

# DIGITIZATION OF HIGHER EDUCATION FOR EXPONENTIAL ECONOMIC GROWTH IN INDIA

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## Abstract

India, the world's oldest civilization is presently the youngest nation in the world. It occupies 24% of the global surface and 17.5% of the world's population. It is expected that by the year 2020, approximately 305 million Indians will be of working age, which will be the world's largest again. This demographic advantage can be encashed upon if this young brigade is made an asset for the country by providing them the right kind of higher education, thereby enabling them to uplift the Indian economy by leaps and bounds.

Today, India has the largest higher education system in the world with more than 600 universities and more than 33,000 institutions providing higher education. Presently its gross enrolment ratio is 18.8%, a significant growth, but still lower than the world average (24%) and much lower than that of the developed nations (58%). In such a scenario both quantitative and qualitative growth in higher education is required to sustain and further growth in the Indian economic status. Conventional way to scale this height is slow, although steady, but it is the time to awake, arise and grab the opportunity and take a stride exponentially otherwise the young India will grow grey, stale, decompose and perish.

Use of technology can be reliably banked upon in providing access, equity and quality in the tertiary education sector. Scattered success stories of use of ICT in higher education in India can be taken as exemplaries to mark that its mass scale use is not impossible and impractical. It just needs a holistic approach, a sensible review, a proper SWOT and a realistic strategic planning, the goal can be achieved.

The present paper is based on a study conducted to understand the awareness, implementation and impact of ICT /digitisation in higher education in India.

## 1. Introduction

Economic growth of any nation is based on the success mantra - **innovation and Education** that can lead to the upliftment of its nationals for which talents and supportive culture is of utmost importance. India, the second most populous nation after China, has an opportunity to drive global innovation in the 21<sup>st</sup> century as it holds more than half (53.5%) of its total population below the age of 25 years.<sup>1</sup> The pressing need is to explore, exploit and exemplify the potentials of these youngsters. By 2020 India will become the biggest domestic market inheriting upcoming talent pool; the two factors complement each other<sup>2</sup>. As it is said that history repeats itself, again it can be **Be Indians By Indians**. That was the call to free India from the clutches of slavery now it will be from the grip of poverty, unemployment and illiteracy. **Made in India** products can flood domestic as well as international market, raising Indians and India's economic standards.

Looking at the economic status of India, agriculture sector employs the largest population of the country (72.2% as per 2014 estimate, and more than 50% on an average) but is showing declining contribution (13.7% in 2012-13) to Indian GDP, the manufacturing sector's share (22% in employment and 25% in GDP) is checked by cardinal factors of energy and resource crunch, the factor that is enabling India to become third largest economy in the world is its service sector (27% in employment and 60% in GDP)<sup>3</sup> like construction, telecom, software and information technology, infrastructure, tourism, education, healthcare, trade, and banking. If analysed critically economy of India directly or indirectly supported by education and skill pillars.<sup>3,4,5</sup>

Education has continued to evolve, diversify and extend its reach since the dawn of human history. Educational system of every country is unique in itself and reflects, expresses and promotes the nation's unique socio-culture identity along with the need to cater the challenges of the times. Education in general and higher education in particular is in the roots of the India. Ancient literature of Shastra and Sutra, of India, has detailed the duties of

teacher and students, the education system primarily focused on making a complete man rather than just for survival. Prevalence of concern for Higher education in India can be traced back to 5<sup>th</sup> century, when not only Indian but the students from far flung countries were also coming to Indian universities of Nalanda, Thakshasila, Vikramshila Vallabhi and Ujjain.<sup>6</sup>

At the time of independence there were only 20 universities and 500 colleges in India. In more than six decades of freedom, India now boasts off to be one of the largest education systems in the world with over 42,000 institutions of higher education.<sup>6</sup> Even with such substantial institutional growth, Gross Enrolment Rate (GER) of the country is just 18.8%, lower than the world's average (24%) and much lower than that of developed countries (58%).<sup>7</sup> Although with this GER, India still stands 3<sup>rd</sup> largest provider of higher education after China and US.<sup>8</sup>

To become comparable with the world's average GER of 24%, Ministry of Human Resource and Development (MHRD) has set a target of 30% GER to be achieved by 2020 in a step-up fashion.<sup>7</sup> Although a substantial progress was made under 11<sup>th</sup> FYP (2007-2011) particularly in the creation of new institutions and driving significant expansion which moved Indian higher education from an elite to a mass system, but a major part of the plan's budget for higher education and vocational education was unspent, showing that the desired targets couldn't be achieved. The 12<sup>th</sup> FYP (2012-17) continues to maintain focus on higher education in the country, to make it more relevant to the global needs so as to make young Indians a global asset, knowledge bank, innovative researchers and builders of a developed nation- India.

Considering the desired targets and demographic opportunity available, India needs an exponential growth in the sector of its tertiary education and research to raise its economic standards. In the present era where technology of diverse nature is evolving, knowledge is multiplying, youth becoming techno-savvy, world becoming a global village, knowledge dissemination should also route through technology based highways. Not only in advanced and developed countries, Information and Technology (ICT) has paved its way in almost every sector in India be it trade, agriculture, healthcare, education, communication or any other. With the evolution of knowledge and technology the interface of teacher student has also undergone great transformation. If a student has evolved from a receiver to learner, the teacher has also metamorphosed from an instructor to mentor enabling and guiding students to acquire knowledge and improve their learning skills.<sup>9</sup> Understanding that the conventional ways of growth, may not achieve the desired results, GOI also felt the need of introducing and propagating digitisation in higher education, thereby initiating various missions, schemes and programmes in the direction.

The higher education system in India has successfully addressed many challenges and difficulties but it still faces many more. The current system is a result of a complex interplay of national and state aims, plans and executions intermingled with desires for individual and collective economic and social development and layered with concerns of equity and access. Presently Indian higher education system is in a state of flux due to so many national missions, programmes and reforms along with increasing private partnership, trying to shape higher education to meet the desired goals successfully and encash the present opportunity of today's India, a leader of tomorrow.

Keeping in view the growing need of education and skill development in higher education for promoting Indian economy and formulating ways and means of meeting the targets of higher education through technology based education, a need to undertake a study was felt to analyse the role digitisation in education can play in the economic upliftment of the country.

## 2. Objectives of the Study

The broad objectives are to :

- Study the status and the factors influencing Indian economy
- Study the scenario of higher education in India and its role in nation's economic development
- Understand the role and importance of digitisation in higher education
- Ascertain the awareness and impact of Government's initiatives in promotion of technology driven higher education
- Get suggestions for implementing effective and responsive higher education for the economic development of the country.
- Propose a model for upliftment of Indian economy via digitations

### 3. Methodology

Exploratory research design was used for the conduct of the study. The methodology for the research comprised of design of partially structured questionnaire for collecting data from varied stakeholders of higher education system comprising of students, teachers and experts and public at large (parents). The secondary data was collected from reports, papers, articles, websites etc. The qualitative data was collected through interviews, discussions and observations with various stakeholders of higher education system in the country. The population for the study comprised of 100 students, 50 teachers and experts and 20 parents. The collected data was edited, coded, tabulated, analysed and inferences drawn to interpret the meaning.

### 4. Findings

The discussion with experts, interaction with educators and the feedback from the other stakeholders on the role of digitisation of higher education in influencing Indian economy, led to the outcome of varied responses which has been clustered under following heads:

#### 4.1 Status and the Factors Influencing Indian Economy

##### 4.1.1 Status

Most of the respondents were aware of the fact that Indian economy is growing and hoped that India will become the biggest economy in next few years. However, only 15% of the students, 40% of the teachers/experts and 25% of the general public at large were aware of the fact that the average GDP annual growth rate in India lies between 5 to 6%. Only 3% of the respondents were aware of the fact that the GDP annual growth rate in the country reached an all time high of about 11.4% during 2010.

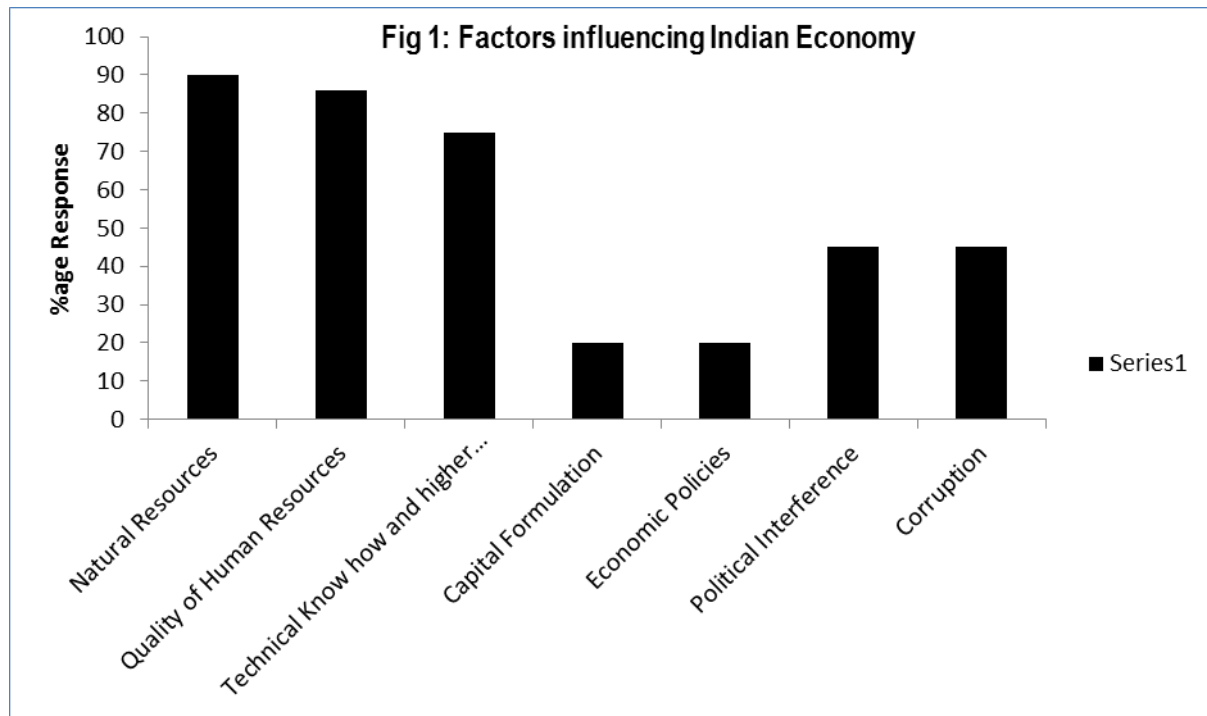
##### 4.1.2 Major Sectors of Indian Economy

50% students and 85% teachers/experts responded that there are three major sectors of economy – Primary (Agriculture and Allied Sector), Secondary (Industrial/Manufacturing Sector) and Tertiary (Service Sector). Although almost all of the respondents were aware of the fact that IT Sector in the country was growing and contributing significantly in the Indian economy, but 15% of the respondents were not aware that IT lies under Service sector. In response to the contribution of different sectors to Indian economy, 10% of the students, 40% of teachers/experts and 5% of the public at large could rightly answer that the contribution of agriculture sector which employs more than 50% of the total workforce is around 18% of the total GDP, whereas the contribution of industrial/manufacture sector which employs about 22% of the total workforce is around 25% and that of service sector employing about 27% workforce is about 56%. Many experts pointed out that the contribution of agricultural sector is declining but it can be increased by solving problems like conditions of roads, proper storage facility, unorganised retail, poor irrigation system etc as it still plays a significant role in the socio – economic fabric of the country. A few experts pointed out that the industrial sector is contributing less than its capabilities and it can be increased by setting manufacturing industries for sustainable economic development. Almost all the respondents acknowledged the contribution of IT and BPO sector which also contributes more than 25% of the total exports of the country. Most of the respondents also appreciated the initiative taken by the Prime Minister in making India a manufacturing hub by giving the slogan “Make in India and Made in India”.

##### 4.1.3 Factors influencing Indian economy

90 % of the respondents gave weightage to the availability of natural resources, 86% to the quality of human resources and 75% to technical know-how and type of higher education as the most important factors influencing the economy of the nation. They were of the opinion that as natural resources are gifted by nature so the competent human resources with relevant know how become the pivot of the economic growth of any country. A country with relevant education system especially higher education becomes a centre stage of growth in the world. 20% experts and teachers emphasised that capital formation and economic policies of the Government play a significant role in the economic development of the country. Some of the other factors influencing the economy of the country are

marketable surplus of agriculture, policies and conditions of foreign trade. 40% respondents especially, public, highlighted that political interferences and level of corruption also influence the economic index of a country.(Fig.1)



## 4.2 Higher Education and its Role in Economic Development

### 4.2.1 Scenario

100% respondents feel that higher education is one of the pivots of economic development which helps in developing competent and relevant human resources which paddle the wheel of economic growth of the country.

62% of the students, 73% of the teachers and experts and 47% of the parents were of the view that the present day higher education system is not appropriate for developing right kind of manpower as per the needs of the industry and world of work. 54% of the experts opined that the present day higher education system of the country is neither able to develop sufficient hard skills capable of handling jobs, nor develop appropriate soft skills in terms of proper work attitude, adaptability, leadership, team work, decision making, entrepreneurial skills etc for making them successful in life. One group of teachers and experts (12%) emphasised that had the present day higher education system of the country be appropriate, the GER in higher education would not have been significantly less than developed nations (54% GER). It clearly shows lack of interest in higher education by its stakeholders.

### 4.2.2 Problems of higher education

The discussion with students, teachers, experts and public at large indicate some of the following major problems which act as a hurdle in its becoming a world class system:

Despite of the universally known fact that Indian is a provider of one of the cheapest tertiary education, only 18.8% enrol for education with just 25% of it access higher education, indicating that Indian higher education has lost its sheen somewhere. The probable reasons may be (Fig.2):

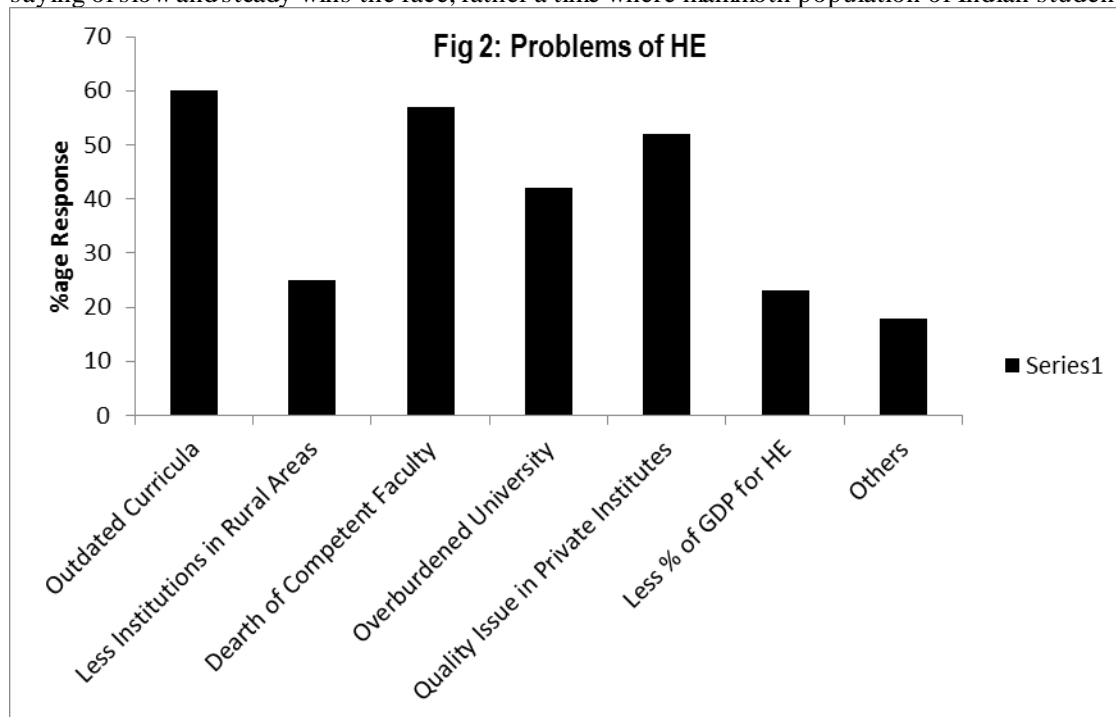
- Higher education curricula is outdated, not matching present day need of youth, not making them employable
- Curricula is more theoretical with least weightage to practical orientation and skill development making Indian students of HE globally uncompetitive

- Institutions of tertiary education are not available in proportion to the existing 70% rural population
- Meagre proportion of GDP allocated to HE forces more than half the students(59%) to enrol to private costlier educational institutes making HE getting out of the reach of needy and deserving talent
- Cut throat merit competition for the enrolment in some premier institutions perturb Indian youth, demoralizing them to peruse the same elsewhere
- Privatization in HE, does not ensure quality products again making them either unemployed or underemployed
- Reservation of creamy layer even in HE block the way of deserving and competent students
- Lack of availability of competent and concerned teachers (Gurus/shikshak)
- Faculty shortage (40% in state institutes, 35% in central Universities)<sup>10</sup>
- Overburdened Universities are more focussed on administrative and evaluation work rather than focussing on teaching, research and faculty development
- Gender biased HE
- Indifferent performance of institutions

It is quite clear from above that most of the problems can still be placed under broad heads of quantity, quality and relevance which is hindering the systems since the independence of the country in 1947. Although, Government has taken significant steps but many more initiatives are required to be taken to match the requirements of the day.

### 4.3 Digitisation – Its Role in Higher Education

To the response on the suggestions, measures and initiatives which must be taken in solving the major problems of higher education almost 50% of the students, 85% of the teachers and experts and 23% of the public at large were of the opinion that conventional way of dealing with higher education will not pay dividends. For taking quantum leaps in enhancing GER in Higher education and improving its quality and relevance, there is need to strategically plan and supplement the conventional efforts with modern tools and technology when most of our young generation is becoming techno/mobile savvy. A section of experts was also of the similar opinion. According to them, due to socio-economic diversity of India, any one approach may not give expected output. This is no time to follow an old saying of slow and steady wins the race, rather a time where mammoth population of Indian students(315 m) can



give an economic make-over of the country, if nurtured strategically. Digitisation of education, especially HE, where both quantity and quality are of utmost importance, can make India, dream come true. According to this group, technology mediated education can meet the growing requirements of our students.

#### 4.3.1 Quantitative benefits of ICT/digitization of Higher Education

**Expansion-** Conventional propagation of education by bricks-and-mortar institution is a long way to success, inviting a lot of hassles of financial, administrative and political involvements. Role of ICT in education can have a multiplier effect for capacity building efforts of educational institutes without compromising quality both in-campus and off-campus.

**Equity-** Digitized learning resources can be accessed by any deserving talent in the country irrespective of gender, caste and creed. It can also help to remove ever pinching reservation policies in the elite sector of education. ICT can even diminish rural-urban divide.

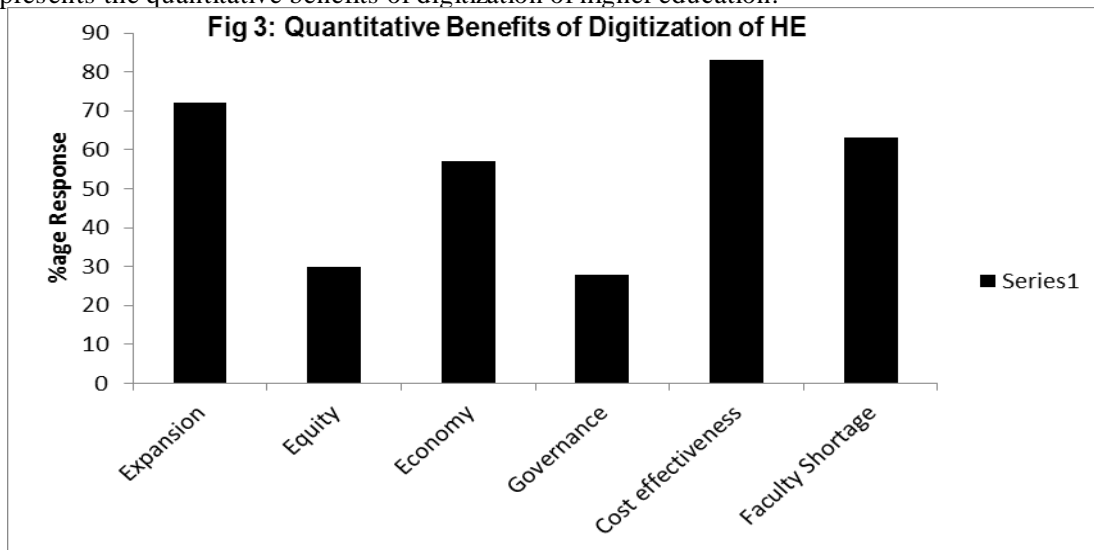
**Economy-** ICT or digitization of education in India can have bidirectional economic benefit, one by providing employability for the generation of e-content and second dissemination of the same to un-accessing deserving Indians, making them employable. E-content generation is an upcoming international market in education service provider sector.

**Governance-** Online learning and evaluation will not only increase transparency and efficiency but can lessen the existing administrative and evaluation pressure on existing limited number of universities, of their affiliated colleges. The apex academic bodies will be able to focus on teaching, research and faculty development.

**Cost-effectiveness-** owing to massive population (roughly 140 million by 2030)<sup>10</sup> belonging to college going age group, a mass scale e-content generation will be more cost effective than constructing institution of higher education in India of the state of the art. It is estimated that to create the desired additional capacity through increase in brick and mortar institutions alone, India would have to build 6 universities and 270 colleges each and every month in the last 20 years.

**Faculty shortage-** Today's shortage of 1.16 million teachers in India is expected to raises to 1.38 by 2020. As many as 4,521 faculty positions are lying vacant in 16 IITs; over 2100 teaching posts are to be filled in NITs<sup>11</sup>. In general around 35% faculty positions in state universities and 40% in central universities are lying vacant. Due to progressive approach in HE student strength has grown 6 times and faculty only 4 times, in last 30 years, further squeezing teacher: student ratio to 1:27.8. Unavailability of competent faculty or unattractive profession to today's youngsters can be supplemented by digitised HE in the country.<sup>10</sup>

Fig. 3 presents the quantitative benefits of digitization of higher education.





#### 4.3.2 Qualitative benefits of ICT/digitization of Higher Education

From the time immemorial, Indian education system has been pivot around ethics and morals. It has always given due priority to qualitative outputs. Keeping in mind the legacy of the country, wide scale use of ICT will not ignore this parameter too. Digitization will have some of qualitative gains like:

**Excellence-** Online content will be more transparent, flawless, and un-ambiguous and meet standardized benchmark so the users will come out of standard quality.

**Retentivity-** E-learning has an inbuilt advantage of increasing retentively, as the learning can be done at individual's pace, allow repetitions and feedback. As the content moves from tier-1 to tier-11 to tier-111, interactivity increases leading to more and more retention of content.<sup>12</sup>

**Self motivation-** Growing interest in technology of Indians can self motivate them to avail opportunity of tech based education. Learning at one's pace is another motivational factor. Privacy in learning and non-publicising of academic achievements can promote and motivate slow and moderate learners.

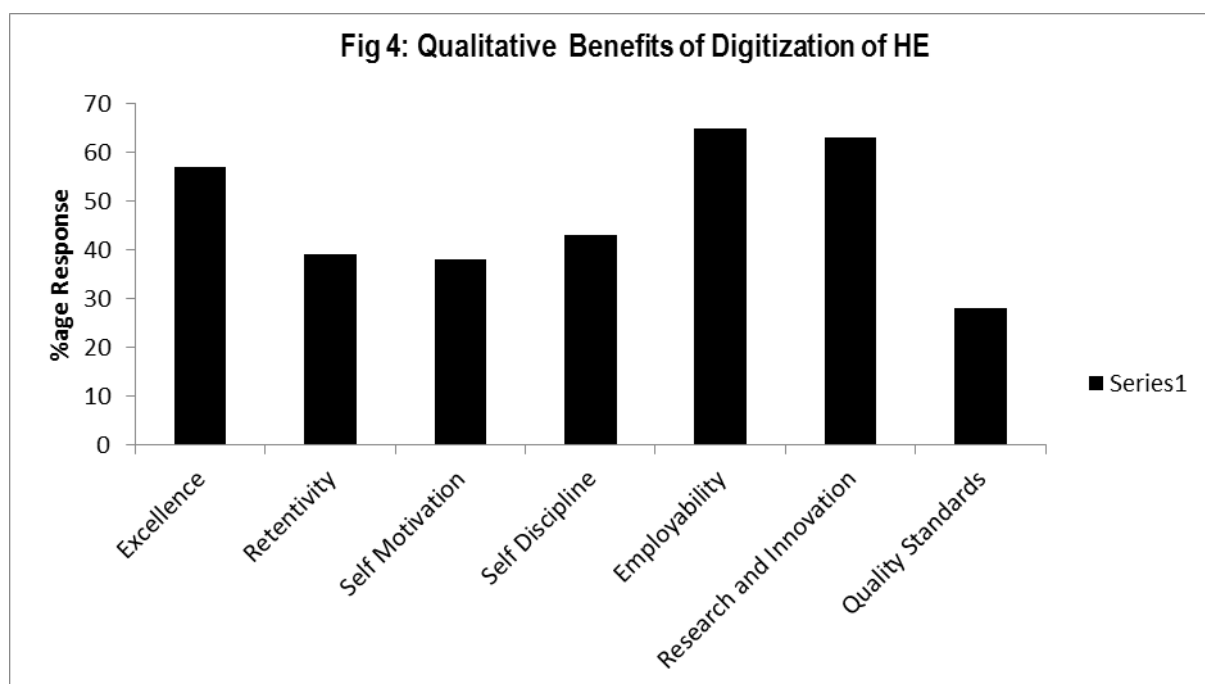
**Self discipline-** Learning of e-content requires a deal of self discipline as the approach is unmanned.

**Employability-** Digitized education will be just a click away. This democratic educational opportunity can make upcoming Indian youth educated, employable and economically self reliant. In the present scenario almost half of the Indian graduates are not employable in any sector, as per the yard stick of employability laid down by industry. Moreover, of the total number of employable graduates, a significant number comes from the country's top 30% of colleges. Digitization can bridge this existing gap.

**Research and Innovation-** Technology based education can make Indian students aware of Global upcoming knowledge. Presently 1% of students pursuing HE opt for research field. Global scenario will motivate Indian scholars to take a plunge in this aspiring and exciting field. R & D can change the shape of existing Indian economy pyramid by giving innovative inputs to primary sector too.<sup>13</sup>

**Quality standards-** ICT based education can raise the quality standards of education, enrolment rate, and employable youth and in toto living of citizens.

Fig. 4 presents the qualitative benefits of digitization of higher education.



#### 4.3.4 Trends and scope of ICT in Higher Education

Given the resource and physical constraints in expanding the conventional education infrastructure and the inroads technology is making in every walk of life, ICT/digitisation of higher education can be a means for expanding access as well as maintaining quality. Application of ICT in higher education can be mainly grouped under three tiers:

- Tier I - Consists of mainly text material with use of multimedia or one way communication and having lower interactivity. Some of the examples under this category are – Power point presentation/slides, e-books and journals, podcasting, video and audio tapes.
- Tier II - This group comprises of tools and technology having moderate to high interactivity.
- Tier III - Highly interactive, includes learner to learner and learner to trainer interaction. Some of the examples under this category include Virtual class rooms, streaming media, group games, video conferences, audio conferences, chat groups, email discussion list, blogging, wikis, mob logging etc.<sup>13</sup>

Some of the initiatives underway to promote ICT in higher education in India are as follows:

- (i) Content generation and adaptation (including personalised learning) being adapted and included in curriculum as a part of e-learning to increase reach and penetration.
- (ii) Cloud Solutions – E learning solutions combined with cloud solutions are increasingly being used to enhance the use of advanced web based tools at an affordable cost.
- (iii) Open educational resources (OER) – Use of free and open educational resources for locating right content has enhanced and open source and open content will play a crucial role in e-learning in future.
- (iv) Low Cost tablets – The low cost access device such as Aakash tablet initiated by Government of India will enable the students to undertake e-learning.<sup>7</sup>

#### 4.4. Government Initiatives and their Impact

For giving boost to higher education in terms of access, equity, quality and relevance, government has taken many initiatives during the last one decade. Some of these towards making higher education technology driven are as follows:

GOI has already started the use ICT or has digitised its education, though partially, by initiating some ventures like

- **Gyan Darshan** (2000) for school kids, university students and adults
- **Gyan Vani** (2000) by IGNOU and IITs
- **E-Gyankosh** (2005)- a digitised learning resource launched by IGNOU
- **NPTEL** (2001-National Programme for Technology Enhanced Learning)- a joint initiative by IITs and IISc
- **NMEICT** (2009- National Mission on Education Through Information and Communication Technology)- a mission, by MHRD and CCEA (Cabinet Committee on Economic Affairs) aims to develop and standardizing digital content for Indian higher education system to cater the need of 500 million
- **MOOCS** (2012- Massive Open Online Courses)- recent initiative by IITs.<sup>14</sup>
- **NCTEL** (2013- NITTTR Chandigarh Technology Enhanced Learning)

The impact of these initiatives can be understood from the fact that 68% of the responding students, 56% of the teachers and experts and almost 92% of the public at large were not even aware of many of these which has been in the systems since more than one decade. More than 76% of the total respondents were not even aware of the GOI's most important mission towards digitisation of higher education for skilling Indian youth i.e. National Mission on Education through Information and Communication Technology (NMEICT) which is in operation since the year 2009 and is expected to cost more than Rs. 10000/- crores where one of the expected outcome is the enhancement of GER in higher education by at least 5%.<sup>15</sup> However, some of the experts were quite appreciative of MOOCs initiative of



IITs and opined that it will be of great benefit to the students especially of technical/professional courses where shortage of quality faculty is very high. It will provide them a platform to listen to the lectures of best in class faculty. 56% of the teachers were not aware of the content generated by UGC and other organisations for PG and UG courses in varied disciplines. 20% of the teachers, although, were aware of it but never used these for teaching. Most of the respondents emphasised that the impact of the technological journey would have been much better, had there been no such hurdles in their implementation as indicated below:

- Unequal exposure to Indian population owing to 72.2% rural and only 27.8% urban distribution.<sup>16</sup>
- Unequal access to technology in differentially funded institutions.
- Lack of faith of a commoner in technology based education along with hesitations/inhibitions of parents of non-tech era to surrender their off springs in the hands of robotic teachers.
- Lack of self discipline in most of the online customers(students).
- Linguistic diversity, one fourth un-nurtured Indian talent and lack of standardised e- content.
- Lack of awareness of National missions to users or facilitators and integrated and collaborative approach.
- Lack of training to the faculty of higher education for generating e-learning contents.
- Lack of clarity on the equivalence of online courses to conventional degrees or certificates.
- Courses not tailor made to the needs of world of work.
- Cost ineffectiveness.

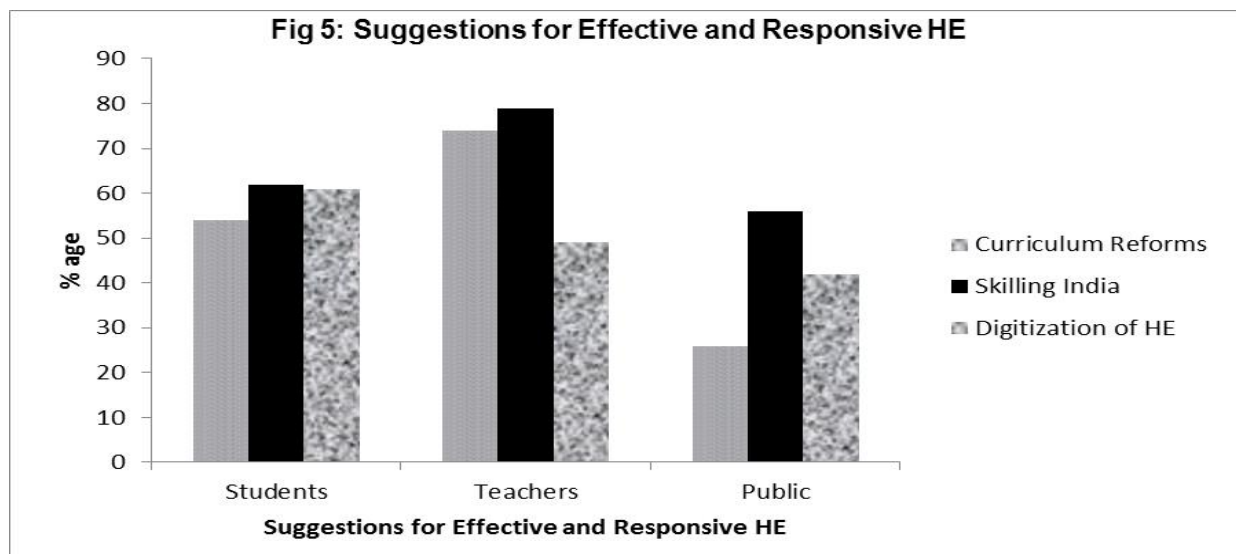
Most of the respondents were of the view that much more awareness amongst the stakeholders of higher education about the initiatives, missions and schemes of government can result in the achievement of expected goals of these positive steps.

#### 4.5 Suggestions for the Effective and Responsive Higher Education

The discussions with the various stakeholders of higher education for up-scaling Indian economy point towards three main benchmarks:

- Curriculum reforms for updated Indian youth (54% students; 74% teachers and experts; 26% Public at large).
- Skilling India for world class human resources (62% students; 79% teachers and experts; 56% Public at large).
- Digitisation for quantitative and qualitative growth for meeting the needs of today and tomorrow. (61% students; 49% teachers and experts; 42% Public at large).

Fig. 5 presents suggestion for effective and responsive higher education.



## 6. Purposed Model for the Upliftment of Indian Economy via Digitization

The major issues, which India is expected to deal with in the 21<sup>st</sup> century are poverty, population growth, food security, unemployment, lack of health care facilities, environmental degradation, factors related to agriculture and industry and so on. As per today's trend, Indian economy is being propelled by its fastest growing service sector, with annual growth rate of 9%, ranking second in the world.<sup>17</sup> For India, to move from the bracket of developing country to developed or even advanced nation, a strategically planned focus on education along with skill development is the need of an hour. On the basis of the feedback of customers, providers and beneficiaries of education system of India, a humble attempt has been made by the authors to foresee the betterment of educational system so as to reap the benefit of demographic dividend.

Components of education	Primary (0-5*)	Middle (6-8*)	High (9-10*)	Secondary (11-12*)	Tertiary (Graduation+PG+P hD+research)
Curricular(%)	40	45	50	55	60
Co-curricular(%)	50	40	30	20	10
Skill development(%)	10	15	20	25	30
Total education	100	100	100	100	100

\*class/grade

This model fulfils the attainment of desired attributes required for the employability of any individual

- Increasing weight age to curricular component can enhance learning capabilities, making them well versed with globally growing knowledge
- Priority to co-curricular activities at lower levels will help in imbibing soft skills like motivation, self-confidence, self-discipline, team-work, leadership, communication etc. which may become part and parcel of one's personality. At higher levels its need is to reinforce once acquired skills
- Skill development at primary age should mainly focus on psychomotor skills, as per biological demand, progressively more weight age should be centred around hard skill development of socially useful and productive nature. This can open the doors of greater section of Indian youth for employability in all skills oriented sectors viz. primary or productive, secondary or manufacturing and tertiary or service sector.

The big question of proposed progressive curricular learning from primary to tertiary level, in Indian scenario seems to be a mammoth task especially when GOI has already set up a target to enhance GER by 11% by 2020. The trends of enrolment in Indian education system are retrogressive with 93% in primary to 69% in secondary and just 25% in tertiary level.<sup>18</sup> The product of primary and secondary education cannot and should not be made to work as per human rights and labour laws. The dependable population of nation's growth, socially and economically is the product of tertiary education. To rope in the growing section of Indian population (approximately 325 million of below 20 years by 2020) in the system of Indian higher education, where quality of education is of utmost importance, technology mediated approach seems to be a saviour. This approach can enable India to make use of the techno-savvy attitudes of its nationals. India now has over 200 million users of internet and by 2018 almost half of the country will be connected through the internet.<sup>19</sup> The digital commerce in the country has also grown substantially {(47,349 cr.(2012) to 62,967 cr. (2013)} and is expected to flourish further. Hence digitization of higher education in India seems to be an achievable target due to prevailing facilities for its promotion like:

- (i) Falling cost of hardware and bandwidth.
- (ii) Infrastructure for narrowcasting (DD), High Power Transmitter(HPT) and Low Power Transmitter(LPT).
- (iii) Rapidly expanding Optical Fibre Cable network for terrestrial broadband connect.
- (iv) Abundance of funding by private sector on computer education.
- (v) Expanding network of cyber kiosks and cafes along with rapidly increasing mobile and internet users.  
16(i-v)
- (vi) GOI initiatives like SSA, RMSA, E-GYANKOSH, NPTEL, NMEICT, MOOCS, NCTEL, NKN (National Knowledge Network) etc.
- (vii) Establishment of new model degree colleges in educationally backward districts(EBDs).

- (viii) International collaboration and growing Industry-academic partnership.

Despite of existing facilities, initiatives, trends, scope and opportunities, Indian youth is plagued with unemployment, underemployment, inland industrial rejection, overseas incompetency, lack of access to education in general and quality education in particular, gender biased attitude, rural-urban divide, irrelevant or outdated curriculum, biased funding of central and other educational institutes so on and so forth. Inception of digitized education, at proper level, can be one click solution of all these gigantic looking problems.

After thoroughly investigating strengths, weaknesses, opportunities and threats (SWOT) of existing education system of India, an attempt has been made to design a **Holistic Learning Model (HLM)** so as to help India grow exponentially economically.

#### Holistic Learning Model (HLM) via Digitization of HE in India

Tools of learning	Primary (0-5)*	Middle (6-8)	High (9-10)	Secondary (11-12)	Graduation	P.G.	PhD & Research
In person (Lect. & discussion)	60 %	50%	40%	30%	20%	10%	10%
Text books	15%	15%	15%	10%	10%	5%	5%
A-V tools	15%	10%	5%	5%	5%	---	----
PPT/simulations	5%	5%	3-5%	3%	3%	3%	3%
e-books & e-journals	---	---	2%	5%	15%	20%	20%
Online	---	5%	12-15%	22%	22-37%	37-42%	37-42%
Hands on	5%	15%	20%	25%	25-30%	25-30%	25-30%

\*Class / grade

HLM tries to explain the biological, psychological, socio-economic and demographic capabilities and needs of human in general and India in particular. Exposure and effective use of technology based education should be inducted, as per India's scenario, gradually at middle level, moderately at higher and secondary level to grossly at tertiary level.

- (i) School education should be mainly handled in person, as this age requires induction of moral values, soft skills, learning attitudes, psychomotor skills, sensitization towards society and environment etc. with gradually building up academic interests and orientations. Tier -1 level of e-learning can reinforce above said targets. Young children should be kept away from technology based learning tools, sources of electromagnetic radiation.
- (ii) Evolution of knowledge and technology has changed the interface of teacher-student. So when world over learning model is shifting to learner centred, to make Indian student globally competent, HLM proposes increasing weight age to e-content, online education with gradually shifting the role of teacher to facilitator. This shifting approach will allow learning at one's pace, interest along with helping GOI to attain desired qualitative GER in coming times
- (iii) Increasing focus on online education and hands on practices from secondary to higher education, as purposed in HLM, will be able to help in plugging loop holes of Indian higher education system viz. access, equity, quality, relevance, employability etc. Hands on/skill development can make a great portion of Indian youth employable, facilitating Indian economy in all sectors.
- (iv) A shift of digitized education in higher education sector can promote research and innovation among our scholars to further assist the up-liftment of the economy of Indian agriculture sector, which is already providing employment to more than 50% of employment, but contributing the least.

- (v) Boost up of agriculture sector or primary productivity will further promote sustainable growth in India, by decreasing urbanisation and environmental degradation along with diminishing all existing rural urban divides.

## 7. Conclusion

So finally it is concluded that for the holistic development of the country - India, a holistic or 360 degree, approach of education especially in higher education is the need of the hour. The conventional approach may reap the fruits but it may take very long to take full benefit of our demographic dividend. In the present situation gradual and differential use of digitization or ICT based higher education in India can not only increase quantity but enhance the quality of Indian education system, enabling India grow economically with leaps and bounds.

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