

ANOVA Analysis: The Role of Education in the Developing World of India

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ABSTRACT

Education availability in India is a complex and multifactorial aspect to consider due to the link to several socio-economic factors. This study pertains to the focus on increasing education enrollment rates to better the economy of India, which have been identified by previous researchers as valuable considerations in improving the Indian nation. The factors observed were Primary Education Enrollment, Secondary Education Enrollment, Tertiary Education Enrollment, Population Level, Food Deficit, and Gross Domestic Household Income. Statistical tools like ANOVA are applied for exploratory data analysis for the observations of the variables. Currently India has been recognized as one of the best economies and has experienced an unbelievable GDP turn around, but still has poor education availability. The lack of education enrollment has the direct ability of affecting the GDP performance, and well-being of the country. Testing the hypothesis claim through ANOVA Analysis, Time frame Analysis, and Forecasting has identified that as education enrollment rises so does the GDP performance of the country.

Keywords: Population: Overall total population (both sexes and all ages) in the country as of July 1 of the year indicated, as estimated by the United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects: The 2012 Revision*. Density (P/Km²): (Population Density) Population per square Kilometer (Km²). World Population: Total World Population as of July 1 of the year indicated. Gross Domestic Product (GDP) is the broadest quantitative measure of a nation's total economic activity.

INTRODUCTION

India is known as the Asian tiger and is the home to the world's second largest population of over 1.2 billion people, which is estimated to be 17.2 percent of the world's population. This larger population has median age is 27 years (CIA World Factbook, 2015). This young age has led to the nickname "Young India." It is a country of colors, diversity, beauty and talent that is ready to open its wings and fly high. In other words, Indian society is highly heterogeneous and diversified and is one of the fastest growing economies in the world. Despite India's meteoric GDP growth rate, the country's poverty is still pervasive. According to the many (McKinsey Global Institute) reports released in early 2014, India has made exceptional progress in reducing its poverty ratio from 45 percent in 1994 to 22 percent in 2012 ahead of 2015 deadline that was set by the United Nations (McKinsey, 2014).

Education has often been seen as the key apparatus for bringing about a social order on value of parity and social justice. The government of India

has been pursuing many strategies to reduce poverty. They have recently been using public expenditures to help the poor gain better access to public assistance and services. This study focuses on several socio-economic factors that have been seen by researchers and census groups. India continues to understand the value of getting the population educated so as to create more growth and jobs. This will hopefully lead to lower poverty levels and removing the title of "third world country."

India is over populated, which makes sense to assume that there is much talent distributed throughout the society. The issue here is that much of this talent goes to waste due to lack of resources associated with a large population. This research will be focusing on how to create opportunities through the over population concern.

India is known for their amazing philosophies and standpoints when it comes to tackling down certain issues. This makes the country an attractive destination for those located in the region. An example of this was when the Parsi population

wanted to move into India to simply live a better quality of life. Instead of India not allowing entrance and focusing on the negative side, government leaders referred to the Parsi's entrance into the nation as adding sugar to milk. The Indian citizens and government welcomed them with open arms.

So as one can see, this research will be focusing on the development of India through education so as to reinforce GDP. For many years, India has been a concern with education and one will notice the increasing amount of funds that are being distributed into education expenditures. In the past, India has been known for its poor GDP performance, but they have tremendously turned it around and are now considered one of the best economies in the world.

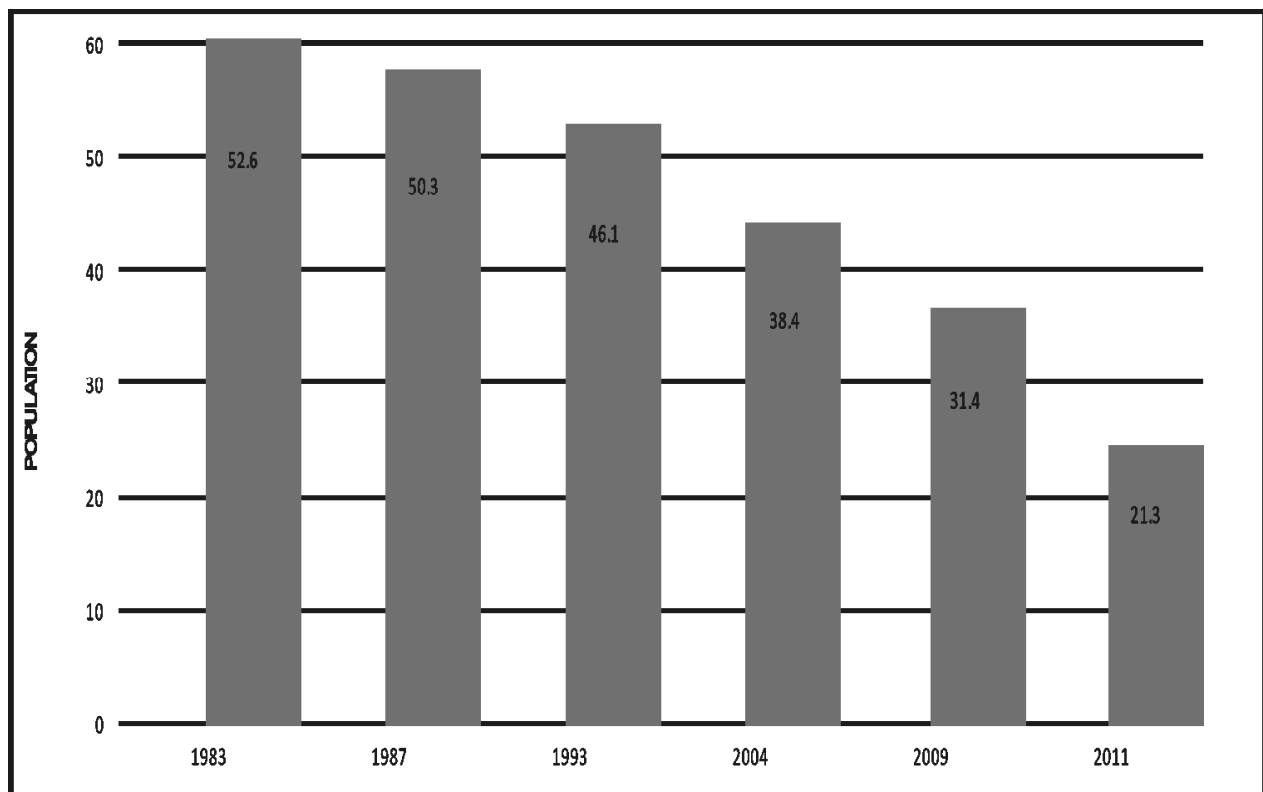
Although, there is many other countries in the world that deal with an education crisis, it is intriguing for India because the nation has managed to turn around their GDP; which is believed as the impossible for a country like India. Which leads to the question of what is it that is holding India back in lowering their uneducated and illiterate population

and will they be able to continue on with their amazing GDP performance?

Many techniques applied in the research project focuses on identifying the proximate cause and their relative importance related to the poverty in India. Furthermore, the report evaluates the assertion that low levels of education increases or correlates to the risk of poverty. Moreover, strong political commitment on the part of the government is required to address these issues. In the end, it is crucial that the government comes up with an effective strategy to combat poverty.

It is important that poverty-reduction strategies in India focus on increasing public spending and expanding the poor's access to quality education and health care. The research suggests that targeting government spending on education through public works should be the primary action to reduce poverty. Furthermore, strong political commitment on the part of government is required to improve enrollment, schools, teachers, instruction material and also improving the quality of schooling. Below one can see the poverty headcount over a several year time span.

Table 1: Indicates the rate of poverty from collected data according to living standards of \$1.90 a day



LITERATURE REVIEW

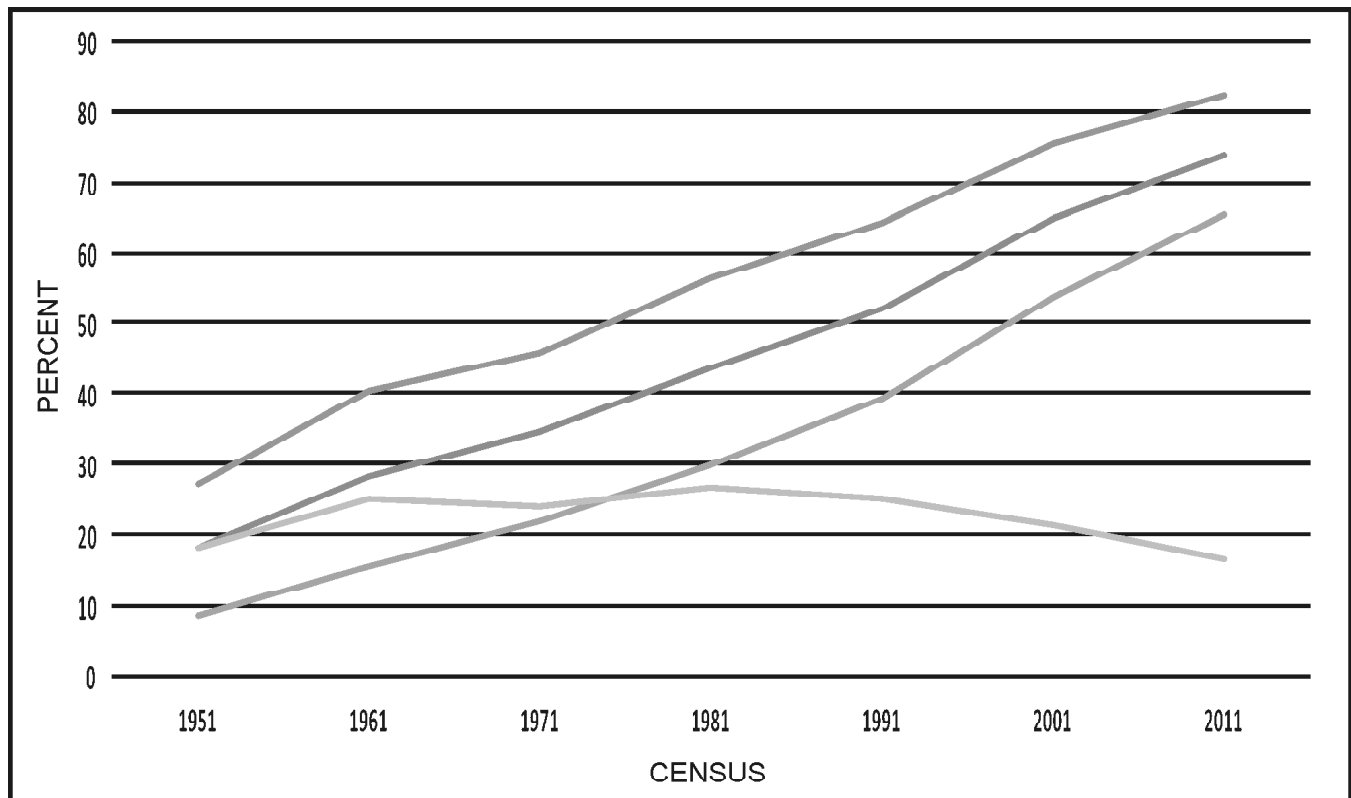
Many researchers and economist see the value of education for India to improve their economy and continue their GDP performance. But understanding the reasoning behind India's slow growth pattern out of the uneducated pool is quite difficult to narrow down causes for some time now. Dr. Sampath Kumar wrote a great research article for the *International Journal of social science & Interdisciplinary Research* (2012). The research he wrote is called *Recent Reforms in Education in India- Achievements and Unfinished Tasks*.

He studies the changes made in the education system over the years through observation of factors: literacy rates according to gender, literacy rates, primary education, secondary education, and higher education. According to his research it shows how drastically literacy rates have improved over time according to gender. This key idea or focus seemed to be the heart of Dr. Sampath Kumar's research. Reason saying so is due to the importance Dr. Sampath Kumar highlights on India wanting to reform the nation through education.

According to the census models, he has signified in his paper that making education universal in India was and currently still is a challenge. According to Dr. Sampath Kumar's data, models for each gender shows in 1951 with 27.16% for male and 8.86% for female (2012,page 84.). Then in 2011 data revealed 82.14% for male and 65.46% for female (2012,page 84.). The results obviously speak for themselves.

Going deeper into Dr. Sampath Kumar's article one can identify that he not only focuses on "India's numbers" mainly, but also what initiative and steps have been made to reach these numbers. Also, not like many other researchers, he mentions what factors are holding India back. He identifies these factors as those of "unfinished tasks." Initially reading on any third world countries education system shows many issues. Many instantly point a finger towards poverty, although the way Dr. Sampath Kumar explains India's education systems issues, identifies factors like over population, private sector education, professional education, women's education, rural education, etc. Researching more into India's

Table 2: Indicates the development of literacy rates of gender over the 60 years after India's independence



education system, reform is definitely the ideal word for their mission of a better India.

It has also been noted that there is a correlation between the Gross Domestic Product (GDP) and the attendance of higher education institutions. In the article, *Why India Lags Behind China and How It Can Bridge the Gap*, the author Panagariya, A. (2007, paragraph 1) goes into how the Indian government is not providing the necessary funds to improve and expand the higher education system. According to Panagariya (2007, paragraph 1), only 10-12% of men and women between the ages of 18-22 were currently attending college and this reflects on the improper funding.

Over the past few decades, the Indian government has been spending a continuously lower proportion of the GDP on higher education. As this proportion becomes less most colleges suffer. The students don't have much financial help from the government to attend college (scholarships, grants, etc.) and this keeps the overall attendance down. Also most of the institutions have outdated facilities that provide a less than adequate environment for the students who do actually attend to learn in. Public investment in higher education is a vital concern but the Indian government is having some trouble giving the proper funds since there has been a fiscal deficit in excess of 10% of the overall GDP (Panagariya, 2007, paragraph 5).

In the article *Educating India*, the author Nayar A. (2011, paragraph 4) goes into different factors affecting the quality of higher education in India. One of the factors that he goes into is the rapid rise of population in India. According to Nayar (2011, paragraph 5), there are 90 million Indian citizens that are within the college-going age (17-21 years of age) and this number is expected to rise to 150 million by the year 2025. Also the overall population increase in India is 1.34% annually, which is more than double the rate of China's growth.

Along with this spike in the population comes a higher demand for education. Currently India only has 500 Universities and 26,000 colleges that only have room for 12% of the eligible college-age population. So the population increase is putting a strain on the amount of quality education that India's population is receiving. According to Pradeep

Khosla, dean of engineering at Carnegie Mellon University, "There is a very large population out there that is extremely qualified and they end up in second or third-rate institutions." Basically only the top 1% of the student population gets the quality higher education they need to succeed in India. It's this statistic that makes many Indian citizens look internationally to obtain a quality college education (Nayar, 2011, paragraph 5).

So the need for more institutions must be addressed in India. According to Kapil Sibal, India's minister of human resources and development, "We will need another 800-900 universities and 40,000-45,000 colleges within the next 10 years and that's not something the government can do on its own" (Nayar, 2011, paragraph 15).

Another factor to be addressed that affects education in India is household net-income. According to the article, *Schooling Investments over Three Decades in Rural Tamil Nadu*, the authors Kajisa, K. and Palanichamy, N.V. (2009, paragraph 1) state that the rainfall in the rural farm area of Tamil Nadu affects the acquisition of quality education in that region. The rainfall is directly correlated to growth of their crops and this factor will ultimately affect their net-income. When families are struggling financially they cannot help finance their schooling system efficiently. This happens to an even greater degree when there are unanticipated negative effects to their farming income, such as sudden droughts and flood (Kajisa & Palanichamy, 2009, paragraph 1).

This study dove in deeper to find out what exactly were the determinants that affected schooling investments. Before the mid 1980's it was not possible for the local population to attain a quality primary and secondary education unless they were making an above average income. Since then more students have achieved a better education because the costs of primary education have been lowered thanks to government spending. So currently the amount of quality primary education is going up, however local investments in these regions are still a major factor when it comes to secondary and higher education since the government does not fund these institutions as much as their primary counterparts. So the analysis of annual rainfall/farm-income

indicates that less rainfall equals less income, which in turn means less overall investment in advanced level schooling (Kajisa & Palanichamy, 2009, paragraph 5).

India faces a multitude of issues regarding their education and the food deficit they are currently experiencing is another factor affecting it. In a developing country, such as India, households on average spend a higher proportion of their income towards food. In the article, *Rising Food Costs & Global Food Security: Key Issues & Relevance for India*, the author Gustafson, D.J. (2013, paragraph 8) states that in India about 50% of the average general household income is spent on food purchases, while in a wealthier country such as the United States, it's at only 10%. This high percentage in India is due to the constant increase in overall food prices. So in order for the Indian population to alleviate this burden of high food prices something needs to be done. Unfortunately, education undergoes a decrease in funding in order for the citizens to obtain the daily nutritional intake they need (Gustafson, 2013, 2).

In India there has been a lack of investment in agriculture and overall financial neglect when it comes to small-scale farmers in the poorer regions of the country. This lack of funding has regrettably led to a food deficit in the country and higher prices are implemented so the poor farmers can compensate for any losses. Nutrition wise, this food deficit has led to a declining per capita food calorie consumption and the overall under-nutrition levels are much higher than most other poorer countries. These nutrition issues further influence the decision to cut spending in order have a healthier and better-fed population. Unfortunately this comes at a cost when the education system has its funding cut in order to cope with this on going food deficit (Gustafson, 2013, paragraph 19).

ABOUT THE DATA

The World Bank "Working for a World Free of Poverty" contains worldwide data sets on a large variety of topics spanning many years. The purpose of these open data sources are for individuals to study certain data, based on different countries to make improvements toward making a better world. From the data set in regards to India we looked at several

key factors contributing to Education of India, which spans from 1980-2014. This large data allowed us to see the progress of India over time and understand historically what affected these numbers during different time periods. India is known for a country of constant change, thus leading to the importance of dating back to older data. In our research the factors considered are GDP, Primary Education, Secondary Education, Tertiary Education, Population, Food deficit, Undernourishment, and Household Income. According to the factors mentioned one can see how all these factors play a role in education in an "impoverished" country like India.

AN ANALYTICAL FRAMEWORK

The study uses ANOVA Analysis for examining the variation between the group means focused on explaining in the data, the independent variable against dependent variables. Our group undertook the examination of the effects of dependent variables upon GDP. Before the study took place we formulated a hypothesis based on the relationship between factors of interest. The factors include GDP, Primary Education, Secondary Education, Tertiary Education, Population, Food Deficit, Undernourishment, and Household Income. According to knowledge and experience we were able to signify that low-income lead to low education background opportunities, and high GDP meant focusing on education in India. Thus leading to the hypothesis studied, to continue India's phenomenal GDP performance it is important that primary education is implemented to lower illiteracy rates, the implementation of secondary and tertiary education will lead to higher household income and thus lower undernourishment and food deficit. To carry forward with this investigation we gathered the variable data and moved on with the ANOVA analysis.

PRIMARY EDUCATION

Data and research performed by researchers show that India's illiteracy rated and primary education rates have drastically changed. This shows a high possibility of improvement for the nation. The link between population growth and education rates could be difficult to analyze; but it is critical to understand what is being produced and valued. According to Dr.

Sampath Kumar’s research one can identify how illiteracy is slowly being eliminated from India’s population. His research shows that in 1951 the literacy rates for both males and females was 18.33% and in 2011 it stood at 74.04% (Dr.Sampath Kumar, 2013, pg.84).

An interesting indicator to point out is the literacy rates of male to female. In 1951 male literacy rates showed 27.16%, while female literacy rate was a merely 8.86% (Dr.Sampath Kumar, 2013, pg.84). But going forward this changed to male literacy rate of 82.14% and 65.46% for female in 2011 (Dr.Sampath Kumar, 2013, pg.84). There is still a difference between the numbers due to the rights of women growing over time in the nation. One might look at this data set and might question, why it took India so long to reach this state or what is distinguishing about these results?

Well considering India’s history and background, the nation has gone through many political upheavals, as well as decision-making which has not allowed India to progress. Certain instances of needing are to recreate infrastructure after the separation of India and Pakistan as well as the departure of the British Empire from India. And it would be unjustified not to mention the separation of the state of Kashmir in the early 1960’s, which lead to several disputes between India and Pakistan. Kashmir has continued to be a growing concern after India’s independence. Three wars have broken out between India and Pakistan due to control of Kashmir. For School Enrollment School Enrollment, Primary vs. GDP growth (annual), Our F test = 2789 is greater than F cv = 3.99 And our P-value is less than .05 therefore we have to Reject the null of Different Means.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
School enrollment, primary (% gross)	30	2903.61	96.788	97.53126
GDP growth (annual %)	35	219.8539	6.281541	4.716698

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	132322.9	1	132322.9	2789.137	7.02432E-54	3.993365
Within Groups	2988.861	63	47.44224			
Total	135311.8	64				

SECONDARY EDUCATION

Like with Primary Education, Secondary Education is also important. Secondary Education consists of

children aged 14-18 years. According to our data set we have distinguished that primary education completion and admission is rising, secondary education fails to follow along. Basically most children are enrolled in primary education but don’t make it over to secondary education due to several reasons like income, nutrition, and access to the education, etc. India has identified this matter and has implemented programs like Rashtriya Madhyamik Shiksha Abhiyan (RMSA)(MHRD, 2015, paragraph 1), which was initialized in March 2009.

The purpose of this initiative is for secondary education to be improved in matters of expanding access, improvement in quality of education, and keeping in mind equity. Equity is important in regards to the previous point mentioned earlier in terms of the literacy rates for females. For School Enrollment, Secondary vs. GDP growth (annual), Our F test = 418 is greater than F cv = 3.99. And our P-value is less than .05 therefore we have to Reject the null of Different Means.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
School enrollment, secondary (% gross)	30	1405.629	46.8543	132.7648
GDP growth (annual %)	35	219.8539	6.281541	4.716698

ANOVA

Source of Variation	SS	df	MS	F	P value	F crit
Between Groups	26591.63	1	26591.63	417.7168	1.7E-29	3.993365
Within Groups	4010.547	63	63.65947			
Total	30602.18	64				

TERTIARY EDUCATION

It is an honor and achievement for India to be placed with China and the United States as one of the best higher education resources in the world. As important as primary and secondary educations are for the nation of India, it applies for tertiary education as well. Authors Vidya Rajiv Yeravdekar and Gauri Tiwari II have done an excellent job in their research of India’s tertiary education impact on India’s economy. The authors mention how important it is to instill technical training, skill development, productivity, and maximization of the potential for human resource development. In consideration of the examination of human resource development refers to the opportunities in creating skills in individuals.

The world is constantly changing and being able to analyze them is important for students to gain. Changes are continuously being made and it is important for the student to face these challenges. India has one of the largest populations in the world and being able to utilize this population to gain opportunities would become India's biggest achievements, and step toward reaching the heights of becoming one of the world's best economies. As seen in the data sets, it is observed that the percent of the Indian's population taking part in tertiary education is still quite low compared to other Asian countries. Like mentioned earlier, it is important not to be discouraged because seeing the vast improvement in primary and secondary education over time definitely signifies the outcome of reaching the tertiary education system as well.

Yet one must understand that India must focus on eliminating the illiteracy rates, and obviously when dealing with one of the world's largest population is definitely not easy. These initiatives take continuous commitment and effort. For School Enrollment, Tertiary vs. GDP growth (annual), Our F test = 11.28 is greater than F cv = 3.99. And our P-value is less than .05 therefore we have to Reject the null of Different Means.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
School enrollment, Tertiary (% gross)	28	272.04	9.715714	30.78983
GDP growth (annual %)	35	219.8539	6.281541	4.716698

ANOVA

Source of Variation	SS	df	MS	F	P-value	Fcrit
Between Groups	183.4552	1	183.4552	11.28451	0.001352	3.998494
Within Groups	991.693	61	16.25726			
Total	1175.148	62				

POPULATION

Population growth is an important variable to study to understand education rates and pacing with GDP. India is known to have one of the biggest populations in the world. It has reached a point over some time now that it is starting to become a concern for India. Often most countries will look at this as a dilemma, but India sees it as an opportunity. In regards to what can be done with this population, where can this population bring this country?

India is well known for their opportunistic and positive behavior, which has allowed them to opportune this hurdle as a bundle of opportunities. India is known to have one of the highest working age populations according UN data (The Economics Times, 2014, paragraph 5). The countries studied were Brazil, China, India, Russia, and Japan during the 2010-2030 time frame. According to this data and the data set observed in this research one can see how much the young population can have an impact on the rise of India. And this is not merely in terms of eliminating poverty or increasing education, but also particularly in becoming a world leader.

For India to achieve this will be a great achievement it will forever be looked as a model of motivation for every economy for struggling countries economy. In the UN study the outcome of these BRIC's (Brazil, Russia, India, and China) over time has showed varying differences. What gave India the advantage is their current efforts in reduce fertility rates and population growth. Due to the datasets studied in this research one can see this as a disastrous predicament, while the research supports it as a bundle of opportunities due to the young population. India is attempting to create blessings out of this misconception of population growth, as GDP enhancers.

This is the ideal way for India to take initiatives, because measuring and controlling population growth is not an easy task; it is to a point an uncontrollable variable. For Population Growth vs. GDP growth (annual), Our F test = 143.1 is greater than F cv = 3.98. And our P-value is less than .05 therefore we have to Reject the null of Different Means.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Population growth (annual %)	35	64.24024	1.835435	0.119481
GDP growth (annual %)	35	219.8539	6.281541	4.716698

ANOVA

Source of Variation	SS	df	MS	F	P-value	Fcrit
Between Groups	345.9374	1	345.9374	143.0623	2.19E-18	3.981896
Within Groups	164.4301	68	2.418089			
Total	510.3675	69				

FOOD DEFICIT

Despite a considerable increase in the food grain production, India is classified as a low-income, food-

deficit country. According to the report by the World Food Program, which states that nearly 35 percent of India’s population is considered as food insecure, consuming 80 percent less of minimum energy requirement. Malnutrition is India’s silent crisis and paramount human development challenges. According to World Bank data, the aggregate levels of malnutrition in India is extremely high and approximately 60 million of the country’s children are underweight and 45 percent are too short of their age, 20 percent are suffering from acute malnutrition, 75 percent are anemic and 57 percent are Vitamin A deficit. For Depth of the food deficit (kilocalories per person per day) vs. GDP growth (annual), Our F test = 1415 is greater than F cv = 4.03 And our P-value is less than .05 therefore we have to Reject the null of Different Means. [The World Bank, Helping India Combat Persistently High Rates of Malnutrition, Para 2]

Anova: Single Factor

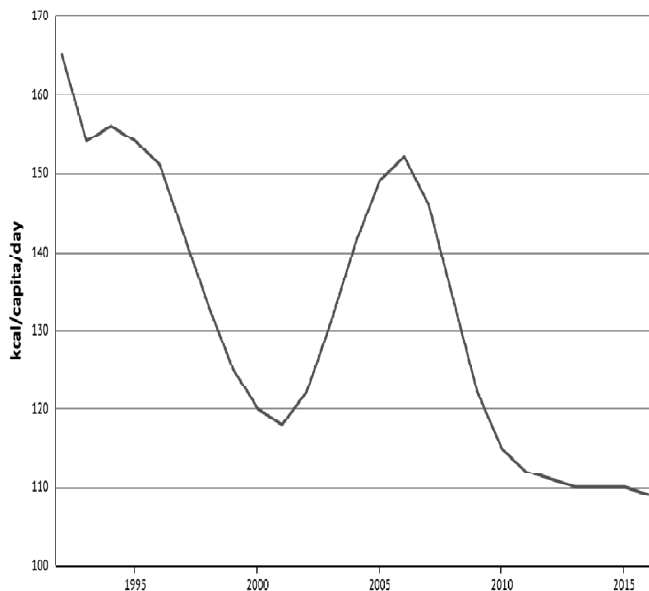
SUMMARY

Groups	Count	Sum	Average	Variance
Depth of the food deficit	23	3083	134.0435	316.8617
GDP growth (annual %)	28	182.4957	6.517703	5.194847

ANOVA

Source of Variation	SS	df	MS	F	P-value	Fcrit
Between Groups	205358	1	205358	1415.024	8.23E-38	4.038393
Within Groups	7111.217	49	145.1269			
Total	212469.2	50				

Table 3: Indicates India-Average food deficit of undernourished population



GROSS DOMESTIC INCOME

Like previously mentioned household income is definitely key to accessing education, and this continues to be an issues in educating impoverished families. The lack of financial resources is usually one of the top issues in educating the Indian population. The government in 2000 has implemented the Universal Primary Education goal of increasing access to primary education to all children. India with this initiative and various other educational ventures has proven their dedication towards an educated India to continue the phenomenal GDP performance of an “impoverished country.” Over the years measuring poverty of India has been quite an issue that the U.N. strongly believes that India has to work on funding their poverty and analytics research (Miguel Nino-Zarazua and Tony Addison, 2012, paragraph 7).

Several economists are determined to understand the growing or decreasing rate of poverty, but due to debates and disagreements which have made it difficult to analyze the data and make full value of it. According to Times of India Suresh Tendulkar has released claims that India is actually headed the right direction in eliminating poverty (Mahendra Kumar Singh, 2014, paragraph 3). While previous economist argue that India is not headed on the right track, but rather poverty has increased in India. Due to this study of constant back and forth has led to issues in accessing this data.

But the study and research shows how much education and GDP can contribute to understanding poverty in India as well. Most certainly if a country’s individuals are not educated one can distinguish that poverty is definitely a concern for the country’s standing. But India has managed to overcome this conception with their GDP. But the question remains, will they be able to keep it up? Well in this research our group has presented possible forecasting in order to determine what India can expect in the coming years through their initiatives being implemented. For Gross National Income vs. GDP growth (annual), Our F-test = 78.6 is greater than F cv = 3.98 And our P-value is less than .05 therefore we have to Reject the null of Different Means.

EDUCATION EXPENDITURE

The amount of money that the Indian government spends on education has always been an important issue. Throughout the years it has been necessary to invest more money in the education system of the country. Looking back through recent years, India has experienced a significant growth in their GDP and along with this growth there has been a rise in education investment. This rising investment in education is a necessary expenditure.

This ensures that the schools throughout India will get the proper resources that are needed to bring about the high quality education that the students need. According to the data that was gathered, the average education expenditure has steadily increased from 1980-2013. Also looking at the GDP growth we can see a rather steady increase annually. Every year in this data has had a positive increase in annual percentage.

This has a positive outlook on how these two factors are related. So we've tested this by putting both data sets from the same year span (1980-2013) together and ran the ANOVA model to measure the variance between the groups. For Adjusted Savings: Education Expenditure vs. GDP growth (annual), Our

F test = 52.7 is greater than F cv = 3.98 And our p value is less than .05 therefore we have to reject the null of different means.

Anova: Single Factor

SUMMARY				
Groups	Count	Sum	Average	Variance
Adjusted savings: education expenditure (current US\$)	34	6.83E+11	2.01E+10	2.68E+20
GDP growth (annual %)	35	219.8539	6.281541	4.716698

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6.96E+21	1	6.96E+21	52.72808	5.15E-10	3.984049
Within Groups	8.04E+21	67	1.32E+20			
Total	1.58E+22	68				

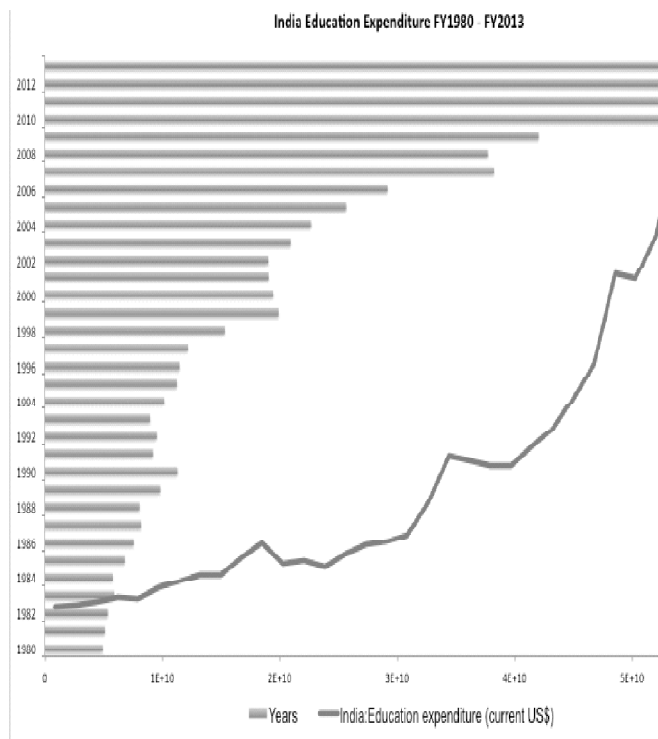
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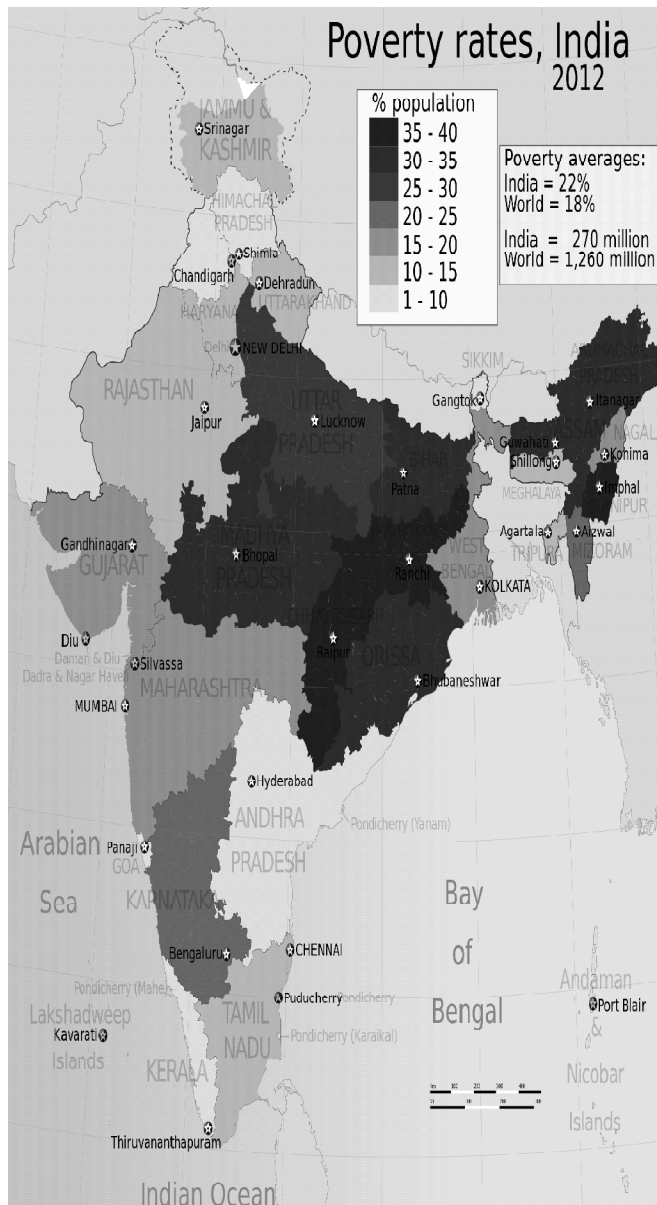
Table 4: Indicates India's education expenditure from 1980-2013



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POVERTY MAP

Table 5: Indicates India's poverty standing as of 2012 according to states



Source: https://en.wikipedia.org/wiki/Poverty_in_India

INDIAN GOVERNMENT POLICY INITIATIVES

Some of the key initiatives made by the Government of India in the Budget 2014-15 w.r.t to revitalizing education to address the poverty concerns in the country

- Improvement in teacher's quality through a teachers training program with an initial allocation of Rs 500 crore for "Madan Mohan Malviya New Teachers Training program". [Union Budget 2014 – 15]
- School Assessment Program launched with an initial amount of Rs 30 crore. [Union Budget 2014 – 15]

Pro poor measures includes

- Betibachao, BetiPadhao (*Save girl child, educate girl child*) campaign and special small savings instrument for the girl child.
 - National program in Mission Mode to halt the deteriorating malnutrition situation in India.
 - Toilets in all the schools for girl child – combat the drop out of girls from school due to lack of sanitation facility.
 - A new program for improving the quality of teachers for bridging the teaching gaps.
 - Skill India to be launched to skill the youth with an emphasis on employability and entrepreneur skills.
 - Enhanced allocation under Sarva Shiksha Abhiyan (SSA) program for universal education.
- * Betibachao, BetiPadhao (Save girl child, educate girl child) a.k.a BBBP is a Government of India scheme that aims to generate awareness and improving the efficiency of welfare services meant for women. The scheme was initiated with an initial corpus of US\$15 million [Ministry of Women & Child Development, FinalBBBPreport06042015, Page 6]
- * Sarva Shiksha Abhiyan (SSA) is Government of India's flagship program for achievement of Universalization of Elementary Education (UEE) in a time bound manner, as mandated by 86th

amendment to the Constitution of India making free and compulsory Education to the Children of 6-14 years age group, a Fundamental Right. [Ministry of Human Resource, SSA Implementation Guidelines]

- * Toilet in schools for girl child initiative is to combat the drop out of girls from school due to lack of sanitation facility.

Other initiatives

‘Hariyali, Udyamita aur Sampannata’, is an (Sustainable) Integrated Village Development Program, which aims at holistic village development over a period of five years for basic need fulfillment like Literacy, Safe drinking water, Sanitation & habitat, Women Self Groups, Farmers Clubs etc.

Education Cess tax is charged at 3% on the tax liability as appropriated by the Government of India for the purpose of promoting and improving the primary & secondary throughout the country. [Ernst & Young, Budget Connect+ 2014, Page 24]

Programs like mid-day meal in school is the largest free lunch program in the world. It started in 1995 with the aim of improving child nutrition and getting countries more of the poor’s kids to the school. Many economists say that in terms of hunger, midday meal is making a big contribution for especially poor households. There are studies which looked at many aspects especially learning impacts which are able to show that how children are able to pay attention in the classrooms. Furthermore, this initiative has brought a dramatic impact in the school enrollments & attendance. The studies have shown that the school enrollment jump is biggest among girls and children from marginalized communities. This free lunch program is helping and encouraging poorest families to send their kids to school. Mid-day meals are the only source of vegetables and lentils for the kids from marginalized communities. [Ministry of Human Resource, MDM Implementation Guidelines, Page 1-4]

The program is helping to self-motivate these children and even some of the school managers are also recommending free breakfast in the schools.

The report recommends that pursuing government spending to primary education, reducing communicable diseases, improving water and

sanitation and reducing household insecurity through public works program would do more to reduce poverty.

MAIN RESULTS

- For School Enrollment School Enrollment, Primary vs. GDP growth (annual), Our F test = 2789 is greater than F cv = 3.99 And our P-value is less than .05 therefore we have to Reject the null of Different Means.
- For School Enrollment School Enrollment, Secondary vs. GDP growth (annual), Our F test = 418 is greater than F cv = 3.99 And our P-value is less than .05 therefore we have to Reject the null of Different Means.
- For School Enrollment School Enrollment, Tertiary vs. GDP growth (annual), Our F test = 11.28 is greater than F cv = 3.99 And our P-value is less than .05 therefore we have to Reject the null of Different Means.

For Population Growth vs. GDP growth (annual), Our F-Test = 143.1 is greater than F cv = 3.98 And our P-value is less than .05 therefore we have to Reject the null of Different Means.

- For Adjusted Savings: Education Expenditure vs. GDP growth (annual), Our F test = 52.7 is greater than F-cv = 3.98. And our P-value is less than .05 therefore we have to Reject the null of Different Means.
- For Gross National Income vs. GDP growth (annual), Our F-test = 78.6 is greater than F cv = 3.98 And our P-value is less than .05 therefore we have to Reject the null of Different Means.
- For Prevalence of Undernourishment vs. GDP growth (annual), Our F-test = 52.7 is greater than F v = 3.98 And our P-value is less than .05 therefore we have to Reject the null of Different Means.
- For Depth of the food deficit (kilocalories per person per day) vs. GDP growth (annual), Our F test = 1415 is greater than F-cv = 4.03 And our P-value is less than .05 therefore we have to Reject the null of Different Means.

Table 6: Indicates forecast GDP growth (annual %) from 1980-2019

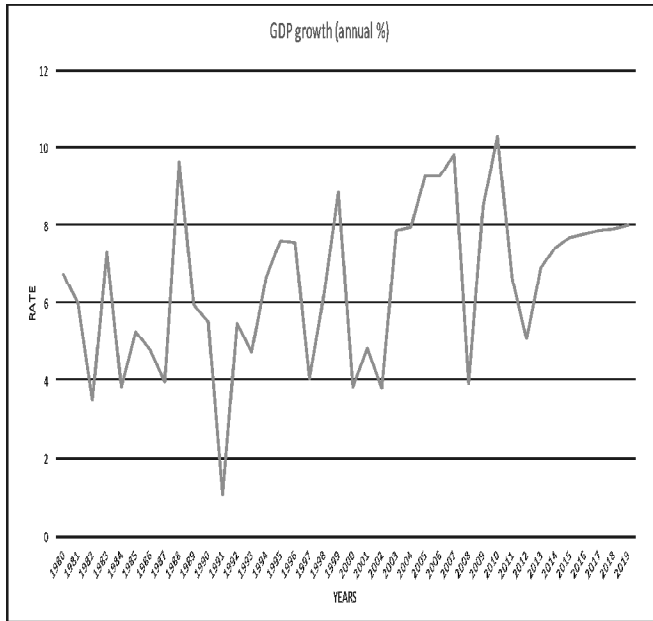
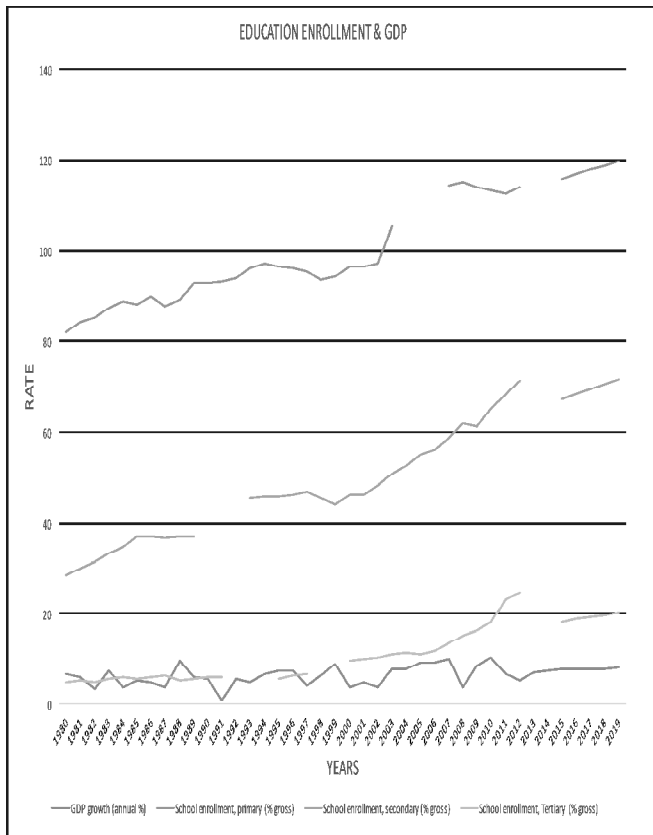


Table 7: Indicates forecast of Education Enrollment & GDP from 1980-2013. Due to missing data in India's data collection, some years have not been represented in the graph set



CONCLUSION

The data researched through the use of an ANOVA Analysis has supported our hypothesis in terms of

education enrollment and completion, leads to better GDP performance. According to the data collected it has accepted our hypothesis that higher level of education availability leads to a stronger GDP performance. As mentioned earlier, India has done the impossible with their GDP performance even though they hold the status of a third world country. This and past experiences have been revealed that education must continue to be focused upon.

Through the programs mentioned in this paper, India hopes to eradicate their illiteracy rates and poverty rates hand in hand to lead to a better country, economy, and worldwide example. Through this research our group has been able to look into India's strategies, changes, future, past, and present in better understanding what factors have affected education availability. We hope this paper sets examples of further research into factors mentioned in the paper, and other factors not discussed in this paper as well.

REFERENCES

1. CIA World Factbook, (2015). India Demographics Profile 2014. Retrieved from http://www.indexmundi.com/india/demographics_profile.html
2. Gupta, R., Sankhe, S., Dobbs, R., Woetzel, J., Madgavkar, A., & Hasyavgar, A. (2014). India's Path from Poverty to 3. Empowerment. *McKinsey & Company*. Retrieved from http://www.mckinsey.com/insights/asiapacific/indias_path_from_poverty_to_empowerment
4. Gustafson, D.J. (2013). Rising Food Costs & Global Food Security: Key Issues & Relevance for India. *Indian Journal of Medical Research*. 138. 398-410.
5. Jerry, P. (2013). Foreign Direct Investment in the Education Sector in India. *Social Science Research Network*.
Kajisa, K. & Palanichamy, N.V. (2009). Schooling Investments over Three Decades in Rural Tamil Nadu, India: Changing Effects of Income, Gender, and Adult Family Members' Education. *Elsevier Ltd.*, 38, 298-314.
6. King, E. (2011). Education is Fundamental to Development and Growth. *The World Bank*.
7. Kumar, D.S. (2012). Recent Reforms in Education in India – Achievements and Unfinished Tasks.

- International Journal of Social Science & Interdisciplinary Research*. 1. 82-94.
8. Kumar, V.S. (2011). The Education System in India. *FSF India Board of Directors*. Retrieved from <http://www.gnu.org/education/edu-system-india.en.html>
 9. National Commission on Population, (2011). Literacy Rate. Retrieved from http://populationcommission.nic.in/content/933_1_LiteracyRate.aspx
 10. Nayar, A. (2011). Educating India, The country's vast education-hungry population could supply the next generation of the world's scientists but only if it can teach them. *Nature Publishing Group*, 472, 24-26.
Nino-Zarazua, M. & Addison, T. (2012). Redefining Poverty in China and India. *United Nations University*. Retrieved from <http://unu.edu/publications/articles/redefining-poverty-in-china-and-india.html>
 11. Panagariya, A. (2007). Why India Lags Behind China and How It Can Bridge the Gap. *The World Economy*, 30, 235-236.
 12. Prabhudesal, A. (2010). India's Young Population: Its Biggest Asset! *Trak. In* Retrieved from <http://trak.in/tags/business/2010/03/02/india-young-population/>
 13. Singh, M.K. (2014). New Poverty Line: Rs 32 in Villages, Rs 47 in Cities. *The Times of India*. Retrieved from <http://timesofindia.indiatimes.com/india/New-poverty-line-Rs-32-in-villages-Rs-47-in-cities/articleshow/37920441.cms>
 14. Yeravdekar, V.R. & Tiwari, G. (2012). The Higher Education System of India and its Impact on the Economy. *Social Science Research Network*.