires-JV-Firm-CVWS.htm>
- <http://www.matruchhaya.in/Gallery.aspx>
- <http://www.thebetterindia.com/9269/like-help-deaf-children-express-camera/>
- [http://www.thehindu.com/multimedia/dynamic/00948/TH11\\_CAMPUS\\_KVS\\_948257f.jpg](http://www.thehindu.com/multimedia/dynamic/00948/TH11_CAMPUS_KVS_948257f.jpg)
- <http://30yearsago.asia/icts-and-economic-empowerment/>, etc

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