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An Empirical Study of Algeria

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

Education is the basis for development and builds on a great deal of our economic and social welfare. It is essential to improve economic efficiency and social coherence. It helps to get the poor out of poverty by increasing the importance and quality of their jobs¹. The total efficiency and intellectual versatility of the workforce are improved. It helps ensure that a country is competitive in world markets, now characterized by changing production techniques and methods. Education contributes significantly to building nationhood and interpersonal tolerance by increasing integration with different social and ethnic groups early in life. Humans have been regarded as the driving force for economic growth in new theories because they are aware of the importance of non-traditional factors for economic growth². Human capital is measured by skills in the fields of employment, health, experience, education, and many other factors³. Human capital is directly represented, raises labor efficiency and makes economic development strong⁴. The largest stock factor in human capital is education. Human capital is positively related to real GDP per capita, as school enrolment⁵. Both business and non-market opportunities are provided by human capital in the form of education. It offers non-market parenting and leisure opportunities. Higher investment in children leaves an emotional, physical, and cognitive impact on life and helps them achieve greater economic capacity than children with less investment⁶.

Education's contribution varies with developmental variations. Some of the previous studies indicate that in less developed countries, the influence of primary and secondary education on economic growth is greater than in the OECD countries⁷. The role of education

¹ Tikly, Leon, and Angeline M. Barrett. "Social justice, capabilities and the quality of education in low-income countries." *International journal of educational development* 31.1 (2011): 3-14.

² Ozturk, Ilhan. "The role of education in economic development: a theoretical perspective." Available at SSRN 1137541 (2008).

³ Unger, Jens M., et al. "Human capital and entrepreneurial success: A meta-analytical review." *Journal of business venturing* 26.3 (2011): 341-358.

⁴ Dustmann, Christian, Itzhak Fadlon, and Yoram Weiss. "Return migration, human capital accumulation and the brain drain." *Journal of Development Economics* 95.1 (2011): 58-67.

⁵ Barro, Robert J. "Economic growth in a cross section of countries." *The quarterly journal of economics* 106.2 (1991): 407-443.

⁶ Denboba, Amina D., et al. "Stepping up early childhood development: investing in young children for high returns." (2014).

⁷ McMahon, Walter W., and Moses Oketch. "Education's effects on individual life chances and on development: An overview." *British Journal of Educational Studies* 61.1 (2013): 79-107.

in economic development has been extensively discussed in various studies. In per capita income, the cross-country difference depends on taxes, education, and population growth⁸. Pritchett (1996) looked at cross-sectional economic growth data and found that the rise in labor-force education has no favorable impact on the production rate per worker⁹. Human capital development has a substantial negative effect on the overall productivity factor. Schooling does not generate intellectual resources but increases private wages. The influence of education on economic growth is positive and significant. Barro and Xavier (1995) found a negative impact on economic growth in Pakistan and Sri Lanka from primary school enrolment¹⁰. In both countries, the impact becomes positive when human capital is attributable to secondary school enrolment. The overall results confirm that human capital plays a positive part in Pakistan's economic growth. Education and health investment will build a highly productive workforce and improve the overall productivity factor¹¹. Such was the negative relationship between human capital investment and per capita income growth by Schultz (1991)¹².

The settlement colonies were exclusively dedicated to their own needs with economic systems, infrastructure, education, but also roadway systems, hospitals, and houses. The denial of education to the indigenous population under colonial rule is a well-documented historical fact. Colonial powers were hesitant to give education to the colonized population. Educational services have, in some cases, been delivered to small elitist communities but have been limited¹³. The majority of the former colonies developed or expanded the education network substantially in the three decades of the post-colonial period. Education has become the target of considerable effort and passion, considered to be a primary determinant of economic development¹⁴. Government resources were used to establish a public education system through substantial human and financial resources.

⁸ Holter, Hans A. "Accounting for cross-country differences in intergenerational earnings persistence: The impact of taxation and public education expenditure." *Quantitative Economics* 6.2 (2015): 385-428.

⁹ Pritchett, Lant. *Where has all the education gone?* The World Bank, 1999.

¹⁰ Barro, Robert J., and Xavier Sala-i-Martin. "Economic growth." (1995).

¹¹ Khan, B. Zorina. *Knowledge, human capital and economic development: Evidence from the British industrial revolution, 1750-1930.* No. w20853. National Bureau of Economic Research, 2015.

¹² Schultz, Theodore W. "Investment in human capital." *The American economic review* (1961): 1-17.

¹³ Stevens, Philip, and Martin Weale. "Education and economic growth." *International handbook on the economics of education* 27 (2004): 205-311.

¹⁴ Gasparini, Leonardo, and Nora Lustig. *The rise and fall of income inequality in Latin America.* No. 118. Documento de Trabajo, 2011.

A good example is the case of Algeria, the old French Empire settlement and, in the beginning an extractive colony. The vast majority of educated Algerian residents under French rule (1830-1962) were French and other European citizens. Less than one-third of Muslim schoolchildren were enrolled in school on the eve of independence, and about 10% of the total indigenous Algerian population was literate¹⁵. Independence also includes an immense expansion of all education levels and steps to improve and promote greater access to education, such as free, compulsory, and primary education¹⁶. The government's high priority for national education was the amount of money spent on it and free education availability at all levels (Tiliouine 2013, 1209-1226). Around 16.5% of the government's expenditure budget in 1985 was devoted to education; 29.7% of the national budget was devoted to the education sector in 1990. The World Bank also funded the country. From 1973 to 1980, Algeria signed five loan agreements for educational purposes for a total of 276 million dollars.

This paper seeks to determine whether, in spite of this massive investment, there has been a persistent regional effect of the level of education on the economy due to the discrimination in public resources and infrastructure, which characterized the colonial era. To do so, the long-term ties between school outcomes and that part of the non-Muslims who lived in Algeria on the eve of the War of Independence (1954) are defined by regional data covering the years 1977 to 1999 (15 to 40 years after independence)¹⁷. The major findings indicate that literacy rates have increased more promptly since independence in regions that have inherited a greater per capita infrastructure stock, i.e., regions where settlers' involvement was more intense, using the instrumental variables to correct possible non-random grouping of settlers and locals into regions. There is also evidence of social interaction effects with the rise in women's education and a more rapid decline in fertility rates in settlement areas than in native regions. However, one can find evidence that this initial benefit dissipates over time, which indicates that post-colonization resources are effectively diverted to areas that have long been ignored.

¹⁵ Becherair, Amrane. "Education and Economic Growth in Algeria: An Empirical Investigation by Using ARDL Approach." *International journal of innovation and applied studies* 7.3 (2014): 1215.

¹⁶ Boutayeba, Faisal, and Mohamed Ramli. "The Link Between Education and Economic Growth in Algeria: An Empirical Investigation." *International Journal of Advanced Research in Education and Society* 1.1 (2019): 35-43.

¹⁷ Houchine, Y. (2015). The relationship between human capital and economic growth in Algeria. *Revue des recherches économiques et financières*, 4 (2), 129-146.

Economists have renewed interest in whether history has an ongoing impact on economic growth. Letiche (1960) has shown that former colonies in settlements are better able to work than extractive colonies in the long run because they have inherited better institutions (preserving privacy rights)¹⁸. The UK's colonial land income system in India is studied by Banerjee and Iyer (2006) and Banerjee, Iyer, and Somanathan (2006), showing that the varying historical property rights institutions create lasting economic differences. This paper forms part of the same large research agenda and focuses on a particular country experience, Algeria, as did Banerjee and Iyer (2006). Contrary to these studies, however, this paper does not concentrate on the position of heritage colonial institutions universally introduced in all Algerian provinces, but on the colonial legacy of heritage in infrastructures and agricultural production as well as cultural and social norms. For many reasons, Algeria provides an ideal environment for this research. First, after Algeria became an integral part of France (1848), French and other European citizens settled massively and even formed a majority in some regions. Second, since the settlers inhabited mainly early conquered areas on the Mediterranean coast, settlements' sizes differ greatly. Third, after 130 years of colonization, the vast majority of the colonists left Algeria in 1962.

1.2 Background of the Study

The conquest of Algeria lasted 27 years and eventually continued from North to South for Algeria's French conquest. France's colonial rule began with Algiers' capture in 1830. In September 1832, Béjaia was arrested. Afterwards, the army marched inside in 1837 to Constantine. Only in 1857, with the collapse of Kabylia, was the conquest complete. In 1900 the Saharan regions Touat and Gourara, which were then Moroccan spheres of influence, were occupied; only after the French conquest of the Anti-Atlas in 1934 was the Tindouf area, formerly considered Moroccan rather than Algerian, part of Algeria¹⁹. A large-scale land disposal program and confiscation made it possible to clear the cultivable

¹⁸ Letiche, John M. "Adam Smith and David Ricardo on economic growth." *The Punjab University Economist* 1.2 (1960): 7-35.

¹⁹ Martinez, Luis. *The Algerian civil war, 1990-1998*. Amer Univ in Cairo Press, 2000.

land rapidly. In the early conquered regions such as Oran and Algiers, settlers were allocated fertile lands and these parts represented the largest populations of settlers.

Prior to the conquest, the municipal lands (*hubus*) supported Algerian Youth Quranic learning and paid for school maintenance. In the early decades of the colonial period, many of the Quran schools had no revenue source and were closed permanently²⁰. The closure of Muslim schools tended to increase analphabetism, which became worse as the next generation became more disabled. In 1962, 90% of the Muslim population of Algeria was unalphabetized.

The French occupation of Algeria focused in the early stages on land confiscation. However, in the colonial era, the agriculture industry was modernized, and land areas were not explored before the conquest was established and evaluated. In 1889, Algeria became the world's fourth-largest wine producer²¹. Important advances in eradicating chronic diseases such as malaria (with the establishment of the Pasteur d'Alger Institute and the creation of health centers and hospitals) have been achieved, thus further contributing to the ideal conditions for mass settlement. Since Algeria was a permanent part of the French nation, France invested much more in Algeria, especially for infrastructure networks development, than in any other colony. The investment fraction for the colonies increased sharply from 9% in 1913 to 45% in 1939. For example, in Algeria, the railways were extended from 1373 kilometers, in 1881, to 4724 kilometers, in 1932²². However, historians generally agree that in the course of colonization, there was a high presence of European settlers due almost exclusively to the additional wealth produced in the agricultural sector and the expansion of public services and facilities (such as hospitals and educational facilities). During the colonial period, the colonists and indigenous people were separated systematically by territory, religion, law, and language²³. An Indigenous Code indicates that Muslims cannot hold public meetings, carry weapons, or leave their districts and villages without government authorization. Furthermore, although they are legally French subjects, indigenous people could not become French citizens and were

²⁰ Ibid.

²¹ Ibid.

²² Chemingui, Mohamed Abdelbasset, and Nassima Ayadi. "Understanding the poor human capital contribution to economic growth in Algeria." paper produced as part of the Global Development Project on Explaining Growth in Developing Countries: The Case of Algeria (2003).

²³ Martinez, Luis. *The Algerian civil war, 1990-1998*. Amer Univ in Cairo Press, 2000.

therefore not permitted to vote or be represented politically²⁴. Therefore, the majority of the indigenous population lived in very poor conditions, indicating widespread starvation and pandemics, which killed millions, particularly in early colonization times.

The independence war began in 1954 and lasted eight years. It has been a period of guerrilla strikes, of maquis struggle and terrorism on both sides²⁵. Damage to the infrastructure network was limited, as local bombs targeted exclusively rural indigenous regions which had been deprived of them. The majority of settlers (about one million people) left the country immediately after Algeria gained independence in 1962. The war disrupted the education sector, and when the country gained its independence, it was hard to acquire formal education for all natives²⁶. While the population is nowadays among the world's most educated, there are several problems facing the educational system, primarily because of the impact of the Israeli occupation and the lack of school facilities, a lack of adequately qualified teachers, access to schools and higher education. Therefore, this study will be designed to assess how the education system has affected Algeria's economic growth.

1.3 Problem Statement

Education has increasingly been known as a driving force for economic development. Enabling a highly skilled workforce would improve efficiency²⁷. They are similarly improving the quality of life, economically, politically, culturally, and so on for people with education²⁸. In addition to increased productivity, these non-monetary returns to education would positively and sustainably affect economic development²⁹. On the other hand, education and economic growth intertwine, and education is both the seed and the flower of economic growth. That means that education can positively affect growth, which will increase funding for the education sector once it has increased. Due to the levels of

²⁴ Ibid.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Hanushek, Jerik, and Dennis Kimko. "Schooling, labor-force quality, and the growth of nations." *Educational Studies* 1 (2006): 154-193.

²⁸ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

²⁹ Azariadis, Costas, and Allan Drazen. "Threshold externalities in economic development." *The quarterly journal of economics* 105.2 (1990): 501-526.

education, researchers generally argue that primary and secondary education in developing countries account for economic growth as opposed to developed education, which primarily has a major educational impact on growth at the tertiary level. The technological gap between the two groups is vaguely mentioned. Although the developed countries are the principal source of innovation and new technology, developing countries generally have a role to play in imitating and assimilating international sources³⁰.

Because of recent history, the attitudes of Algerians towards the French language are complex. The roles given to the French were ambivalent during the colonial rule (1830-1962). On the one hand, this language symbolized colonialism and must therefore be resisted, but on the other hand, it also served as a means of raising public awareness and support for such resistance due to the universal values it conveyed (freedom, equality, brotherhood).

The language policies were implemented after independence to achieve the above quota's two aims³¹. The first foreign language and the first compulsory foreign language was French from the fourth grade in the primary period from the late 1970s up to the early 1990s. Introduced during middle school (eighth grade), English was the second foreign language³². The Ministry of primary and secondary education, as a rival of French, implemented in primary school English in September 1993 under the influence of the lobby for pro-Arabization. Therefore, the students of the fourth grade (aged 8-9) had to choose English and French as the first foreign language that was required. English was 'the language of scientific knowledge' for the minister of education, and French was in nature an 'imperialistic' language used by colonists for opponents of Arab-French bilingualism. Unforeseen, it was a stunning error that rivalry between Europe's languages turned in favor of French and a forecast made by the poet and writer quoted above in 1963. The overall

³⁰ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

³¹ Lin, T-C. "Education, technical progress, and economic growth: the case of Taiwan." *Economics of Education Review* 22.2 (2003): 213-220.

³² Goldin, Ian, Halsey Rogers, and Nicholas Stern. "The role and effectiveness of development assistance." World Bank, *A Case for Aid: Building a Consensus for Development Assistance*, Washington DC: World Bank (2002).

number of students choosing English between 1993 and 1997 was negligible – between 0.33% and 1.28% out of two million schoolchildren in the fourth grade³³.

Nevertheless, while there has been a significant increase in the number of French-speaking people, French use has decreased since the Colonial Ages, when the language occupied an insecure role in media, education, government, and economy. As a result of the Algerian government's commitment through its official language policy, the roles assigned to institutional Arabic have increased. For example, in the Ministry of Justice, the Ministry of Religious Affairs, the Registry offices and town halls, the Ministry of Education is complete or almost complete. Arabization is also basically complete. In the field of education, the language of education has been changed to Literary Arabic primarily in elementary and secondary levels since 1962. But in universities, French remains the key language for science studies and remains the language of higher social status and prestige³⁴. In the other governments, apart from ministries where the Arabization is full or partial, not all official documents are written exclusively in Arabic.

As these statistics easily demonstrate, the French Language Arabization policy was not successful, among other things. One of the main goals of Arabization was for Algerians, contact and socialization (in the media, government, schooling, home, and jobs). Despite an increasingly Arabic Algeria, neither the English language nor the Arabic have bowed to rivalry. In convincing Algerians to give up French, Algeria's language strategy failed. Contrary to all the odds, not only did the latter thrive, but the number of users increased. The effect of education has continued to be broad in recent years, resulting in changes in economic growth³⁵. To assist in understanding the impact of education on economic development, gaining insights into the meaning of economic development is vital. As such, the current project seeks to determine whether education's influence is the overall significant determinant of national economic development. This information will help deal with how the two variables are related and to what extent do they need each other. Hence,

³³ Adhikary, Bishnu Kumar. "FDI, trade openness, capital formation, and economic growth in Bangladesh: a linkage analysis." *International Journal of Business and Management* 6.1 (2011): 16.

³⁴ Benrabah, Mohamed. "Language-in-education planning in Algeria: Historical development and current issues." *Language policy* 6.2 (2007): 225.

³⁵ Hill, M. Anne, and Elizabeth M. King. "Women's education in developing countries: An overview." King, Elizabeth M. and M. Anne Hill, eds (1993): 1-50.

with all that odds that faced Algeria's education system, the study forms a foundation to understand how this education system has impacted economic development.

1.4 Objective

This study's broad objective will be to evaluate how the education system in Algeria has impacted the growth of the economy.

1.4.1 Specific Objectives

1. To evaluate the relationship between primary educational enrolment and economic development
2. To examine the impact of tertiary enrolment on economic development in Algeria
3. To evaluate the mediating effect of labor force on the impact of education enrolment (primary, secondary, and tertiary) on economic development (GDP per capita)

1.5 Research Questions

1. What is the impact of primary enrolment on the GDP per capita?
2. What is the impact of tertiary enrolment on the economic development?
3. What is the mediating effect of labor force on the impact of education enrolment (primary, secondary, and tertiary) on economic development (GDP per capita)?

1.6 Purpose of the Study

Based on the economists' perspectives, education attainment (primary, high school, and tertiary level) may have a significant effect on the economic growth/development of both developed and developing countries like Algeria. The reasoning behind this comprehension is direct, that is, those who have attained primary education have lesser knowledge to apply in the field of the economy compared to those who have attained high school or tertiary education (college, university, or postgraduate) since every level will work in various industries and occupations. The education level affects various factors of the

economy, such as income generation and labor productivity, which are major factors that contribute to the growth of the economy, with some contributions to an increased GDP per capita, while others reduce the GDP per capita. This study aims to use quantitative techniques to analyze the country of Algeria data from 2000 to 2019 and examine whether the overall education attainment has a significant impact on economic development (GDP per capita).

1.7 Nature of the Study

The nature of this research is a quantitative correlation method. This correlation study aims to determine relationships to quantify the degree to which variables relate without assuming cause and effect. Cypress (2017) claims that quantitative research is more successful than qualitative research in determining a correlation between and among several variables due to the accurate dimensions and logical structures that arises in the hypotheses testing³⁶. The proposed quantitative study will use secondary data to investigate the influence of education on economic development. A qualitative approach is not feasible for this proposed study because it would capture more contextual detail. A cross-sectional correlation is suitable where the target population is enormous. Furthermore, Almalki (2016) adds that non-experimental research often involves the use of surveys³⁷.

1.8 Justification of the Study

This study tends to determine the impact of the Algerian education system on economic development. Since Algeria is accompanied by multiple education, starting from French, English, and Arabic, the study will form the scope of understanding of how these education systems have impacted economic growth. The study will specifically focus on the GDP per capita, labor productivity, and income distribution as a form of economic development strategy. Therefore, the study on completion will suggest how education will

³⁶ Cypress, Brigitte S. "Rigor or reliability and validity in qualitative research: Perspectives, strategies, reconceptualization, and recommendations." *Dimensions of Critical Care Nursing* 36.4 (2017): 253-263.

³⁷ Almalki, Sami. "Integrating Quantitative and Qualitative Data in Mixed Methods Research--Challenges and Benefits." *Journal of education and learning* 5.3 (2016): 288-296.

impact the Algerian economy. The findings are expected to generate new knowledge that will be instrumental and effective in understanding how education and economic development relate to each other. Further, the findings may help develop an understanding of which level of education enables employers to be more secure with the people they employ that will perform enormously. This will help the major governmental organizations and revenue-generating enterprises to understand the connections between the two variables involved and understand which part of the economy is likely to be affected more by education.

1.9 Scope and Limitation of the Study

This study will be limited to only one country of Algeria. Since there is no follow-up in cross-sectional design studies, as is the case in longitudinal studies, the researcher will require a greater representative sample of the population to reduce observation errors.

1.10 Assumptions

The first assumption made in this quantitative study is that Algeria's data, which is available online, accurately contained all the data for GDP per capita, education attainment, and human labor during the specified period (2000-2019). Secondly, it is assumed that the data populated for the country was correct. Finally, it is assumed that all the data available in the General Accountability Office, National Bureau of Labor Statistics, World Bank Database, and the rest of government sources utilized in the research will comprise accurate data for analysis.

1.11 Definition of Terms

Education - Education "is definable as the resource of skills, competencies, and other characteristics that enhance productivity"³⁸. In general, education as a critical part of

³⁸ Barro, Robert J., and Xavier Sala-i-Martin. "Economic growth." (1995).

human capital in a country increases the efficiency of each employee and helps economies transcend manual tasks or production processes³⁹.

Economic development - Economic growth is a dynamic phenomenon, with economists finding the key factors difficult to define. At its heart, this mechanism incorporates financial and human resources in increasingly complex and efficient ways, and that is why some countries move much faster in this mechanism than others⁴⁰.

Education system - An education system relates to the economic and social factors usually present in federal, state, or community-based public schools⁴¹. Those considerations include public finance, school infrastructure, training, salaries, benefits for teachers, teaching, and more. The education systems relate to individual communication (with educators, supervisors, and students), mechanisms, and working organizations and processes (including safety facilities and transportation).

1.12 Summary

Chapter One: Introduction

This section includes a background description of the study topic. Study gaps are also established in this chapter. The chapter also constitutes a research problem description, objectives, and research questions or hypotheses.

Chapter Two: Literature Review

This section comprises a detailed review of literature related to the education and its association with economic development. This literature review is meant to ease the understanding of the problem at hand. Various concepts relating to the education system, education levels, contribution of education, and economic development will be provided. At

³⁹ Ibid.

⁴⁰ Benhabib, Jess, and Mark M. Spiegel. "The role of human capital in economic development evidence from aggregate cross-country data." *Journal of Monetary economics* 34.2 (1994): 143-173.

⁴¹ Krueger, Alan B., and Mikael Lindahl. "Education for growth: Why and for whom?" *Journal of economic literature* 39.4 (2001): 1101-1136.

the end of the chapter, a comprehensive summary and conclusion drawn from the literature are presented.

Chapter Three: Methodology

This section includes a description of the data collection methods, sample size, sampling procedure, and how the data is analyzed.

Chapter Four: Data Analysis, Findings, And Discussion

This section presents the quantitative scientific findings of the study by analyzing the results based on the study objectives and giving meaning to the results. Also, this chapter entails an in-depth and scientific explanation of the results based on previous studies on the same subject by other authors.

Chapter Five: Summary, Conclusions, Recommendation, and Future Research

The section involves making conclusion remarks based on the study results, giving recommendations based on the conclusion. The recommendations may be directed to policymakers, employees, or any other relevant party. The section also allows giving remarks on future directions on the research regarding the impact of education on economic development.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents appropriate literature on the research topic, which corresponds to the research objectives. The central aim of the chapter involves the provision of deeper insights into economic development based on education provision in Algeria. This section is organized with sub-themed sections. The first section covers the literature search strategy, which includes an overview of the education system in Algeria, current education in Algeria, challenges and remedies, economic development in Algeria, the contribution of French Colonial rule in the Economy of Algeria. The study will focus on the contribution and impact of education on economic growth. In the next section, the theoretical framework of the study is provided, preceded by the literature review related to, and finally, there will be a summary of the literature review.

2.2 Research Search

Studies reviewed to provide relevant information were obtained from reputable academic search databases. Among the databases from which relevant scholarly articles were obtained include Google scholar, Ensco host, CINHALL, SAGE, ProQuest, and Cochrane libraries. Besides, other literature searches strategies, including computer search were used to gather relevant literature for the study. To select the relevant studies for the current research, search terms, such as education system, contribution of French colonialism in Algerian economy, economic development in Algeria, and contributions and impacts of education on economic growth were utilized. Boolean operators 'AND' and 'OR' were employed during the search process to form researchable search terms. Furthermore, an iterative search process was performed to retrieve the most relevant scholarly articles on the relationship between education and economic development.

2.3 Overview of Education System in Algeria (A Historical Perspective)

A hybrid educational system, incorporating religious schools of French, Arab, and Zaway, was established in 1962 by the newly independent Algeria⁴². Parallel to the method in France, French schools were run in Algeria, and students were taught the same curriculum in both countries. This did not correspond, however, to the needs and aspirations of the nascent Algerian community, which sacrificed its most promising young people to preserve their Arabic and Islamic heritage and culture. The Algerian Nationalist Movement and the Algerian Muslim Ulema Organization, which had schools and institutes all over the country, have supported the Arab education system. In grassroots circles, the Independent National Party (the Algerian People's Party) offered free education to the people. In the meantime, the Zaway schools were mainly located in rural areas and in southern regions that are far from the French government. Since independence, the State has made it a matter of priority to establish an educational framework that is in harmony with the Algerian people's intellectual and cultural needs, and that is lacking from the French⁴³.

According to Benrabah (2013), the ruling authorities faced significant challenges in the education sector after independence and an analphabetism of over 90 percent⁴⁴. The mass emigration of European settlers further exacerbated the situation. Around 18,000 teachers (76.59%) of the country's 23,500 in 1962 left the country. This left an immense staff gap that came from Arab, European, and Asian nations, which often did not reach the standard of education needed to hold positions. The effects on educational quality were negative, and the system was split: the state system of Algeria on the one hand and the French system regulated at the French embassy by the French Cultural University Office on the other hand⁴⁵. The consequences of this divide are still felt today, with the current conflicts that are most fitting between the pro-Arabization camps and the French-

⁴² Benrabah, Mohamed. Language conflict in Algeria: From colonialism to post-independence. Vol. 154. Multilingual matters, 2013

⁴³ Benrabah, Mohamed. Language in education planning in Algeria: Historical development and current issues. Language policy 6.2 (2007): 225.

⁴⁴ Benrabah, Mohamed. Language conflict in Algeria: From colonialism to post-independence. Vol. 154. Multilingual matters, 2013.

⁴⁵ Abainia, Kheireddine. "DZDC12: a new multipurpose parallel Algerian Arabizi–French code-switched corpus." Language Resources and Evaluation (2019): 1-37.

language camps. Algerian officials have sought to unify the system and to find fast solutions for the rising number of school children and the shortage of teachers.

The education system is divided into primary schools for nine years, followed by three years of high schools and then by universities⁴⁶. Algerian education is still focused on the French approach to fact-acquisition, and instruction is almost entirely based on reading and memorization. In 1996, total primary and secondary school enrolment was 86% of the population of high school age (89% males, 82% girls). Primary school enrolment in the same age group was 97% for boys and 91% for girls⁴⁷. In a 1995 UNICEF survey, children under the age of six had restricted early childhood education services. Less than 50,000 children were admitted to the pre-school Quran (Quranic schools host multiple pre-school students). Of the children registered, 10% were kindergartens under the age of 3, and 90% were kindergartens aged between 3 to 6 years. 55% of children in kindergarten were urban children. Estimates of 1995 ranged from 3% - 20% of children enrolled at pre-school age in some institutional forms (including schools of Quranic institutions). A 1995 study shows that for children with special educational needs, there were no pre-school facilities except for special sections of primary school kindergartens for those who have an auditory disability. Primary schools in Arabic are not mandatory⁴⁸.

The nine-year model was replaced by a 10 years model also called a Foundation School (École Fondamentale et Polytechnique). Middle and primary schools, science, and technical literacy have been integrated, and closer links between schooling and employment have been pursued. Classes are taught in Arabic, the first foreign language being French. Students are directed to secondary or technical education. Primary school is divided into three cycles each of three years (Enseignement Primaire). It is obligatory between 6 and 15 years of age. One of three tracks – general, technical, or vocational – is pursued by students entering primary school. Students take a final examination (fundamental teaching certificate) which they have to pass in order to get into high school⁴⁹. In 1996, 94% of

⁴⁶ Nadia, Rezig. "Teaching English in Algeria and educational reforms: an overview on the factors entailing student's failure in learning foreign languages at university." *Procedia-Social and Behavioral Sciences* 29 (2011): 1327-1333.

⁴⁷ Zahia, Ouadah-Bedidi. "Gender inequity in education in Algeria: When inequalities are reversed." *Journal of Education & Social Policy* 5.2 (2018): 84-105.

⁴⁸ Swink, Roland Lee (2014). *Education in French Colonies and Former Colonies*, Encyclopedia Britannica. Available at <http://www.britannica.com>, accessed 26 November 2014.

⁴⁹ Clignet, Remi P., and Philip J. Foster. "French and British colonial education in Africa." *Comparative Education Review* 8.2 (1964): 191-198.

the relevant age groups (97% of the boys, 91% of the girls) were enrolled in primary education⁵⁰. The ministry has reported 15,426 state primary schools, including 4,674,947 students (46% girls) and 149,958 first- to sixth-year teachers, and 3,038 middle schools (7 to 9 years of age) with 1,762,761 students. The secondary education is of two kinds: technical and general. Secondary school starts at the age of 15 and ends when baccalaureate students go to colleges, national technical institutes, career training centers, or go directly to a job⁵¹. Schooling is free, although the state provides some grants for livelihood costs.

In 1996, 56% of the required age groups (58% of boys and 54% of girls) were enrolled in 1,033 secondary schools with 52,210 teachers and 853,303 students. Secondary school enrolment is based on primary school grades for students and the student quota set by the Ministry of Primary and Secondary Education at each college based on Arabic instruction. Universities, national higher education institutes, engineering schools, and teacher colleges are part of higher education. The institutions managed by the Education Ministry generate about 90% of the bachelor's degree. Other ministries control the remaining institutions. A total of 347,410 higher education students attended in 1995-1996. The entrance fees are based on the student quota (set by the ministry) and grades for every institution. The study field assignment depends on how well students in every area have done in primary subjects. The teachers are predominantly Algerian⁵².

Undergraduate Programs: Admission to undergraduate programs includes a bachelor's degree or similar (preparatory courses to higher education, and capability in law). Many common areas, such as pharmacy, need additional knowledge⁵³. International students are accepted if their parents reside in Algeria and satisfy the criteria for admission or if they are granted an Algerian bursary. The Centres des Oeuvres Scholaires et Universitaires shall coordinate bursaries and rooms and committees.

⁵⁰ Zahia, Ouadah-Bedidi. "Gender inequity in education in Algeria: When inequalities are reversed." *Journal of Education & Social Policy* 5.2 (2018): 84-105.

⁵¹ Mahdjoub, Rosa, and Mohamed Miliani. "Education and career guidance in Algeria: Recurrent dysfunctions." *Career Guidance and Livelihood Planning across the Mediterranean*. Brill Sense, 2017. 123-137.

⁵² Mekdad, Yousra, Aziz Dahmani, and Monir Louaj. "Public spending on education and economic growth in Algeria: Causality test." *International Journal of Business and Management* 2.3 (2014): 55.

⁵³ Bebba, Imane, Abdelhak Bentafat, and Sulieman Ibraheem Shelash Al-Hawary. "The Reality of Algerian Universities Doctoral Students Configuration." *Global Journal of Management and Business Research* (2017).

According to Mebitil (2016), there are two levels of higher education: five and six, with eight to 12 semesters in duration⁵⁴. The five levels are generally graduated with a degree in technology, and the six levels are graduated with a degree in first (license), a diploma in higher education, a graduate in medicine, dentistry, pharmaceutical, and engineering.

Professional/Postgraduate programs: In 1988-1989 graduate student registration increased to 11,987. Graduate education is designed to educate students and teachers, to meet Arabic's teaching needs, and to include universities in the development work of Algeria. The education of graduates is not fully established yet. Master, the first degree or equivalent, and two years (four semesters) are required in the master's programs. Students spend the first year studying, leading science, lecturing, and a language abroad. A thesis has to be written for the second year. Entry into the Ph.D. program requires a master's degree or equivalent. If approved by the Ministry of Education, international students are admitted to graduate school.

The teacher's diploma requires a 'mention' of the student's results. Possible indications include: 'Passable' with an average of at least 10/20 and average below 12/20; 'Rather Nice' with an average of 12/20 or higher but averaged below 14/20; 'Well,' with a general average of at least 14/20 and lower than 16/20; and 'Very Nice.' The total average is determined by assigning the average exam and advocacy equal weighting.

A radical policy reassessment was carried out in 1995 with the establishment of the High Commissioner for a L'amazighité, and Berber's dialects (Amazigh) were incorporated into schools through the decree of the President in response to an eight-month school boycott by nearly one million pupils. This was an enormous victory for the Berbers in the political-cultural sphere (Amazigh means free men). Just 15 years before that, the Berber characters, scribbling in Tifinagh a few words, meant a stay in jail. In the last year of middle school (ninth years) and first year of high school (ten years), one-third of 48 provinces introduced a Pilot Cours in Berber. Teacher training was organized, and examinations for

⁵⁴ Mebitil, Nawal. "Accreditation of initial teacher education programmes in Algeria." *IOSR Journal of Research & Method in Education* 6.6 (2016): 42-45.

the medium (middle school certificate) certificate of education and the baccalaureate were scheduled⁵⁵.

2.4 Current View of Education in Algeria

The main element of any social, cultural, economic, and other reform is also an educational reform in Algeria⁵⁶. Education was also a top priority in the holistic development strategy implemented immediately after independence. As a response to progressive changes that involved numerous education stages, it introduced simple texts and charters into the Constitution. The program was endorsed by the issuance of legislation setting the legal basis and characteristics for the organization of education. These foundations were based on a variety of themes: strengthening the nationalist spirit and the cultural and religious identity of the Algerian people, promoting the values of spirituality and civilization and their key options, raising public awareness of the need for education in order to abolish illiteracy rates. In a study by Kisaichi (2013), the education system has undergone four major phases since independence. The first phase was the identity establishment and restoration (1962-1970)⁵⁷. The first National Educational Reform Committee was established to develop a system of education consistent with the identity of Algeria and removed the legacy of the French colonizers. Then the education system was established (1970-1980). Arabization of education, as well as its connection to Algerian identity (in curricula, teachers, and supervisors) as well as standardization of circulations and examinations and the introduction of exclusive state control, were one of the priorities of that phase.

The institutional reforms, the completion of the Arabization process, and the position of education from 1980 to 2000 followed this period. A reform committee was set up to track the quality of basic education, and it was mandated for the planning of new school days, curricula and activities, and composition of the new schoolbooks and teaching aids. The

⁵⁵ Little, Angela W., and Andy Green. "Successful globalisation, education and sustainable development." *International Journal of Educational Development* 29.2 (2009): 166-174.

⁵⁶ Mekdad, Yousra, Aziz Dahmani, and Monir Louaj. "Public spending on education and economic growth in Algeria: Causality test." *International Journal of Business and Management* 2.3 (2014): 55.

⁵⁷ Kisaichi, Masatoshi. "Maghrib." *Islamic Urban Studies: Historical Review and Perspectives* (2013): 11-74.

next step was the process of opening and privatization, which began in 2000; promulgating a law of national education defining the mission of schools; building the identity of the Algerian people and uniting the country, and promoting and preserving values in the Arab, Islamic and Amazonian languages; and the provision of citizenship education, transparency, and participation in the movement for global change. The last stage marked the launch of a highly divisive and unparalleled private investment in education.

It should be remembered that education declined when Algeria experienced a series of terrorist attacks during the so-called black decade (1990-2000)⁵⁸. During this period schools and colleges have been attacked and destroyed, causing desolation and hesitations to seek education, as it has taken the lives of many students and teachers. Furthermore, the migration from rural communities to cities to avoid violence made it difficult for educational institutes to accommodate the influx of students. The fact that existing sections are overcrowded, joint sections are opened, and two-switch systems are implemented because of the extreme shortage of teachers. The education system has not yet fully recovered, despite the changes.

2.4.1 Challenges faced by Algerian after Independence

The democratization of education makes education a human right and prevents a certain group of citizens from monopolizing education, as it was happening in the colonial period⁵⁹. There were few Algerians who had access to French schooling, and only a few could become physicians, lawyers, pharmacists, and engineers.

The inadequate pay of teachers at all levels is probably one of the major reasons for this decline. A retired professor earns no more than 60,000 dinars a monthly salary, which equals EUR 400 and is not very different from that of the professors who, in reaching the retirement age, would earn a monthly salary not exceeding 150,000 dinars or EUR 1000⁶⁰. The financial condition of teachers is heavily affected by values, life quality, and optimistic expectations while filling them with frustration and a desire for alternative work.

⁵⁸ Roberts, Hugh, and M. Hugh P. Roberts. *The battlefield Algeria, 1988-2002: studies in a broken polity*. Verso, 2003.

⁵⁹ Benrabah, Mohamed. *Language conflict in Algeria: From colonialism to post-independence*. Vol. 154. Multilingual matters, 2013.

⁶⁰ Djennane, Taoufik. *Language Planning and Education Issues in Algerian Higher Studies: Attitudes towards Arabic and French in Scientific Streams*, Tlemcen University. Diss. 2016.

The education system overhaul, like the failures, has persisted. The Baccalaureate Arabic Language Test was incorrect in July 2015⁶¹. Mahmoud Darwish's poem tested students, however the poem was compared to Hitler's "Mein Kampf" by Israeli defense minister. The error became a national scandal, which was perceived to have been compromised by Education Minister Nouria Benghabrit-Remaoun. In early September 2016, because of typographic misconduct, which had Israel's name included on a map, instead of Palestine, in a country popular for its steadfast stance on Israel, the Ministry of Education decided to cancel the new geographical grade 1 manual⁶². The following controversies also raised many concerns about the essence of the curriculum reforms that have not been explicitly identified within the framework of reform. The reform has received a mixed response, some of which views it as an isolation tool and others as a tool for modernizing it.

In 2016 in the study on the World Economic Forum following the annual meeting held in Davos, Switzerland, the effect of low paid teachers on Algeria's low level of education was reported⁶³. The study notes that in both quality and educational standards, Algeria ranked 119th out of the 140 countries.

2.4.2 Reforms and Policies in Algerian Education Sector

More and better education should be the main priority for international policymakers because it enables people to help themselves, thereby helping them to improve their governance and reduce corruption. The most promising route from poverty to sustainable development would seem to be a concerted effort for far more primary and secondary education with combined national and international forces⁶⁴. Policymakers interested in promoting future prosperity should focus on education instead of inputs or achievements⁶⁵.

⁶¹ Abainia, Kheireddine. "DZDC12: a new multipurpose parallel Algerian Arabizi–French code-switched corpus." *Language Resources and Evaluation* (2019): 1-37.

⁶² Ramcharan, Bertrand G. *United Nations Protection of Humanity and Its Habitat: A New International Law of Security and Protection*. Brill, 2016.

⁶³ Salmi, Jamil. *The tertiary education imperative: Knowledge, skills and values for development*. Springer, 2017.

⁶⁴ Chemingui, Mohamed Abdelbasset, and Moataz Mostafa El-Said. "Algeria's Macroeconomic Performances from 1962 to 2000." *Contributions to Economic Analysis* 278 (2006): 335-358.

⁶⁵ Woessmann, Ludger. "The economic case for education." *Education Economics* 24.1 (2016): 3-32.

The country of Algeria raised and promoted democracy education in the country as a whole and among all the social groups following independence. Ten years later, all levels of learning – primary, secondary, and higher – were free and accessible to all Algerians. In the last half-century, this virtuous aim of education has become a right for all, which favors quantity over quality⁶⁶.

Despite the general economic contraction caused by the collapse of the hydrocarbons market in 2014, Algeria has maintained a high degree of education investment in recent years. As the Ministry for National Education (MEN) continually focuses on improving teacher training and education practices, the Ministry of Higher Education and Scientific Research (MESRS), in order to meet the growing demand, is focusing on extending existing teacher networks and institutions.

The current policy on lower education follows the three foundations for education development laid down in July 2014 and June 2015. These three policies focus on a pedagogical revision which seeks to go beyond rough memorization techniques, to improve self-regulatory governance, and to modernize training for teachers. The MEN established a strategic primary education system up to 2030 that supports the three pillars and maintains a general commitment to improving education quality.

2.5 Importance of Education Attainments

Secondary education programs provide a major catalyst for economic growth, far more than compulsory primary training alone can do. The U.N. Millennium Development Goals were, therefore, significant but inadequate in their emphasis on universal primary education. In order to ensure that large segments of the population have at least completed their junior high school, compulsory primary education must be achieved. The Sustainable Development Goals (SDGs), among other objectives, ensure that girls and boys obtain free, equal, and high-level primary and secondary education and achieve a specific

⁶⁶ Mekdad, Yousra, Aziz Dahmani, and Monir Louaj. "Public spending on education and economic growth in Algeria: Causality test." *International Journal of Business and Management* 2.3 (2014): 55.

and successful learning result by 2030⁶⁷. This shows that secondary education is more important. The only thing that can provide developing nations with the human resources to get large segments of the population out of poverty is broad-based secondary schooling and general primary education. More developing countries are also playing a key role in economic development by tertiary education for younger adults⁶⁸.

2.6 Economic Development in Algeria

In 1962 Algeria agreed on a country's industrialization-based growth policy⁶⁹. Indeed, for the Algerian authorities, industrialization still was a primary concern. Oil sales grew significantly during the 1960s and 1970s, changing the government's economy to the petroleum industry. Thus, the industrialization took place, and the economy flourished. The structure of the Algerian economy was consistent with the standards of the market economy, especially for the banking and monetary systems, until 1967⁷⁰.

According to Mohamed, Okba Abdellaoui, and Nawal (2018), in the first 4-year plan, 1970-1973, the central organized decision-making process was agreed as a framework for coordinating the growth of the national process. Physically, this scheme of the Soviet kind was conceived. This organization has stimulated investments that clearly explain the Algerian economy's strong success after independence. Unfortunately, in the 1980s, oil prices plummeted, having a negative effect on Algeria's oil-related economy. In the 1990s and early 2000's the political and social backdrop – the so-called events ("the events") discreetly called by Algiers – and the low price of oil threatened the degree of governors' independence. Algeria suffered from several political problems, defined, and called a civil war, between 1988 and 1998⁷¹. These developments were accompanied by the years of economic stagnation in Algeria in the 1980s, after the collapse of oil prices, leading to the

⁶⁷ Zajacova, Anna, and Elizabeth M. Lawrence. "The relationship between education and health: reducing disparities through a contextual approach." *Annual review of public health* 39 (2018): 273-289.

⁶⁸ Lutz, Wolfgang, and Endale Kebede. "Education and health: redrawing the Preston curve." *Population and development review* 44.2 (2018): 343.

⁶⁹ Chemingui, Mohamed Abdelbasset, and Nassima Ayadi. "Understanding the poor human capital contribution to economic growth in Algeria." paper produced as part of the Global Development Project on Explaining Growth in Developing Countries: The Case of Algeria (2003).

⁷⁰ La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. "Government ownership of banks." *The Journal of Finance* 57.1 (2002): 265-301.

⁷¹ Martinez, Luis. *The Algerian civil war, 1990-1998*. Amer Univ in Cairo Press, 2000.

explosion in public debt and declines in Algeria. The sub-period was marked by high unemployment rates as well as low growth levels. With a lag of up to 12 months, inflation was attributed to an increased fiscal deficit associated with the unsustainable increase in the supply of money. The political leaders of Algeria then could not keep the public sector produced. Throughout this time, Algeria was suffering from two stabilization programs for the IMF, a macroeconomic stabilization program from April 1994 to March 1995, and a structural reform program from April 1995 to March 1998. In the 1980s, the situation in other transition economies also led to significant losses causing an increase in unemployment among the Algerian public enterprises⁷².

These programs were designed for the reform of the Algerian economy, a recession that saw high unemployment, a significant trade deficit, and high inflation in Algeria. Of course, at the end of Algeria's economy, unemployment reached nearly 30%, a budget deficit equivalent to 8.7% of the gross domestic product (GDP), rapid growth in the supplies of cash (+21%), a balance of trade deficit aggravated by a fall in the exchange reserves until only six weeks were able to cover imports. Factors which burden the country in the 2000s have been overcome: the "accidents" have come to an end, and the dinar has become more stable compared to the dollar and oil prices have increased, resulting in a positive balance of payments and an excessively liquid bank system. Fortunately, until the last two years, Algeria has seen stable and moderate inflation. The action was taken against fluctuated budgetary surplus by unpredictable variations in oil prices to cut public debt and protect public spending. Thus, following the rise in oil prices, a regulatory revenue fund (RRF) was created. The Algerian leaders committed themselves to a new economic strategy, the main aim of which was to liberalize the economy⁷³. The new reform strategy, which was introduced in 1994, was to promote an open, market-based economy rather than a public sector. At the end of the 1990s, this new approach was based on two key improvements, which were accompanied by an advantageous context. Algeria was more stable than it was in the 1990s on the political side, even despite the ongoing problems.

⁷² Mohamed, Zergoune, Okba Abdellaoui, and Nawal Ben Amara. "Determinants of the Algerian Economy: Autoregressive Distributed Lag Approach." *International Journal of Economics and Financial Issues* 8.5 (2018): 7.

⁷³ Mohamed, Zergoune, Okba Abdellaoui, and Nawal Ben Amara. "Determinants of the Algerian Economy: Autoregressive Distributed Lag Approach." *International Journal of Economics and Financial Issues* 8.5 (2018): 7.

On the economic side, the continuous rise in oil prices from 13 U.S. dollars per barrel in June 1998 up to 60 U.S. dollars in August 2005 played crucial rolling stock.

The rise in oil prices contributed by improving the external accounts and achieving the goals of the Adjustment Program. From 1998 to 2005, Algeria's reforms gave the authorities more independence and freedom to reform. Algeria launched an Economic Recovery Program for 2001-2004. The purpose of this program was, by means of public infrastructure investment, to support agricultural and small and medium-sized enterprises, to stimulate aggregate demand and absorb higher employment rates. The economy of Algeria is heavily dependent on its revenue in the oil and gas sectors. However, incessant uncertainty has plagued the asset market. The economy since the 1980s has been marked by financial uncertainty, likely as a result of the various policies introduced. The country's domestic institutions typically receive government subsidies to achieve higher competition with international institutions. In comparison, large amounts of money fell significantly from 1980 to 1988 until 1996. Big cash recovered from 1996 to 2010 meant steady growth. Oil and gas exports – which compose between 94% and 98% of total Algerian exports, have significantly increased apart from 1985 to 1994. Other exports have also been increasing. This is because these goods are definitely required and are also exported raw⁷⁴. On the other hand, except for 1990-1997, imports continue to increase, and this could be caused by the fragility of industries to achieve self-sufficiency by the lack of technology and untrained workers. Fortunately, exports remained higher than imports because of the large part of the hydrocarbon field in GDP. The balance of payments of goods and services has also been maintained positive irrespective of import volume⁷⁵.

2.7 Contribution of the French Colony on the Economy Development

French settlement started in the 17th century, particularly in North America, but the majority of this “first colonial empire” was lost in 1814⁷⁶. The “second colonial empire,” to which, thus, we are essentially tied, started in 1830. The region of Western Africa and the

⁷⁴ World Bank Indicators, World Bank Database. (2010), Available from: <http://www.data.worldbank.org/>. [Last accessed on 2020 September 07]

⁷⁵ Ibid.

⁷⁶ Aldrich, Robert. Greater France: A history of French overseas expansion. Macmillan International Higher Education, 1996.

Maghreb and various areas in East Africa, the Middle East, East Asia's and the Pacific came to be included later in the 19th and early 20th centuries. Mostly in 1960, French colonialism ended with the liberation of most colonies. A highly centralized and standardized education system was developed in all the colonies^{77 78 79}. Without government approval, schools could not run. Officials of the Ministry ensured the implementation of national education policy. The colonial administration inspected all schools, including private and missionary schools. They were expected to follow a national curriculum and use only qualified government teachers. The teachers were mainly from France and other countries in Europe. The only language of teaching was French. Only materials for metropolitan education have been used. Class size often was large, and pupils obtained basic skills only, apart from small elites, in French colonial schools. The French sought to force their own culture on colonies through this strategy^{80 81 82}. The traditional traditions, including traditional schooling, have been neglected and displaced. Colonial rule-makers felt obliged to "free" and train citizens of the colonies to a higher degree of civilization⁸³.

In its colonial education program, the French government incorporated three more elements from the beginning of the 20th century⁸⁴. First, at all levels, school fees have been eliminated. Second, it was to be a purely secular education, for all missionary and church-led schools. The state was by far the largest educational provider. Thirdly, education should be related to the needs of administrative workers. The French education system was very hierarchical and elitist for a long time. This characteristic of the colonies was

⁷⁷ Clignet, Remi P., and Philip J. Foster. "French and British colonial education in Africa." *Comparative Education Review* 8.2 (1964): 191-198.

⁷⁸ White, Bob W. "Talk about School: education and the colonial project in French and British Africa (1860-1960)." *Comparative Education* 32.1 (1996): 9-26.

⁷⁹ Garnier, Maurice, and Mark Schafer. "Educational model and expansion of enrollments in sub-Saharan Africa." *Sociology of Education* 79.2 (2006): 153-176.

⁸⁰ Gifford, Prosser, and Timothy C. Weiskel. "African Education in a Colonial Context: French and British Systems." *France and Britain in Africa: Imperial Rivalry and Colonial Rule*, edited by Prosser Gifford and William Roger Louis. New Haven: Yale University Press. *Gifford African Education in a Colonial Context: French and British Systems France and Britain in Africa: Imperial Rivalry and Colonial Rule* 1971 (1971).

⁸¹ Swink, Roland Lee (2014). *Education in French Colonies and Former Colonies*, Encyclopedia Britannica. Available at <http://www.britannica.com>, accessed 26 November 2014.

⁸² Bryant, Jo Anne R. (2015). *Syria*, Education Encyclopedia. Available at <http://education.stateuniversity.com>, accessed 4 January 2015.

⁸³ White, Bob W. "Talk about School: education and the colonial project in French and British Africa (1860-1960)." *Comparative Education* 32.1 (1996): 9-26.

⁸⁴ Gifford, Prosser, and Timothy C. Weiskel. "African Education in a Colonial Context: French and British Systems." *France and Britain in Africa: Imperial Rivalry and Colonial Rule*, edited by Prosser Gifford and William Roger Louis. New Haven: Yale University Press. *Gifford African Education in a Colonial Context: French and British Systems France and Britain in Africa: Imperial Rivalry and Colonial Rule* 1971 (1971).

emphasized and reinforced by the third aspect. Elite school enrolment was strictly limited now based on job availability estimates, particularly in the colonial government.

The French colonial education policy has been divided into three stages: the 19th century, the period from the beginning of the twentieth century until 1945, and the subsequent decolonization period. The politics in the 19th century was based on the assimilation principle. Indigenous people have been converted into Frenchmen, and education is considered the main instrument for achieving that objective. The assimilation policy has degraded the cultural traditions of the settled societies. For example, the texts used in colonial schools constantly reminded local pupils that their atmosphere and the French way of life are all less important than France⁸⁵.

"Adaptation" replaced "assimilation" as the norm for education systems at the beginning of the 20th century. The program has now been updated according to local requirements. They were only able to change their traditional way of life gradually, instead of attempting to turn natives into Frenchmen. A two-way structure for education was set up: basic mass education and specialized education for Europeans and a few local elites. This adjustment strategy was the result of an excessive European sense of racial superiority and mistrust of aboriginal people⁸⁶.

Finally, the assimilation policy was revived in the period of decolonization after 1945. Strict copies of French metropolitan schools were produced by the French government in colonies. The registration was significantly increased, but the system remained very limited. The new policy changes were partially due to the 1944 Conference of Brazzaville, which declared education to be intended to make top African managers and not just sub allows⁸⁷. In addition to the decolonization age, registration rates have been extremely low. On average, for example, the gross primary enrolment rates for French colonies were approximately 6% in 1880, between 13% and 14% between 1890 and 1910, between

⁸⁵ Gifford, Prosser, and Timothy C. Weiskel. "African Education in a Colonial Context: French and British Systems." *France and Britain in Africa: Imperial Rivalry and Colonial Rule*, edited by Prosser Gifford and William Roger Louis. New Haven: Yale University Press. Gifford African Education in a Colonial Context: French and British Systems France and Britain in Africa: Imperial Rivalry and Colonial Rule 1971 (1971).

⁸⁶ Kelly, Gail P. "Colonialism, indigenous society, and school practices: French West Africa and Indochina, 1918-1938." *Education and the colonial experience* (1984): 9-32.

⁸⁷ Cowan, Laing Gray, James O'Connell, and David G. Scanlon, eds. *Education and nation-building in Africa*. Vol. 571. FA Praeger, 1965.

1920 and 1930, around 18%, and between 1935 and 1940 24%. By comparison, between 1890 and 1910, France itself accounted for around 84% and in the period from 1920 to 1930 for around 74%⁸⁸. In several former colonies after independence, the conventional French education system continued^{89 90}. The consistency of the education system is referred to its composition as well as its selectivity and elitism. Reform of the curriculum has been sluggish⁹¹. In addition, most of the teaching was in English⁹². Only in a few countries was French partially or entirely replaced by the respective local dominant language. In Laos, for instance, Lao became the language of instruction at all educational levels only after the Revolution of 1975⁹³. The country gained complete independence from France in 1953.

The only meaningful change from the colonial era was that primary enrolment was considerably increased after independence – initially quite quickly but much slower later on⁹⁴. For example, the gross primary Enrolment Rate rose from about 30% on average in 1960 to around 50% in 1970 across the old French colonies in Africa. Only in the late 1970s, it exceeded 60% and held just above 60% until 1995. It increased further only in the late 1990s and 2000s. By 2009, it stood at nearly 100%⁹⁵.

2.8 Considerations of Quality of Education for Economic Growth

Education does not only involve the amount of education but more importantly also the quality of education – the percentage of the population attending main, secondary, or tertiary schools. For instance, Odit, Dookhan, and Fauze (2010) conclude that the quality of schooling (this can be reflected in international tests) has a significant connection to

⁸⁸ Benavot, Aaron, and Phyllis Riddle. "The expansion of primary education, 1870-1940: Trends and Issues." *Sociology of education* (1988): 191-210.

⁸⁹ Clignet, Remi P., and Philip J. Foster. "French and British colonial education in Africa." *Comparative Education Review* 8.2 (1964): 191-198.

⁹⁰ Corbett, Edward M. *The French presence in black Africa*. Black Orpheus Press, 1972.

⁹¹ Swink, Roland Lee (2014). *Education in French Colonies and Former Colonies*, Encyclopedia Britannica. Available at <http://www.britannica.com>, accessed 26 November 2014.

⁹² Paasche, Karin. *Djibouti, Education Encyclopedia*. (2015) Available at <http://education.stateuniversity.com>, accessed 4 January 2015.

⁹³ Fry, Gerald W., Hui Bi, and Rosarin Apahung. "Regional Educational Disparities in Thailand." *Education in Thailand*. Springer, Singapore, 2018. 373-391.

⁹⁴ Clignet, Remi P., and Philip J. Foster. "French and British colonial education in Africa." *Comparative Education Review* 8.2 (1964): 191-198.

⁹⁵ Dupraz, Yannick. *British and French Colonial Education in Africa: A Spatial Discontinuity Analysis at the Border Between French-Speaking and English-Speaking Cameroon*. Mimeo, Paris School of Economics, 2013.

economic growth, not merely years of schooling⁹⁶. Pavlova noted that calculating the secondary and tertiary registration rates for the World Economic Forum requires training and education quality as measured by corporate executives and the level of employee training. The SDGs notice that important progress has been made in access to education for both boys and girls, particularly in primary school. Access, however, does not always mean the quality of education or primary school completion. Today, 103 million young people around the world still do not have the basic know-how to learn, with more than 60% being females. The role of education in supporting growth is discussed by Singell et al. (2010), concentrating on the position of education quality⁹⁷. It suggests that there are strong signs that people's cognitive abilities are closely linked to long-term economic development rather than just school achievement. In empirical applications, the relationship between skills and growth is extremely strong. Complementing the efficiency of economic institutions, the importance of skills is also of great significance. The long-term rewards for quality of education are high, but they require patience also, according to growth simulations. The emphasis on human capital as a driving force for economic development for developing countries has brought disproportionate attention to the achievement of schools. Developing nations have made significant strides in closing the school achievement gap with developed countries, but research has demonstrated how important cognitive skills are to economic development. This draws focus on school quality issues, where emerging countries have been far less able to close the gaps with developed countries. Developing nations can hardly boost their long-term economic performance without enhancing school quality⁹⁸.

2.8.1 Relationship of Education and Productivity

Educational policies within each country clearly represent an essential determinant of the composition and development of the production and exports of that country and are a key component in a system's ability to effectively borrow external technology. In this respect,

⁹⁶ Odit, Mohun P., K. Dookhan, and S. Fauzel. "The impact of education on economic growth: The case of Mauritius." *International Business & Economics Research Journal (IBER)* 9.8 (2010).

⁹⁷ Singell Jr, Larry D., and Brad R. Curs. "Dominic J. Brewer and Patrick J. S McEwan, Editors, *Economics of Education*, Academic Press, Oxford (2010) pp. ix+ 369, \$99.95." *Economics of Education Review* 29.6 (2010): 1183-1184.

⁹⁸ Singell Jr, Larry D., and Brad R. Curs. "Dominic J. Brewer and Patrick J. S McEwan, Editors, *Economics of Education*, Academic Press, Oxford (2010) pp. ix+ 369, \$99.95." *Economics of Education Review* 29.6 (2010): 1183-1184.

education supports basic science, appropriate choice of technologies imports and domestic adaptation and technology development; for example, health, nutrition, and primary and secondary education, all increase workers' productiveness; secondary, including vocational education, helps acquire ability and management skills; third, secondary education supports the growth of basic science. These relationships are further illuminated by empirical evidence at both micro and macro levels. Numerous studies show that earnings increase contribute to additional years of schooling, and the return rate varies from high education⁹⁹ ¹⁰⁰. Primary school returns tend to be higher than secondary education returns¹⁰¹.

In agriculture, evidence indicates that farmers who use modern technology have positive effects of education on productivity, but that the impact on farmers using traditional methods is not as anticipated. The chance for fertilizer and other modern inputs in Thailand was three times greater than that for less trained farmers, with four or more years of experience¹⁰². Similarly, in Nepal, the productivity increased by more than a quarter in wheat and in rice by 13% over at least seven years of schooling. Training is also a key contributor to the industry's technological and technical shifts. A statistical study of the clothing and engineering industries in Sri Lanka, for example, showed that employees and entrepreneurs have a good relationship between the level of ability and education of the business¹⁰³. Naturally, education alone cannot change the economy. Other important factors in economic performance include the quantity and quality of investment, domestic and international, as well as the overall policy setting. But these factors are also affected by the stage of human growth. The standard of policymaking and investment decisions is conditionally affected by education for both managers and policymakers; in addition, when the supply of human resources to the system is more available, the amount of both foreign and domestic investment could be higher.

⁹⁹ Behrman, Jere R., and Barbara L. Wolfe. "How does mother's schooling affect family health, nutrition, medical care usage, and household sanitation?" *Journal of econometrics* 36.1-2 (1987): 185-204.

¹⁰⁰ Psacharopoulos, George. "Returns to investment in education: A global update." *World development* 22.9 (1994): 1325-1343.

¹⁰¹ *Ibid.*

¹⁰² Ozturk, Ilhan. "The role of education in economic development: a theoretical perspective." Available at SSRN 1137541 (2008).

¹⁰³ Samaranyake, Sanjee Udari, and Toshihiko Takemura. "Employee readiness for organizational change: a case study in an export-oriented manufacturing firm in Sri Lanka." *Eurasian Journal of Business and Economics* 10.20 (2017): 1-16.

In macro prospects, "modern theories of growth" seek to enhance technological progress by integrating some of these same results, emphasizing both education, learning, research, and development. For example, the higher the level of education of the workforce, according to Birdi et al. (2008), the higher the total productiveness of capital because more skilled people are more likely to innovate and thus influence the productivity of everyone¹⁰⁴. In other models, the increased education of individuals not only raises their own productivity but also the levels of those with whom they interacted, thus increasing the overall productivity as the average level of education rises¹⁰⁵. Another way human development affects macro-output is to influence the quality and growth of exports that, in turn, affect the overall growth rate. The preparation and skills of a working force in a developing world affect the essence of its factor endowment and, therefore, its market composition. Even "unqualified" staff in a modern factory typically require literacy, digitalization, and discipline that is learned in primary and lower secondary schools¹⁰⁶.

2.8.2 Relationship between Education and Income

There is also a significant correlation from better learning to more equitable wages, which would, in turn, encourage higher growth rates. As education gets broader, people with low incomes will pursue economic opportunities more effectively. For example, in 18 countries of Latin America in the 2000s, a report on the relationship between education, income inequality, and poverty found that one-quarter of a difference in the income of workers had differences in the level of schooling; it concluded that "clearly, education was the variable with the most significant impacts on income equality"¹⁰⁷. Another study showed that a 1% rise in the population with at least secondary education would raise the income share by between 6% and 15%, respectively¹⁰⁸. An analysis of the income distribution determinants in 36 countries found significant secondary entry rates¹⁰⁹.

¹⁰⁴ Birdi, Kamal, et al. "The impact of human resource and operational management practices on company productivity: A longitudinal study." *Personnel psychology* 61.3 (2008): 467-501.

¹⁰⁵ Perotti, Roberto. "Political equilibrium, income distribution, and growth." *The Review of Economic Studies* 60.4 (1993): 755-776.

¹⁰⁶ Wood, Adrian. *North-South trade, employment, and inequality: Changing fortunes in a skill-driven world*. Oxford University Press on Demand, 1995.

¹⁰⁷ Gasparini, Leonardo, and Nora Lustig. *The rise and fall of income inequality in Latin America*. No. 118. Documento de Trabajo, 2011.

¹⁰⁸ Kumar, M. Dinesh, et al. "Human Development, Inclusive Growth and Poverty Alleviation through Water Security: Global Evidence." (2014).

¹⁰⁹ Bourguignon, Francois, and Christian Morrisson. "Income distribution, development and foreign trade: A cross-sectional analysis*." *European Economic Review* 34.6 (1990): 1113-1132.

The effects of education on the denominator, that is, population growth per capita, will influence per capita income growth. For instance, a study of the 14 African countries in the mid-1980s revealed a negative association in almost all countries between women's schooling and fertility, with primary education negative effects in about half of them and no major impacts in the other half and secondary education constraining fertility^{110 111}. Kenya, Botswana, and Zimbabwe are the three stable countries with the lowest fertility levels and the lowest mortality rates in the infant.

2.9 Methods involved in Assessing the Contribution of Education in Economic Growth

Economists sought for a long time to find an effective way to assess the contribution to the economic growth of education. The variety of methods that have been established are one of the hallmarks of the emerging literature. The numerous stacks taken can be considered a tribute to the inventiveness of the profession, an indication of the scope and difficulty of the problems, or a signal that we are unable to proceed¹¹². The economic impact of education is calculated using four primary approaches. These are the following:

2.9.1 Simple Correlation Approach

The relationship between education and GDP is seen under this method by the similarities between certain overall indicators of education and economic activities¹¹³. The most popular educational metrics are the literary ratio to the total population, the enrolment ratio to a certain age group, and per capita education expenditure. There are correlated registration levels and GDP per capita for economists like Edding and Svennilson, and they have found that there is a strong correlation. According to Hanushek and Ludger (2011), this approach can be used to compare education and economic development in different

¹¹⁰ Ozturk, Ilhan. "The role of education in economic development: a theoretical perspective." Available at SSRN 1137541 (2008).

¹¹¹ Hill, M. Anne, and Elizabeth M. King. "Women's education in developing countries: An overview." King, Elizabeth M. and M. Anne Hill, eds (1993): 1-50.

¹¹² Stevens, Philip, and Martin Weale. "Education and economic growth." International handbook on the economics of education 27 (2004): 205-311.

¹¹³ Ibid.

countries and to draw useful lessons (inter-country comparison)¹¹⁴. Education expansion may also be related over a period with economic growth (inter-temporary correlation). A further approach is to measure the level of education of employees in an organization and to include the research and development and profitability of the company relative to other industries. The approach to connection is the best approach to the improvement of education and economy. But one of the basic objections is that the GDP connection tells us little about their casualties. This is partly due to the issue of time to predict educational returns. The returns from schooling usually take time and again for a long time. This is also a deceptive strategy.

2.9.2 Residual Approach

This approach considers a cumulative improvement in economic performance in a country for a certain period¹¹⁵. The increase is due to the observable inputs such as capital and labor. That is what is left as education's contribution. The remaining component also involves economies of productivity, better working-class health, changes in the product mix, increases in capital asset efficiency, and economic order reorganization. Alston et al. (2000) following this approach, worked for 68 years on U.S. economic development from 1889 to 1957¹¹⁶. He noted that while the combined output rate rose 3.5% annually, this average combined input index rose by 1.9% annually. This contributed to a 1.6% annual residual rise. As a percentage of the increase in total production, the residual contribution can also be expressed. In this scenario, 80% of increased output per unit of labor input can be attributed to residuals, with only about 20% due to the rise in physical capital stock.

Correa's research (1962) showed how education leads to GDP growth in the U.S. The paper shows that 31% of the rise in private non-field GNP between 1909 and 1949 was attributed to inputs in labor-capital; 5.5% to rises in labor force education; 4.4% to increased workability because of health development and 59.3% to technical changes¹¹⁷.

¹¹⁴ Hanushek, Eric A., and Ludger Woessmann. "The economics of international differences in educational achievement." *Handbook of the Economics of Education*. Vol. 3. Elsevier, 2011. 89-200.

¹¹⁵ Dritsakis, Nikolaos. "Tourism development and economic growth in seven Mediterranean countries: A panel data approach." *Tourism Economics* 18.4 (2012): 801-816.

¹¹⁶ Alston, Julian M., et al. *A meta-analysis of rates of return to agricultural R&D*: Vol. 113. Intl Food Policy Res Inst, 2000.

¹¹⁷ Behrman, Jere R. "Schooling in developing countries: which countries are the over- and underachievers and what is the schooling impact?" *Economics of Education review* 6.2 (1987): 111-127.

Here 80% of increased production per unit of work input can be traced to residuals, with just 20% of the rise in the physical capital stock attributable.

A study by Kneese Robert and Ralph stated that economists considered residual factors to be an important engine of economic development, although it is not popular to agree on the exact type and composition of the residual. In this regard, several economists worked and developed a positive correlation between the residual factor and economic growth. But there are drawbacks to the residual method. Some capital assets may also involve the interrelationship between capital formation technologies and the creation of expertise. They make a significant contribution to education. There is no distinction between formal, informal education, and the variations in this approach. But it is worth pointing out the importance of education to national production to the attention of economists and policymakers.

2.9.3 Return Rate Approach

According to Cutler and Adriana, the returns rate approach reflects on the lifespan of individuals with varying educational levels. The average percentage return on the education expenses can be calculated as the difference in lifetime earnings. Two forms of return rates, (1) private return rates, and (2) social return rates, are applicable. Earnings are derived solely from income tax and social rates in the calculation of the private rate of return; earnings are included as sales tax. The rate of return investment in education is determined by two groups. One approach is to measure the return on investment by individuals in education by comparing the expenses incurred and the returns they earn from education. The resulting rate is called the private return rate.

The second approach is to measure the social rate of return by using educational expenditure for social investment and the costs and profits of society¹¹⁸. Different studies have calculated the social and private rate of return for education by Cutler and Adriana (2006) and have shown that the profits vary accordingly¹¹⁹. They also argued that

¹¹⁸ Behrman, Jere R. "Schooling in developing countries: which countries are the over- and underachievers and what is the schooling impact?" *Economics of Education review* 6.2 (1987): 111-127.

¹¹⁹ Cutler, David M., and Adriana Lleras-Muney. *Education and health: evaluating theories and evidence*. No. w12352. National bureau of economic research, 2006.

educational returns are higher than those in more advanced countries. Acs, Sameeksha, and Jolanda (2000) found that the private rate of return on education almost never exceeds the corresponding social rates of return in his return analysis model¹²⁰. Several studies on the rate of return on education were also conducted in India. The social and economic importance of education is illustrated in every major report.

The use of this approach has some issues. The future income of an individual is difficult to predict, and the market part of his education cannot be established. An individual's income is supplemented by different variables, including intellect, motivation, family ties, and educational differences. This approach allows contrast between costs and advantages, despite its drawbacks, and explores the impact on earning disparities of skill differentials.

2.9.4 Needs of Manpower Forecasting Approach

As illustrated by Acs, Sameeksha, and Jolanda, in this context, the ratios between different groups of employees in different developing countries are discussed in order to evaluate the link between education and training, on the one hand, and economic development, on the other¹²¹. For future work, the balance between demand and availability of skilled staff is crucial in the provision of the workforce for future work. It is a sound strategy to schedule the performance of educational institutions to meet the real needs of employers so that no unemployed or empty jobs can be achieved. The services dedicated to education and training are important to think about. In most countries, this approach is used to prepare education projects in the future on the basis of their staff needs. However, because of the sensitive issues involved, it is very challenging to provide workforce estimates for the potential growth activities, but it is straightforward scientifically, and the advice is very useful for realistic leaders. However, the situation becomes awkward if the forecasts are not well arranged or if they do not happen.

¹²⁰ Acs, Zoltan J., Sameeksha Desai, and Jolanda Hessels. "Entrepreneurship, economic development and institutions." *Small business economics* 31.3 (2008): 219-234.

¹²¹ *Ibid.*

2.10 Education Contribution to Economic Growth

There are two ways – direct and indirect – for education to be a part of economic development. In productivity, employment, the composition of labor forces, division, and mobility of labor, etc., direct contributions can be observed. Education's indirect contribution to the growth of the economy is that it influences thrift, saving, family size constraints, and the creation of the necessary competencies and skills.

2.10.1 Direct Contribution

Rising productivity is provided through education. Investments in an individual's schooling established income, or livelihoods are projected to increase. The national production of a country often increases with the people's possession of knowledge. The disparity in earnings to devote a portion of it to education can be measured quite difficultly. The difference in income can be related to a variety of factors such as age, family history, schooling, work opportunities, parents' social and cultural-political affiliation circle. In addition, the educational inputs, the type of formal, non-formal, and informal education, and the educational materials cannot be produced separately. Due to some technological drawbacks, a statistics methodology is difficult to define and can clearly demonstrate how education leads to efficiency. Pritchett, Lant, and Deon (1999), noted that “The positive return to individuals in the form of higher wages and to society will always be provided by a healthy, productive, and appropriate educational system through greater efficiency, as long as it reacts to critical needs and needs in the economy and state of the art”¹²². With its aim, education's contribution cannot be confirmed statistically, but it does not indicate that it does not help growth and innovation of preserving and distributing information education. It eliminates such barriers to economic and social growth. Information improves thinking and enhances the capacity to interpret similar incidents and evidence accurately, draw inferences, and adapt the results to new circumstances.

Also, functional literacy, as it differs from traditional education, turns a fragmented society into a common culture with access to current information, the mass media, societal

¹²² Pritchett, Lant. Where has all the education gone? The World Bank, 1999.

developments, and modernization¹²³. The study, creativity, and innovation are often driven by education with respect to productivity. This new insight will lead to new approaches and new methods that will further accelerate the process of capital creation. Training not only enhances the productivity of the trained worker but also increases neighboring workers' productivity by having a role model that is significant¹²⁴.

As stated by Mokyr et al. (2015), training increases the job capacity of citizens in the context of economic growth¹²⁵. The labor force must have the technical skills necessary for modern industrial production and must also be imbued with a philosophy that concludes the acceptance and promotion of economic and technological change for rapid economic growth. Human capital must be built in tandem with material capital, which contributes to a large improvement in productivity. Human capital functions in many respects in the area of jobs. The growth of economic activity also increases the chances of jobs. It also results in shifts in technology where changes in job trends arise. Manual labor is often turned into trained jobs. This is an important shift in the rate of involvement in the study. Labor composition is also influenced by education. The substitution of child labor for adult labor contributes to people's well-being. It is possible to fully alter the occupational structure of society. The traditional occupations have been replaced by more advanced and skilled occupations. A kind of revolution takes place in the world of professions as culture shifts from agricultural to industry trends to the trend of automation, and cybernetic culture is substituted for automation society. It is, therefore, important to meet the occupational needs of society in the education system of every country. For such educational build-ups, primary and secondary education must first be provided, and, after that, specialist, technological, mechanical, or skilled training must be supplied.

By developing a correct attitude towards work and life, education leads to economic growth. The craze for "white collar" work exists in India. Rising education with lowered expectations and inability to manage education and economic growth in the country led

¹²³ Tyner, Kathleen. *Literacy in a digital world: Teaching and learning in the age of information*. Routledge, 2014.

¹²⁴ Kim, Youngsang, and Robert E. Ployhart. "The effects of staffing and training on firm productivity and profit growth before, during, and after the Great Recession." *Journal of Applied Psychology* 99.3 (2014): 361.

¹²⁵ Mokyr, Joel, Chris Vickers, and Nicolas L. Ziebarth. "The history of technological anxiety and the future of economic growth: Is this time different?" *Journal of economic perspectives* 29.3 (2015): 31-50.

to issues such as unemployment, job loss, and work losses¹²⁶. Studies by the Directorate-General for Employment and Development show that 24.4% of business graduates in clerical and related jobs were mainly for enrolment based on sample surveys of Indian graduates¹²⁷. This raises employee dissatisfaction and disparities since they face a smaller category of employment than their qualifications. Therefore, it is necessary for proper economic development in the country to be established that there exist proper values among students.

Pritchett, Lant, and Deon (1999), who stressed the division of labor, remarked: "Education offers an optimal combination of production factors by encouraging the division of labor and specialization¹²⁸. We have specialists in accounting, procurement, development, supervision, and management in every public or private enterprise, just as we have specialists from each community or field of economic activity, a condition that is impossible if not attributable to the pervasive presence of education in modern societies. This means that work can no longer be regarded as a homogeneous product, as each work unit varies by its nature, ability, and specialization. The fact that education helps us achieve the optimal combination of production factors has significant importance for a country such as India, whose high population needs to be comparatively more exploited in all combinations of production factors.

Education hastens the labor transition process, which in the process of industrialization is to transfer the population from one region to another, between various geographic areas, which leads to economic growth¹²⁹. The heavy industry hires people from remote areas when it is built. This is achieved even by the illiterate population, but primarily by the mobility of workers, which leads to improving the financial well-being of everyone.

2.10.2 Indirect Contribution

The size of the families is designed in an educated society based on different aspects. To have a smaller family and improved living conditions, people marry and support family

¹²⁶ Katz, Lawrence. "Long-term unemployment in the Great Recession." EPRN (2015).

¹²⁷ Alsaqri, S. "A survey of intention to leave, job stress, burnout and job satisfaction among nurses employed in the Ha'il region's hospitals in Saudi Arabia." (2014).

¹²⁸ Pritchett, Lant. Where has all the education gone? The World Bank, 1999.

¹²⁹ Little, Angela W., and Andy Green. "Successful globalisation, education and sustainable development." *International Journal of Educational Development* 29.2 (2009): 166-174.

planning steps at a late stage. This regulates the population and accelerates the process of economic growth. In general, an educated population is increasing at a lower rate. This is because education also contributes to increased incomes, increased equality and empowerment for women, and more limited access for smaller families for family planning initiatives. Although schooling results in less population growth, a decrease in fertility decreases potential pressures on the education system. A country with a decreasing population or increasingly increasing school age will increase spending to provide higher quality education for more years of schooling. The value of education is a springboard.

Education has better health outcomes, and literature and life expectancy or longevity are closely related¹³⁰. Training at home has a greater influence on the health of children. Demography, economics, medicine, and anthropology studies have established the close correlation between education and decreased mortality rate incidence¹³¹. A study of 25 developed countries shows that all of the same variables will reduce infant mortality by 15%, with one or three years of education. In addition, these findings suggest a 5% to 10% decrease in infant mortality with an additional mother's year of schooling. Educated parents usually have healthier children. Greater education also tends to improve sanitation, dietary habits, and family well-being effectively. Researches show that the average risk of infection is lower for children with educated parents because they are better immunized, hygienically better off, and have improved household food. Education will also encourage different family members to spend more on food and health care rather than on alcohol and playing games. Parental education and child mortality are especially strongly linked. Furthermore, empirical evidence shows that the level of child labor decreases significantly when primary education is universal. Several longitudinal studies have established a strong and optimistic correlation between education and health improvements.

Education has a crucial role to play in reducing extreme poverty. Several research studies in the 2000s have concluded that rising education levels in a country have also been

¹³⁰ Sobotka, Tomáš, Vegard Skirbekk, and Dimiter Philipov. "Economic recession and fertility in the developed world." *Population and development review* 37.2 (2011): 267-306.

¹³¹ Unger, Jens M., et al. "Human capital and entrepreneurial success: A meta-analytical review." *Journal of business venturing* 26.3 (2011): 341-358.

followed by an acute decrease in absolute poverty¹³². As poverty levels were compared to variables such as mean education years, adult employment, and gross enrollment rates, absolute poverty declined with rising education. Training has the greatest impact on poverty reduction in rural areas. It is these wider educational forces that make education expenditure so important for all society beyond the mere economic rate of return. Human capital investment continues to be a contentious topic. Critics who claim that schooling does not improve the productive capacity of employees but is just a "screening tool" to classify employees with higher inborn abilities or personal characteristics that make them more productive have criticized attempts to calculate the rate of return on investment in schooling.

2.11 Impact of Education on Economic Development in Algeria

There is much scientific research that attempts in developing countries to examine the contribution of education. These studies employed various estimation techniques. Some of them took the neoclassical approach, while others relied on the theory of endogenous growth. The findings indicated that the essence of the relationship between education and development is enormous.

The key driver of economic development, jobs, and wages is education. Failing to consider the economic component of education would threaten future generations' stability, which would have a widespread effect on poverty, social exclusion, and social security systems' sustainability¹³³. Economic growth can generate between 10 U.S. dollars to 15 U.S. dollars for every 1 U.S. dollar spent on education¹³⁴. If the lowest OECD mathematics target were to hit 75% more 15-year-olds in forty-six of the world's poorest countries, then economic growth will increase by 2.1%, and 104 million people will emerge from extreme poverty¹³⁵.

¹³² Dustmann, Christian, Itzhak Fadlon, and Yoram Weiss. "Return migration, human capital accumulation and the brain drain." *Journal of Development Economics* 95.1 (2011): 58-67.

¹³³ Torres, M. (2012). UNESCO: Global Monitoring Report. Retrieved June 10, 2012.

¹³⁴ Barro, Robert J. "Economic growth in a cross section of countries." *The quarterly journal of economics* 106.2 (1991): 407-443.

¹³⁵ Hanushek, Jerik, and Dennis Kimko. "Schooling, labor-force quality, and the growth of nations." *Educational Studies* 1 (2006): 154-193.

A study by Kreishan and Alhawari (2011) explored in their paper the causal effect of education in Jordan on economic growth during the 1978-2007 period¹³⁶. For this reason, they used co-introduction and causation measures. The key result of their analysis indicates that in Jordan, education and economic development have a long history. The technique of co-interaction was used by Naeem (2012) in Pakistan to research education-economic growth relations during the period 1971-2008¹³⁷. They find that both primary education and high school contribute to the GDP per capita. They also argued that the relationship between education and development is long-lasting. The role of human capital in economic growth during 1983-2004 was examined in Nigeria by Owalabi and Okwú (2010). The model was calculated using the OLS technique. Results show that Nigeria's growth over this period was statistically influenced only by the secondary and tertiary enrolment rates. For the period 1951-2002, Leoning (2004) studied the impact of education on Guatemala's economic growth¹³⁸. He concluded, with the use of the ECM model, that better-skilled workers have a good and important effect on growth. In addition, an accounting framework for growth demonstrated that education accounts for approximately 50% of production growth. Bils and Klenow (2000) concluded that increased enrolment to school in 1960 is correlated with a faster annual growth over 1960-90, which was one more year of achievement¹³⁹. According to them, this hypothesis is robust, and it enables technology to benefit positively externally from human capital. Their findings are consistent with Azariadis and Drazen (1990), which indicates temporary variations in the rates of human capital development¹⁴⁰. The relationship between education and economic growth was examined by Mankiw et al. (1992)¹⁴¹. They looked at differences in the rate of school enrolment in the developing and underdeveloped countries in one cross-section. Both surveys have shown that education has a substantially positive effect on real GDP growth rates. The effect of government education spending was also

¹³⁶ Kreishan, Fuad M., and Ibrahim M. Al Hawarin. "Education and economic growth in Jordan: causality test." *Journal of Economic & Management Perspectives* 5.1 (2011): 45.

¹³⁷ Khattak, Naeem Ur Rehman. "The contribution of education to economic growth: evidence from Pakistan." (2012): 145-151.

¹³⁸ Loening, Josef Ludger. "Time series evidence on education and growth: the case of Guatemala, 1951-2002." *Revista de Análisis Económico* 19.2 (2004).

¹³⁹ Bils, Mark, and Peter J. Klenow. "Does schooling cause growth?" *American economic review* 90.5 (2000): 1160-1183.

¹⁴⁰ Azariadis, Costas, and Allan Drazen. "Threshold externalities in economic development." *The quarterly journal of economics* 105.2 (1990): 501-526.

¹⁴¹ Mankiw, N. Gregory, David Romer, and David N. Weil. "A contribution to the empirics of economic growth." *The quarterly journal of economics* 107.2 (1992): 407-437.

investigated by Lin (2003)¹⁴². Their regressions show that the annual average of public education returns is in the range of 20% using instrumental variable techniques.

Boutayeba and Ramli (2019) argued that weak policies and structures in many of the least advanced economies have hindered development and have diverted skilled labor towards relatively unproductive activity, thereby undermining the statistical relationship between education and development in samples of less developed economies¹⁴³. The problems of unexplained differences in educational quality are compounded by panel results. According to Tilak (2007), increases in the stock of education have been shown to increase short term economic development, taking data quality into account¹⁴⁴. Moussaoui and Zirar (2015) affirm the close link between direct labor quality controls, from international math and science test results¹⁴⁵. Temple (2001) finds that optimistic, yet there are non-linear growth effects. Studies that enforce linearity will fail in these non-linear effects¹⁴⁶.

A number of subsequent studies took advantage of panel data to study changes in education and growth over time. Many of these panel studies have failed to recognize any significant relationship between the increased rate of education investment and the growth rate. The positive findings from the previous cross-sectional studies were suggested by the failure to control country-specific effects because of an omitted variability. Becherair (2014) compared models that treat human resources as a direct source of production with models that treat humans as an intermediate contribution to the acquisition of knowledge and/or skills¹⁴⁷. The first implies a connection between output growth and educational growth, while the latter implies a connection between output growth and the average human capital stock per worker. They support the latter model with its

¹⁴² Lin, T-C. "Education, technical progress, and economic growth: the case of Taiwan." *Economics of Education Review* 22.2 (2003): 213-220.

¹⁴³ Boutayeba, Faisal, and Mohamed Ramli. "The Link Between Education and Economic Growth in Algeria: An Empirical Investigation." *International Journal of Advanced Research in Education and Society* 1.1 (2019): 35-43.

¹⁴⁴ Tilak, Jandhyala BG. "Post-elementary education, poverty and development in India." *International journal of educational development* 27.4 (2007): 435-445.

¹⁴⁵ Moussaoui, Mohamed, and S. Zirar. "The impact of investment in human capital on economic growth in Algeria." *Revue innovation et marketing* 2, no. 2 (2015): 37-52.

¹⁴⁶ Temple, Jonathan RW. "Generalizations that aren't? Evidence on education and growth." *European Economic Review* 45.4-6 (2001): 905-918.

¹⁴⁷ Becherair, Amrane. "Education and Economic Growth in Algeria: An Empirical Investigation by Using ARDL Approach." *International journal of innovation and applied studies* 7.3 (2014): 1215.

econometric evidence. More trained employees can easily identify, adapt, and implement new ideas, both domestically and abroad.

In their study of the impact of education on economic growth, Houchine (2015) indicated that, human capital contributes to the Mauritian economy's growing production and thus encourages the country's adoption of the latest technology¹⁴⁸. We may note that the development of capital played a major part in explaining Mauritius' GDP growth rate at approximately 60%, followed by the accumulation of human resources and the growth of the labor force. It is evident, however, that human capital improves efficiency and shows, rather than just an instrument that people use to show their capacity to the boss, that education is beneficial.

Self and Grabowski (2004) based their research on the effect on India's economic growth of various levels of education¹⁴⁹. Their research is based on the premise that educational changes are responsible for economic growth changes. They tested the difference between education and economic development when the population is divided into groups by sex. They used 30-year data (1966 – 1996), with registration ratios as a proxy for the flows of human resources to calculate their educational levels. The average difference in years of schooling at each stage of education was another indicator. This formula measures the growth rate of the stock of human capital. As an outcome, Self and Grabowski (2004) demonstrated that primary and secondary education not only has a close relationship with the country's economic growth, but also has an important incidental effect on India's economic development¹⁵⁰. They also showed that all levels of education are interrelated. However, it also revealed differences in terms of their impact on economic growth between primary, secondary, and tertiary education as tertiary education does not seem to have a causal effect on economic growth. There was some weakness in their research. For example, the data were collected during the period during which reliable data were not accurately or at all recorded. Furthermore, the data may be obsolete as country, environment, and economy changes may occur within 20 years.

¹⁴⁸ Houchine, Y. (2015). The relationship between human capital and economic growth in Algeria. *Revue des recherches économiques et financières*, 4 (2), 129-146.

¹⁴⁹ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

¹⁵⁰ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

Therefore, their study is most probably not contemporary. By contrast, the lack of a secondary level impact of human capital on human resources reduces the reliability of the estimate of the effect of enrolment rate as a variable according to Easterlin (1981)¹⁵¹.

The author tries to demonstrate in another study by Boutayeba and Ramli (2019) that secondary and tertiary education is not necessary for the country's economic development, whereas post-elementary education, especially in terms of poverty reduction, a reduction in infant mortality, an increase in life expectancy and, particularly, economic growth in the country is more significant¹⁵². The results showed that there is a relationship between education and development after elementary education. The results also show that gender inequality is one of the greatest problems of Indian society in education. This is particularly true for rural women with lower socio-economic backgrounds¹⁵³. The gender gap has revealed the elements that affect education's relationship to economic growth. In India, it only exacerbates inequality in Indian society, and the higher education level is the higher salary of a person. Several other articles centered on the relationship between education level and the country's economic development. Schultz (1972) may be used as an example for this publication where the relationship between economic development, education, and technological progress is discussed¹⁵⁴. As has been shown, all the variables are linked and associated positively. Tikly and Barret (2011) explored the relationship between economic growth and higher education in his other study, which he also found to be positively linked¹⁵⁵. Some publications have reported on the same issue in wider areas like East Asia. McMahon (1998) found a positive correlation between education and economic development in his study¹⁵⁶.

Numerous studies in Algeria have tried to show the link between education and economic growth. For the estimation of co-integration and ARDL, several techniques were used. The most recent studies include from 1964 to 2010, Zhang (2013) studied the role of

¹⁵¹ Easterlin, Richard A. "Why isn't the whole world developed?" *The Journal of Economic History* 41.1 (1981): 1-17.

¹⁵² Boutayeba, Faisal, and Mohamed Ramli. "The Link Between Education and Economic Growth In Algeria: An Empirical Investigation." *International Journal of Advanced Research in Education and Society* 1.1 (2019): 35-43.

¹⁵³ Letiche, John M. "Adam Smith and David Ricardo on economic growth." *The Punjab University Economist* 1.2 (1960): 7-35.

¹⁵⁴ Schultz, Theodore W. "Human capital: Policy issues and research opportunities." *Economic Research: Retrospect and Prospect*, Volume 6, Human Resources. NBER, 1972. 1-84.

¹⁵⁵ Tikly, Leon, and Angeline M. Barrett. "Social justice, capabilities and the quality of education in low-income countries." *International journal of educational development* 31.1 (2011): 3-14.

¹⁵⁶ McMahon, Walter W., and Moses Oketch. "Education's effects on individual life chances and on development: An overview." *British Journal of Educational Studies* 61.1 (2013): 79-107.

human capital in Algeria's growth¹⁵⁷. As a proxy for human capital, he used high school enrolment rates. For estimation, he used the VAR technique. The main findings of his study indicate that education has a negative impact on economic growth. In their study, the effect of government spending in education on economic growth between 1970 and 2009 was estimated by Khan (2015)¹⁵⁸. They used the approach of co-integration to study the long-term balance between the two variables. It was concluded that increased educational expenditure in Algeria reduces growth. In another study, Becherair (2014) used ARDL to study the link between education and economic growth between 1971 and 2011¹⁵⁹. The findings indicated that the primary and tertiary education, on the one hand, and economic growth on the other, have a long-lasting relationship.

The effect of education on economic growth during 1991–2009 was calculated by Boutayeba and Ramli (2019)¹⁶⁰. As a metric for human resources, they used high school enrolment rates. Their key finding is that education has an important, three-year-long positive impact on development. The increase in high school enrolments will rise by 1% after three years. There is, however, a negative short-term relationship between the two variables.

The relationships between university graduates – an indicator for human capital – and economic growth from 1970-2009 have been analyzed by Houchine (2015)¹⁶¹. He used a model of co-integration for this reason. He showed that, with 1% more graduates, economic growth, in the long run, would rise by 0.27%. A series of factors that explain the lack of education in economic growth in Algeria were identified in Chemingui and Ayadi (2003)¹⁶². Firstly, inefficient labor institutions and education systems¹⁶³. Second, there is not a well-diversified national economy. Thirdly, private sector participation remains

¹⁵⁷ Zhang, Wei-Bin. "Education, Local Amenity and Spatial Agglomeration in a Small-Open Multi-Regional Economic Growth Model: Extending the Uzawa-Lucas Model to an Interregional Economy." *Business and Economics Research Journal* 4.1 (2013): 1.

¹⁵⁸ Khan, B. Zorina. Knowledge, human capital and economic development: Evidence from the British industrial revolution, 1750-1930. No. w20853. National Bureau of Economic Research, 2015.

¹⁵⁹ Becherair, Amrane. "Education and Economic Growth in Algeria: An Empirical Investigation by Using ARDL Approach." *International journal of innovation and applied studies* 7.3 (2014): 1215.

¹⁶⁰ Boutayeba, Faisal, and Mohamed Ramli. "The Link Between Education and Economic Growth in Algeria: An Empirical Investigation." *International Journal of Advanced Research in Education and Society* 1.1 (2019): 35-43.

¹⁶¹ Houchine, Y. (2015). The relationship between human capital and economic growth in Algeria. *Revue des recherches économiques et financières*, 4 (2), 129-146.

¹⁶² Chemingui, Mohamed Abdelbasset, and Nassima Ayadi. "Understanding the poor human capital contribution to economic growth in Algeria." paper produced as part of the Global Development Project on Explaining Growth in Developing Countries: The Case of Algeria (2003).

¹⁶³ Ibid.

small. Fourthly, the labor reform does not work. It also used the Granger causality test to assess the causalities between them. The co-integration test results showed the presence of a long-lasting correlation between secondary education and economic growth after testing the stationary variables under analysis. However, neither education causes growth nor growth causes education in Algeria were suggested as causality checks.

2.12 Theoretical Approach

Several theories and models explain and analyze the concept of education and economic growth. Such theoretical models and theories attempt to elucidate the impact of education on economic development. The GDP has been a longstanding concept of labor markets globally for decades. Theories, including sociological, economic, and psychological theories, have been utilized by researchers and economists to elucidate the GDP. Human capital theory and Neoclassical theory entail the theories that illustrate the concept of education on economic development (GDP).

2.12.1 Human Capital Theory

According to human capital theory, human capital refers to the productive wealth personified in skills, labor, knowledge, and innate traits or any stock of knowledge an individual possesses that contributes to their economic productivity¹⁶⁴. The concept of education is viewed in modern economic terms as a significant investment in human capital for the future in the present. It was identified as an important national development parameter. The word "capital" refers to natural and manmade reproductive capacity. The concept of human capital refers to the fact that people invest in their own lives through education and training or other activities that raise their future earnings by increasing their livelihoods. The word "investment" is used by economists as a means of expenditure on assets that generate future revenues and contrasts expenditure on investment with expenditures that generate immediate satisfaction and profit but do not generate future revenue. In the future, assets that generate revenue are called money. Traditionally, investment

¹⁶⁴ Gershman, John, and Alec Irwin. "Getting a grip on the global economy." *Dying for growth: Global inequality and the health of the poor* (2000): 11-43.

and capital analysis tended to focus on physical capital, namely machinery, equipment, or construction, which would generate income by creating productive capacity in the future. It is not an innovative concept to consider humans as a part of the capital that is important to economic development. The economic discipline has not fully integrated the component of human capital into the economic thinking flow.

Several classical economists, especially Addison (2002), pointed out that, in the same way as new structures or other types of physical resources were purchased, education helped increase a factory or other business' productive capacity¹⁶⁵. Therefore, there was a connection between physical capital investments and human capital investment. Education as a fixed human resources capital and as national expenditure was envisaged by Letiche (1960)¹⁶⁶. The acquisition of those talents through the maintenance of acquirers through their preparation, studies, or apprenticeship means to Smith (based on his *Wealth of Nations*, 1937) always the real costs of the acquisition, which is, as it were, a capital fixed and performed in his body. These talents are like the wisdom of the culture to which he belongs as they form part of his future. Khan (2015) asserts that "Capital is the most powerful engine of production; knowledge is the most powerful engine of organization." It underlines the importance of education as a national investment.

Until the 1960s, when U.S. economist Theodore Schultz analyzed educational expenditure as a type of investment, the notion of human capital was not completely developed. In 1962, a supplement to "investment in human beings" was published in the journal of "Political Economy" in the United States, and Becker published a book called "Human Capital" (Becker, 1964, second publishers 1975) on the theory of the development of human capital, a study of the rate of return on investment in education and training. The idea of human capital dominates the economy of education and has greatly influenced labor market research, wage determination, economic growth research, healthcare spending, and emigration study since then. With Theodore Schultz's presidential address, in 1960, during his address to the American Economic Association, the concept of

¹⁶⁵ Addison, Tony. "Structural Adjustment Handbook on Development Policy and Management. Ed. Colin Kirkpatrick, Ron Clarke, and Charles Polidano." (2002).

¹⁶⁶ Letiche, John M. "Adam Smith and David Ricardo on economic growth." *The Punjab University Economist* 1.2 (1960): 7-35.

education as an investment in human capital came into being. Schultz (1961) formed a more scientific and coherent theory¹⁶⁷.

In economics, Denison and Becker (1964) became known for the "Economic Capital Approach". Schultz pointed out that main investment, like property investment, are ways to create extra income streams (Schultz, 1961). It, therefore, promoted a higher priority in terms of increasing investment in education and developed a concept of human capital to quantify education's contribution to economic growth. Education is a capital investment, and such investment not only increases individual productivity but also provides a technical foundation for the type of workforce needed for rapid economic growth. In the process of economic development Schultz, (1961) argued vigorously against undermining human capital and overriding soil and physical capital. In his reading, "The Economy of Being Poor," he says: space, resources, and cropland are not the decisive factors for development to enhance the well-being of poor people.

The decisive determinants are an improvement in the quality of people and progress in education. The number of people and the number of hours worked is the quantity of human capital. The quality of human capital consists of skill, expertise, and human capacities. Investment in education is, according to Schultz (1972), a means of capital training and a key economic development factor¹⁶⁸. He noted, "While it is obvious that people develop valuable skills and knowledge, it is not clear that these skills and knowledge are a source of capital, that a major part of that capital is a consequence of deliberate investment¹⁶⁹. Earnings disparity is generally due to variations in human expenditure quantities. Education, like food, partly as consumption and partly as a capital good, is important. Human capital has risen faster than non - human capital in some Western countries; because of human investment, the portion of the human capital of national income is very high. Therefore, education emerges as a key investment in human capital and human resources growth in a developing economy.

¹⁶⁷ Schultz, Theodore W. "Investment in human capital." *The American economic review* (1961): 1-17.

¹⁶⁸ Schultz, Theodore W. "Human capital: Policy issues and research opportunities." *Economic Research: Retrospect and Prospect*, Volume 6, Human Resources. NBER, 1972. 1-84.

¹⁶⁹ *Ibid.*

Economists have known for a long time that people form an important part of the diversity of nations. Human beings are more productive than all other types of shared capital. Professor Schultz points out that we cannot perceive human beings as capital goods through our values and beliefs. Investment in citizens has also not been included in the systematic treatment of the state. Educational investment's main features are: (i) the educational spend contains both customer and investment characteristics; and (ii) education investment is typically defined by a longer duration of gestation than any other competitive investment type; (iii) education spending provides relative long-term usefulness of education assets. In general, educational expense includes teacher wages, buildings, appliances, and other postal equipment, as well as the cost of ignoring students' income.

Therefore, human capital theory elucidates that education elevates a person's efficiency and earnings. As such, education becomes an investment that is important for a person and the country's economic growth. Consequently, the Human Capital Theory recommends that investing in education and training enhances a person's hope of earning highly in the future.

2.12.2 Neoclassical Theory

Economists have been trying to figure out why some countries are rich and other poor since Adam Smith's *The Wealth of Nations* was published in 1776¹⁷⁰. Several economic development theories have attempted to justify the development process, from Walter W. Rostow's linear theory of modernization to the neoclassical emphasis on free trade as a growth motor. Both endogenous and exogenous factors leading to and impeding development have been discussed through theories. Depending on the political and economic climate of the international arena, global growth models move and go out of fashion.

One of today's common economic growth theories, the neoclassical theory of development, is market fundamentalism. This theory notes that economic growth is directly linked to free trade, with a view to achieving the desired economic development, the countries should implement policies of globalization, privatization, and liberalization. Development

¹⁷⁰ World Health Organization. *The World health report: 1999: Making a difference: message from the Director-General*. No. WHO/WHR/99.1. World Health Organization, 1999.

is a product of undue government interference and inadequate allocation of capital due to irrational pricing policies. The neoclassic theory is that free markets build competitive conditions in which manufacturers can promote their participation in the world market¹⁷¹.

A variety of features are found in all the various methods, mostly introduced under Structural Adjustment Initiatives (also called Poverty Reduction Strategies), by the World Bank or by the IMF. The first is the conditionality of loans. In order to ensure ongoing lending rights, certain procedures and protocols must be followed. In addition, historically regulated industries, and facilities from airlines to healthcare must be privatized by the government. The liberalization aspect requires that market forces without government interference or help decide prices (interest, exchange rates, salaries, and product costs)¹⁷². A final aspect tackles the globalization of the economy of the nation by eliminating any obstacles to international trade and investment¹⁷³. In line with Heckscher-Ohlin's theorem of factor abundance, neoliberal economists argue that open world trade networks allow developing countries to produce goods with a comparative advantage. These products are generally labor-intensive, with little or no added value in production in labor abundant developing countries.

Although the aim of the liberalizing policies was economic growth, the opposite was true among the participating countries, especially those in Africa¹⁷⁴. It meant that economic and social changes which should follow the economic reorganization did not return to many of the people most affected by the reforms. In Sub-Saharan Africa, for instance, despite a slight change in the 1990s, the entire region saw no rises in per capita income between 1965 and 1999 (Goldin 2002). Moreover, although the health and education indicators (life expectancy and literacy) have been greatly improved in African countries, the AIDS epidemic reversed the gains made with life expectancy. A double-digit decrease in life expectancy occurred in several countries from 50 years in 1990 to 47 years in 1999.

¹⁷¹ Schoepf, Brooke G., Claude Schoepf, and Joyce V. Millen. "Theoretical therapies, remote remedies: SAPs and the political ecology of poverty and health in Africa." *Dying for growth: Global inequality and the health of the poor* (2000): 91-126.

¹⁷² Ibid.

¹⁷³ Gershman, John, and Alec Irwin. "Getting a grip on the global economy." *Dying for growth: Global inequality and the health of the poor* (2000): 11-43

¹⁷⁴ Ibid.

The Neoclassical Theory of Growth is a growth model that demonstrates how a stable rate of economic growth happens when three economic forces are brought into play: labor, capital, and technology¹⁷⁵. Solow-Swan Growth Model is the simplest and most popular variant of the Neoclassical Growth Model.

The Neoclassical theory implies that short-term economic balance is a function of different quantities of labor and capital, which play an important part in the process of development¹⁷⁶. The theory argues that technological change influences the overall workings of the economy significantly. The neoclassical theory of growth defines three factors required for a rising economy. However, the argument that temporary or short-term equilibrium is different from long-term balance and does not necessitate any of the three factors emphasized in theory. For deciding economic growth, the Neoclassical Growth Model claims that the accumulation of capital and how people use it in an economy is significant¹⁷⁷.

The study also states that its overall production is calculated by the relationship between capital and labor. Finally, technology improves work productivity and increases overall output by enhancing labor performance. Therefore, to calculate economic growth and economic equilibrium, the output function of a neoclassical growth model is used. In the neoclassical growth model, the overall output function takes the following form:

$$Y = A.F. (K, L)^{178}$$

Y – Income (the economy's gross domestic product (GDP))

K – Capital

L – Amount of skilled labor in the economy

A – Determinant level of technology

¹⁷⁵ Adhikary, Bishnu Kumar. "FDI, trade openness, capital formation, and economic growth in Bangladesh: a linkage analysis." *International Journal of Business and Management* 6.1 (2011): 16.

¹⁷⁶ Faggian, Alessandra, Félix Modrego, and Philip McCann. "Human capital and regional development." *Handbook of regional growth and development theories*. Edward Elgar Publishing, 2019.

¹⁷⁷ Dombi, Ákos, and István Dedák. "Public debt and economic growth: what do neoclassical growth models teach us?" *Applied Economics* 51.29 (2019): 3104-3121.

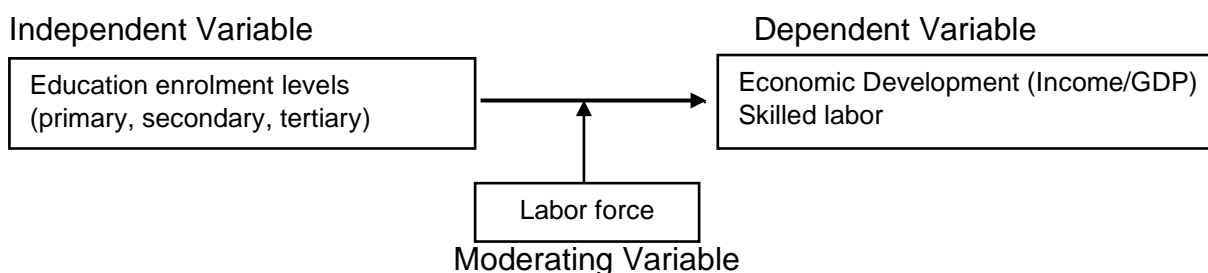
¹⁷⁸ Dombi, Ákos, and István Dedák. "Public debt and economic growth: what do neoclassical growth models teach us?" *Applied Economics* 51.29 (2019): 3104-3121.

This theory will be highly used in the current study as it will try to explain how income (GDP) is affected by the amount of skilled labor and capital as a result of education.

2.13 Conceptual Framework

The following is a framework showing the relationship between education and its effects on economic development (country's GDP)

Figure 1: Conceptual Framework



2.14 Summary

Overall, this chapter reviews relevant literature related to the topic under study to allow for a deeper understanding of the topic. This study is based on human capital theory. Human capital refers to the productive wealth personified in skills, labor, and knowledge as well as the innate traits or any stock of knowledge an individual possesses that contributes to their economic productivity. The fact that many people in Algeria have acquired higher education levels has increased the number of graduates in the labor market. Significantly, increased education levels have promoted collective actions taken by employers. The study was also based on the Neoclassical Theory of Growth, which is a growth model that demonstrates how a stable rate of economic growth happens when three economic forces are brought into play: labor, capital, and technology. The Neoclassical Theory implies that short-term economic balance is a function of different quantities of labor and capital, which play an important part in the process of development. The theory

argues that technological change influences the overall workings of the economy significantly.

From the literature reviewed, it has been noted that education plays a vital role in the development of the economy, which is shown on how there is a rise in GDP per capita. The education system in Algeria is based on four levels, which include pre-primary, primary level, high school, and tertiary level (college, undergraduate, and postgraduate). The review has shown that, since Algeria attained its independence, there has been a rise in the number of those who have been enrolled in school and thus an increase in educational attainment. Despite education in Algeria becoming increasingly an aspect to consider for economic development, it is also faced with some challenges, such as a countrywide error in the exam setting. The economic development of Algeria started as soon as the country attained its independence from French colonialists in 1962. The country started from industrialization, and ever since, the economy has grown drastically as the current GDP per capita is 3.4%.

There was a review of the relationship between education and various factors, and from the review, education supports basic science, appropriate choice of technologies imports and domestic adaptation and technology development; for example, health, nutrition, and primary and secondary education, all increase workers' productiveness; secondary, including vocational, helps acquire ability and management skills; third, secondary education supports the growth of basic science. The relation between education and income as education gets broader; people with low incomes will pursue economic opportunities more effectively.

There are two ways – direct and indirect – for education to be a part of and contribute to economic development. In productivity, employment, the composition of labor forces, division and mobility of labor, etc., direct contributions can be observed. Education's indirect contribution to the growth of the economy is that it influences thrift, saving, family size constraints, and the creation of the necessary competencies and skills.

As seen, economists sought for a long time to find an effective way to assess the contribution of education to the economic growth. The variety of methods that have been established are one of the hallmarks of the emerging literature. These methods include a

simple correlation approach, which shows the most popular educational metrics. These are the literary ratio to the total population, the enrolment ratio to a certain age group, and per capita education expenditure. There are correlated registration levels and GDP per capita for economists. The residual approach takes into account a cumulative improvement in economic performance in a country for a certain period of time. The increase is due to the observable inputs such as capital and labor. That is what is left as education's contribution. The remaining component also involves economies of productivity, better working-class health, changes in the product mix, increases in capital asset efficiency, and economic order reorganization. The rate of return approach reflects on the lifespan of individuals with varying educational levels. The average percentage return on the education expenses can be calculated as the difference in lifetime earnings. Two forms of return rates, (1) private return rates, and (2) social return rates, are applicable. Finally, the need for manpower approach indicates the ratios between different groups of employees in different developing countries are discussed in order to evaluate the link between education and training, on the one hand, and economic development, on the other. For future work, the balance between demand and availability of skilled staff is crucial. In the current study, we shall use the applicable rate of return approach as we shall try to show how different education levels will impact the growth of the economy.

Some studies have to determine the overall impact of education on the economy, and researchers have concluded that the main recent findings indicate that education has a negative impact on economic growth. In another study, the effect of government spending in education on economic growth between 1970 and 2009 was estimated using the approach of co-integration to study the long-term balance between the two variables. It was concluded that increased educational expenditure in Algeria reduces growth. In another study, where ARDL examines the link between education and economic growth between 1971 and 2011. The findings indicated that the primary and tertiary education, on the one hand, and economic growth on the other, have a long-lasting relationship. The effect of education on economic growth during 1991–2009 in another study was calculated as a metric for human resources, and high school enrolment rates were used. The key finding is that education has an important, three-year-long positive impact on development. The results also showed that an increase in high school enrolments would rise by 1% after

three years, and economic growth will increase by 0.17%. There is, however, a negative short-term relationship between the two variables. The relationships between university graduates – an indicator for human capital – and economic growth from 1970-2009 have been analyzed in another study. The model of co-integration was used for this reason. The results showed that, with 1% more graduates, economic growth, in the long run, would rise by 0.27%.

The finding above, however, is not updated as most focused up to 2009. Therefore, this creates a gap as education enrolment and attainment have occurred from the year 2009 update with many policies being introduced in the education sector. Therefore, the current study will expound the time frame up to the year 2019 and find if the results concur and differ from previous studies. The study will use correlation and regression as the main statistical test despite many studies applying co-integration.

CHAPTER THREE: METHODOLOGY

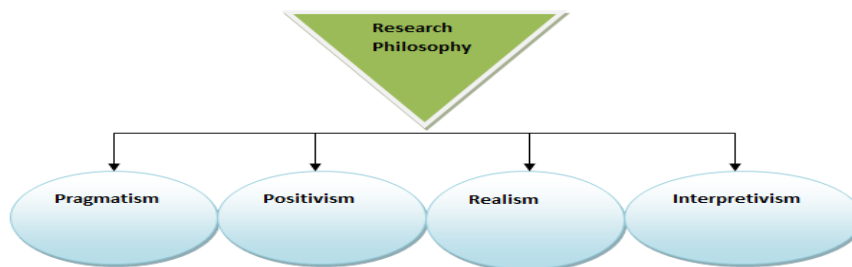
3.1 Introduction

This chapter presents the methodological approach used in this study. The concepts discussed in this section include the research philosophy, research design, and approach, the research strategy employed, and the data collection approach. Further, the section presents the data analysis procedures that the researcher used to address the research question. Besides, information regarding the details of the target population and the sampling techniques is presented.

3.2 Research Philosophy

Research philosophy can be defined as the perceived idea and the way the researcher views occurrences in real-life situations, thus forming the basis for their beliefs, assumptions, and theories. Saunders, Lewis, and Thornhill (2009) reveal that research philosophy is significant to any study as it assists in acknowledging the research paradigm¹⁷⁹. Four philosophies are considered while seeking to reflect on the most suitable research approach. They include pragmatism, positivism, realism, and interpretivism as shown below.

Figure 2: Basic Elements of Philosophy of Research¹⁸⁰.



¹⁷⁹ Thornhill, Adrian, Mark Saunders, and Philip Lewis. "Research methods for business students." Essex: Pearson Education Ltd (2009).

¹⁸⁰ McKenna, Lisa, and Richard Gray. "The importance of ethics in research publications." *Collegian* 25.2 (2018): 147-148.

Basically, research philosophies are different research paradigms, as outlined by Bunniss and Diane (2010)¹⁸¹. A paradigm refers to the basis for conducting a study through the observation of the world in a particular way.

The choice of the most appropriate research paradigm has a fundamental role in the initial research set-up. A paradigm comprises a theory or a framework that specifies the set of questions that the researcher examines in specific ways. This study adopts the use of the positivism paradigm.

The study adopts this research paradigm since it would allow the use of the quantitative method as opposed to qualitative. Positivism is objective and views social phenomena externally.

This paradigm defines and foresees happenings in the social world through seeking to give explanations of social happenings and conducting searches of various phenomena and their causal relationships. According to positivists, science provides the direction of achieving the truth and analyzing the social world in a controllable and predictable way. The positivist paradigm is quantitative in nature.

The positivism paradigm was useful for this study, as it allowed the researcher to give explanations of social happenings and conduct searches of various phenomena and their causal relationships. Specifically, it allowed the researcher to examine the causal relationship between economic development, education (human capital), and labor force and to explain the existing yearly differences in GDP in Algeria.

3.3 Research Methodology

The current study employed a quantitative research method. Specifically, it was quantitative comparative research that sought to determine the relationship between education and economic development. The quantitative research technique matched the data that was available online. According to Walliman (2017), quantitative methods are efficient

¹⁸¹ Bunniss, Suzanne, and Diane R. Kelly. "Research paradigms in medical education research." *Medical education* 44.4 (2010): 358-366.

while measuring the association between variables under study¹⁸². Moreover, the data's nature, which was measurable and quantifiable, led to the choice of quantitative research. The quantitative method also allows a researcher to provide objectivity and numeric precision to generalize and replicate findings. Besides, it confirms the cause-and-effect associations; thus, the quantitative method was deemed appropriate.

The positivism paradigm, which is quantitative in nature and allows giving explanations of social happenings and conducting searches of various phenomena and their causal relationships, will be adopted for this study.

3.4 Research Design and Approach

According to Fellows and Liu (2015), a research design refers to a framework of practices and methods utilized in integrating multiple research components to answer the study's research questions¹⁸³.

The prototype is used to define the relations between the study variables, which may or may not exist. The concept addresses questions such as: what techniques are used for data collection; how is data collection used? What type of sample is to be used? How will time and cost constraints be managed? A co-integrated research design will be utilized to explore the relationship between factors that influence the overall economic development (GDP per capita) across Algeria. The most substantial strength of this research design is its ability to analyze the data and examine the relationship between variables.

The data will be drawn from the World Bank database for a period of 20 years (2000-2019) as a result of the existence of comprehensive and accurate information relevant to answer the available research questions. The country and variables will be selected from the World Bank website to facilitate statistics.

The database will contain the data which will be available for both the dependent and explanatory variables. Specifically, the sample focused on Algeria, and co-integration and

¹⁸² Walliman, Nicholas. *Research methods: The basics*. Routledge, 2017.

¹⁸³ Fellows, Richard F., and Anita MM Liu. *Research methods for construction*. John Wiley & Sons, 2015.

correlational research design will be used to analyze the relationship between the variables using inferential statistics. Notably, the correlation research design examines whether changes in one or more variables are linked to the changes evident in other variables and are usually cross-sectional. For this study, the analysis was performed based on a cross-sectional design, which elucidates an association between multiple variables. Four continuous variables, including income (GDP per capita), education intake with the least of those who have attended primary and above, and human labor, will be included in the study.

This study adopted a deductive research technique. Johnston (2014) reveals that this method entails collecting facts based on an understanding of the general deductions to specific inductions¹⁸⁴. According to the author, this is possible as the approach can make the proposed theory operational. The deductive research technique was utilized in connection with the projected results from the collected data.

First, the current study was not fit for the use of experimental or case study design as it sought to describe and show the relationship between the study variables without manipulation. However, the designs are not applicable in describing the association between the variables in the study. Besides, the study was aimed at analyzing the relationship between variables. Therefore, it could not have adopted an experimental design. A correlational research design could answer all the research questions; thus, it was regarded as the most suitable research design.

3.5 Research Strategy

Walliman (2017) defines a research strategy as an approach for collecting and analyzing the data required for assisting the decision-making that relate to the proposed research questions¹⁸⁵. The research strategy serves as a representative of various research models.

¹⁸⁴ Johnston, Alan. "Rigour in research: theory in the research approach." *European Business Review* (2014).

¹⁸⁵ Walliman, Nicholas. *Research methods: The basics*. Routledge, 2017.

As such, detailed research strategies are essential since they serve as the guideline for all the decisions the researcher makes about the research process. The current study utilized a quantitative research design. Quantitative research is a systematic evaluation of the studies phenomenon through gathering data and performing statistical tests that assist in drawing a research conclusion. Due to the benefits associated with this approach, the conclusion drawn is usually rational and unbiased. Further, Almalki (2016) adds that a quantitative approach for the study is used to gain detailed insights into a social trend.

Therefore, by utilizing objective variables or figures to analyze the research phenomenon and its correlations, the technique promotes knowledge creation¹⁸⁶. Besides, it enables the researcher to handle multiple inquiries by using variables that can quantify the overall nature of the research issue, predict, explain, and monitor. The researcher selected a quantitative methodology rather than a qualitative approach because of the nature of the research's main objective. The study sought to determine the impact of the independent variables on the dependent variable.

3.6 Target Population and Sampling

A study population refers to a set of units in which the findings of the study aim to generalize¹⁸⁷. Research reveals that the targeted population's features must align with those required by the research prospects^{188 189}. The target population serves as a significant measure of the research's meaningfulness and accuracy in terms of quality measurement¹⁹⁰. This study relies solely on secondary data; thus, there is no need for the study population. Contrary, secondary data has been obtained from the World Bank Organization (WBO) database.

¹⁸⁶ Almalki, Sami. "Integrating Quantitative and Qualitative Data in Mixed Methods Research--Challenges and Benefits." *Journal of education and learning* 5.3 (2016): 288-296.

¹⁸⁷ Asiamah, Nestor, Henry Kofi Mensah, and Eric Fosu Oteng-Abayie. "General, target, and accessible population: Demystifying the concepts for effective sampling." *The Qualitative Report* 22.6 (2017): 1607.

¹⁸⁸ Ibid

¹⁸⁹ Martínez-Mesa, Jeovany, et al. "Sampling: how to select participants in my research study?" *Anais brasileiros de dermatologia* 91.3 (2016): 326-330.

¹⁹⁰ Martirosyan, Liana, et al. "Methods to identify the target population: implications for prescribing quality indicators." *BMC Health Services Research* 10.1 (2010): 137.

Sampling refers to the procedure of selecting a portion of the individuals or objects from the target populace¹⁹¹. Sampling involves drawing a sample, a finite section of participants selected from the target population. Moreover, sampling is essential in a study that entails human subjects since it enhances the selection of potential respondents. Sampling dictates the method of data collection, where the collected data is further analyzed to make inferences about the target population. Participant selection has a significant implication on their time, cost, and quality of data they collect. The current study utilized a purposive sampling technique to select the country (Algeria) to be used in the study.

Purposive sampling is a form of non-probability sampling in which the researcher relies on his or her own judgment while choosing the members of the population to take part in the study¹⁹². In this sampling method, variables are chosen based on the needs of the study. The primary goal of the purposive sampling technique is to focus on the population's specific characteristics that are of interest, which would enable the researcher to best answer the research questions. Since the study relied on secondary data, the researcher purposively chose the country (Algeria) whose complete data was available online.

The sampling frame for this study comprised the country of study, which was the case under study. The researcher utilized simple random sampling because it is simple and economical to select the country (Algeria) to be included in the study. Notably, the proper sample size must be selected to augment the outcome of any given population.

An inappropriate selection of participants may lead to postponements, issues of data quality, and unnecessary costs. Furthermore, the optimization of sampling efforts prevents cases where inadequate respondents lead to inconclusive data. An excel spreadsheet format was used to conduct a random sample. A list of years to be included in the analysis were recorded into a spreadsheet and assigned a random number. Of the years whose data was readily available online, 20 years (2000-2019) will be chosen.

¹⁹¹ Bluman, Allan G. *Elementary statistics: A step by step approach: A brief version*. No. 519.5 B585E. McGraw-Hill, 2013.

¹⁹² Ames, Heather, Claire Glenton, and Simon Lewin. "Purposive sampling in a qualitative evidence synthesis: a worked example from a synthesis on parental perceptions of vaccination communication." *BMC medical research methodology* 19.1 (2019): 26.

3.7 Instrumentation and Data Collection Procedure

When examining how the educational attainment of the overall people of Algeria impact economic growth, secondary data was used. Secondary data refers to the data that has already been collected and analyzed by another party¹⁹³. Further, Johnston (2017) explained that secondary data analysis is an appropriate method of inquiry that involves following a systematic procedure¹⁹⁴. Notably, existing data sets are often more efficient and available resources for addressing the research questions¹⁹⁵. Instrumentation can be defined as the data collection tool or means by which researchers attempt to measure items and variables of interests during the data collection process. This process entails designing the instrument, constructing, and evaluating the instrument, as well as stating the conditions under which these instruments are administered. Since this study adopted the use of secondary data, no instrument for data collection was constructed.

3.8 Reliability

According to Heale and Twycross (2015), reliability refers to the measure of how well the test scores are¹⁹⁶. Simply, the reliability test determines whether the test statistics are stable or consistent. Reliability may be further described as the ability of the research to provide similar results when the procedure is repeated multiple times. In quantitative studies, Cronbach's Alpha and Kuder-Richardson may be used to determine the reliability of the test statistics in quantitative reports¹⁹⁷. Reliability entails the extent to which the methodology adopted for the study yielded the data to address the research question. According to George and Mallery (2003), a coefficient $>.9$ is excellent, $>.8$ is good, $>.7$ is acceptable, $>.6$ is questionable, $>.5$ poor, and $<.5$ is unacceptable. For this research,

¹⁹³ Johnston, Melissa P. "Secondary data analysis: A method of which the time has come." *Qualitative and quantitative methods in libraries* 3.3 (2017): 619-626.

¹⁹⁴ Ibid.

¹⁹⁵ Greenhoot, Andrea Follmer, and Chantelle J. Dowsett. "Secondary data analysis: An important tool for addressing developmental questions." *Journal of Cognition and Development* 13.1 (2012): 2-18.

¹⁹⁶ Heale, Roberta, and Alison Twycross. "Validity and reliability in quantitative studies." *Evidence-based nursing* 18, no. 3 (2015): 66-67. Adamson, Katie Anne, and Susan Prion. "Reliability: measuring internal consistency using Cronbach's α ." *Clinical simulation in Nursing* 9.5 (2013): e179-e180.

¹⁹⁷ Adamson, Katie Anne, and Susan Prion. "Reliability: measuring internal consistency using Cronbach's α ." *Clinical simulation in Nursing* 9.5 (2013): e179-e180.

Cronbach's alpha test was performed to determine whether the study findings were reliable.

3.9 Validity

Validity entails ensuring that the results of the study are accurate and trustworthy¹⁹⁸. Validity is significant since it determines what survey questions should be utilized to make sure that the researcher measure what should be measured. Validity tests are pivotal for testing the virtuousness of a measure. Validity involves examining three major components, including confirmability, credibility, and transferability of the study findings. It is not possible to express content validity quantitatively. However, this is determined through the experts' judgments. Credibility is the process of assessing the truth of the research findings. A reflective journal was used to ensure both confirmability and credibility. Reflective journals are an essential tool for learning that allows students reflect on their learning critically and comprehend the concepts clearly. Usually, validity and reliability are needed to evaluate the degree of measurement error existing in any measure.

The research findings' transferability can be defined as the procedure of measuring the external validity of a study. Research is considered as confirmable if the results can fit other phenomena outside the study. Besides, if the findings of a study are meaningful and applicable by researchers in other contexts, this study may be confirmable¹⁹⁹. Since this study used secondary data, it was easy to achieve transferability as the findings from existing studies could be transferable based on the methodology employed. McGinley, Lu, and Yanyan (2019) urge that large sample sizes are not effective in enhancing applicability²⁰⁰. This is because they result in too much data that may hinder the applicability of findings to other settings.

¹⁹⁸ Cypress, Brigitte S. "Rigor or reliability and validity in qualitative research: Perspectives, strategies, reconceptualization, and recommendations." *Dimensions of Critical Care Nursing* 36.4 (2017): 253-263.

¹⁹⁹ McGinley, Sean, et al. "The State of Qualitative Research in Hospitality: A 5-Year Review 2014 to 2019." *Cornell Hospitality Quarterly* (2020): 1938965520940294.

²⁰⁰ McGinley, Sean, et al. "The State of Qualitative Research in Hospitality: A 5-Year Review 2014 to 2019." *Cornell Hospitality Quarterly* (2020): 1938965520940294.

3.10 Data Analysis

Data analysis refers to the procedure of generating significant statistics through the transformation of knowledge into evidence²⁰¹. Analyzing secondary data is an effective way of utilizing data to answer the research questions. Dunn, Arslanian-Engoren, DeKoekkoek, Jadack, and Scott (2015) reveal that analyzing secondary data saves on time and is economical as it requires less monetary resources to analyze data sets assembled at minimal or no cost at all²⁰². While analyzing secondary data, the researcher should have a clear idea and thought-out of the theoretical model and the variables to be tested. For the current study, the researcher focused on the theoretical framework and key variables of the study. Further, the researcher made sure that all the assembled data related to the study variables, which included income (GDP per capita), labor productivity, and at least the primary education level. To choose the best method for data analysis, the researcher constructed the research variables.

A statistical analysis method for the analysis of the data collected was used in the current study. Specifically, to answer the research questions, regression and comparative analysis were appropriate for the data analysis procedure. Data was downloaded from the World Bank database. Further, the data was then exported for coding and analysis into the Social Sciences Statistical Software (SPSS). The normality test of the data was then considered to determine whether parametric or non-parametric tests should be taken. Cronbach's Alpha was used to perform the reliability check for the data. Souza et al. (2017) report that if the Cronbach alpha of the study items exceeds 0.5, the study is considered reliable²⁰³.

²⁰¹ Kass, M. Andy, and Yaoguo Li. "Quantitative analysis and interpretation of transient electromagnetic data via principal component analysis." *IEEE transactions on geoscience and remote sensing* 50.5 (2011): 1910-1918.

²⁰² Dunn, Susan L., et al. "Secondary data analysis as an efficient and effective approach to nursing research." *Western journal of nursing research* 37.10 (2015): 1295-1307.

²⁰³ Souza, Ana Cláudia de, Neusa Maria Costa Alexandre, and Edineis de Brito Guirardello. "Psychometric properties in instruments evaluation of reliability and validity." *Epidemiologia e Serviços de Saúde* 26 (2017): 649-659.

3.11 Variables

3.11.1 Dependent Variable

In this study, GDP per capita will be the dependent variable. GDP per capita data will come from a global economic growth dataset from the World Bank. For most of the nations, i.e., Algeria, in 1990-2015, the researcher will measure historical GDP per capita in form of current U.S. dollar and population figures.

3.11.2 Independent Variable

Education attainment will be the independent variable. The dataset comprising the registration data on primary, secondary, tertiary, and literary education and literacy scores is almost universally available each year for the period 2000-2019. Yet economic growth is not influenced by enrolment but by educational achievement. That is because trained employees appear to be more efficient and creative than uneducated workers because, by only having school children, they do not have an immediate impact on efficiency due to innovation. For most countries, i.e., Algeria, this educational attainment data is only available from about 1970, but the current study will be limited from 1990 to 2015 as the enrolment dataset was reached to that point.

3.11.2.1 Model Estimation

The study involves a collection of time series which involves a time period between 1990-2015. Therefore, the study used the neoclassical theoretical model which gives the following overall output function and takes as shown below:

$$Y = F. (K, L)$$

Y – Income, or the economy's Gross Domestic Product (GDP per capita)

K – Capital (education enrolment using primary(pri) and tertiary(ter))

L – Amount of skilled labor in the economy (labor force)

F – Other External Factor

In order to enhance linearity of the model, logarithm of the dependent and independent variable (primary and tertiary) was conducted, and the final model was as follows:

$$\text{Ln}(Y) = \alpha_0 + \alpha_1 \text{Ln}(\text{Labor}) + \alpha_2 \text{Ln}(\text{Primary}) + \alpha_3 \text{Ln}(\text{Tertiary}) + \mu_i$$

3.12 Ethical Considerations

Ethics are essential factors that every researcher must put into consideration. Usually, ethics aim to protect the rights, privacy, anonymity, and confidentiality of the participants and make sure that the relevant data is collected by asserting that the methodological approaches employed in the research are suitable for addressing the research objectives without harming the respondents²⁰⁴. Besides, research ethics are useful since they promote transparency in the study. According to Harper et al. (2017), ethics in research allow for proper interpretation and presentation of the findings of the study²⁰⁵. Consequently, this promotes the quality of the research.

The fact that this study adopted the use of secondary data made ethical considerations necessary. The first ethical consideration in the study was that the data gathered were relevant and adequate to address each of the research questions. Since the data was available to the public as published by one of the reputable databases (World Bank), it was necessary to use the correct link to the data source and ensure that data was correctly downloaded and saved on a personal computer without distorting the data.

The second ethical consideration was to recognize the application of information from other researchers to ensure the originality of the study. This entailed citing the original authors of each study to acknowledge the work of other researchers.

²⁰⁴ McKenna, Lisa, and Richard Gray. "The importance of ethics in research publications." *Collegian* 25.2 (2018): 147-148.

²⁰⁵ Harper, J. C., et al. "Recent developments in genetics and medically-assisted reproduction: from research to clinical applications." *Human reproduction open* 2017.3 (2017): hox015.

3.13 Conclusion

Overall, the current study sought to examine the education attainment (primary, secondary, and tertiary), labor productivity, impact economic development (GDP per capita) across Algeria. The research used secondary data. The researcher used SPSS for data analysis. Before analysis, validity and reliability tests were conducted. Finally, regression analysis and comparative analysis were performed to establish a statistical association between factors that influence economic development (GDP per capita) and compare the influence of different education levels. All the data was available to the public. Therefore, since the data was public information, there was no requirement to seek IRB approval. The analysis and presentation of the results will be presented in the next chapter.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS, AND DISCUSSION

4.1 Introduction

This chapter presents the study's findings and the discussion of the results based on the collected data. The study sought to examine how different level of education enrolment, including primary, lower secondary, and tertiary enrolment, impact GDP per capita across Algeria. The results are compared to determine whether these account for the difference in the national labor force. First, correlation and regression analysis with GDP per capita as the dependent variable and education enrolments levels was conducted to find how each independent variable impacted economic growth. The following research questions guided the execution of the data analysis:

1. What is the impact of primary enrolment on the GDP per capita?
2. What is the impact of a secondary enrolment on the GDP per capita?
3. What is the impact of tertiary enrolment on the economic development?
4. Are labor force, education enrolment (primary, secondary, and tertiary) significant indicators of the economic development (GDP per capita)?

4.2 Data Screening

Before performing the data analysis, data screening was conducted. According to Tabachnick and Fidell (2007), data screening allows the researcher to point out any potential violation of statistical assumptions prior to the data analysis process²⁰⁶. The process of data screening for this research entailed the detection of the data's missing values. To check the missing values, the research downloaded the dataset from the World Development Indicators (WDI) for GDP per capita and labor force variables and International Education Statistics for education enrolment and scrutinized it to determine if there were any missing values. Data screening was imminent since, according to Hair et al.

²⁰⁶ Tabachnick, Barbara G., and Linda S. Fidell. *Experimental designs using ANOVA*. Belmont, CA: Thomson/Brooks/Cole, 2007.

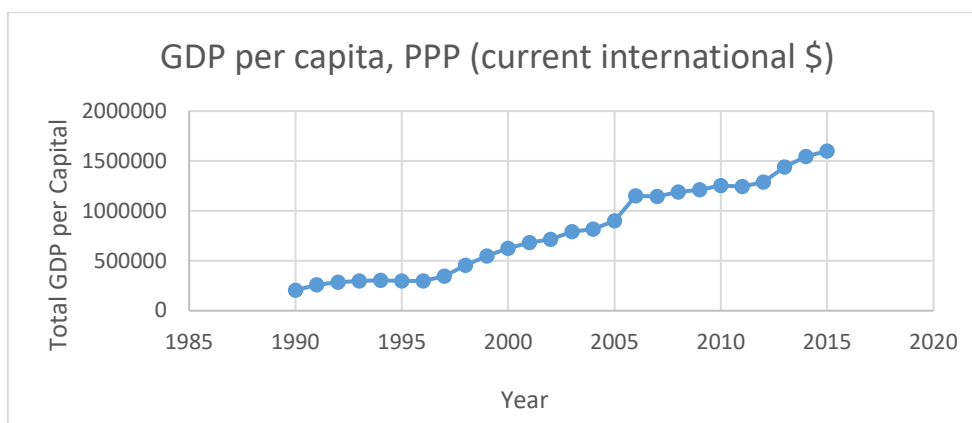
(2010), carrying out data analysis with a dataset with missing values may result in erroneous results²⁰⁷. For secondary data, missing data may be as a result of unpublished data for certain years. According to Creswell (2017), missing values are a problem in the analysis if the number of the missing data surpasses 15%²⁰⁸. For our case, Algeria years which did not have either GDP, nor education enrolment, and labor force data coverage for the specific years of study were eliminated. Therefore, in the current study missing data was detected in the datasets used. The study found that secondary school enrolment data for more than 8 years were missing, which was more than 15% of the recommended data missing rate. Hence, secondary enrolment variable was eliminated as a predictor of economic development.

4.3 Trend Analysis

4.3.1 Trend Analysis for GDP per Capita

The figure below shows how GDP per capita, PPP (current international U.S. dollar) was distributed over the stipulated years (1990-2015). The figure shows the trend was moving with almost similar trend in the years 1990 to 1994 and the trend has risen up to the year 2011, thereafter the GDP per capita has taken a decreasing trend.

Figure 3: GDP per capita of Algeria



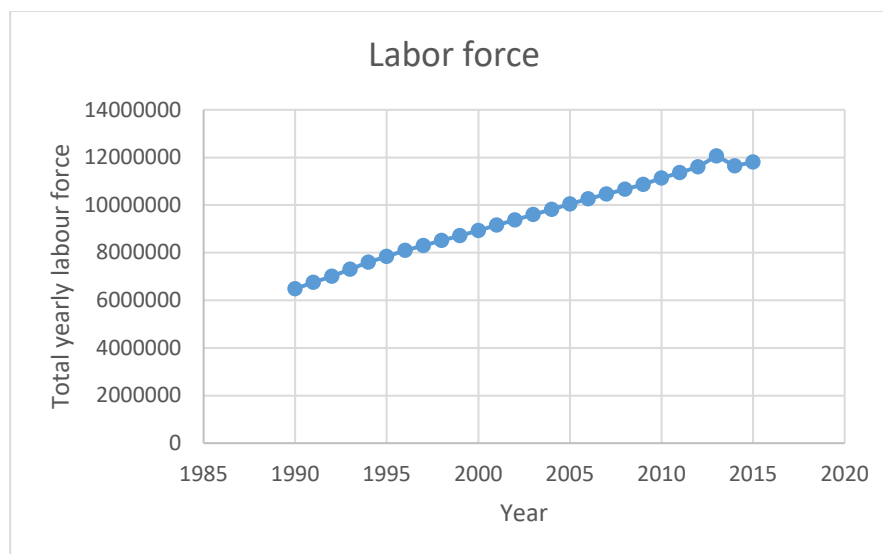
²⁰⁷ Hair, Joe F., et al. "An assessment of the use of partial least squares structural equation modeling in marketing research." *Journal of the academy of marketing science* 40.3 (2012): 414-433.

²⁰⁸ Creswell, John W., and J. David Creswell. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications, 2017.

4.3.2 Trend Analysis of Labor Force

The study also sought to show the distribution of labor force over the years and the trend is as shown in the figure below:

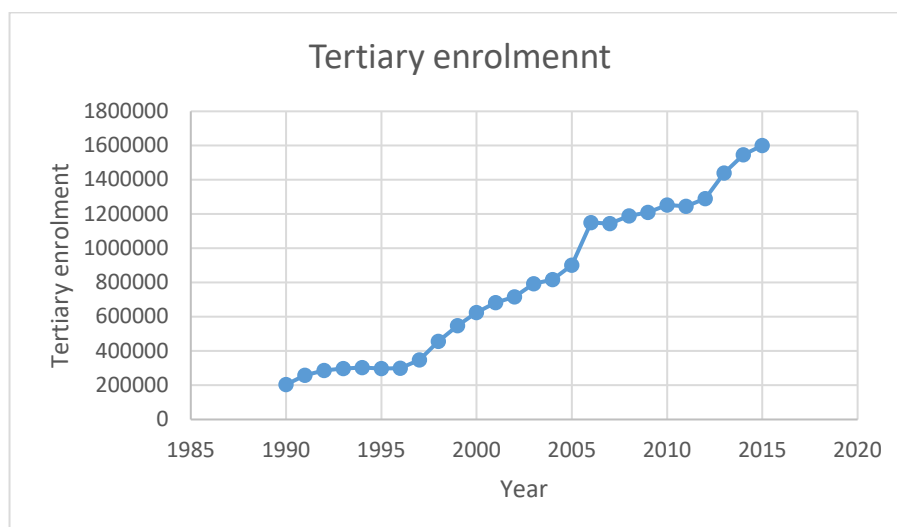
Figure 4: Labor Force



4.3.3 Trend Analysis of Tertiary Enrolment

In determination of the tertiary enrolment trend of the stipulated years, the graph below shows tertiary enrolment has continued to increase over the years, with slight changes over the years.

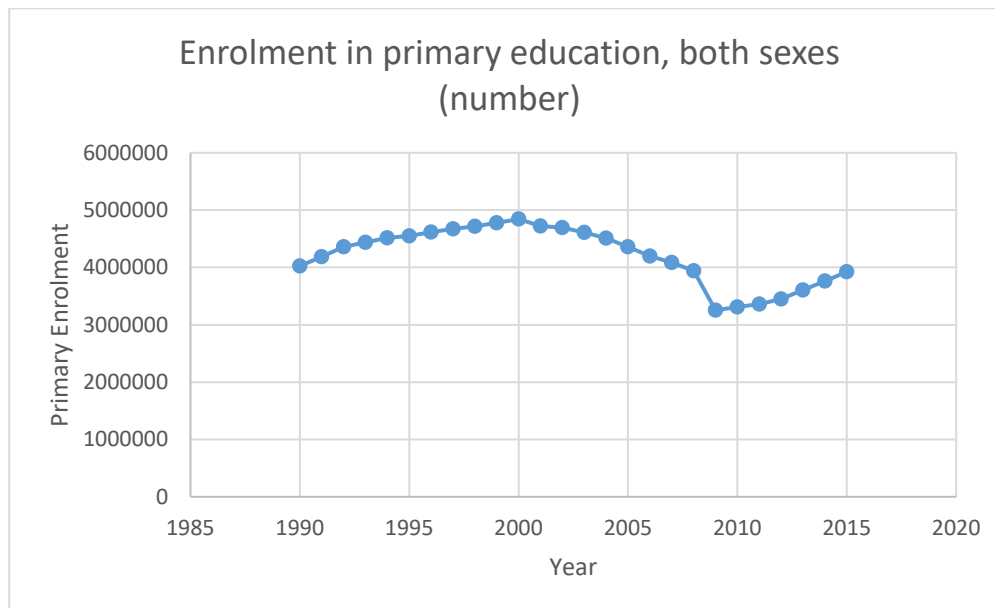
Figure 5: Trend Analysis of Tertiary Enrolment



4.3.4 Trend Analysis of Enrolment in Primary Education

Finally, the study sought to determine the trend of enrolment in primary school and as shown in the figure below, enrolment increased drastically until the year 2000, and decreased drastically to the year 2009, and thereafter has increased to the last year of study. The trend has shown to continue rising even after the last year of study.

Figure 6: Trend Analysis of Enrolment in Primary Education



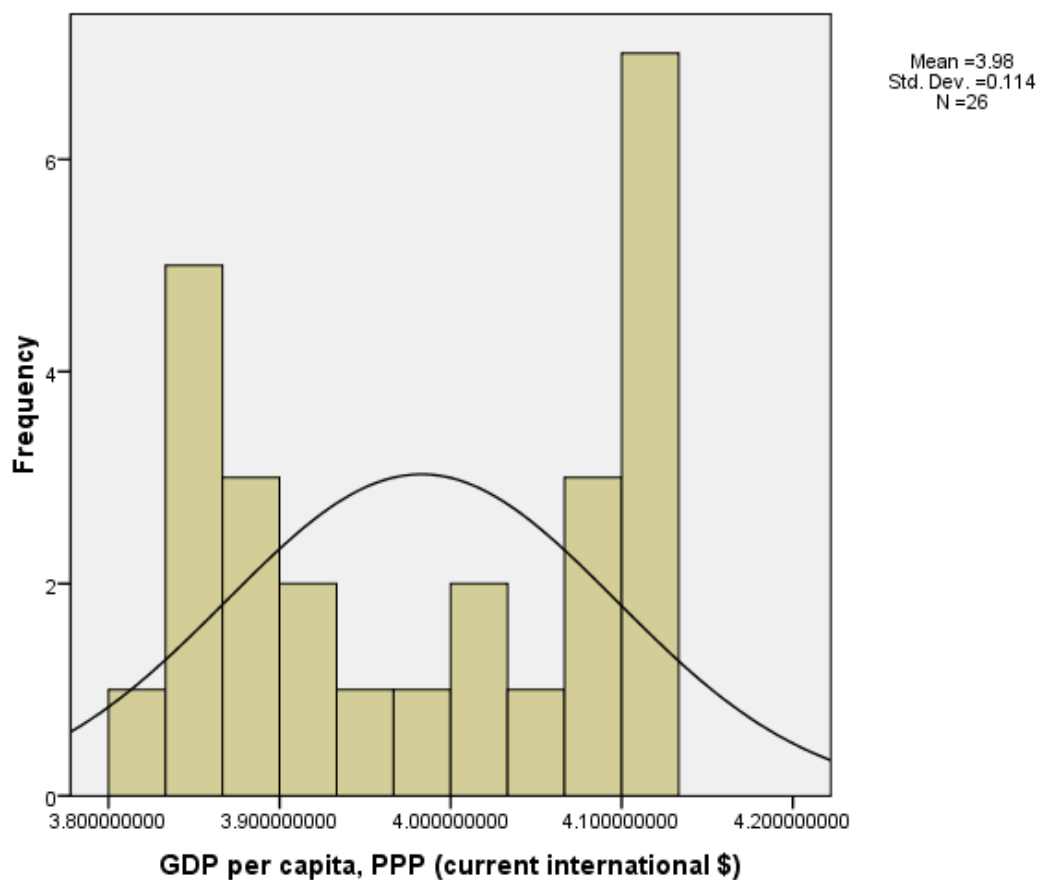
4.4 Inferential Statistics

Research reveals that Multiple Regression Analysis (MRA) is utilized in measuring the relationship between the outcome variable and two or more predictor variables. Prior to conducting MRA, various assumption tests, such as homoscedasticity, normality, and multicollinearity, are performed. The purpose of these tests is to ascertain the validity of the data and its fit for use. This section covers different assumption tests that were performed for this study.

4.4.1. Normality

While conducting a study that involves a parametric statistical analysis, it is requisite for the researcher to assess the normality test. The test assesses if the attributes or the characteristics of the population have a normal distribution. A true sample representative of a population must follow a similar distribution pattern of the population to allow for an accurate prediction of the population. This establishes that there is no over-presentation of the population's properties in the sample and that the sample is closer to the population's mean range²⁰⁹. In order to test for data's normality, the data was utilized to plot a histogram. As demonstrated in the figure below, the data falls fairly and is a properly distributed representation of a normal distribution. As such, it can be concluded that the normality assumption was met.

Figure 7: Histogram of GDP per capita



²⁰⁹ Sekaran, Uma, and Roger Bougie. Research methods for business: A skill building approach. John Wiley & Sons, 2016.

4.4.2 Multicollinearity

Multicollinearity describes the correlation degree among the predictor variables. In a study, multicollinearity can be described as the extent to which one predictor variable can be explained by another predictor variable. Multicollinearity problem exists if the predictor variables are closely related to each other. Notably, predictor variables must be independent. As such, if the multicollinearity test shows that these variables are correlated, the data is not valid for performing inferential analysis. Hair et al. (2012) ascertain that a high degree of correlation among the predictor variables minimizes the predictive power²¹⁰. The collinearity tests, which include tolerance values and Variance Inflation Factor (VIF), are utilized to determine if the dataset has a multicollinearity problem. The tolerance values have a range of 0 to 1, while the VIF is the opposite. VIF closer to 1 indicates either little or no multicollinearity. No VIF is more than 10. Values closer to zero are associated with a good VIF. Hair et al. (2010) elaborate that the rule of thumb for tolerance value and VIF is that tolerance value must not be less than 0.01, and VIF should not be more than 10²¹¹.

As shown in the multicollinearity test performed for this study, no VIF values exceeds 10, while the tolerance values are above 0.01. This indicates that the predictor variables are not correlated, thus proving the absence of multicollinearity in the data.

Table 1: Multicollinearity

Model	Collinearity Statistics	
	Tolerance	VIF
Enrolment in tertiary education, both sexes (number)	.038	6.641
Enrolment in primary education, both sexes (number)	.648	1.543
Labor force	.037	2.736

Coefficients (Dependent Variable: GDP per capita, PPP (current international \$))

4.4.3 Homoscedasticity Test

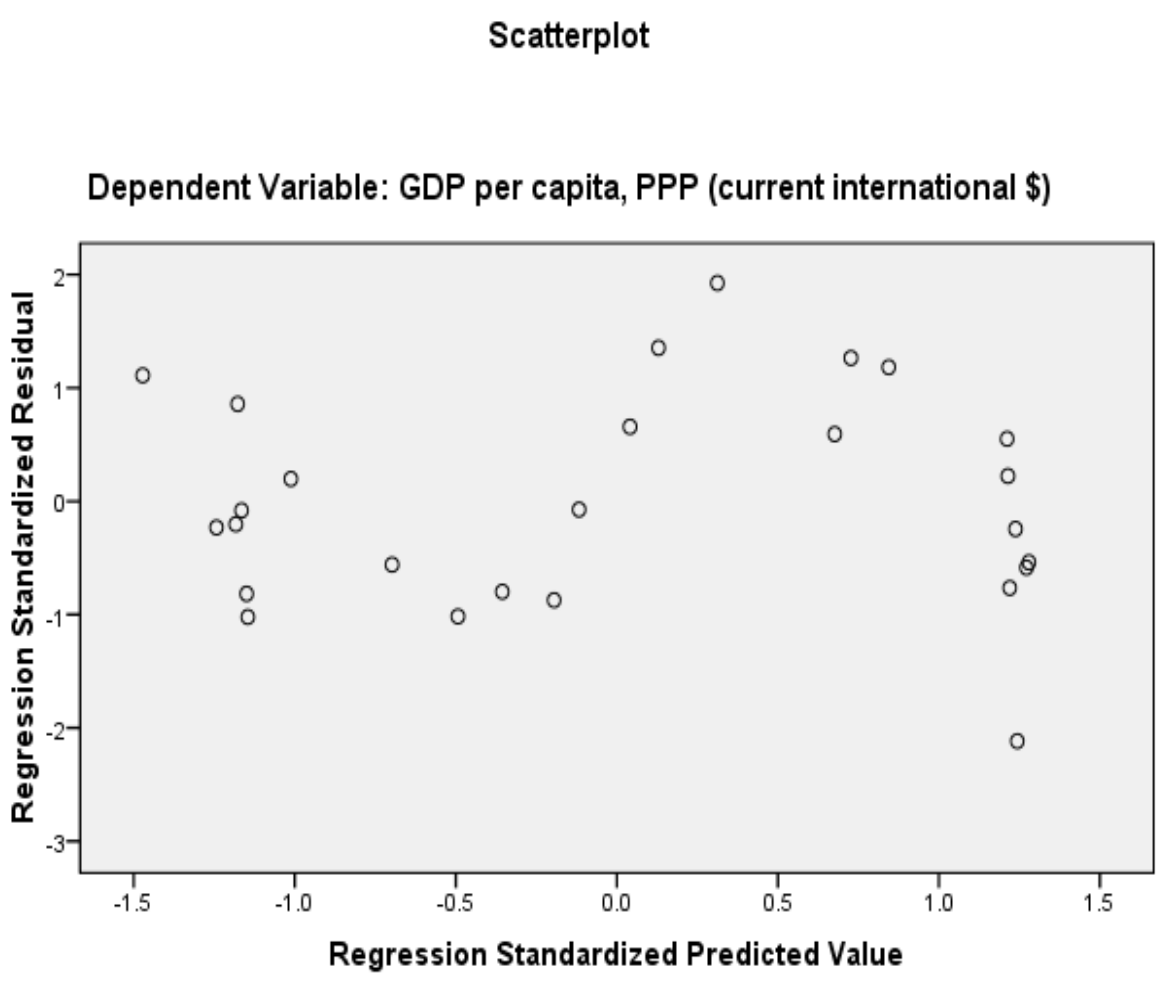
Homoscedasticity describes whether or not residuals in the data are equally distributed. Data is defined as homoscedastic if it is randomly distributed. Contrary, the data that is

²¹⁰ Hair, Joe F., et al. "An assessment of the use of partial least squares structural equation modeling in marketing research." *Journal of the academy of marketing science* 40.3 (2012): 414-433.

²¹¹ Ibid.

not homoscedastic portrays a cone shape when a homoscedasticity test is performed. The homoscedasticity assumption is assessed by plotting the predicted values and residuals on a scatter plot. The results for the homoscedasticity assumption test for this study, as presented in Figure 7 below, reveal that the data does not show any distinct pattern. The values were evenly distributed across the plot area. This implies that data has been gathered from a population with constant variance (homoscedastic population).

Figure 8: Homoscedasticity Test



4.5 Correlation Analysis

Before proceeding to Multiple Regression Analysis (MRA), Pearson Product Moment Coefficient was performed to ascertain if the explanatory and the outcome variables are statistically significant. The analysis intended to define the strength and direction of the relationship between these variables.

Schober, Poer, and Schwarte (2018) reveal that the Bivariate Pearson Correlation gives a sample coefficient of correlation (r) that determines the linear relationship's strength and direction²¹². Pearson's r has a range of +1 to -1. In this case, +1 implies that the relationship has a significant positive relationship. On the other hand, -1 means that there is a significant negative relationship²¹³. 0 is an indication that the linear relationship between the variables does not exist. Since correlation analysis is a technique for measuring the strength of the relationship between the variables in a study, it was the first step in the statistical analysis process.

4.5.1 Correlation between Education Enrolment and GDP per Capita

The correlation is a measure calculation of the relationship intensity between the relative movements of the two variables²¹⁴. From the Spearman correlation, the values clearly show that the gender pay gap does not auto correlate with tertiary education enrolment, primary enrolment, and labor force, which are the independent variables.

From the results, the correlation between GDP per capita and the independent variables (education enrolment and labor force) show a coefficient of 0.969 with a P-value of 0.00 for enrolment in tertiary education and -.716 with a P-value of 0.00 for the primary enrolment while labor force had a value of .957 with a P-value of .000.

The coefficient is positive for tertiary education enrolment, labor force and GDP per capita, showing that tertiary education enrolment, labor force and GDP per capita move in

²¹² Schober, Patrick, Christa Boer, and Lothar A. Schwarte. "Correlation coefficients: appropriate use and interpretation." *Anesthesia & Analgesia* 126.5 (2018): 1763-1768.

²¹³ Schober, Patrick, Christa Boer, and Lothar A. Schwarte. "Correlation coefficients: appropriate use and interpretation." *Anesthesia & Analgesia* 126.5 (2018): 1763-1768.

²¹⁴ Vaz, Sharmila, et al. "The case for using the repeatability coefficient when calculating test-retest reliability." *PloS one* 8.9 (2013): e73990.

the same direction with a strong association. Meanwhile, primary education enrolment has a negative coefficient but is significant indicating that it has strong negative associations.

Table 2: Correlation of Variables

		GDP per capita PPP (current international \$)	Enrolment in tertiary education, both sexes (number)	Enrolment in primary education, both sexes (number)	Labor force
GDP per capita, PPP (current interna tional \$)	Pearson Correlation	1	.969**	-.716**	.957**
	Sig. (2-tailed)		.000	.000	.000
	N	26	26	26	26
Enrolment in tertiary e ducation, both sexes (number)	Pearson Correlation	.969**	1	-.589**	.981**
	Sig. (2-tailed)	.000		.002	.000
	N	26	26	26	26
Enrolment in primary e ducation, both sexes (number)	Pearson Correlation	-.716**	-.589**	1	-.591**
	Sig. (2-tailed)	.000	.002		.001
	N	26	26	26	26
Labor force	Pearson Correlation	.957**	.981**	-.591**	1
	Sig. (2-tailed)	.000	.000	.001	
	N	26	26	26	26

**Correlation is significant at the 0.01 level (2-tailed)

4.6 Testing of Hypotheses

This section covers the hypothesis testing of all three research questions. MRA was performed to measure the direct and indirect relations with the stated hypothesis. MRA is a procedure that assists in describing the probable form of the relationship between variables.

The method can predict or estimate the value of the outcome variable that corresponds to the predictor variables' particular value. In this study, regression analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20.

The study's main objective was to define the nature of the relationship between the education enrolment (tertiary and primary), labor force and economic development (GDP per

capita) and further compare the values to determine if these factors account for the Algeria differences in GDP per capita between 1990 and 2015.

Besides, the findings assisted in determining which of the education enrolment level has more predictive power on the outcome variable (GDP per capita). The regression analysis assisted in answering each of the three research questions.

Regression analysis was carried out to assess the indirect and direct associations within the stated questions and proposed model. Multiple regression analysis is a procedure that aids in defining the probable form of the association between variables²¹⁵.

The technique can estimate or predict the value of the dependent variable that corresponds to a certain value of the independent variable (s). The regression analysis output contains the beta weight (β), which renders a significant interpretation of the relationship between the explanatory and dependent variables. β value may either be negative or positive, which illustrates the extent of decrease or increase in a dependent variable for a unit of change in the explanatory variable.

Also, the output of the regression analysis gives the correlation coefficient (r), coefficient of determination (R^2), and the adjusted coefficient of determination (adjusted R^2). These illustrate how well the dependent variable can be predicted by the explanatory variable (s). R^2 shows the value of change for which the explanatory variable is accountable.

A multiple linear regression model, with the gender pay gap as the dependent variable and collective bargaining and trade unions as the independent variables and the comparative results for different countries are as shown below.

H1: The impact of primary education enrolment on economic development

When determining whether primary education had a significant influence on economic development, regression analysis was carried out. This hypothesis was tested simultaneously with H3 which sought to determine whether education enrolment and labor force

²¹⁵ Cohen, Jacob, et al. Applied multiple regression/correlation analysis for the behavioral sciences. Routledge, 2013

account for internal differences in economic development. After regression analysis was performed, the coefficients for different factors were compared to test the third hypothesis.

- After data analysis was carried out and taking into consideration primary enrolment, there was R^2 of 0.513 and adjusted R^2 of 0.493 which means that primary enrolment contributes 51.3% and 49.3% of the total change/variation in economic development respectively,

Table 3: Model Summary of Primary Enrolment

Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate
1	.716 ^a	.513	.493	.081251500978

Model Summary^b

a: Predictors: (Constant), Enrolment in primary education, both sexes (number

b: Dependent Variable: GDP per capita, PPP (current international \$)

- While other factors outside the model could explain the other variation, the ANOVA table revealed that the model was a significant predictor of the economic development, $F(1, 25) = 25.267$, $P\text{-value} = 0.00$ at 0.05 level of significance.

Table 4: ANOVA Table

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.167	1	.167	25.267	.000 ^a
	Residual	.158	24	.007		
	Total	.325	25			

ANOVA^b

a: Predictors: (Constant), Enrolment in primary education, both sexes (number)

b: Dependent Variable: GDP per capita, PPP (current international \$)

This also implies that there was a significant positive relationship between the primary enrolment and economic growth in Algeria. The results are shown in the figure above.

- When the analysis was done to find the effect of all the independent variables on economic development (GDP per capita), primary enrolment has the following values that ($\beta = -1.519$, $t = -5.027$, $P\text{-value} = 0.000$) are as shown in the table below:

Table 5: Regression Coefficient of Primary Enrolment

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	14.041	2.001		7.017	.000
Enrolment in primary education, both sexes (number)	-1.519	.302	-.716	-5.027	.000

Coefficients^a

a: Dependent Variable: GDP per capita, PPP (current international \$)

Enrolment in primary education had a negative and significant influence on the economic development and when other factors are kept constant a unit increase in enrolment in primary education produce a 1.519 U.S. dollar decrease in the GDP per capita in Algeria.

H2: The impact of tertiary education enrolment on economic development

When determining whether enrolment in tertiary education had a significant influence on the economic development, regression analysis was carried out. This hypothesis was tested simultaneously with H3 which sort to determine whether primary enrolment, tertiary enrolment, and labor factor account for internal differences in economic development.

- After regression analysis was performed, the coefficients of the analysis are as shown in the table below:

Table 6: Model Summary

Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate
1	.969 ^a	.943	.937	.028564507606

Model Summary

a: Predictors: (Constant), Enrolment in tertiary education, both sexes (number)

After data analysis was carried out and taking into consideration primary enrolment, there was R^2 of 0.943 and adjusted R^2 of 0.937 which means that tertiary enrolment contributes 94.3% and 93.7% of the total change/variation in economic development.

- The ANOVA table revealed that the model was a significant predictor of the economic development, with $F(1, 24) = 374.628$, $P\text{-value} = 0.00$ at 0.05 level of significance.

This also implies that there was a significant positive relationship between the enrolment in tertiary education and economic growth in Algeria. The results are shown in the figure below.

Table 7: ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	.306	1	.306	374.62	.000 ^a
Residual	.020	24	.001		
Total	.325	25			

ANOVA^b

a: Predictors: (Constant), Enrolment in tertiary education, both sexes (number)

b: Dependent Variable: GDP per capita, PPP (current international \$)

- When the analysis is done to find the effect of education enrolment level variable on economic development, enrolment in tertiary education have the following values ($\beta=.385$, $t=19.355$, $p\text{-value}=0.00<0.05$) and are shown in the table below:

Table 8: Regression Coefficients of Tertiary Enrolment

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Err.	Beta		
(Constant)	1.740	.116		15.00	.00
Enrolment in tertiary education, both sexes (number)	.385	.020	.969	19.35	.00

Coefficients^a

a: Dependent Variable: GDP per capita, PPP (current international \$)

In Algeria, enrolment in tertiary education for both sexes had a positive and significant relationship with education development (GDP per capita) and when other factors are kept constant, a unit change in enrolment in tertiary education produce a .385 change in dollars in economic development (GDP per capita).

H3: The moderating effect of labor force on the impact of education system on economic development

When determining the influence of the moderating effect of labor force on the relationship between education system and economic development, a moderating labor force effect variable is computed to assess.

- Regression analysis is determined to show its effect.

Table 9: Model Summary

Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate
1	.986 ^a	.972	.969	.019934967070
2	.986 ^b	.972	.968	.020308000485

Model Summary

a: Predictors: (Constant), Enrolment in primary education, both sexes (number), Enrolment in tertiary education, both sexes (number)

b: Predictors: (Constant), Enrolment in primary education, both sexes (number), Enrolment in tertiary education, both sexes (number), Labor force

R^2 of 0.972 and adjusted R^2 of 0.969 means that education enrolments (primary and tertiary) contribute 97.2% and an adjusted 96.9% of the total change/variation in economic development. When labor force was used as a moderator, total contribution of education has no great effect on the change of economic development.

- The ANOVA table revealed that the model was a significant predictor of economic development, $F(2, 23) = 397.723$, $P\text{-value} = 0.000$ at 0.05 level of significance. This also implies that there was a significant positive relationship between education and economic development. However, the F -value was lower when a labor force as a moderator variable was introduced. The results indicate, labor force as a moderator produces lower test statistics as it increases the degree of freedom.

Table 10: ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.316	2	.158	397.72	.000 ^a
Residual	.009	23	.000		
Total	.325	25			
Regression	.316	3	.105	255.55	.000 ^b
Residual	.009	22	.000		
Total	.325	25			

ANOVA^c

a: Predictors: (Constant), Enrolment in primary education, both sexes (number), Enrolment in tertiary education, both sexes (number)

b: Predictors: (Constant), Enrolment in primary education, both sexes (number), Enrolment in tertiary education, both sexes (number), Labor force

c: Dependent Variable: GDP per capita, PPP (current international \$)

- When a labor force was used as moderator on the association between education and economic development, the results indicate a reduced initial influence value of 0.333 to an updated value of 0.305 for enrolment in tertiary enrolment and a reduced initial influence of -0.470 to -0.467 for primary enrolment. This is the result of when the moderator is introduced, and its impact lowers the overall influence of education on economic development.

Table 11: Regression Coefficient of Moderating Effect

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	5.15	.672		7.680	.000
Enrolment in tertiary education, both sexes (number)	.333	.017	.839	19.38	.000
Enrolment in primary education, both sexes (number)	-.470	.092	-.222	-5.126	.000
(Constant)	4.57	1.609		2.840	.010
Enrolment in tertiary education, both sexes (number)	.305	.073	.767	4.172	.000
Enrolment in primary education, both sexes (number)	-.467	.094	-.220	-4.980	.000
Labor force	.105	.261	.074	.403	.690

Coefficients^a

a: Dependent Variable: GDP per capita, PPP (current international \$)

- The general objective is to examine the impacts of education on economic development in Algeria.

Table 12: Model Summary of General Objective

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986 ^a	.972	.969	.019934967070

Model Summary

a: Predictors: (Constant), Enrolment in tertiary education, both sexes (number), Enrolment in primary education, both sexes (number)

R^2 of 0.972 and adjusted R^2 of 0.969 means that enrolment in tertiary education and enrolment in primary education contribute 97.2 % and 96.9% of the total change/variation in economic development (GDP per capita), respectively.

- The ANOVA table revealed that the model was a significant predictor of economic development, $F(2, 23) = 397.723$, $p = 0.000$ at 0.05 level of significance. This also implies that there was a significant positive relationship between the enrolment in tertiary education and enrolment in primary education and education development.

Table 13: ANOVA Table for General Objective

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.316	2	.158	397.723	.000 ^a
Residual	.009	23	.000		
Total	.325	25			

ANOVA^b

a: Predictors: (Constant), Enrolment in tertiary education, both sexes (number), Enrolment in primary education, both sexes (number)

b: Dependent Variable: GDP per capita, PPP (current international \$)

- When the analysis is done and holding other factors constant, GDP per capita is attributed to be 5.185 U.S. dollars. When finding the effect of all the independent variables on economic development, enrolment in primary education has ($\beta = -0.470$, $t = -5.126$, $P\text{-value} = 0.00 < 0.05$), and enrolment in tertiary education has ($\beta = 0.333$, $t = 19.383$, $P\text{-value} = .000 < 0.05$).

Table 14: Regression Coefficients for General Objective

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	5.185	.672		7.680	.000
Enrolment in primary education, both sexes (number)	-.470	.092	-.222	-5.126	.000
Enrolment in tertiary education, both sexes (number)	.333	.017	.839	19.383	.000

Coefficients^a

a: Dependent Variable: GDP per capita, PPP (current international \$)

Enrolment in primary education shows a negative and significant relationship with economic development, and when other predictors are kept constant, a unit increase in enrolment in primary education produces a 0.427 decrease in Gross Domestic Product (GDP per capita). Enrolment in tertiary education showed a positive and significant relationship with economic development in Algeria, and when all other factors are kept constant, a unit change in tertiary enrolment increases GDP per capita by 0.333 U.S. dollars. The above results show that primary enrolment does not majorly contribute to economic development. This is due to the fact at this level almost every pupil of appropriate age is involved at this level of education and much resource is needed to cater for the further education, hence producing a negative influence on the GDP of the country.

Model Estimation

$$\begin{aligned} \ln(\text{GDP per capita}) \\ = 5.158 - .470\ln(\text{Primary enrolment}) + .333\ln(\text{Tertiary enrolment}) \end{aligned}$$

Hence, the time series model is as follows

$$\text{GDP per capita} = 143879.8(2.153\text{Tertiary enrolment}/0.339\text{Primary})$$

4.7 Discussion of Findings

The first research objective sought to determine whether primary enrolment has a significant impact on the economic development (GDP per capita). As defined by world data indicator (2019), primary enrolment is the ratio of total enrolment, regardless of age, to the population of the age group that formally matches the level of education shown.

Primary education provides youngsters with rudimentary reading, writing, and mathematics skills along with an elementary understanding of subjects such as history, geography, natural science, social science, art, and music. The findings of the study reveal that enrolment into primary education has a significant negative impact on the GDP per capita. This indicates that enrolment into primary education will deteriorate the economy given the fact that every child has a high chance to join primary school hence will need more resources. The findings are consistent with those of Naeem and Jangraiz (2012) in

Pakistan whose research was based on education-economic growth relations during the period 1971-2008²¹⁶. The authors find that both primary and high school enrolment contribute to GDP per capita. They also argue that the relationship between education and development is long-lasting. The results differ with those of Self and Grabowski (2004) who demonstrated that primary and secondary education not only have a close relationship with the country's economic growth, but also have an important incidental effect on India's economic development²¹⁷. In another study, Becherair (2014) used ARDL to study the link between education and economic growth between 1971 and 2011²¹⁸. The findings indicate that the primary, on the one hand, and economic growth on the other, have a long-lasting relationship.

In the second objective, the study sought to determine whether tertiary enrolment has a significant impact on the economic development (GDP per capita). Tertiary enrolment is the ratio of total enrolment, regardless of age, of the population of the age group that formally corresponds to the level of education portrayed. The findings of the study reveal that enrolment in tertiary education coverage has a significant positive impact on the education development as the GDP grew with 0.333 U.S. dollars. The results support those of Owolabi and Okwú (2010) who investigated the role of human capital (education enrolment) in economic growth during 1983-2004 in Nigeria²¹⁹. The model was calculated using the OLS technique. Results show that Nigeria's growth over this period was statistically and positively influenced only by the secondary and tertiary enrollment rates. The results of Bils and Klenow (2000) showed consistency and concluded that increased tertiary enrolment to school in 1960 is correlated with a faster annual growth over 1960-90, which was one more year of achievement²²⁰. According to them, this hypothesis is robust to enable technology to benefit positively externally from human capital (education enrolment). The results are also consistent with Self and Grabowski (2004), who revealed differences in terms of the impact on economic growth between primary, secondary, and

²¹⁶ Khattak, Naeem Ur Rehman. "The contribution of education to economic growth: evidence from Pakistan." (2012): 145-151.

²¹⁷ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

²¹⁸ Becherair, Amrane. "Education and Economic Growth in Algeria: An Empirical Investigation by Using ARDL Approach." *International journal of innovation and applied studies* 7.3 (2014): 1215.

²¹⁹ Owolabi, S. A., and A. T. Okwu. "A quantitative analysis of the role of human resource development in economic growth in Nigeria." *European journal of economics, finance and administrative sciences* 27 (2010): 7-17.

²²⁰ Bils, Mark, and Peter J. Klenow. "Does schooling cause growth?" *American economic review* 90.5 (2000): 1160-1183.

tertiary education as tertiary education does not seem to have a causal effect on economic growth²²¹. Besides, according to Lin (2003) who explored the relationship between economic growth and higher education in his other study, he found higher education (tertiary education level) and economic growth to be positively linked²²².

Overall, the study findings regarding the impact of education enrolment (primary and tertiary) revealed that education results in reduced GDP per capita since the coefficient of change in primary is much high in negation than the positive coefficient of tertiary enrolment which is on the positive side. The results were consistent with those of Becherair (2014) who used Autoregressive Distributed Lag (ARDL) to study the link between education and economic growth between 1971 and 2011²²³.

The findings indicate that the primary and tertiary education, on the one hand, and economic growth on the other hand, have an either positive or negative long-lasting relationship.

²²¹ Self, Sharmistha, and Richard Grabowski. "Does education at all levels cause growth? India, a case study." *Economics of Education Review* 23.1 (2004): 47-55.

²²² Lin, T-C. "Education, technical progress, and economic growth: the case of Taiwan." *Economics of Education Review* 22.2 (2003): 213-220.

²²³ Becherair, Amrane. "Education and Economic Growth in Algeria: An Empirical Investigation by Using ARDL Approach." *International journal of innovation and applied studies* 7.3 (2014): 1215.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND FUTURE RESEARCH

This section provides the conclusion as a summary of the previously discussed chapters. Furthermore, it highlights the proposed study contributions to the current literature and provides recommendations for further reforms. This chapter will end with a brief discussion about the possible applicability of the suggested recommendations. The section will also make suggestions for a roadmap in which the subject can be extended for further research.

5.1. Summary

This study's broad objective was to explore the impact of education system on economic development in Algeria. Specifically, the study was focused on determining the causal relationship between the dependent variable (GDP per capita) and the independent variables (primary enrolment and tertiary enrolment) for a period of 26 years (from 1990-2015). The study was motivated by the fact that despite an increasingly Arabic Algeria, both English and Arabic have not bowed to rivalry. In convincing Algerians to give up French, Algeria's language strategy failed. Contrary to all the odds, not only did the latter thrive, but the number of users increased. The effect of education has continued to be broad in recent years, resulting in changes in economic growth. To assist in understanding the impact of education on economic development, gaining insights into the meaning of economic development is vital. As such, the current project seeks to determine whether education's influence is the overall significant determinant of national economic development. This information will help deal with how the two variables are related and to what extent do they need each other. Due to the data that was available only, although the researcher intended to include data for primary, secondary, and tertiary, the researcher was forced to use only primary and tertiary enrolments. The research used a descriptive survey research design. A correlation research design and deductive research approach were utilized to explore the relationship between factors that influence the overall economic development (GDP per capita) across Algeria. They were also used as they yield

logical and unbiased results. Stratified random sampling was used to collect data using questionnaires from 339 respondents. To achieve the study objectives, the researcher formulated three research questions, which are summarised below.

What is the impact of primary enrolment on the GDP per capita?

The first research question sought to determine if there is a significant relationship between enrolment into primary education and economic development. The findings of the study revealed that enrolment into primary education for both sexes has a significant negative impact on the economic growth (it reduces GDP per capita). The second hypothesis states that there is a significant relation between unionized wage setting and GDP.

What is the impact of tertiary enrolment on the economic development?

The second research question was designed to assess if there is a significant relation between tertiary enrolment for both sexes on economic development. According to the research findings, enrolment into tertiary education has a significant positive impact on the economic development (it increases the GDP per capita).

What is the mediating effect of labor force on the impact of education enrolment (primary, secondary, and tertiary) on economic development (GDP per capita)?

When determining the moderating effect of labor force on the association of education and economic growth, a moderation analysis was performed, which compared the regression results with and without labour factor. The results indicated that, labor force is one of the factors influencing economic growth, therefore when included lowers the overall influence of education enrolments on economic growth.

Overall, the study sought to determine how education systems in Algeria have impacted economic growth. The results showed, that due to high increase in enrolment in primary school, it has reduced the economic growth as the education at this stage is free. The results showed tertiary education enrolment leads to growth of the economy, as at this level, those who are enrolled pay for their studies.

5.2. Conclusions

This section covers the conclusions of this study based on research findings. The conclusions are divided into two categories, namely: theoretical conclusions, and empirical conclusions.

5.2.1. Theoretical Conclusions

This study was built on the following underpinning theories: human capital theory and neoclassical theory of development. According to human capital theory, human capital refers to the productive wealth personified in skills, labor, knowledge, and innate traits or any stock of knowledge an individual possesses that contributes to their economic productivity. The theory gives the concept of education which is viewed in modern economic terms as a significant investment in human capital for the future in the present. According to this theory investment in education is a means of capital training and a key economic development factor. Since human capital has risen faster than non - human capital in some developing countries; as a consequence of human investment, the portion of the human capital of national income is very high. Therefore, education emerges as a key investment in human capital and human resources growth in a developing economy. Hence, the theory concludes that education elevates a person's efficiency and earnings. As such, education becomes an investment that is important for a person and the country's economic growth. Consequently, the Human Capital Theory recommends that investing in education and training enhances a person's hope of earning highly in the future.

According to neoclassical theory, economic growth is directly linked to free trade, with a view to achieving the desired economic development, the countries should implement policies of globalization, privatization, and liberalization. Development is a product of undue government interference and inadequate allocation of capital due to irrational pricing policies. The Neoclassical Theory of Growth is a growth model that demonstrates how a stable rate of economic growth happens when three economic forces are brought into play: labor, capital, and technology. The Neoclassical Theory implies that short-term economic balance is a function of different quantities of labor and capital, which play an important part in the process of development. The theory argues that technological change

influences the overall workings of the economy significantly. Therefore, the theory concludes that accumulation of capital and how people use it in an economy is significant. The theory also concludes that economic income and human capital (enrolment in education) have a relationship.

5.2.2. Empirical Conclusions

Overall, the study sought to explore the impact of education system on the economic development which was measured in terms of Gross Domestic Product (GDP) per capita. First, a correlational analysis was performed to determine the nature of the relationship. The regression analysis was subsequently performed to the relationship between independent variables (primary and tertiary enrolment), and dependent variable (GDP per capita).

The first objective was designed to determine the influence of primary enrolment on the economic development. The findings of the study showed that primary enrolment as form of human capital have negative impact on the GDP per capita of Algeria. Hence, one can conclude that primary enrolment lowers the economy growth of the country where primary education is free.

The second research objective was to seek the impact of tertiary education on economic growth. The research clearly showed enrolment in tertiary has a positive relationship with economic development. Therefore, one can conclude that in Algeria, enrolment in tertiary education is a contributor of positive economic growth since in many tertiary institutions, students pay fees for their studies which in turn improves the economy. Moreover, the results showed labor force as moderator, contributes positively to the enhancement of economic development. The moderator also lowers the initial effect of primary and tertiary on gross domestic product per capita, and this helps balance the association of economic growth and education enrolment. Hence, one can conclude that labor force as a moderator enhances the model and produces a new influence on the gross domestic product per capita.

5.3. Limitation of the Study

Research limitations entail the factors that hinder the reliability of the research outcome. For this study, purposive sampling was a profound limitation. According to Hair et al. (2012), the utilization of purposive sampling hampers generalizability as it lacks randomness²²⁴. Further, Tyner (2014) urges that the purposive sampling technique is judgmental since the researchers select the sample based on their convenience²²⁵. Usually, the absence of randomness in research creates questions about whether the data used in the study is reliable or not. Besides, the generalizability of the study's findings across Algeria was limited since only education was considered to affect economic where there are other factors that contribute to change of the economy, representing a very small representation of factors. Besides, the generalizability of findings that primary and tertiary education was limited since no secondary enrolment was included in the study due to insufficient data.

5.4. Recommendations

In order to assess the impact, the influence of education, this study makes the following recommendations in respective areas:

Since the results indicate that the effect of primary enrolment on economic growth was negative, the study recommends the Algerian government to take measurements such as revenue generation through tax collection which will help balance their expenditure on primary enrolment which will help to not deteriorate the growth of the economy.

The study found tertiary enrolment having a positive impact on economic growth. Therefore, the study finding recommends the government of Algeria to continue supporting tertiary institutions by increasing their numbers in the country in order to have an increase on tertiary enrolments. This will, therefore, continue improving the economy growth year in year out.

²²⁴ Hair, Joe F., et al. "An assessment of the use of partial least squares structural equation modeling in marketing research." *Journal of the academy of marketing science* 40.3 (2012): 414-433.

²²⁵ Tyner, Kathleen. *Literacy in a digital world: Teaching and learning in the age of information*. Routledge, 2014.

In terms of the moderating effect of labor force, the study showed it significantly influences the association between education and economic development. Hence, it is recommendable that Algeria could use both labor force and education, which will improve the growth of the economy.

Generally, since the government is mandated in the growth of economy, the study recommends the government to apply the best education system to increase the growth of the economy without engaging the outsources.

Since the study was associated with limitations linked to the choice of the sampling technique, the study should, therefore, be conducted using a probability random sample. Only two main factors of the education enrolment i.e., primary and tertiary have been considered for this study. As such, future studies should focus on including more factors of education i.e., secondary and post-tertiary enrolments to examine how they impact the gross domestic product per capita. The study also used a small sample. For future research work, scholars can conduct the same research with the inclusion of a large sample size by including more years. Researchers can conduct the same study in other African countries and other developed nations and compare the results of the current study with their findings and show if the results concur or differ.

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Appendix

Appendix 1: Data Distribution for a period of 26 years (1990-2015)

Year	Tertiary enrolment	Enrolment in primary education, both sexes (number)	GDP per capita, PPP (current international \$)	Labor force
1990	203529	4027612	6916.719	6484523
1991	258995	4189152	6893.122	6754968
1992	285930	4357352	7010.395	7003986
1993	298117	4436363	6871.419	7300192
1994	303111	4515274	6812.44	7594096
1995	298133	4548827	7083.012	7847454
1996	298767	4617728	7377.937	8095036
1997	347410	4674947	7466.139	8298341
1998	456358	4719137	7817.022	8507810
1999	549009	4778870	8068.556	8719346
2000	624788	4843313	8446.86	8930754
2001	682775	4720950	8775.399	9157765
2002	716452	4691870	9294.136	9379039
2003	792121	4612574	10019.68	9598546
2004	817968	4507703	10591.37	9819757
2005	901562	4361744	11406.01	10042271
2006	1149666	4196580	11776.42	10254779
2007	1144271	4086925	12311.43	10460143
2008	1188562	3942242	12643.56	10661074
2009	1210272	3252664	12722.79	10861407
2010	1252579	3312440	13095.87	11136940
2011	1245478	3363236	13500.48	11358923
2012	1289474	3451588	13303.42	11597819
2013	1439594	3608812	13056.79	12064459
2014	1545523	3765307	13003.19	11642569
2015	1600676	3925429	12015.65	11798754

Abstract

For a long time, education has been the motor of economic development. Enabling high-skilled labor, forces would improve their productivity. It will increase the quality of their lives, economically, politically, culturally and so on, by similarly empowering people with education. In addition to increased productivity, this non-monetary return to education would have a beneficial and sustainable impact on economic development. In Algeria, the education system has continued to evolve since independence with introduction of all levels of education including primary, secondary, and tertiary. Education enrolment has continued every year in and out in all sectors. From reviewed literature, scholars have indicated education enrolment and economy development have a continuous relationship. Therefore, the study evaluated the impact of education regarding enrolment on the economic development in Algeria. The study adopted a correlation research design to explore the relationship between education enrolment that influence the overall economic development (GDP per capita). The findings of the study showed that primary enrolment as form of human capital has a negative impact on the GDP per capita of Algeria. The research clearly showed enrolment in tertiary has a positive relationship with economic development. The study concluded that primary enrolment lowers the economic growth of the country, this is because primary education is free, thus, it is the government mandate that must guarantee this level of education. The study's findings also concluded that in Algeria, enrolment in tertiary education is a contributor of positive economic growth since in many tertiary institutions, students pay fees for their studies which in turn improve the economy. The study's findings recommend that the government of Algeria should continue supporting tertiary institutions by increasing their numbers in the country in order to have an increase on tertiary enrolments.

Abstrakt (Deutsch)

Bildung ist seit Langem der Motor der wirtschaftlichen Entwicklung. Durch die Ermöglichung hochqualifizierter Arbeitskräfte verbessern die Unternehmen ihre Produktivität. Die Qualität des Lebens wird in wirtschaftlicher, politischer, kultureller Hinsicht verbessert, indem die Menschen in ähnlicher Weise mit Bildung befähigt werden. Neben der Steigerung der Produktivität würde sich diese nicht monetäre Rückkehr zur Bildung positiv und nachhaltig auf die wirtschaftliche Entwicklung auswirken. In Algerien hat sich das Bildungssystem seit der Unabhängigkeit mit der Einführung aller Bildungsebenen, einschließlich der Primär-, Sekundär- und Tertiärstufe, weiterentwickelt. Die Einschreibung in die Bildung wurde jedes Jahr in allen Sektoren fortgesetzt. Aus der überprüften Literatur haben Wissenschaftler angegeben, dass die Einschreibung in die Bildung und die wirtschaftliche Entwicklung eine kontinuierliche Beziehung haben. In der Studie wurden daher die Auswirkungen der Bildung in Bezug auf die Einschreibung auf die wirtschaftliche Entwicklung in Algerien bewertet. In der Studie wurde ein Korrelationsforschungsdesign angenommen, um die Beziehung zwischen der Einschulung zu untersuchen, die die gesamtwirtschaftliche Entwicklung (BIP pro Kapital) beeinflusst. Die Ergebnisse der Studie zeigten, dass sich die Grundschulbildung als Form des Humankapitals negativ auf das Pro-Kopf-BIP Algeriens auswirkt. Die Forschung hat eindeutig gezeigt, dass die Einschreibung im Tertiärbereich einen positiven Zusammenhang mit der wirtschaftlichen Entwicklung hat. Die Studie kam zu dem Schluss, dass die Grundschulbildung das Wirtschaftswachstum des Landes senkt. Dies liegt daran, dass die Grundschulbildung kostenlos ist und daher das Regierungsmandat dieses Bildungsniveau gewährleisten muss. Die Ergebnisse der Studie kamen auch zu dem Schluss, dass in Algerien die Einschreibung in die Hochschulbildung zu einem positiven Wirtschaftswachstum beiträgt, da in vielen Hochschulen Studiengebühren für ihr Studium gezahlt werden, was wiederum die Wirtschaft verbessert. Die Ergebnisse der Studie empfehlen, dass die algerische Regierung die Hochschulen weiterhin unterstützen sollte, indem sie ihre Zahl im Land erhöht, um die Zahl der Hochschuleinschreibungen zu erhöhen.