

A FRAMEWORK FOR HIGHER EDUCATION AND INDUSTRY LINKAGE IN THE GHANAIAN BUILT ENVIRONMENT

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³

^{1&2} *Department of Construction Management and Quantity Surveying, University of Johannesburg, Johannesburg, South Africa*

³*Mechanical Engineering Department, Cape Coast Polytechnic, Ghana*

ABSTRACT

One of the challenges we face as a nation is the absence of relevance or responsiveness of the polytechnic training efforts to the changing needs of industry and society. The overall purpose of this study is to explore the effectiveness of industrial attachment collaboration between higher institutions and the industry. The objectives are to identify the relevance of the polytechnic curricula to industry and the world of work. To find how Polytechnics are actively involved in the monitoring and assessment of students' industrial attachment. To determine the capacity of the polytechnics in the delivery of both theory and practical lessons. To identify major constraints faced by polytechnics and the Industry during attachment. To find out how mutual benefits between polytechnics and Industry are likely to strengthen collaborations. Existing research works were conducted in the research area. The industrial attachment is expected to give students the requisite practical skill and for that matter the needed manpower necessary for national development.

Keywords: Industry; Linkage; Education; Construction; Ghana

INTRODUCTION

Generally speaking, all past and present governments of Ghana ranked Technical Education high on their policy agenda including polytechnic education. Notably, government in 2004 renewed its pledge to continue supporting polytechnics in their drive to produce technically trained graduates for national development (Iddrisu, et al, 2014). Government will continue to equip the polytechnics to make them offer tertiary education in their own right; to emphasise practical skills that are needed to run the productive economy and build a nation. Achio (2012) stated that the linkage between Polytechnic education and industry was very crucial to its identity and development as the industry provides placement for their students as well as helps to set the standards through which the students are trained. He stated that they have recognized the acute need to equip their graduates with key employable knowledge and skills, and as such had reached agreements to co-operate in skills training, teaching and research with a number of firms. In Zimbabwe because of a growing number of universities producing graduates each year and dwindling employment opportunities employers have raised the stake by looking for those graduates who are self starters and who have gone through the working environment (Matamande, et al, 2013). Not all aspects a of profession

munkhas@yahoo.com
Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

can be learned in a classroom, but must necessarily be learned in the environment where the profession is practiced (Barbeau and Stull, 1990).

Ideally there should be a linkage between educational institutions and the world of work. According to Agyefi-Mensah (2014) the quality of the Polytechnic curriculum is a concern for Ghanaians. He emphasized that the curriculum is intended to reflect the demands and expectations of the larger society—local and global. There should be constant review of national curricula in general and those in our Polytechnics in particular are important. Mensah, A. (2002) in educational review report noted that one of the challenges we face as a nation is the lack of relevance or responsiveness of our national curricula to the changing needs of society and other external factors. Yawson (2014) in a three day conference highlighted the need for polytechnics and Industry linkages, and to ensure that solutions are found to challenges facing industry and polytechnics in terms of hands down training for students. He further explained that the gap between the two sectors could be bridged when technical staff from industry were engaged in part-time teaching to impart practical knowledge while officials from the school also visit industries to be abreast with current methodology and equipment (Agyefi-Mensah, 2014).

RATIONALE / MOTIVATION FOR THE STUDY

One of the major functions of polytechnics is to develop a curriculum which is in consonance with what pertains in industry and obviously industrial attachment is a major component of the curriculum. Ideally, there should be networking and collaboration between polytechnics and the world of work. One of the challenges we face as a nation is the absence of relevance or responsiveness of the polytechnic training efforts to the changing needs of industry and society. Students on attachment seem not to be doing well after graduation. It is against this background that the researcher conducts a survey to examine the circumstances surrounding polytechnic-industry linkages, especially Students' Industrial Attachment (SIA)

Significance of The Study

The findings may influence institutional policies on training students in the Technical Universities, making industrial attachment more effective and efficient; consequently this may enhance the job prospects of graduates. The research study could provide information on types of linkages with industry and models of theories. The new framework will help improve the capacity of the polytechnics. The findings shall also contribute to knowledge by which all stake holders can take advantage of. Additionally, implementation of the findings can also go a long way to address the national unemployment problem and hence foster national development.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

Problem Statement

Polytechnics are expected to give educational offerings that are career oriented, linking it with industry. However this has not been the case; there are great lapses between the needs of industry and the caliber of graduates produced to serve in those industries. Adjei et al, (2014) in their works indicated that Competency-based training and industrial attachment have been introduced and instituted in the polytechnics as a significant step and conduit of enhancing technical knowledge and productive skills of students. One raises quizzical eye brows as to whether the industrial attachment is not well designed or implemented? Or there is no close collaboration between polytechnics and industries? Or lack of funding or capacity is the major problem? This study seeks to investigate the lapses that exist between polytechnics and industries, and possible measures that are likely to link up polytechnics with industries for effective industrial attachment.

Research Questions

The research questions posed in this study are as follows:

- To what extent are polytechnic curricula relevant to industry and the world of work?
- What roles do Institutions and Firms play in monitoring and assessment of students' industrial attachment
- Do Polytechnics have the requisite capacity in the delivery of both theory and practical lessons?
- What are the constraints faced by the Institutions and firms during industrial attachment?
- How does apparent mutual benefit between Universities and Industry strengthen collaborations
- What other collaborations generally contribute to effective partnership of University-Industry.

Purpose of The Study

The overall purpose of this study is to explore the effectiveness of industrial attachment collaboration between higher institutions and the industry, including the major constraints of industry in terms of giving the right skills to interns. It will assess the factors that will improve the capacity of polytechnics as well as the capacity of industry to provide relevant practical training to students during industrial attachment.

Objectives of The Study

The study is designed to achieving the following specific objectives:

- To assess the relevance of the polytechnic curricula to industry and the world of work.
- To look at how Polytechnics are actively involved in the monitoring and assessment of students' industrial attachment.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

- To investigate the capacity of the polytechnics in the delivery of both theory and practical lessons.
- To look at major constraints faced by polytechnics and the Industry during attachment.
- To find out how mutual benefits between polytechnics and Industry are likely to strengthen collaborations
- What other collaborations generally contribute to effective polytechnic-Industry partnership.

Value of The Study

This is to identify the constraints and challenges confronting industrial attachment of students and nature of networking that is currently in operation, and to design a conceptual frame work for a more effective networking and collaboration between polytechnics and industry.

Literature Review

Polytechnics are comprehensive universities offering professional and career-focused programs in the arts, social and related behavioral sciences, engineering, education and natural sciences and technology that engage students in active, applied learning, theory and research essential to the future of society, business and industry. According to (Lauber, et al 2004) Industrial attachment is a practical skill training enterprise prepared to narrow the gap between the theoretical world of academic enterprise and the world of work of professional practice.

Importance of higher education and Industry Linkages

In realising the aims and objectives of polytechnic education in human capital development, it is quite essential for students and senior members to acquire both theoretical and practical knowledge including technical skills (Adjei et al, 2014). This effort can be achieved through institutional support and collaboration as well as polytechnic-industry linkage. With regard to institutional support and collaboration, a number of key institutions including the Ministry of Education (MoE), National Council for Tertiary Education (NCTE), National Accreditation Board (NAB), National Board for Professional and Technician Examinations (NABPTEX), and Council for Technical Vocational Education and Training (COTVET) have been set up to coordinate the activities of technical institutions including the polytechnics (Adjei N.K. et al, 2014). Adequate funding for the converted polytechnics (Afeti, et al, 2014) is a critical challenge that must be addressed by the Government, policy implementers, and leaders of the polytechnics currently; the Government of Ghana spends less than GH¢ 3,000 on a student in a polytechnic per year. The huge gap between the current and optimal funding levels will have to be bridged if the quality of training in the converted polytechnics is to be comparable to international standards (Afeti, et al, 2014). This collaboration is to ensure quality of programmes and good governance, also to ensure the award of degrees and diploma

munkhas@yahoo.com
 Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

certificates to students. Competency-based training and industrial attachment have been introduced and instituted in the polytechnics as a significant step and conduit of enhancing technical knowledge, productive skills of students (Adjei et al, 2014). Instead of the methodology being student centered it is rather teacher centered approach with skeletal practical training. Unfortunately this curriculum, since its inception, had not been revised. University-industry linkages (Ssebuwufu, et al.2012) require pro-activity on the part of both sides, the emphasis on the need for internal capacity-building (skill development, strategic planning, leadership, etc.) rather than on non-conducive external conditions (lack of national policies, industry weaknesses, etc.), they therefore challenge universities to take responsibility and action for strengthening their own internal capacity to work with the productive sector. (Barry and Sawyerr, 2008) noted that the strength of University-industry linkages is basically measured in terms of how closely institutions work with high-tech industries and other key players in the formal sector. They further noted that African economies differ significantly from those economies that are more industrialised. For effective and successful university-Industry relation (West, 2008) enumerated three major points as the mission of each partner and must be supported in the collaboration, institutional practices and national resources should focus on promoting appropriate long term partnerships between HEIs and industry. HEIs and industries should focus on the benefits to each party that will result from the collaborations and ensure timely conduct of the research and development of the research findings. Relating the case of universities to that of polytechnics (Pauw et al, 2008) stated that there is a growing perception concerning the knowledge and skills acquired by students in African universities; they do not meet the requirements of industry and the wider economy. This mismatch results from under-training in the critical skills of problem-solving, analytical thinking and communication. This accounts for the emerging high graduate unemployment and under-employment in many parts of Africa.

Institutions of higher learning are expected to constantly interact with their environments. In fact, they need to structure themselves to deal with forces in the world around them (Scott, 2008). On the contrary, a closed-system theory views Institutions of higher learning as sufficiently independent to solve most of their problems through their internal forces, without taking into account forces in the external environment. Afeti (2003) clearly indicated that the curriculum of the polytechnics in Ghana was designed without taking cognizance of the needs of local industries, and therefore not practical-oriented. Industrial attachment cannot be effective without educational institution partnering with industry for certain collaborations. Experiential Learning couple with student industrial attachment will definitely lay a solid foundation leading to human capital development that is needed for nation building. Jarvis(1995) noted that industrial work experience, following a prior theoretical learning in the lecture hall, reinforces the lesson learnt and therefore produces skilled and knowledgeable students who possess productive and employable skills required for the world of work

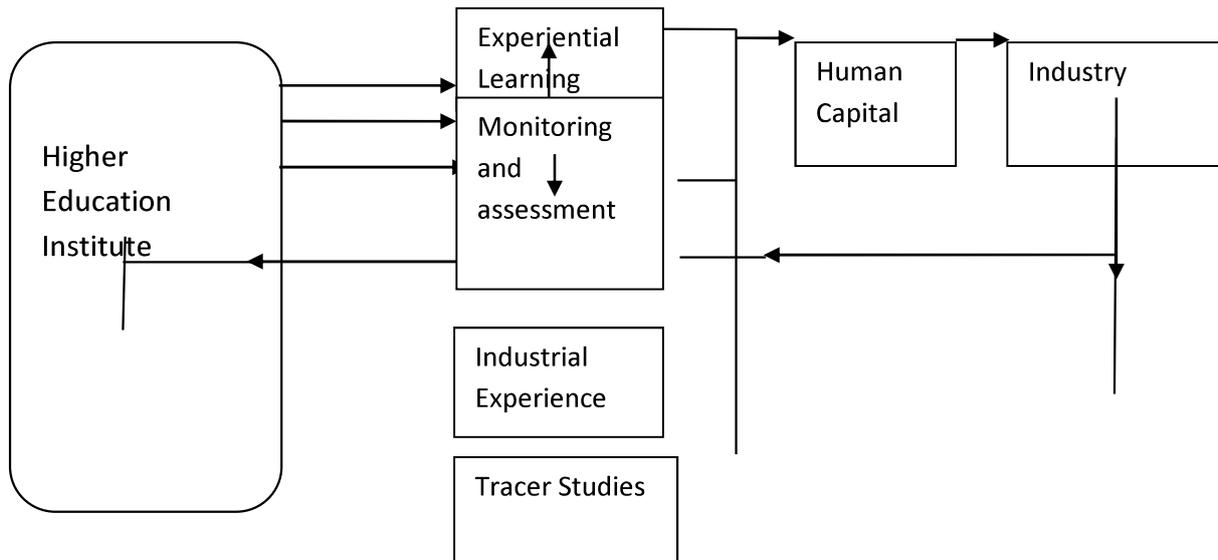
munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

Theoretical Perspective

The two main theories found to be relevant to this study are the Experiential Learning Theory and Human Capital Theory. In this context, industrial attachment is the collaborative effort between educational institutions and the industry. Clearly speaking, industrial attachment is an integral part of the Polytechnic curriculum and is expected to address this issue. However, Ford (2007) stressed the fact that Polytechnic curricula are alien to the manpower needs of the country and should therefore be tailored to reflect the developmental needs of the country.

UNIVERSITY-INDUSTRY TRAINING FRAMEWORK



Human Capital Theory

This can be defined as knowledge, skills, attitudes, aptitudes, and other acquired traits contributing to production (Goode, 1959). It implies that this model takes into account a synergy of theoretical and practical learning in the overall human capital development of the student undergoing training. Human capital is operational on the assumption that formal education is necessary and highly instrumental in improving the production capacity of a population. It stresses on the fact that education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability. (Psacharopoulos & Woodhall, 1997).

Experiential Learning

This is a situation where **student has direct encounter with the phenomenon being studied instead of merely conceiving and thinking about it (Brookfield, 1983; Smith, 2005)**. The key proponents who laid groundwork of learning through experience or learning by doing were John Dewy (1859-1952), Carl Rogers (1902-1987), and David Colb (1939). John Dewy discouraged rote learning and learning by memorization but rather laid emphasis

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

on the concept of experiential learning thus, learning by doing which focuses on problem solving and critical thinking. Davis (2011) indicated that what is so essential about experiential learning is that, it is learning by doing, reflecting and applying. These processes make it quite distinct from other models such as “learn by doing” or “hands on learning”. A number of steps are evident in experiential learning Haynes (2007): Experiencing (doing), reflecting (what happen), analyzing (what is important) and generalizing (so what). In experiential learning the instructor guides rather than direct the learning process where student develops a keen interest and enthusiasm for learning. Houle (1980) describe experiential learning in twofold: A learning situation where students are given the chance to acquire and apply knowledge, skills and feelings in an immediate and relevant setting.

Conceptual Framework for the study

It is worth noting that experiential learning rather restricts academic and practical experience to the educational set up, neglecting collaborations with industry where students could be attached to improve upon deficiencies and learn new skills relevant to the word of work. Houle (1980) rather referred to the experiential environment as “immediate and relevant setting” which could be construed to mean both institution and industry. This study could further be built on the concept of GMU, 2011 and Lorette, 2011 who listed a number of experiential learning opportunities in higher education, and it includes Apprenticeship experience, internship experience, practicum experience, etc, where these concepts have something to do with industry.

The open system is the main approach to connect the institution and the industry for effective collaboration. The open system model shall be blended with human capital theory and the experiential learning theory as a training strategy. The open system model is expected to constantly interact with the environment in which the polytechnic is situated. The open system needs to structure itself to deal with forces in the world around them (Scott, 2008). It implies that allowing a system to be open ultimately sustains growth and serves its parent environment.

Strictly based on the understanding of environment, this study will certainly construe the idea of environment to mean industry with close monitoring and assessment.

Integrated (Enhanced) Industrial Experience

Integrated Industrial Experience in this context is the learner’s translation of theoretical learning into practical application during student industrial attachment with close bilateral monitoring and assessment from the firm and the Institution. It encompasses strengthening institutional capacity in terms of qualified staff and provision of requisite machinery and equipment. It is also expedient to support startup companies or existing and emerging productive sectors of the economy with technical expertise and Research & Development

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

(Afeti et al, 2014). The theoretical content must also be reduced, making more room for practical and skill training. It is wasteful to teach people things they would never use. John franklin Bobbitt (1912), his primary goal of curriculum design is the elimination of waste. Graduate career tracking should also be given due attention in order to assure quality.

Keywords: industrial attachment, practical acquisition, reflective learning, bilateral supervision and assessment, building institutional capacity, nation building.

Assumptions Underlying the Framework

This framework is operational on the assumption that theoretical content coupled with enhanced industrial experience will give a graduate the much needed skills relevant to industry for both wage and self-employment, and for that matter give the country the requisite human capital for nation building. Enhanced industrial experience in this context implies close monitoring in terms of assessment during attachment. The following variables shall be put together in order to operationalise the concept. They however include reduction of theoretical content, increase duration of attachment, evidence of mutual benefits, relevance of acquired skills, bilateral assessment and supervision, engagement of all students for attachment and well structured tracer studies.

CONTRIBUTION TO KNOWLEDGE

The study will deepen the partnership between the polytechnics and the industry, improving communication between them and bilateral relation during attachment. Consequently, making student industrial attachment more effective. The industrial attachment is expected to give students the requisite practical skill and for that matter the needed manpower necessary for national development.

CONCLUSION

In conclusion, the study seeks to examine the linkage between polytechnics and industries, and the cooperation between the two institutions, including the benefits accruing to both sides. A mixed methodology shall be used, comprising both quantitative and qualitative approaches. Obviously the case study approach shall be used to survey the lapses between needs of industries and products of polytechnics. The purposive method of the non-probability method shall be used to select the sample. A sample size of 300 shall be considered and the descriptive method shall be used to answer the research questions. Questionnaire consisting of close and open ended items together with interview sessions shall be administered to respondents. In analysing the data appropriate statistical model. Finally the study shall be developed on a conceptual frame work which shall serve as a blue print and a guide for a smooth sail.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

REFERENCES

Achio, S. (2012). A-Poly Holds 12th Congregation

<https://www.modernghana.com/news/478704/a-poly-holds-12th-congregation.html>

Retrieved April 23 2016

Adjei, N. A. K. , Nyarko, D.A. and Nunfam, V.F. (2014). Journal of Education and Practice www.iiste.org.ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.5, No.33, 2014.

Afeti, G., Baffour-Awuah, D. and Budu-Smith, J. (2003). “Baseline Survey for the Introduction of Competency-Based Training in Polytechnics”. National Council for Tertiary Education (NCTE) and Japan International Cooperation Agency (JICA), Accra Afeti, G., Afun, J.V.K., Aflakpui, GK.S.A., Sunnu, A.K., Combey,J.A.C., Nkwantabisa,D.D.,

Duwiejua,M., Dattey ,K. and Ankomah –Asare, E.T. (2014).Report of the Technical Committee on Conversion of the Polytechnics in Ghana to Technical Universities. Ministry of Education

http://www.moe.gov.gh/assets/media/docs/ConversionOfPolytechnicsToTUs_FinalReport.pdf retrieved April 14 2016

Agyefi-Mensah, S.(2014). NABPTEX and Review Of Curriculum In Our Polytechnics,News Ghana - March 12, 2014.

Ayoub, C.K. ,Rugambuka, LB., and Ikupa M. (2012). The implementation of competency based teaching approaches in Tanzania: The case of pre-service teachers at Morogoro teacher training college, Universal Journal of Education and General Studies (ISSN: 2277-0984) Vol. 1(11) pp. 339-347.

Barbeau,J.E and Stull,W.A.(1990). learning from work: A guide for cooperative education /internship students, south-western publishing, Cincinnati. OH,

Barry, B. and Sawyerr, A. (2008). African Higher Education and Industry: What Linkages?” Paper Presented At The Annual Bank Conference On Development Economics (Abcde). The Annual Bank Conference on Development Economics (Abcde), Cape Town, South Africa.

Brookfield, S. D. (1983). Adult learning, adult education and the community. Milton Keynes: Open University Press.

Brown, L. (1997).Competitive Marketing Strategy[M]. Melbourne: Nelson Press. Chryssolouris, G. and Mavrikios, D. Education for Next Generation Manufacturing, Paper presented at IMS Vision Forum 2006, 12-13 April 2007 available at ftp://ftp.cordis.europa.eu/.../gc_to_ims-visionforum2006-paper.pdf retrieved April 23 2016

Connor, H. Shaw, S. (2008). Graduate training and development: current trends and issues, Education and Training Journal, vol 50 p.357-365.

Council for Technical and Vocational Education and Training (COTVET) (2013) “TVET Policy and System-Industrial Attachment Policy, Ghana.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji,M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610

- Donkor, F., Stanislaus N., Nsoh, and Mitchual, S.J. (2009). Assessment of supervised industrial attachment of a technical and vocational teacher education program in Ghana *Asia-Pacific Journal of Cooperative Education*, 2009, 10(1), 1-17
- Eggink, J. & Van Den Werf, E. (2006). Higher education in the Netherlands. The systems, institutions and degrees. (NUFFIC), The Hague, The Netherlands, August, 2005.
- Etzkowitz, H. (2006). The triple helix model of innovation, University-industry-government interaction, *TECH MONITOR* □ Jan-Feb 2007.
- Eraut, M. (1994). Developing professional knowledge and competence. London: Falmer Press.
- Erhurua, H.E.O. (2007). Skills Acquisition: A Tool for Youth Empowerment for Economic Growth and Development. *Journal of Business and Management Studies*: 1(2), 116-125.
- Giddens, A. (1991). *Modernity and self-identity*. Stanford, CA: Stanford University Press.
- Goode, R. B. (1959). Adding to the Stock of Physical and Human Capital, the *American Economic Review*, 49(2), 147—155.
- Haynes, C. (2007). *Experiential learning: Learning by doing*.
http://adulthoodeducation.wikibook.us/index.php?title=Experiential_Learning_-_Learning_by_Doing.
- Henry Ford, K. (2007). MP for Buem. At the launch of the Students Representative Council (SRC) and Ghana National Union of Polytechnic Students (GNUPS) Week celebration, on the theme: "Ghana at 50: Contributions of Polytechnic Education". Ho Polytechnic.
- Houle, C. (1980). *Continuing learning in the professions*. San Francisco, CA: Jossey -Bass.
- Iddrisu, S. et al, (2014). Polytechnic Education In Ghana: Management Delivery And Challenges, *The International Journal of Social Sciences and Humanities Invention*, Volume 1 issue 6 2014 page no.411-424 ISSN: 2349-2031
- Jarvis, P. (1995). *Adult & Continuing Education*. (2nd ed.). London: Routledge.
- Joon-Mo YANG(2009) Department of Economics, College of Business and Government Yonsei University, Wonju Campus.**
- Kaplinsky, R. and Morris, M. (2000). *A Handbook For Value Chain Research*. Bellagio Workshop in September 2000 Prepared for the IDRC.
- Kazmi, S. W. (2007). *Vocational Education and Skills Development: A Case of Pakistan*. Available at: www.shrhc.org/doc/.../8.%20Syeda%20Wadiat%20Kazmi.pdf Shar (Accessed: March, 13th 2013).
- Lauber, C. A., Ruh, L., Theuriand, P. M. and Woodlock, P. (2004) 'Use Internships to Contribute to the Younger Generation and Get a Good Look at Potential Hire: Road to the Future.' *Journal of Accountancy*, 182: 6, 41.
- Leong, S. (2004). *How To Develop Talent for Training*, New York: Management Books.
- Lowe, C.U. (1982). The Triple Helix—NIH, industry, and the academic world. *The Yale Journal of Biology and Medicine* 55, 239-246.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) *Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana.* 599-610

- Matamande, W. et al, (2013). An investigation of the effectiveness of work related learning: A case of the industrial attachment program offered by the faculty of commerce, University of Zimbabwe, *Journal of Instructional Pedagogies*.
- Mensah, A. (2002). Presidential Committee on Review of Education Reforms in Ghana. The committee presented its report in October 2002, under the chairmanship of Professor Jophus Anamuah-Mensah, Vice-Chancellor of University of Education, Winneba. NYP (2010). Prospectus, available at [http://www.nyp.edu.sg/about NYP/ Publications Files prospectus/2010_11/The_NYP_Experience.pdf](http://www.nyp.edu.sg/about/NYP/Publications/Files/prospectus/2010_11/The_NYP_Experience.pdf).
- OECD (2001). Organisation for Economic Co-operation and Development. *The Well-being of Nations. The Role of Human and Social Capital* (Paris, OECD).
- Pauw, K., Oosthuizen, M. and Van Der Westhuizen, C. (2008). "Graduate Unemployment in the Face of Skills Shortages: A Labour Market Paradox." *South African Journal of Economics*, 76: 45–57. doi: 10.1111/j.1813-6982.2008.00152.x.
- Penrose, E.T. (1959). *The Theory of the Growth of the Firm*. Oxford University Press: New York.
- Porter, Michael E. (1985). *Competitive Advantage*. New York. The Free Press (Chapter in which Porter introduces the generic value chain concept).
- Porter, M. E. and Kramer, M. R. (2006). Strategy and society: the link between competitive advantage and corporate social responsibility, *Harvard Business Review*, (December, 2006):78-92; "Creating shared value," *Harvard Business Review*, 89
- Psacharopoulos, G. & Woodhall, M. (1997). *Education for development: An analysis of investment choices*. New York: Oxford University Press
- Sábato, J. Mackenzi, M. (1982). *La Producción de Tecnología*. Autónoma o Transnacional. Nueva Imagen, Mexico.
- Scott, R. W. (2008). *Organizations and organizing: Rational, natural, and open systems perspectives*. Upper Saddle River, NJ: Prentice Hall.
- Smith, M. K. (2005). *The encyclopedia of informal education*, Retrieved on 15/09/2013 from <http://www.infed.org/biblio/b-expltn.nl.htm>
- Ssebuwufu, J. et al, (2012). *Strengthening University-Industry Linkages In Africa: A Study On Institutional Capacities And Gaps*. Association Of African Universities (Aau)2012, Available@ [Http://www.Aau.Org](http://www.Aau.Org).
- Tennant, M. (1997). *Psychology and adult learning* (2nd ed.). London: Routledge.
- Tether, B. S. (2002). Who Co-operates for Innovation and Why? An Empirical Analysis. *Research Policy*, 31(6): 947-967.
- West J.(2008). *Best Practices in University-Industry Collaboration*. Website:[http://blog. Open inovation .net /2008/06/best-practices-in-university-industry](http://blog.Openinnovation.net/2008/06/best-practices-in-university-industry).
- Yawson, G. (2014). School of engineering at the Takoradi polytechnic A three-day conference on the theme: polytechnic and industry linkages-prospects and challenges. *News Ghana* Apr 29, 2014.

munkhas@yahoo.com

Alhassan, M.¹, Aigbavboa, C. O.² and Atepor, L.³ (2016) A Framework For Higher Education And Industry Linkage In The Ghanaian Built Environment In: Mojekwu, J.N., Nani G., Atepor, L., Oppong, R.A., Adetunji, M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) *Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 599-610*