Pedagogy of Learning, Vol. 1, Issue-4, pp. 28-38 (E), Oct 2015
(International Journal of Education)
E-ISSN: **2395-7344**, P-ISSN: **2320-9526**
Website**:** www.pedagogyoflearning.com

Recommended Citation:

Mishra,P.K. & Mishra, S.K. (2015). Education and skills as catalyst for sustainable growth in India**.** *Pedagogy of Learning, 1* (4), pp. 28-38 (E).

Education and Skills as Catalyst for Sustainable Growth in India

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Article Received : 25-08-2015
Article Revised : 12-09-2015
Article Accepted : 17-10-2015

Abstract: Skill development plays an important role towards achieving faster, sustainable and inclusive growth and making the country's youth employable. Countries with higher and better levels of skills adjust more effectively to the challenges and opportunities of growth in globalized world. In a developing country like India, the recent consensus among the economists, academicians, planners and policy makers is that education and skills can be mobilized for attaining sustainable development. The primary goal is to impart quality based and skill loaded education to all. This paper is an effort to provide empirical evidence for the relationship that exists between education/skills and economic growth in India. Using statistical tools, the study provides the evidence of the existence of strong association between education/skills and economic growth. However, for sustainability of this linkage well neat plans and policies are needed. The GoI has also been giving utmost importance to it in all its recent days' schemes and programmes meant for upward mobility of the society at large.

Key Words: Education, Skill, Economic Growth, India

Introduction

People are the real wealth of a nation, and they should be at the centre of development. So, the basic goal of development should be to create an enabling environment in which people can enjoy long, healthy and creative lives (UNDP-HDR, 1990). And, it is the education which can enable them to live healthier, happier, and more productive lives. There is a conformity among economists, planners and policy makers, backed by research findings, that education enhances people's ability to make informed decisions, sustain a livelihood, adopt

new technologies, be better parents, cope with shocks, be active participants in civic matters, and be responsible citizens, and effective custodians of the natural environment. Education carries a high economic value and leads to the human capital formation thereby making a significant contribution to the economic growth of a country (Barro, 2001; Gylfason and Zoega, 2003; Loening, 2004; Dickens *et al*, 2006). Education has many development benefits including more rapid growth and poverty reduction, as well as better health, reduced fertility, improved resilience to economic shocks, and greater civic participation (World Bank, 2011). Therefore, the paramount role of education in bringing about the sustainable socio-economic development of a nation cannot be overemphasized. Education is considered as an important policy instrument for economic and social progress, particularly in developing countries (Rondinelli & Montgomery, 1995).

Endogenous growth theorists including Lucas (1988), Barro (1991) and Mankiw, Romer and Weil (1992) stated the importance of educated population for economic growth and more generally, for a higher quality of life. In particular, quality education has been considered as a cornerstone of economic development and social transformation (Bayat, Louw and Rena, 2014). Education increases the human capital inherent in the labour force, which in turn increases labour productivity and thus, transitional growth towards a higher equilibrium level of output (Mankiw, Romer, and Weil, 1992). Education increases the innovative capacity of the economy, and the new knowledge on new technologies, products and processes promotes growth (Lucas, 1988; Romer, 1990; Aghion and Howitt, 1998). Education facilitates the diffusion and transmission of knowledge needed to understand and process new information and to implement successfully new technologies devised by others, which again promotes economic growth (Nelson and Phelps, 1966; Benhabib and Spiegel, 1994). Education can influence growth and, hence, development, in developing countries through the activities that lead to catching up with foreign technological progress (Berthelemy and Varoudakis, 1996).

Besides such macroeconomic significance of education, at the micro level education yields its greatest benefits in countries undergoing rapid technological and economic change because it gives workers the ability to continue acquiring skills as well as to learn new technology (World Bank, 2011). Education as an investment secures returns in the form of skilled manpower that caters to the needs of development, both for accelerating economic development and for improving the quality of the society (Yogish, 2006). Empirical studies suggest that countries that are richly endowed with human capital (as measured by quantity and quality of formal education) tend to better use existing technologies and firms and entrepreneurs in these countries also innovate much more. Thus, education accelerates progress towards the technological frontier (Benhabib and Spiegel, 1994).

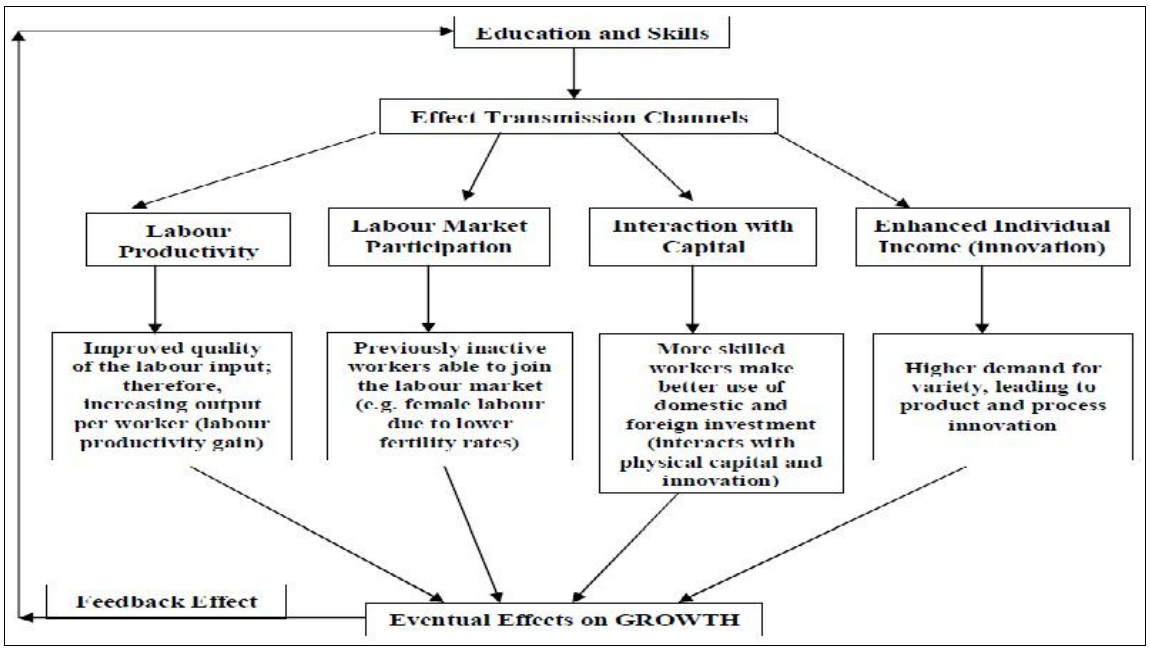
Thus, in recent years emphasis has been shifted to education and skill acquisition as an important means of achieving inclusive and sustainable development. Knowledge and skills have increasingly become the primary determinants of the economic growth and development of a country. Skill is an important instrument to improve the effectiveness and contribution of labour to the overall production. It is an important ingredient to push the production possibility frontier outward and take growth rate of the economy to higher trajectory. Skill is also significant in empowering the individuals and improving their social value and participation (Jagadeeswari, 2015). Empirical findings suggest that the cognitive skills of population have strong relationship with individual earnings, the distribution of income, and economic growth (Hanushek and Woessmann, 2008, 2012).

It is, therefore, learned that the effective way of generating economic growth is through educational development and skill formation. Education is commonly regarded as the most direct avenue to rescue a substantial number of people out of poverty since there is likely to be more employment opportunities and higher wages for skilled workers. Furthermore, education can enable children's attitudes and assists them to grow up with social values that are more beneficial to the nation and themselves (UNESCO, 2014). It is with this backdrop, this paper proceeds to examine the theoretical as well as the empirical relationship that may exist between education/skills and economic growth in the context of a developing nation like India. The rest of the paper is organized as follows: Section II makes an empirical analysis of education, skills and economic growth in India; Section III examines the causal relationship between government expenditure on education and economic growth in India; and Section IV concludes.

Education, Skills and Economic Growth in India

In the literature, education and skills are considered to be one of the key determinants of economic growth and development. The education and skills of a developing country's labour force influence the nature of its factor endowment, and consequently the economic growth. It has been argued that even unskilled workers in a modern factory normally need the literacy, numeracy, and discipline, which are acquired in primary and lower secondary school and contribute to growth (Wood, 1994). Education and skill are also important contributors to technological capability and technical change in any industry. Statistical analysis of the clothing and engineering industries in Sri Lanka, to cite just one example, showed that the skill and education levels of workers and entrepreneurs were positively related to the rate of technical change of the firm (Deraniyagala, 1995).

Hawkes and Ugur (2012) made a systematic review on the evidence on the relationship between education, skills and economic growth in low-income countries, and presented the following channels through which education and skills may affect economic growth in accordance with both exogenous and endogenous models of growth.



(Fig.1: Channels through which Education and Skills may affect Economic Growth)

The first key pathway considered in the above model is the interaction between human capital (as measured by education and skill) and labour productivity (Bils and Klenow, 2000; Hanushek and Kimko, 2000; Oketch, 2006; Temple, 2001). The second link is between human capital and labour market participation (Glewwe, 2002; Klasen, 2002). The third link relates to the interaction of human capital with domestic and foreign investment (Engelbrecht, 2003; Nelson and Phelps, 1966; Oketch 2006). The fourth link is through the income effect of human capital that fosters higher levels of product variety and product innovation, i.e., that higher-income countries tend to produce a wider set of products is a well-established correlation in the development literature (Bils and Klenow, 2001). In a low income country like India, this dynamic relationship between education/skills and economic growth is policy imperative. Thus, this section (i) makes a review of the recent scenario of education and skills development in India, and (ii) tries to explore the empirics of growth by estimating the model that attempts to explain economic growth in terms of education and skill development.

(i) Education, Skills and India

The Indian economy has recently been emerged as one of the largest economies with a promising economic outlook on the back of controlled inflation, rise in domestic demand, increase in investments, decline in oil prices and reforms among others. India's demographics occupy 2nd rank among the world's most populated countries. When age structure of India is considered, 65% of India's population is of the age group 15-64 and 30% of population being under the age of 15, it can be inferred that India's population is very young. While only 74.04 per cent literacy has been achieved as per Census 2011, there has been marked improvement in female literacy. Male literacy at 82.14 per cent is still higher than female literacy at 65.46 per cent. In terms of literacy, there are varied rates in different states with some states like Kerala and Mizoram well above national average and Bihar with a dismal rate of 63.8 per cent. Thus, there is a need to improve the overall literacy rate as improved literacy rate has an impact on increasing a country's economic growth rate and decreasing population growth rate. Also as India has a very young population, literacy will play a very important role in turning the young population into potential human capital (Desai, 2012).

According to the DISE, between 2007-08 and 2013-14, the total enrolment in primary schools increased from 134 million to 137 million in 2011-12 and then declined to 132 million in 2013-14 while upper primary enrolment grew from 51 million to about 67 million. According to MHRD report, the total enrolment in high school increased from 28.2 million in 2007-08 to 37 million in 2013-14, and the total enrolment in higher secondary/intermediate level increased from 16.3 million in 2007-08 to 21 million in 2011-12. The Indian higher education system is one of the largest in the world in terms of the number of colleges and universities. From 350 universities and 16,982 colleges in 2005-06, the numbers have gone up to 713 universities, 36,739 colleges, and 11,343 diploma-level institutions in 2013-14. The gross enrolment ratio in higher education has nearly doubled from around 11.6 per cent in 2005-06 to 21.1 per cent in 2012-13, with 29.6 million students enrolled in 2012-13 as compared to 14.3 million in 2005-06.

It is inferred that the lower enrolment into higher levels of education is the clear indication of higher dropouts, especially among the secondary and upper primary levels. This consequently leads to the accumulation of the less educated and less skilled at the bottom of the pyramid. According to latest NSSO survey, the general education level of over 50 per cent of our labour force remains extremely low, and only 10 per cent of the labour force is

vocationally trained. In India around 12 million youth enter the workforce each year, most with poor education and negligible work skills. Our current skill training capacity is only about 4 million per year. This leads to an inherent skill deficit in the emerging workforce. It shows that 80 per cent of the entrants to the workforce do not have the opportunity of skill training. Thus, with the changing demographic features and declining child population, the inadequacy of human capital could become a big obstacle in India's sustainable growth. The challenges are here two-fold. The foremost challenge is developing skills, and the second one is using the skills so developed. As per the Labour Bureau Report 2014, the current size of India's formally skilled workforce is small, approximately 2 per cent. This number contrasts poorly with smaller countries like South Korea and Japan that report figures of 96 and 80 per cent respectively. At all-India level around 6.8 per cent persons aged 15 years and above are reported to have received/ be receiving vocational training. As per studies conducted by National Skill Development Corporation for the period between 2013 and 2022, there is an incremental requirement of 120 million skilled people in the non-farm sector.

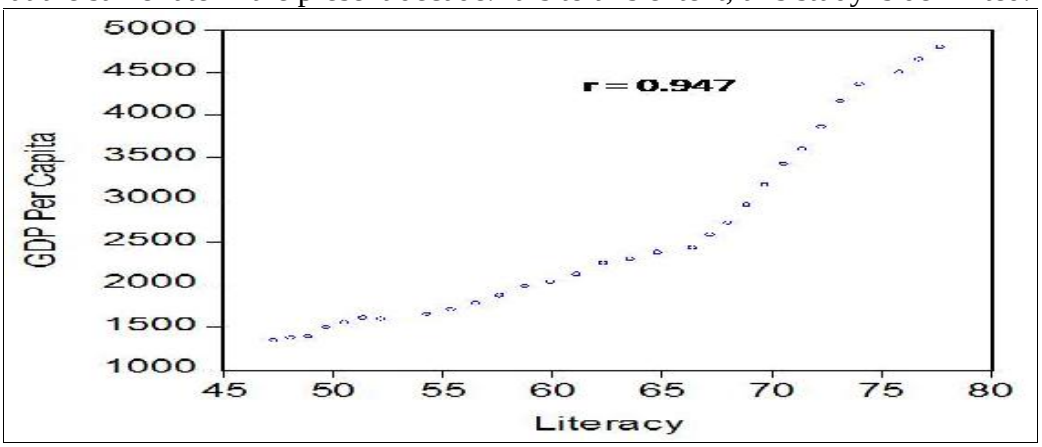
Some recent initiatives of the government of India that aim to enhance access, equality, quality, innovation, etc. in the area of higher and vocational education are the Rashtriya Uchchatar Shiksha Abhiyan, Technical Education Quality Improvement Programme, and National Skill Qualification Framework. The Deen Dayal Upadhyaya Grameen Koushalya Yojana is a placement-linked skill development scheme for poor rural youth. A total of 51,956 candidates have been skilled under this initiative, of which 28,995 have been placed till November during 2014-15. Other new programmes that aim at bringing minorities into mainstream development include Nai Manzil for education and skill development of dropouts; Upgrading Skills and Training in Traditional Arts/Crafts for Development to conserve traditional arts/crafts and build capacity of traditional artisans and craftsmen belonging to minority communities; Nai Roshni, a leadership training programme for women; and MANAS for upgrading entrepreneurial skills of minority youths.

After the setting up of a new ministry of Skill Development and Entrepreneurship to promote skill and entrepreneurial activities, work is being undertaken on setting up common norms for skill training across central ministries/departments. In between, 31 industry/employer-led sector skill councils have been made operational and these have been aligned with the 25 sectors of 'Make in India'. In order to create a common standard for skills training and certification in the country, efforts are on to align the national council for vocational training, school boards, and the university grants commission.

(ii) Empirics of Education, Skills and Economic Growth in India

In this sub-section our attempt is to empirically provide the evidence that increasing education/skills of people lead to a higher growth of the economy. We use statistical techniques such as visual representation, calculation of Pearson's correlation coefficient and OLS estimation of linear regression model to tests the null hypothesis that literacy has got no strong impact on the economic progress of India. It is learned from the existing literature that the economic growth is most frequently measured by GDP growth per capita, and education/skills measured by literacy rates (Hawkes and Ugur (2012). The sample period under consideration is 1985 to 2014. Data for GDP per capita is collected from the RBI Handbook of Statistics on Indian Economy, and that for Literacy is collected from the official web page of Census, Government of India. Due to the non-availability of annual literacy data, the decadal census data were taken and CAGR between two successive decadal figures was calculated. Then the literacy rates for all the years in between the two years are calculated by

multiplying the base year literacy rate with $(1+CAGR)^n$, where *n* is the *n*th year from the base year (Desai, 2012). And, for the calculation of literacy rate beyond 2011, CAGR for the previous decade has been taken on the basis of the assumption that literacy rate will increase at the same rate in the present decade. It is to this extent, this study is delimited.



(Fig.2: Plot of Literacy and GDP Per Capita)

We plot the relationship between literacy and GDP per capita to visualize the degree of association between them (see fig.2). A high degree positive association is observed between these two variables. When we calculated the Pearson's Correlation coefficient, we found r = 0.947 which is significant at 1 per cent level (2-tailed) over the sample period. Then to see the degree of impact of education/skills on economic growth in India, we estimated the regression model: $G_t = \sim + \ S_t + £_t$, where G stand for GDP per capita, the proxy for economic growth; S stands for Literacy Rate, the proxy for Skills in the country; and $\sim$, are parameters of estimation, and £ is the random disturbance term. The results of regression estimation are presented in Table-1.

Table-1: Results of Regression Estimation

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
~	-4230.770	442.4100	-9.563007	0.0000
	109.1522	7.001613	15.58959	0.0000
R-squared	0.896692	**Mean dependent var**		2590.044
Adjusted R-squared	0.893003	**S.D. dependent var**		1097.957
S.E. of regression	359.1465	**Akaike info criterion**		14.66968
Sum squared resid	3611614.	**Schwarz criterion**		14.76309
Log likelihood	-218.0452	**Durbin-Watson stat**		0.970251

It is inferred that the coefficients of regression are significant at 1 per cent level in our model. It means the impact of literacy on economic growth of India is significant. It is clear that 1 per cent increase in literacy level in the country leads to about Rs.109.15cr increase in GDP per capita. Furthermore, R-squared value is 0.896 which is close to 1. It means the aforesaid relationship is strong over the sample period. The value of Adjusted R-squared is

0.893. It means about 89.3 per cent variations in GDP per capita is explained by literacy in the country. On this basis, it can be said that education/skills are catalysts for sustainable growth of India. As the result shows, the null hypothesis is rejected for possible acceptance if the hypothesis that literacy is having a strong impact on the economic progress of India. However, there are certain challenges as just being literate will not guarantee access to productive activities and hence, contribute to sustainable economic growth of a nation. Since literacy is just the ability to read and write with the understanding in any language, it is critical to have specific skills required to become competent labour force in the market. Since unskilled labourers are seasonally unemployed, it is a necessity in our economy to have supplementary skills to improve the productivity, to get better permanent jobs, and to access higher wages. Hence, emphasis should be given on imbibing technical skills in Indian labour. In this respect, literacy as a proxy of skills is delimited. Further research is warranted to suggest better measures of skills so that the true relationship between skill formation and economic growth can be explored.

(iii) Government Spending, Education and Economic Growth

It is inferred from the previous section that quality based and skill embedded education is vital for sustainable economic growth and development as these can build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. Quality education promotes sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. Primary education raise the productivity of workers, rural and urban; secondary education, including vocational, facilitates the acquisition of skills and managerial capacity; tertiary education supports the development of basic science, the appropriate selection of technology imports and the domestic adaptation and development of technologies; secondary and tertiary education also represent critical elements in the development of key institutions, of government, the law, and the financial system, among others, all essential for economic growth. Education alone, however, cannot transform an economy. The quantity and quality of investment, domestic and foreign, together with the overall policy environment, form the other important determinants of economic performance.

Expenditure on education is supposed to bring into the economic system the externalities and other indirect effects such as higher education attainment and achievement of children, better health, and lower mortality of children, better individual health and lower number of birth which subsequently cause higher productivity in terms of increased earnings, more participation in the labour force, i.e., increased labour force; all these coupled with lower population growth and better health of population tend to positively influence higher economic growth (Michaelowa, 2000). Empirical literature supports that the investment in education leads to the formation of human capital, comparable to physical and social capital, and that makes a significant contribution to economic growth (Pradhan, 2009; Dickens et al., 2006; Loening, 2004; Gylfason and Zoega, 2003; Barro, 2001). Mankiw et al. (1992) found that if human capital investment (as a share of GDP) is increased by a tenth, output per worker will rise by 6 per cent; if investment in human capital is doubled, output per worker will eventually rise by about 50 per cent. Chandra (2011) found a bi-directional causal relationship between government spending on education and real economic growth in India during 1951 to 2009. This result indicates that the economic growth affects the level of government spending on education irrespective of any lag effects, and investments in education tend to influence economic growth with time-lag. But Pradhan (2009) provides the

evidence of unidirectional causality running from economic growth to education expenditure over the sample period 1951 to 2001 in the context of India. Contrary to this, in a recent empirical study, Mishra and Mishra (2015) found the existence of unidirectional causal relationship running from education expenditure to real economic growth in India over 1985-86 to 2014-15. Thus, in the presence of such conflicting findings, the issue that whether improved level of education/skills resulting from more education spending can promote economic growth is still a topic of debate.

It is with this backdrop, this study examined the relationship between government expenditure on education as a proxy for the education and skill development in India, and real gross domestic product per capita as the proxy for real economic growth in a dynamic framework while controlling for the interest rate fluctuations in the country as measured by weighted average of interest rates on central government dated securities as such securities are used to finance government spending. The required time series data for the sample period 1985-86 to 2014-15 have been collected from various sources – GDP per capita at 2004-05 prices from Central Statistical Organization, General Government Expenditure on Education from plan documents and economic survey of India, and interest rates on central government dated securities from the Handbook of Statistics on Indian Economy published by RBI.

At the outset, we have checked the order of integration of each of the aforementioned three variables using Phillips-Perron unit root test (Phillips and Perron, 1988). It is found that the variables are respectively integrated of orders 2, 1 and 1. Since the variables are having different orders of integration, we have used Toda and Yamamoto (1995) method of analysing the causal relationship between government expenditure on education and real economic growth in India. As the maximum order of integration of the variables under study is 2, the above method involves the addition of extra 2 lags of each of the variables to control for potential long-run equilibrium relationship. In the next step, we selected the appropriate lag length using Akaike Information Criterion and Final Prediction Error techniques. The optimal lag length, thus, selected is 2. In the next step, the augmented VAR of order 4 has been estimated with Seemingly Unrelated Regression, and the Wald test is carried out using standard chi-square distribution. The results of such Toda-Yamamoto causality test are reported in Table-2.

The results show that both the null hypotheses are rejected at 5 per cent level of significance for possible acceptance of the hypotheses that there exist a feedback relationship between the government expenditure on education and real economic growth of India over the sample period. In other words, both the variables contain some information such that they cause each other. Since this bidirectional causal relationship is significant with a lag value of 4, it can be said that the government expenditure on education in past years is translated into and affects to some extent the real economic growth of India.

Table 2: Results of Toda and Yamamoto Granger Causality Test

Null Hypothesis	**Chi-Square Statistic (d.f)**	**Probability**	**Decision**
Government Expenditure on Education does not Granger Cause Economic Growth	49.03789(4)	0.0000	**Reject**
Economic Growth does not Granger Cause Government Expenditure on Education	23.42504(4)	0.0001	**Reject**

In a macroeconomic perspective, investment on education leads to skill formation which in turn contributes to higher economic growth through increased productivity of human capital. In India this fact is evident from the development of huge educational infrastructure, increased labour productivity, and expansion in domestic market size, technological sophistication, and increased per capita national income. Similarly, higher economic progress is beneficial to invest in human capital for skill formation. The reasons may be that with economic growth new technology is applied to production which calls for skilled workforce and better education; second, ample education related resources may be available in a developed economic set up; third, people accept education for further betterment; and last but not the least, high-wage jobs require more education and improved skills. All these cause the education sector to grow strength to strength when economic growth occurs.

Conclusion

Education has been interpreted to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; to enable individuals, especially women, to live and aspire to healthy, meaningful, creative and resilient lives by strengthening their voices in community, national and global affairs; to offer better livelihoods for those in the non-formal sector; to prevent the transmission of poverty between generations; and to escape chronic poverty. In a developing country like India, improvement in quality as well as quantity of education facilitate the working population to become well equipped and sound in terms of latest methods of production and R&D. This will enhance their productivity skills which ultimately contribute to higher levels of output, and sustainable development (Mishra and Mishra, 2015). It is in this context, this paper attempted to provide the empirical evidence that education and skills are catalyst for real economic progress of India. Over a time frame of 1985-86 to 2014-15, the study found (i) strong correlation between skill development and real economic growth; (ii) significant impact of skill development on real economic growth; and (iii) a feedback relationship between educational development and economic growth in India. Since India is a developing nation, such empirical findings keep much relevance for long-run growth and development. The key challenge in the country is creating employment opportunities for a large and growing workforce, and also correcting the low levels of general education and lack of vocational training of the existing labour force in order to enhance its employability and productivity. In this regard, India needs better education and skill development programs to lead a highly productive human capital. The skills that need to be developed in our country may be technical skills, soft skills and industry knowledge. Technical skills include functional knowledge and skills, business specific knowledge, and organization specific knowledge and skills. Soft skills include communication skill, self presentation and management, professional work habits, leadership and team working, and organization fitment. Industry knowledge includes specific knowledge on IT, retail, manufacturing, automobiles, and pharmaceuticals, etc. Vocational training and certification programs should be undertaken for producing skilful workforce. Industry collaboration should be undertaken to design and develop curriculum for skill based education. Pedagogy, classroom training as well as internship would be helpful to get competency in industry based skills. Government of India has already initiated the process of setting up of skill development centres in PPP mode, setting up of skill development schools, formation of state level skill development corporations, introducing vocation education in government funded schools, and incentives

for private skill providers. The success of these would go a long way in accelerating the pace of socio-economic development of the country.

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