



Educational Reforms and the Role of Polytechnic Education in the Socio- economic Development of Ghana.

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Received: 8th August, 2014 **Revised:** 21st August, 2014 **Published Online:** 30th August, 2014

URL: <http://www.journals.adri.org/>

[**Cite as:** Iddrisu, S., Alhassan, E. and Kinder, T. (2014). Educational Reforms and the Role of Polytechnic Education in the Socio- economic Development of Ghana. Africa Development and Resources Research Institute Journal, Ghana: Vol. 11, No. 11(2), Pp. 29-52, ISSN: 2343-6662, 30th August, 2014.]

Abstract

This paper contributes to the debate on the educational reforms and the role of the polytechnics in economic development of Ghana. The paper was an outcome of a review of secondary data supported by interviews with, polytechnic Rectors, polytechnic administrators and government officials across seven polytechnics in Ghana. Purposive sampling technique was used to select the key informants and qualitative analysis procedure was used. The study examined the educational development from the colonial period as bases for Ghana educational system today, the period of internal self-governance, the impact of the education development and reforms that took place in 1987. Following the educational reforms, the polytechnics became part of the institutional network responsible for the training of the middle man-power for the socio-economic development of the Ghana. Apart from raising the political and social awareness of citizens in Ghana, the polytechnics have witnessed the unprecedented growth and expansion from the 1990s to date. Many polytechnic trainees who became successful entrepreneurs have provided employment to other citizens in Ghana. They provided the alternative route aimed at easing pressure on the traditional universities and also promoted and encouraged scholarship and community service within Ghana. In that sense, they have made a significant strives as centres for excellence for the development of human resource for

national development. The paper calls for government to pay more attention to the polytechnics in Ghana and backed all initiative to develop the country's polytechnics by legislation.

Keywords: education, development, socio-economic, polytechnic, tertiary

INTRODUCTION

Ghana has long been regarded as a leader in African educational systems (George 1974; World B 2004). She inherited a vibrant educational system from Britain that has since witnessed a series of reforms and government educational policies formulated from time to time in a bid to make the system more relevant to the needs of the country. These initiatives include: the Education Act of 1961; Kwapong Report 1967; Dzobo Committee (1973); new structure and content of Education 1974; Education Commission Report on Basic and Secondary Education 1987/88; Education Reform Programme 1987; University Rationalization Committee (URC) 1987; Free Compulsory Universal Basic Education (FCUBE) Programme 1996-2005; FCUBE Policy Document and Programme of Operations, 1996; GETFund Act 581 (2000); and the Education Sector Review Committee (2001).

Currently, there are 17,881 primary schools of which 13,510 are public and 4,371 private; 10,213 Junior High Schools (JHS) of which 7,656 are public and 2,557 private; 670 Senior High Schools (SHS) comprising 493 public and 177 private schools (ESPR 2009; MOE, 2008/09 Education Profiles) with total enrolment figures of 2,216,792 and 767, 303, with Gross Enrolment Rate of 78.6% for the primary and 60.9% for the JHS respectively (ESPR 2009; MOE, 2008/09 Education Profiles). It is worthy of note that there is active private participation in education across all levels. At the Basic level, 550,423 pupils are in private basic schools (MOE 2008/09, Education Profiles). Presently, Ghana has 126 tertiary institutions categorised as public universities (PUs), private universities (PTUs), professional institutions, tutorial colleges, polytechnics, Colleges of Education (CoE), Colleges of Nursing (CoN) and Agriculture.

The demand for tertiary education (TE) has reached high levels. For instance, polytechnic enrolment increased from 1,385 in 1993/94 to 18,474/18,459 in 2000/01 and appreciated by 55% growth (28,695) in 2008/2009 (Daily Graphic 2005). While enrolments into the five PUs went up from 15,365 in 1993/94 to 40,673 in 2000/2001 and by 2006/2007 this figure soared up by 117% to 88,445 (Effah and Hoffman 2010). Total enrolments into TE increased from 159, 158 in the 2008/2009 to 162,460 in the 2009/2010 academic year. The distributions among the sub-groups within the tertiary brackets are Universities 107,640 (66.2%); Polytechnics 45,934 (28.3%); and professional institutions 8,886 (5.5%) (NCTE 2011).

The objective of this paper is to examine the reforms and the role of polytechnics in the socio-economic development of Ghana. This justifies the importance of polytechnic in the tertiary educational sector of Ghana and also the need for more reforms of polytechnic education. The euphoria that followed the development and expansion of the Ghanaian educational sector is no longer there. This may be in part due to inadequate infrastructural resources, the challenge of meeting industry needs by the human resource produced at Ghana's tertiary institutions, and the critical being financing education in Ghana.

The Development of Education in Ghana from 1520 – 1951)

The Portuguese were the first to establish western European type school at Elmina in 1529. The primary aim was to provide schooling to sons of Europeans traders by African wives and to convert the indigenes to the Catholic Faith through reading, writing and religious teaching for African children (McWilliams 1962; Graham 1974). This was followed by the Dutch in 1637 who revamped the school in 1664. The aim of course, was not different from that of their predecessors. About a century later, the Danes established one at the Christiansburg Castle in Accra. The last in the trail were the British who established theirs at the Cape Coast Castle in 1751 (McWilliams 1962). All this while, education was both sporadic, limited, and in the hands of the missionaries (Graham 1974; McWilliams 1962).

Before 1800, there was this window of opportunity for outstanding Africans to study in Europe. Notable beneficiaries of this scheme include William Awo of Axim (1707); and Jacobus Capitein (1728). They both distinguished themselves in their pursuit and returned home after their courses. There were many others who also studied in Europe and returned afterwards (McWilliams 1962; Graham 1971). The British after establishing their influence continued with the same gesture. Around 1788 for instance, there were 50 West African children mainly from the Gold Coast and Sierra Leone studying in Britain. Rev. Thompson, Phillip Quaco, Thomas Caboro and William Cudjo are good examples of such beneficiaries. Phillip Quaque, the survivor of the trio continued his studies for 10 years and graduated from Oxford with a Master of Arts Degree. He was later ordained the first African Minister of a Church of England in 1765. Others include Acquah, Sackey, Nkwantabisa, Owusu Ansah, Akwasi Buakye and Kwamina Poku (Graham 1974; McWilliams 1962).

Throughout the 18th Century, the number of schools and enrolment were negligible. Indeed, enrolment hovered between zero and sixteen from 1766 through to 1789. For example, George (1974) recorded about 139 Government and Government-assisted schools with three run by missions along the coastal regions. These schools had total enrolment of 5,000 students; which later increased to 12,000 in 135 Government and Government-assisted schools and 120 unaided schools. However, the early 19th Century saw expansion largely due to combined efforts of government and Missionaries such as: The Basel Society, Wesleyan Methodist Missionary Society, and Bremen Missionary Society among others. Enrolments in primary education increased from 5,000 in 1880 to 12,018 in 1901 and to 32,839 by 1925. In a similar fashion, enrolments in secondary education rose from 538 in 1931 to 2,776 by 1951. Also, the number of teacher trainees increased from 555 in 1931 to 1,831 by 1951; 3,873 by 1957 and 5,452 by 1960 (George 1974; McWilliams 1962).

Education during the Period of Internal Self-Government (the 1951 Accelerated Development Plan (ADP))

The year 1951 represents an important watershed in Ghana's educational history. This was when the control of educational policy shifted from colonial hands into African hands before political independence in 1957. By 1951, Ghana then Gold Coast had achieved considerable measure of internal self-government. Around this time, the educational system though undeveloped had a total of 3,000 institutions with 31,200 pupils in attendance (George 1974).

When the 1951 constitution came into being; an ADP for education was laid before parliament. The main objective of this plan as provided for in the Act 1951 was:

To help develop a balanced system working towards universal primary education as rapidly as consideration of finances and teacher training allowed, but maintaining at the same time proportionate facilities for further education for those most fitted to receive it (Graham 1971:177).

The Act recognised that progress in education depended on the supply of quality trained and motivated teachers. To this end, government committed itself to providing the required facilities at all levels including teacher training, however, with a bias towards primary education. One year on, January 1952, over 132,000 children began primary schooling, that is, more than double the 1951 figures. By 1957, there were over 450,000 children in primary schools representing about 10% of Ghana's population then being serviced by about 15,000 teachers. The most outstanding result of the ADP had been the provision of half a million primary school places. This ultimately called for expansion in secondary education. Government planned to increase the intake into secondary from 2,500 in 1958 to 6,000 in 1964 through the Ghana Educational Trust.

By extension, parents were to be fined up to ten pounds for noncompliance. No fee other than the payment for the provision of essential books or stationery or of material required by pupils for use in practical work was being charged in respect of tuition at a public primary school. Between 1951 & 1957, educational facilities expanded in every nook and corner of the country. By February 1958, there were 3,402 primary schools and 1,030 middle schools, - more than anticipated by ADP. Between the planned periods of 1951 to 1958 the number of secondary schools rose sharply from 12 to 38 and by February 1958, there were 10,423 students in secondary schools throughout the country. Of this total, 9,860 were enrolled in the 38 assisted secondary schools. The plan also envisaged a total of 3,500 enrolments at the teachers training colleges (TTC) for both Certificates A and B. By 1958, enrolments at the TTC's had reached 4,055. The same year also witnessed a drop in the number of untrained teachers below 10,000 - the first time ever since 1952. Thus, the ADP exceeded the estimated target of 9,860 by 563 in terms of enrolments for the planned period.

The 1961 Education Act

Another important event that also helped to give fillip to educational expansion in Ghana was the Education Act of 1961. The Act provided legislation on the right to education and a structure on which Ghana's education was to revolve. It further empowered the sector

Minister to make regulation that had the force of law. This Act made BE 10 years comprising six years primary and four years of middle school. One outstanding feature of the Act is the aspect that gave legal effect to the government's decision to make Basic Education compulsory. McWilliams (1962) noted that every child who has attained the school going age as determined by the Minister shall attend a course of instruction as laid down by the Minister in a school recognised for the purpose by the Minister.

The Act that came into effect in 1961-62 made middle schooling free as was done for the primary in 1952. All parents were required to do was to provide for the uniform and books of their wards. However, in 1963, government embarked on its free textbooks distribution policy to both primary and middle school pupils, thus relieving parents of this hitherto onerous responsibility. The compulsion and free BE policy which also saw the untiring of admission to faith led to higher enrolments at all levels. This indirectly led to the demand for secondary education and HE as well. The 1961 Act led to a massive expansion across all sectors of education. The exceedingly high demand led to the introduction of the shift system as demand stretched existing facilities. Table 1 below provides the summary of enrolments by George (1974).

Table 1: Summary of School Enrolment from 1951- 1966

Category of institution	Base year (1951)	Current Years (1965-66)
Primary	154,360	1,137,495
Middle	66,175	267,434
Secondary	2,937	42,111
Technical	622	4,956
Teacher Training	1,916	15,144
University	208	4,267
TOTAL	226,218	1,471,407

Educational Developments from 1966 - 1986

On February 24, 1966, the National Liberation Council (NLC) overthrew President Nkrumah and consequently scrapped his programmes and policies including education (George 1974). Following from this, the NLC on March 7, 1966 appointed an Education Review Committee under the chairmanship of Professor Kwapong to conduct a comprehensive overhaul of the entire educational system and of research in Ghana (George 1974; Antwi 1992; Government of Ghana 2004). The Committee presented its findings to Government on July 28, 1967. Government accepted it and consequently issued a White Paper (WP) embodying its comments and detailing its response to the recommendations and statements of its educational policy direction in 1968. This committee recommended that the energies of the nation should be directed towards the middle level of education covering secondary, technical, commercial and vocational and teacher training. The Committee further

recommended the introduction of the two-year Continuation School Policy as a stopgap measure to address the issue of majority of pupils being unable to gain access to the few places in secondary “grammar” schools (George 1974). This policy was later criticised as elitist as it did not address the problems but rather promoted inferior education and further skewed secondary education to the elites rather than the masses (MOE 2004).

The Dzobo Review committee of 1974 introduced the concept of comprehensive junior secondary school (JSS) that was geared at teaching both academic and practical skills to all pupils. The JSS concept was run on an experimental basis together with the middle school until the 1987 reforms converted all middle schools to JSS (MOE 2004).

The 1987 Educational Reforms

The 1987 educational reforms were prosecuted by the PNDC to check the decline in access, infrastructure, expansion and quality of education through a radical overhaul of both the structure and content of education. The reforms introduced the 6-3-3-4 structure initiated by the Dzobo 1972 recommendations. The reforms also led to the adoption of Senior Secondary School Certificate (SSSC) now West African Senior Secondary Examination (WASSE) that replaced the Ordinary and Advanced Levels examination in 1993, thus reducing the school time by five years. The moving spirits behind the reforms are contained in a government WP paper in 1987. According to the paper, education:

“Is the basic right of every Ghanaian to be able to read, write and function usefully in the society. The system as is organised now makes it difficult for this right to be enjoyed” (MOE 1987).

The 1987 reforms, in the words of Effah (2003:40), were designed to increase access at all levels and provide for expansion and equity; improve institutional infrastructure, pedagogic efficiency and effectiveness; expand school curricula to provide for academic, cultural, technical and vocational subjects.

The most significant contribution of the 1987 reform was the reduction in time spent in pre-university education from 17 to 12 years. Another milestone achieved by the 1987 reforms was the increase in BE. BE schools increased from 12,997 in 1980 to 18,374 in 2000 (Akyeanpong 2010). Consequently, primary enrolments soared from 1,803,148 in 1991 up from 455,053 at independence (representing 82.5% of the age group). The new three year JSS also rose from 115,831 to 569,343 within the same period (up by 10% from 25% under the old structures (Dwomoh 1994). The intent of the reforms was to revolutionise Ghana’s educational downturn was not fully achieved as globalisation and Information Communication Technology (ICT) caught up with it.

President’s Education Review Committee (2002)

On assumption of office in January 2002, President J.A.Kuffour, set up a 29 member Committee on Education Review headed by Jophus Anamuah-Menash to wholly review the system with a view to making it responsive to the challenges of the 21st Century under the following terms of reference:

“To review the entire educational system in the country with a view to making it more responsive to the current challenges. Specifically, the Committee was required to examine the structure of education and discuss issue affecting the development and delivery of education, the constrained access to different levels of the educational ladder, Information Communication Technology, Distance Education, professional development and the management and financing of education in addition to other cross-cutting issue concerning the sector” (Government White Paper Page 2).

The committee completed its work in October 2002 and recommended a new education structure of 2-6-3-4 at the pre-tertiary levels and 4 years at the university. However, the Kuffour government did not muster the political courage to implement these recommendations before leaving office in December 2008.

The new Government under the leadership of the late President Mills implemented all but one recommendation-three years Senior High School (SHS). Also, for the first time, Kindergarten (KG) was integrated into the educational structure.

Development of Tertiary Landscape in Ghana

Bloom, Canning and Chan (2005); Bening 2005; and McWilliams (1964) trace the origin of modern TE in Ghana to Achimota in 1927. Its first graduate received a BSc. Degree in Engineering in 1935 under the auspices of the University of London (UoL) (Bening 2005; and Graham 1974). Later in 1948, due to agitations of the nationalist, the University College of Gold Coast (UCGC) was established at Legon as Ghana’s premier university. In October 1948, Governor, Alan Burns with Mr M.D. Balme as its first Principal, opened the UCGC. The UCGC started with 90 students, “as an autonomous institution under a Council with complete control of the general policy and property of the college” (McWilliams 1962:78). By an ordinance, the UCGC was established as an offshoot and branch of the UoL “for the purpose of providing and promoting university education, learning and research” (Graham 1971:176). The UCGC was renamed the University College of Ghana (UCG) after political independence. It attained full-fledged university status through Parliamentary Act (Act 79), and later in August 1961 it was renamed University of Ghana (UG). By 1950 there were 213 student enrolled, 80 of whom were in the Arts, Economics or Science faculties, 103 for Intermediate Examinations and 30 with the Institute of Education (Graham 1971); 300 at the beginning of the 1951-52 academic year (George 1974) and by 1959 more than 1,100 students had enrolled in the two universities (George 1974). By 1961, the student population had grown to 670, of whom 46 were women. In the same year 166 appeared for the degree examination out of which 148 completed successfully (McWilliams 1962).

After UG came the second of Ghana’s HEIs; the Kumasi College of Technology (KCT) established in October 1951 as an affiliate of the UG in order to train a diversity of personnel required for the economic, technological, educational and social development of Ghana (Graham 1971). However, the college was officially opened on 22 January 1952 with 200 teacher trainees transferred from Achimota College to form the nub of KTC. In 1961, the Kumasi University College (KUC) was upgraded to a university and renamed the Kwame Nkrumah University of Science and Technology (KNUST) as a tribute to the first President

of Ghana, Osagyefo Dr. Kwame Nkrumah. KNUST was changed to the University of Science and Technology (UST) after the 1966 coup but reversed to its earlier name KNUST by President Rawlings in 1996. In March 1962, KNUST had 533 students being serviced by 147 staff. While the three Higher Educational Institutions had a total enrolment of 4,301 (Eshun 1998: 241; cited by Opare et al 2008:17). The total number of students in the two institutions rose from 1,184 in 1960-61 to 4,267 in the 1965-66 academic years (George 1974). Until independence, the training of advanced and specialist teacher training was under the purview of KNUST and later moved to Winneba. To regulate the operations of the two universities, the National Council for Higher Education (NCHE) was set up in 1962. However, it was abolished after the 1966 coup; revived in 1969 by NLC Decree 401. It was again abolished in 1983 and re-established as the NCTE in 1993.

The University College of Education (UCE) was established in Cape Coast in 1964 under the UG and achieved full-fledge university status in 1971 as the University of Cape Coast (UCC). This was established with a mission to train graduate professional teachers especially in the sciences for the colleges, second cycle schools as well as the Ministry of Education (MoE) in a bid to meet the unprecedented demand that emanated from the expansion in school places (Antwi 1992; Bening 2005). These three institutions with a sizeable number of research institutions and professional associations represented Ghana's TE sector with total enrolments around 9,000 until the mid-1990's (Effah 2003). By 1986, there were three universities, six non tertiary polytechnics, a few diploma awarding institutions and other post-secondary institution (Girdwood 1999). These three institutions of higher learning dominated the tertiary landscape and largely succeeded in setting the ethos of the educational system of Ghana from the 1960's until the reforms of the 1990s led to the establishment of the fourth public university, the College of Education at Winneba (UCEW). UCEW was established on 30th September 1992 to meet the increased demand for qualified teachers that was necessitated by the reforms of 1987. It took a unique form by amalgamating the former Specialist Training College, National Academy of Music, and Advanced Teachers College (all in Winneba), School of Ghana Languages, Ajumako, St. Andrews Agricultural Training College in Mampong, Ashanti and the Kumasi Advanced Technical Training College (KATTC). UCEW thus became the first multi-campus of higher learning (Bening, 2005). UCEW was affiliated to the UCC until 14th May 2004 when it attained a full fledge university status and renamed the University of Education, Winneba (UEW) (Opare et al 2008).

The University for Development Studies (UDS) was established in 1993 as the second multi-campus with campuses in Tamale, Nyanakpala, Wa, Navrongo and Kintampo and specially mandated to engage in action oriented approach to education with a view to solving community problem using multi-disciplinary approaches. In the words of Girdwood (1999:22), UDS was established "in the interest of spatial equity".

As part of URCs recommendations six non-tertiary polytechnics were elevated to tertiary polytechnics in 1993 in what Atakpa (2006) describes as a "jump start" in Accra, Tamale, Kumasi, Takoradi, Ho and Cape Coast with a mandate to run career focused professional courses geared at filling the middle-level manpower needs of the country. Four more were later established between 1997-2003 in Sunyani, Koforidua, Bolgatanga and Wa to complete

the cycle of regional polytechnics. The CoEs and other specialised professional post-secondary institutions such as nursing and agriculture have all being upgraded to tertiary status. There are six tutorial colleges, which provide tuition to students to take external examination (Afeti 2003). The University of Mines and Technology (UMAT), the most recent public university (PU) was established in 2004/2005 at Tarkwa in the WR, bringing to six the number of PUs. Beside the six PUs, there are seven other degrees awarding professional institution all located in Accra (Ghanaian Times 2011).

The reforms of the 1990s also brought about the liberalization of the tertiary sub sector that necessitated private participation (PP) into it. In essence, PP in TE began in 1993 with the establishment of NAB (Afeti 2003; Effah 2005). The UG, KNUST and UCC continued their dominance well into the 1990's with total enrolments of 10,000. By 2000/2001, Ghana had 12 universities comprising five public and seven private with enrolment around 43,242 with the PUs having the highest of 96% of enrolments (Sawyer 2004). Many more private institutions (PIs) began the accreditation process thereafter. Presently, there are three chartered PIs, namely Akrofi Christaller Institute of Theology, Mission and Culture, Trinity Theological Seminary and Valley View University (VVU). These institutions have been given the Presidential charter to award their own degrees. However, in 1997, VVU became the first private university to be accredited by the NAB. The number of PTIs stood at 25 by September 2008. To date, there are 36 PTIs offering degree, HND and other Diploma programmes. PTIs have expanded the tertiary terrain of Ghana's education sub-sector and by the year 2000-2001 academic years a total of 16,670 were enrolled; appreciated by 96% in 2006-2007 to 18,278 and recorded the highest female participation ever of 39% in the HE sub sector (Daily Graphic 2008; Walenkamp and Gondwe 2011).

The Private Institutions offer programmes mostly in religion and such specialized areas like Accounting, Business Administration, Banking, and HRM among others. So far, only VVU has ventured into the sciences. Though enrolments at the PTIs are small as compared to the PUs, their presence has injected some healthy competition, innovation and management efficiency into Ghana's tertiary landscape (Effah 2005). According to Effah (2003), PTIs have carved a niche for themselves in the tertiary sub sector market by offering programmes that are demand driven and flexibly tailored to the needs of employers and employees alike in terms of content and timing for classes. Unlike the traditional system where classes are held only once, the PIs have lectures for mornings, afternoons and evenings for their varied clientele. Because of the flexibility and demand driven nature of their courses, graduates of the PIs have a high degree of securing employment arising out of the congruence between PIs and the needs of the labour market. There has been an increase in PTIs which has helped to increase enrolments at the tertiary levels; by 2008, NAB had accredited 25 PTIs. In 2010, NAB accredited 32 programmes in 55 PTIs and vigorously monitoring the quality of TE provided by the PTIs (NCTE 2011). Overall, Ghana as of February 2011 has 126 tertiary institutions (Ghanaian Times 2011).

The demand for TE in Ghana has grown exponentially due largely to growth in population and expansion in enrolments across both basic and secondary levels. According to Effah (2003:340), PUs enrolled 11,857 students in 1992 and by 1998/9 academic session, enrolments

increased by 165% (31,460). Amankwa (2007) cited in Opare et al (2008:25) reported increased enrolment in universities from 15,365 in 1993-94 to 40,673 in 2000-2001. Likewise, polytechnic enrolment soared from 1,385 in 1993-94 to 16,956 in 1999-2000; 18,474 in 2000-2001 and registered a further increase to 28,695 by 2007/2008 (of which 30% are females). On the whole, enrolments into the tertiary sub sector increased from 139, 768 in 2006/07 academic year (of which 34% are females) to 139,158 in 2008/2009 to 162,460 in the 2010/2011 distributed as: universities 66.2%; polytechnics 28.3% and professional institutions 5.5% (NCTE 2011).

An important innovation in Ghana's tertiary landscape is the introduction of DE and sandwich programmes on their programme menu. The UCC and UEW set the pace in 2006/2007 when they enrolled 20,499 (98.67%) of 20,722 students. However, UG and KNUST had shares of 0.95 and 0.35% respectively. Enrolment as of the 2009/2010 academic year has increased to 37,589 distributed as: UEW (45%); UCC (36.1%); UG (12.8%); and KNUST (5.8%). Altogether, UEW and UCC have 81%; while UG and KNUST share 19%.

Evolution of Polytechnics

The concept of Polytechnic take roots from the Greek word "Polyteknos"- 'skilled in many arts'. A polytechnic is therefore an institution that provides many skills to its trainees. The concept evolved from Germany in the 19th century to promote its industrial drive. For instance, Germany and France established technical universities with a well-developed educational system that had an appreciation for science and had direct linkage with industry in the early 1800 while little was done by England until the turn of the 20th century. The German education system collaborated closely with industry and appreciated the importance of the application of science to industry (Shadwell cited in Evans 2007). Germany with its Technische Hochschule had the richest stock of technical manpower in the world. Britain before the 18th Century was a pace setter in most discoveries, while Germany, France and the United States were mere followers. However, Britain's industrial supremacy was short lived as France and Germany later dwarfed it in the late 19th and early 20th centuries. By comparison, the United States (US) in the late 19th and early 20th centuries also developed a robust educational system at the higher level that was not only responsive but equally attuned to the needs of businesses and conducive to innovation which saw it surge pass Britain (Gospel 1991).

According to Evans (2007), by the close of the 19th Century Britain had lost out its supremacy in the international market in a wide range of products due to its failure to develop and exploit newer technologies associated with chemical and industrial engineering. For instance, Oxford and Cambridge which wielded a lot of influence in setting the educational philosophy of British universities and continue to do so concentrated in classical and liberal education to the neglect of science and technology while their European counterparts in Germany and France placed emphasis in the technical education (TcE) by investing in people, machine and plant which paid off tremendously as there was synchronization between human resources and technology. For example, Evans (2007) argues that whilst in 1880 the United Kingdom (UK) accounted for 41.1% of the world's manufactured products, Britain's share of the world market plummeted to 29.9% by 1913

whilst the share of US and Germany appreciated to 34% and 24% respectively with British chemical clocking a mere 11%. One irrefutable reason for England's decline after its thrilling lead in the early to mid-19th century was the long time it took for England to realize and evolve a national strategy for TcE and to establish an organised TcE system. Gowing (1977) on her part attributes the main cause of Britain's decline squarely to its failure to develop a robust educational system essential for national efficiency. The approach adapted by the British in contrast to what pertained in Germany and France led Clarke and Winch (2007) cited in Education International (EI) to conclude that 'the British VET model is less one of state intervention and more of social injustice'.

The US around the late 19th century had a poor stock of labour especially engineers, though its growth rate was the highest in the Western world. To augment the shortfall, it was compelled to move into technology-intensive industries. This move stimulated technological innovation and made technology intensive more attractive than labour intensive. The growth in industries was further spurred by the development of a pool of technocrats emanating from expansion in its TcE at the universities after the civil war and the emigration of engineers. The US from the late 19th into the early 20th century dwarfed Britain in terms of technology and leadership as it planned and consolidated production, distribution and innovation culminating in the attainment of higher output per person (Lazonick 1990; Gospel 1991). Well into the 20th century US surpassed all industrial nations in terms of the supply of engineers (Evans 2007).

Japan, around this same time lacked managerial, technical, and skilled blue-collar workers for the implementation of the western science and technology. To this end, the Japanese government in collaboration with industry developed training and educational programmes in order to train and fill the gap. With a liberal approach, the Japanese quickly imbibed modern technologies by borrowing the best practices from the West. This move catapulted and consolidated Japan as a global industrial giant, from being a net importer of technology well into the Second World War period to a key developer and exporter of innovative products and into the post-war period Japan had attained outputs levels greater than Britain and the US. Japan is also credited for being the first nation to rationalize the teaching and learning of Technical and Vocational Education Training (TVET) using competency based training (CBT) and learning in 1921.

Emphasising the importance of education, Gospel (1991) noted: education and training holds the key to everything; it was the groundwork of British superiority in the early 19th century; the basis of America's success in the second industrial revolution and it underpins the leap in Japan's technological success in the third industrial revolution.

Following the reforms of 1987, demand for tertiary education (TE) rose astronomically. For instance, enrolments into universities rose from 11,857 in 1992-1993 academic years to 31,460 in 1998/9 (Effah 2003). By 2008-2009, enrolment in public universities (PUs) reached 139,158; it witnessed another increase in 2009-2010 academic to 162,460 students (NCTE 2011). Polytechnics were established as part of Ghana's tertiary network, first and foremost to provide an alternate route of TE and secondly to make TE more accessible to the high numbers of qualified youth waiting to be educated at the door-steps of the then few tertiary

institutions. The PNDC government established six regional polytechnics in 1993 to train high-quality, multi-skilled units of human capacity relevant to the national needs of Ghana. There are currently ten regional polytechnics and each region is provided with its own polytechnic. Between 1993 and 2011, polytechnics have since expanded in both their scope and numbers. For instance, enrolments have risen from 1,385 in 1992-1993 to 45,934 in the 2009-2010 academic years representing an increase of 3,316% and projected to increase at 7.6% per annum between 2000-2020 (NCTE 2011; and Effah and Hoffman 2010; JICA 2001). Currently, polytechnics are the second most sought tertiary option (28.3%) after universities (66.2%) in the tertiary network (NCTE 2011). Ghanaian polytechnics have created a niche in the HE subsector by providing career focused programmes with emphasis on hands on experience.

Polytechnics are part of the HE institutional network responsible for training in the applied scientific and modern technological literacy (subjects) for the advancement of the national development across varied sectors of the economy. Polytechnics in Ghana could be classified on the basis of their phases of evolution or ages as: first, second and third generation polytechnics. The first generation polytechnic represent the first six established in Accra, Kumasi, Takoradi, Tamale, Ho and Cape Coast following the promulgation of Provisional National Defence Council (PNDC) Law 321 in 1992. The second represent those established in 1996-97 academic year at Sunyani and Koforidua; while the third were established in between 1999 and 2003 at Bolgatanga and Wa respectively. As per their mandate, polytechnics are to provide training in middle-level manpower in the scientific and technological areas needed for the national development of Ghana. Polytechnics have since 1996 supplied Ghana's labour market with the requisite manpower across over 25 programme/areas at the Higher National Diploma (HND), other Diploma, technician and craft courses and recently a few Bachelor of Technology (B-Tech). The revised Act 745 (2007) mandates polytechnics to award other certificate and higher degrees such as masters in Technology (M-Tech) and Doctorate in Technology (D-Tech).

Since 2000, polytechnics in the country have difficulty in attracting and keeping their staff especially the academic staff. They are thus always engaged in the ritual of recruitment and training of fresh hands which brings in its wake some financial implications as well as disruption to scheduled plans. The frequency of staff departures at short notices and its consequences on the efficacy of the teaching and learning process has the tendency of threatening the sustainability of polytechnics in Ghana if the trend remains unchecked. Interestingly, in most cases, it is when staffs' marketability is enhanced through investments in training by the polytechnics that they turn to quit to other public, private and non-governmental organisations (NGO's). Though vacancies are readily filled up by novices – who in the end hardly stay. Conclusively, polytechnics are going to benefit from the study through the findings and recommendations.

However, from its inception, no empirical study has been done to examine their roles to national development. Also, polytechnics are plagued with a myriad of problems such as underfunding; poor service conditions; negative public perception; incessant strikes by various stakeholders; under representation at national level; high staff turnover; lack of

physical and infrastructural facilities; academic progression of HND graduates; poor institutional management, job placements of HND graduates to encroachment in its mandate by analogous institutions. It was noted that the 'push and pull' factors have culminated in the mass migration of disillusioned faculty to universities, the public and private sectors as well as NGOs in search of greener pastures. Therefore, the attraction and retention of a satisfied workforce becomes crucial. Also, the high patronage for polytechnics in Ghana makes it imperative for government to provide an enabling environment for their sustainability.

Higher Education and National Development

The view that education is central to national development is not in doubt (Ugwuonah and Omeje, 1998; Stevens and Weale 2003; and Rena, 2007). For Bloom, Canning and Chan, (2005), education is increasingly being acknowledged as the key to the sustenance of economic growth. Early economists such as Adam Smith and Alfred Marshall of the 18th and 19th centuries respectively underscored the need for nations to invest in education. For instance, Alfred Marshall cited in Harbison and Myers (1964:3) view education as a national investment and in his view "the most valuable of all capital that is invested in human beings" and urged nations to invest in education. Generally speaking, education has been the backbone of societal development through the construction of knowledge based economy. Nations all over the world depend on it for progress (World Bank (WB) 1999; Saint, Hartnett and Strassner, 2003; Ekundayo and Ekundayo, 2009). An educated and skilled population that is amenable to change is the key elements required for a rapid socio-economic transformation of a country.

Apart from raising the social and political awareness of the citizenry, education also increases the stock of a nation's human capital of the citizenry. Education plays a key role in the socio-economic development agenda of nations and will remain an important investment in the foreseeable future (Bloom, Hartley and Rosovsky, 2006). According to Bloom et al. (2006), a nation that fails in its duty to provide sound and relevant education to its citizenry risks drawing back its clock of progress as it will by that act plunge the citizenry into mass illiteracy, obscurantism, superstition, poverty, squalor, disease, de-industrialisation and above all low productivity. Similarly, Psacharopoulos (1981; 1985; and 1994) argues that education contributes to economic growth by increasing the productivity of labour. It also facilitates the development of technologies which then feeds into economic activities and improves the wellbeing of the individual which is reflected in improved health and reduced infant mortality.

Empirical studies conducted around the globe attest to the fact that education and economic development are intertwined. For instance, Gyimah-Brempong (2010) investigated the effects of education on political stability and gender in Africa and found a positive correlation between education, income growth, health outcomes, political stability and the participation of women in national politics. Findings in earlier studies; Romer (1990), Barro (1999), Paddison and Mitiku (2006) and Baldwin and Borrell (2008) are in congruence with Gyimah-Brempong (2010) conclusions. Similarly, Silles (2008), Gilleskie and Harrison (1999) as well as Gyimah-Brempong and Wilson (2004) investigated the impact of education on

health outcomes and reported a positive correlation between the two. This, they argue, is perhaps, partially attributable to the fact that educated people are better equipped in terms of health information or they make more informed health decisions given the available options at their disposal.

At independence, Ghana like most African states looked to Higher Education as the panacea to the anticipated economic growth in the new states by investing hugely in its HE system from the public purse (Sawyer 2002). Indeed, the huge investments reaped handsome dividends as the new HEIs lived up to the challenge by producing the requisite HRs needed to take over the civil service which hitherto was manned by expatriates. HEIs were thus tasked to educate and train the indigenous Africans to take over the mantle of administration from the colonial elite and professionals. The fulfilment of this initial role of training to take over from the colonial officials and professionals by African universities has been duly acknowledged to have gone beyond expectations (Ajayi, Goma and Johnson 1996).

Ghana's HEIs continue to play the roles expected of it by ensuring an ample supply of its manpower needs: teachers, lawyers, engineers, politicians, doctors, nurses, pharmacists, health workers, community workers, administrators, bankers, accountants, economists, journalists and technicians among others to power the national economy. HE has not only ensured the training of quality professionals but also enhanced present and future earnings of its trainees, which in turn contribute to government's revenue (Barr 2000; Bloom 2005; and Cunningham 2006; and Baum 2010).

The polytechnic sub sector of the tertiary system in Ghana has witnessed unprecedented growth and expansion from the 1990s when they were established to date. For instance, polytechnic enrolments have risen from 1,385 in 1993 to 45,934 in 2009-2010 academic years while faculty turnover is also on the ascendancy i.e. threatening the sustainability of Ghana's polytechnic network. Present and past governments have continued to support polytechnics through Ghana Education Trust Fund (GETFund) i.e. by providing infrastructure, logistics and most of all staff development through its faculty development window. Through this window, GETFund has sponsored faculty members of polytechnics and other HEI's to undertake further studies both within and outside Ghana in a bid to beef up the strength and quality of staffing. This is against the backdrop that, the vigour and quality of polytechnic faculty is crucial to its survival and competitiveness (Keller 1983).

The educational sector in Ghana is categorized into three sectors or pyramid of education, that is primary, secondary and higher education. Though the contribution of education to national development is not in doubt, there are however debates as to which of these three sectors or pyramid of education have the greatest potential of contributing to economic growth than the other. For instance, Friedman and Friedman (1980) contend that HE yielded more benefits to the individual than it did for the society. They went further to premise that HE may bring about "social unrest and political instability". Similarly, Psacharopoulos and Patrinos (2002) in a review study of 98 States between 1960-1997 found a higher rate of return of 18.9% and 10.8% for primary and HE respectively. This view was thus upheld for decades and thus bolstered the emphasis on primary and secondary education to the neglect

of Higher Education by the international community and governments (Bloom et al 2004). Around the 1980s and early 1990s Tertiary Education in Africa witnessed a decline as donor agencies shifted their focus from TE to primary and secondary education on the grounds that mass education was more attuned to the needs of Africa than HE. For instance, the World Bank's global expenditure on HE was 17% between 1985 and 1989. The figure however dropped by 10% between 1995 and 1999 indicating a shift in emphasis for TE. The trend has since the year 2000 changed in favour of HE by donor agencies that have come to the consciousness of HE's contribution to economic growth.

In the past decades, scholars such as Shultz (1961); Friedman (1980); Becker; (1964) and Mincer (1962; 1974); Psacharopoulos and Patrinos (2002) influenced the notion that primary and secondary education in Africa were more attuned to improving its economic growth. On the basis of their arguments backed by empirical data, HE suffered a major setback because of the lack of empirical evidence to establish that Higher Education affects economic growth and poverty reduction.

DISCUSSIONS

Polytechnics have contributed to the national economy of Ghana by providing high-level middle manpower training in the relevant course areas for the national economy. The polytechnics have thus largely fulfilled the main objectives for which they were established by engaging in the production and distribution of practical and technically oriented skills to those who require it. By 2005, polytechnics educated 48,000 graduates across the various disciplines.

The current figures obtained at Statistical Service indicate that between 2008/09 and 2012/13, the polytechnic network has trained 74,732 graduates across various disciplines on offer in Ghanaian polytechnics. By this development, polytechnics have provided education and training for about 122,732 graduates to spearhead and staff the wide-ranging industries and businesses in Ghana and even beyond. Polytechnic graduates have contributed significantly to the socio-economic and industrial growth of Ghana. Many polytechnic graduates are successful entrepreneurs whose businesses have provided employment; others hold positions of responsibility and leadership in industry, business and in public and private institutions. The polytechnics have really succeeded in getting quite a number of well-trained middle-level manpower for the business sector in particular, even though the same cannot be said of the technological sector. That notwithstanding, polytechnics have helped in filling the labour market needs of Ghana.

Polytechnics were to provide alternate route aimed at easing the pressure on the traditional universities by making TE more accessible and affordable to the ordinary Ghanaian. The increased demand for PE lends credence to the fact that the polytechnics have come of age and are on course in terms of the delivery of their mandate. From a total enrolment of 1,385 in 1993, enrolment increased to 18,459 in 2000/2001; 24,353 in 2003/04; and levelled to 28,695 in the 2006/07. In essence, enrolments covering six polytechnics then increased by 1,463%

from 1993 to 2003/04 alone; and by 2009/10 academic year, polytechnics had 28.3% (45,934) of total tertiary enrolment in public TE (NCTE 2011).

The polytechnic have also provided an alternate route of TE that is practically oriented. Beside the HND, the polytechnics still run other non-tertiary programmes such as the Diploma in Business Studies (DBS) and other technician courses as far down to the craft levels as well as other professional courses such as the Chartered Institute of Marketing (CIM) and Association of Certified Chartered Accountants (ACCA) courses among others, thus, fulfilling the mandate imposed on them by the laws that established them.

Polytechnic have made it possible for individuals to acquire both physical and intellectual skills that have armed them- graduates to be self-reliant and productive members of the society. Polytechnics have since their inception provided transitional labour to the nation through the National Service Scheme (NSS). Through the NSS, polytechnics have contributed their bit in nation building by serving in very deprived areas of the country in classrooms, health post and community service. In 2010 for instance, of the 40,000 personnel posted nationwide, 24,000 of the personnel representing 60% of the total, were deployed to the education sector. For 2011, the education sector received 32,596 personnel representing 65% of the total postings in 2011 (Duffour 2010).

Although, no tracer survey on the polytechnics graduates has yet been done, it is speculated that about 70% of the graduates are employed (Afeti 2003). It is worthy to note that that the graduates from Ghana's polytechnics are spread across the broad spectrum of Ghana's economy, while some of them have established their own businesses and have contributing employment wise. Employed polytechnic trainees earn high income and by default contribute to Ghana's revenue basket through taxation.

The polytechnics have thrived to promote and encourage scholarship and community service within Ghana. It is to provide for the development of research and publications of research findings. The Polytechnic Lecture Series initiated by Sunyani polytechnic in 2005/06 has gone through it fourth stage. Another Conference is slated for Koforidua in 2011 and Tamale in September 2011. Besides, there are other research conferences being organised on various polytechnic campuses. These scholarly discourses are ample manifestation of the polytechnics fulfilling it roles in the national agenda as members of the ivory tower fraternity where instruction is given and received without any harassment or undue influence from the outside world (Banjo 2001). Polytechnics have also taken an extra step to liaise with their communities by engaging them in polytechnics activities as well as being engaged by their immediate communities in their programmes and activities as well.

Polytechnics have made significant stride as centres of excellence for the development of HRs for national development by disseminating knowledge in various forms to their products. For example, Effah (2003) cites Tamale polytechnic as having designed and manufactured a rubbish dump, a domestic waste extractor, a circular wood sawing machine, shea butter extraction and cashew shelling and machine and domestic water filtration unit; while the catering department of Ho Polytechnic has developed over 17 recipes for the hospitality industry. A lot more of such innovative steps have taken place in other polytechnics across the length and breadth of the country.

Polytechnics and Socio- economic National Development

Polytechnics in Ghana have over the last two decades (established in 1992/3) trained varied personnel across its programmes. By 2005, the network had trained over 48,000 graduates most of whom are engaged in both public and private sectors. Some other polytechnic products have emerged as successful entrepreneurs; created jobs that provide employment opportunities for others who would have relied on government for employment. Contributing, a staff member noted:

“The polytechnics so far have trained manpower for the nation. To that extent I think that they have contributed well to the economic development of the nation”

The training of graduates has however remained skewed (70:30) in favour of business related programmes as against the technological courses. Moreover, the manufacturing sector has been depressed. In the opinion of one respondent, the contribution of the network would have been more if equal numbers were trained in the technological areas. He remarked:

“The science and technology is the base... but if these were also addressed alongside the other programmes; I think that we would have achieved 90-95%”

In relation to the rationale for establishing polytechnics, the evidence above demonstrates they have lived up to their mandate of training high quality technical manpower for the growth of Ghana’s national economy. The problems of polytechnics in Ghana are tied to their history. At their inception in 1992/93, they inherited the human, material and infrastructure of then technical institutes. These challenges have threatened their sustainability and consequently their performance as centres of academic excellence. Respondents appreciated the difficulties under which polytechnics were operating, but they see them as sustainable. Responding to this question, a senior government official remarked that:

“The objectives are sustainable; the institutions are sustainable in terms of the objectives they have been set to achieve”.

Contributing, a former rector of Accra polytechnic added:

“They won’t be unsustainable. There is no reason to doubt the sustainability of the polytechnics”

In contrast, another former rector expressed some reservations about sustainability when he reflected that:

“So, there’s a danger there, that if nothing is done to ensure that the polytechnics are well resourced or the polytechnics are able to train their students to the level required and demanded by industry, then, we are going to have if you like a drift of polytechnic graduates going into traditional university

degree programmes and that could really be a problem for sustainability of the polytechnics. As I said, what makes an institution great is the quality of its graduates”

Supporting this view, a student leader noted:

“If this trend continues; definitely the sustainability of polytechnic education in the country will be threatened”

Closely linked to the issue of sustainability are the implications of polytechnics becoming unsustainable. Respondents argued from different angles. For instance, two respondents described it as a bad scenario as reflected below:

“Well, that’s a bad scenario but the implication will be that the country will lack the middle-level manpower to drive the economy” he added:

“But yes, the implications will be serious. That chunk, that base- that mass will be missing. It will be serious, dire consequences”

A third perspective argues that such a situation will rob the nation of middle-level personnel. He remarked:

“Well, the implication I think is going to be a lot on the Government itself, the nation, because the kind of people that we train the universities don’t train such people, we train people with hands on experience”

Nesting his argument on employment a faculty member explained:

“You can imagine for those of us who are in the classroom as lecturers will have to look elsewhere for jobs”

Contributing, an administrative staff perceived their collapse as a catalyst to the increase of endemic poverty. He noted:

“The implication to society, you know, there is a direct correlation between education and poverty, so if majority of people who are supposed to get enrolled are not... it can have an impact on the poverty level...to man various sectors... will affect the governmental agenda and that is a serious issue”

Another respondent summed it as a catastrophic failure. He postulated:

“It would have been a failure on the part of stakeholders especially, government, lecturers and the general public”

CONCLUSIONS AND RECOMMENDATIONS

The sustainability of polytechnics remains a key issue. However, with the commitment demonstrated by present and past governments particularly in areas of staff development and infrastructural expansion through GETFund projects, it is possible to argue that polytechnics are financially sustainable in both the short and long run. Polytechnics in Ghana need qualified staff to live up to the task. In spite the fact that the education reforms

in 1987 had impacted more positively on the development of polytechnic in Ghana, there is the need for the full implementation of the polytechnic policy which made emphasis on upgrading all the polytechnics in Ghana to degree awarding institutions. This should be backed by legislation. For polytechnics to play a major role in the socio-economic development of Ghana, the major stakeholders- polytechnic administrators, the Ministry of Education (MoE) and the National Council for tertiary education (NCTE) must collaborate effectively so as to minimise the challenges faced by the polytechnic in Ghana.

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