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Full Length Research Paper

Adoption of competency based education in TVET Institutions in Ghana: A case study of Mechanical Engineering Department, Accra Polytechnic

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Polytechnics education in Ghana, as it is now, lacks proper direction. Indeed, Poku et al. (2013) stated that education in Ghana can be described as being under experimentation, without a very clear direction and focus. It is observed that Polytechnic education which is meant to enhance trainee's practical abilities and prepare them effectively for the world of work has been degrading gradually. Many polytechnics in Africa do not possess adequate laboratory facilities, the linkages with industries are totally broken, their curriculum has become obsolete and do not respond to the market need. All these factors have negatively affected young graduates of polytechnics for years back. It is extremely difficult for them to value themselves and access a job available on market. Some few who are lucky to be employed have to undertake a certain number of training in their industry in order to meet the job requirements. In view of these problems, this paper proposes the adoption a Competency Based Education (CBE) Approach to re-strengthen the practical skills, the linkage with industry and finally improve work accessibility to Polytechnic's graduates in Ghana. A case study of Competency Based Education (CBE) program in Mechanical Engineering at Accra Polytechnic (Ghana) was considered from 2009 to 2013. Secondary data were collected on student rate of employment each year for both the normal Higher National Diploma (HND) program and the CBE program. Analysis shows that the CBE approach enhances job accessibility better than the normal programmes and at the same time equips trainees with considerable skills required in industry. However, the limited number of students enrolled on the CBE program, the lack of awareness and proper readiness for CBE approach, have contributed to limit the effective implementation of the CBE system in Ghana.

Keywords: CBE, polytechnic education, employment, practical skills transferred.

INTRODUCTION

Polytechnics were created in Ghana by the law 1992 (Provisional National Defense Council Law 321) in order to deepen the educational reform in Ghana. Polytechnics

which are Technical Vocational Education and Training (TVET) type of education are meant to provide tertiary education being the training and retraining of upper

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and middle level manpower which is conceived by the government of Ghana as an essential component of development strategy to steer and manage economic and social development so as to achieve national goals (White Paper, No. 0001/97). At the beginning, six polytechnics were created namely Accra, Takoradi, Kumasi, Ho, Tamale and Cape Coast polytechnics. Four more polytechnics were later established at Sunyani, Koforidua, Bolgatanga and Wa bringing the number of Polytechnics in Ghana to ten (Honyenuga, 2013).

Moreover, Polytechnics activities in Ghana are regulated by three main bodies namely: National Board for Professional and Technician Examination (NAPTEX), National Council for Tertiary Education (NCTE) and National Accreditation Board (NAB). NAPTEX not only takes control of the examination process but also ensures that a unique curriculum is run in the ten polytechnics. The polytechnics normally awards an HND certificate obtained after passing through three years of training and fulfilling some minimum conditions.

According to Effah and Hoffman (2010), Tertiary Educational Institutions have distinct features from other organisational types that in turn make their management different. Since their establishment, Polytechnic suffered a lot of problems as identified by many previous studies. It was previously argued that Polytechnics have received less adequate funding and stable support as compared to universities. Effah and Hoffman (1998) have noted that, polytechnics in 1998 received about 28% of inputs requested from government; this percentage appreciated to 58% in 2000. Moreover, Nyarko (2011) summarized the problems faced by the polytechnics as following: poor funding, inadequate staffing, curriculum, career progression, poor remuneration and autonomy. Idrissu et al. (2014) further develop more challenges faced by the polytechnics in terms of high enrollment, lack of effective laboratory tools, obsolete equipment and curriculum delivery. The polytechnics curriculum is common for the ten polytechnic and is subject to review by NAPTEX. It should be noted that the polytechnics curriculum which is developed with the intention to enhance practical skills and re-empower middle level manpower is not Competence Based oriented and therefore is gradually deviating from its main objective. Competency-based learning or Competency Based Education and Training is an approach to teaching and learning more often used in learning concrete skills than abstract learning. According to Soares (2012) Competency Based Education is an outcome based approach to education where the emphasis is on what comes out of postsecondary education –what graduates know and they can do- rather than what goes into the curriculum.

Moreover, laboratory facilities that are required to enhance practical training have been progressively degrading, forcing facilitators to make their teaching more theoretical than practical. The polytechnic education as it is now does not have a clear direction just like Poku et al.

(2013) stated it earlier that education in Ghana can be described as being under experimentation, without a very clear direction and focus. In addition, the linkage to industry that strengthens the practical skills of trainees is also getting wicker and wicker. All these factors seem to make polytechnic teaching very similar to the university approach which is recognized for its theoretical perspective rather than producing practical skilled people as set by the objectives of polytechnics. This situation explains the motivation of this paper to propose a Competency Based Education (CBE) approach to enhance polytechnic teaching and align this with the already set objectives. This will also impact on the process of employment as the CBE approach directly aligns skills with industry training. Specifically, the project will achieve the followings: Assessing the potential of employment provided by the CBE curriculum and comparing this vis-a-vis the current TVET program.

METHODOLOGY

A CBE program run by the mechanical department of Accra Polytechnic in collaboration with Japan International Cooperation Agency (JICA) has been used as a case study to analyze this problem. The CBE program which was a pilot one proposed by the Japanese association (JICA) in collaboration with Accra Polytechnic, ended in 2013 providing therefore limited data to perform a deep quantitative analysis. The program started since 2009 and was run with the financial support of JICA for the PLANT students of the mechanical department. The CBE program in PLANT, was run concurrently with the normal PLANT program of the school. Enrollments over the years are summarized in the Table 1. It can be seen from Table 1 that the enrollment for normal HND students is far higher than the one of the CBE program despite the fact that the registration fees were the same. The reason is that there is a fixed and limited number of students that were taken for the CBE program and once this limit is attained, no more admission is given. The CBE program in PLANT is normally announced to the students during the orientation ceremony and those who wish to attend the program do register for it. Additionally, data were collected on the graduating students and this is shown in Table 2.

The third series of data that help to make a comparative analysis of the CBE program versus the current HND program is the rate of employment of students over time. For the CBE students, there was an attempt to build a comprehensive database on their employment rate by the mechanical department through a survey that is still ongoing. However, a random sampling was used to locate the students for both the CBE and the normal HND students. The data collected for the CBE program and the current HND program are presented as follow in Tables 3 and 4 respectively. The population for the CBE students who graduated is 41 and the one for the normal HND students is 102.

Based on the information collected in both Tables 3 and 4, a cumulative number of student versus duration before employment was inferred and presented in Table 5.

FINDINGS AND DISCUSSION

A plotting of the cumulative rate of employment for both the CBE and the normal TVET program for HND is displayed in Figure 1. According to Figure 1, the

Table 1. Enrollment of students in Plant program since 2009.

Yrs	No of students enrolled for the CBE program in PLANT	No of students enrolled for the normal HND program in Plant
2009 to 2010	20	60
2010 to 2011	22	62
2011 to 2012	22	70
2012 to 2013	Unknown	Unknown

Table 2. Graduating students in Plant program since 2009.

Yrs	No of students enrolled for the CBE program in PLANT	No of students registered for the normal HND program in PLANT
2009 to 2012	19	49
2010 to 2013	22	53
2011 to 2013	Unknown	Unknown
2012 to 2013	Unknown	Unknown

Table 3. Accra Polytechnic, Plant student's employment rate for CBE program.

Company's name	Date of graduation	Date of starting job	Duration in month	No of student Employed
Tropical cable	November 2012	January 2013	2	4
NexansKabelmetal	November 2012	November 2012	0	8
Accra Brewery	November 2012	March 2013	4	2
Nestle	June 2013	September 2013	3	2
VRA	November 2012	May 2013	6	2
Ghana Gas pipeline	November 2012	December 2012	1	6
CFAO Ghana	June 2013	August 2013	1	1
Mechanical Lloyd	June 2013	October 2013	4	2
Aluworks	June 2013	September 2013	3	6
Sun-Ray Engineering	June 2013	July 2013	1	2
Cocoa processing company	June 2013	September 2013	3	1
Tema steel works company	November 2012	May 2013	6	1

employment rate for the CBE program is faster than the one of normal HND program. However, this result cannot be confirmed at 100% due to the non-availability of massive data that could lead to a more statistically sound analysis. In fact the data collection was the most challenging aspect of this work. The data collected on the CBE program is enough representative of the total population but this has not been the case for the normal TVET HND program. One of the deficiencies the researchers suffered was the fact that there were no proper measures put in place to keep track the graduated students in order to build a strong database on their workplaces and date of employment. In view of this, it is recommended that alumni services should be re-strengthened to improve those records.

A total of 27 out of 102 students were successfully tracked with their working places for the normal HND program against a total of 37 over 41 for the CBE program. Despite all these factors, the graph in Figure 1 shows an undeniable trend in favor of the employment rate provided by the CBE program as compared to the normal TVET HND program.

Discussion of findings on direct observations

This finding is subject to a lot of changes in terms of infrastructure. The full implementation of a CBE program in Ghana will be highly limited by factors including the number of students enrolled, the Internally Generated

Table 4. Accra Polytechnic, plant student's employment rate for normal HND program.

Company's name	Date of graduation	Date of starting job	Duration in month	No of student taken
Tropical cable	November 2012	January 2013	2	2
NexansKabelmetal	November 2012	November 2012	0	2
Accra Brewery	November 2012	March 2013	4	6
Nestle	June 2013	September 2013	3	1
VRA	November 2012	May 2013	6	0
Ghana Gas pipeline	November 2012	December 2012	1	2
CFAO Ghana	June 2013	August 2013	1	0
Mechanical Lloyd	June 2013	October 2013	4	0
Aluworks	June 2013	September 2013	3	2
Sun-Ray Engineering	June 2013	July 2013	1	0
Cocoa processing company	June 2013	September 2013	3	0
Tema steel works company	November 2012	May 2013	6	1
Tema Oil Refinery	November 2012	March 2013	4	2
Bluemont Engineering	November 2012	September 2013	10	1
Jofed company ltd	November 2012	October 2013	11	1
Vital Source ltd	November 2012	August 2013	09	3
Pinnacle Engineering	November 2012	November 2013	12	2
Itema	November 2012	August 2013	09	1
Karmans Holdings ltd	November 2012	February 2013	3	2
Volta Aluminium company	November 2012	January 2013	2	1

Table 5. Cumulative data analysis for both CBE and normal HND.

CBE		Normal HND	
Duration (month)	Rate of employment (%)	Duration (month)	Rate of employment (%)
0	19.5122	0	1.9608
1	41.4634	1	3.9216
2	51.2195	2	6.8627
3	73.1707	3	11.7647
4	82.9268	4	17.6471
5	82.9268	5	17.6471
6	90.2439	6	18.6275
		7	18.6275
		8	18.6275
		9	22.5490
		10	23.5294
		11	24.5098
		12	26.4706

Fund (IGF) provided to the schools and the available infrastructures. For instance, for the CBE program to accommodate 100 students which is the average number of enrolment per year in most departments running the TVET program, there will be a need to engage four lecturers per course for a close monitoring of the students and provide more infrastructures including laboratory

equipment, computer resource centers with access to internet. These limitations put much pressure on the school administrators without effectively increasing their IGF as the fees do not vary whether the student attend the CBE or the normal HND program. These financial limitations have contributed one way or the other to the unsustainability of the program and this bring forth the

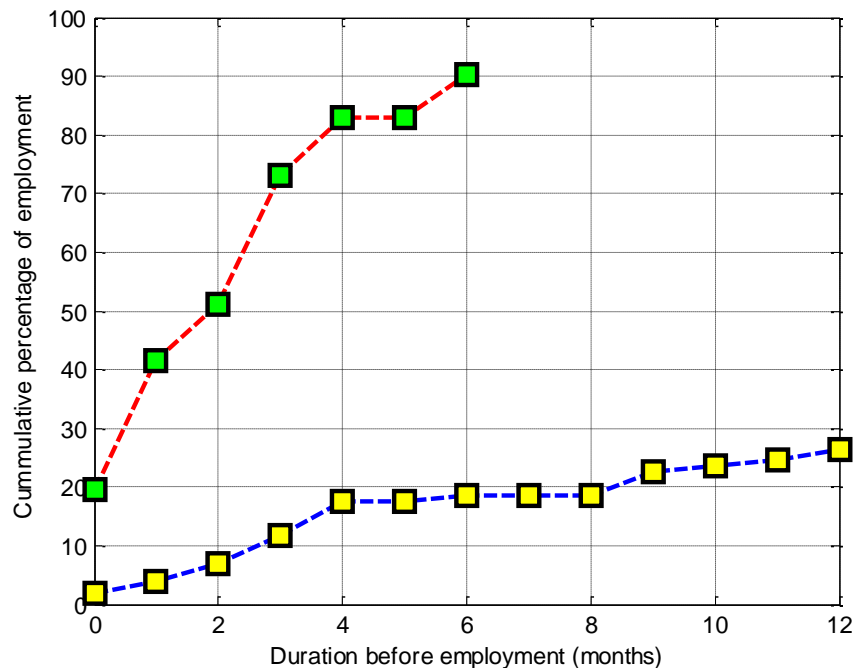


Figure 1. Graph showing the rate of employment over time for both CBE and normal HND program.

question of effective implementation of CBE program. In actual fact Dilmore et al. (2011) proposed a 13 steps process and 3 steps implementation procedure to ensure that a CBE program in clinical research is properly implemented. A key element in the process is the review of existing CBE program. Even though CBE programs are gradually being adopted in Ghana, awareness and readiness for such change in educational sector have not yet reached a considerable threshold to trigger an effective change. Financial support appears therefore as a serious handicap in implementing CBE programs.

However, the study shows that the CBE program enhances employability better than the TVET program but surely accommodates a far limited number of students.

According to Kpamma et al. (2014), the Competency-Based Training (CBT) system departs from the traditional mode of training by focusing post-secondary training on defining, teaching, and assessing competencies industry requires. Therefore unlike the conventional system whereby the unit of progression is time and teacher-centered, in a CBT system the unit of progression is mastery of specific knowledge or skills, and is learner-centered. Also industry partners develop more appreciation to the CBE students owing to their comfort with equipment and ease of operating machines. They do not request extra training to perform their duty as compared to the many other from the traditional program to whom the industry appears to be totally new. The CBE

program can produce skilled technicians capable of transforming the economy of our country to the next level of industrialization and at the same time reduce youth unemployment and eradicate poverty to some extent. These great benefits cannot be underrated and this is the reason why this study strongly recommends the adoption of CBE in TVET institution in Ghana as the country is actually in its developing stage and this will require more technical skills in manufacturing and related industries. An appeal is therefore made for all stakeholders to invest more in the polytechnic and improve the state of laboratory equipment as well as provide more infrastructure and adequate tools to adopt a CBE program. This will be a choice of quality education against a high number of enrolled students. Otherwise, the current state of education program in Polytechnics in Ghana will continue degrading and turn to be more theoretical than practical.

CONCLUSION

In summary a comparative analysis of employment rate for CBE program and TVET HND program in mechanical department option "PLANT" was carried out. It was found out that the CBE program improves job accessibility and therefore it is highly recommended to polytechnics. CBE provides many other advantages including increase practical activities, effective capacity building and

linkages with industry, easy job placement. It is for these reasons that the CBE system is fully adopted in Australia and other part of the world like Japan, China etc. It is further recommended that a deeper analysis based on more data including cost and other factors should be carried out to assess the sustainability of a CBE program in Ghana and also the factors that limit an effective implementation.

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Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Nyarko DA (2011). Polytechnic education in Ghana: the challenges and prospects. Address delivered on the occasion of the NAPTEX/Polytechnics meeting.
- Dilmore TC, Moore DW, Bjork ZJ (2011). Implementing Competency-Based Education A Process Workbook. Clinical and Translational Science Institute, University of Pittsburgh.
- Effah P, Hoffman A (1998). Funding Tertiary Education. Report Prepared for the National Council for Tertiary Education (NCTE), Ghana. Accra: NCTE.
- Effah P, Hoffman A (2010). Regulating Tertiary Education. The Ghanaian and International Perspective. Accra: Ghana Universities Press.
- Honyenuga BQ (2013). Polytechnic Education in Ghana: A Change Management Perspective. Inter.J.Soc.Sci. Interdisciplin. Res.IJSSIR. Vol.2. ISSN 2277-3630.
- Soares L (2012). A 'Disruptive' Look at Competency-Based Education. Center for American Progress.
- Sulemanalddrisu, EliasuAlhassan, Tony Kinder (2014).Polytechnic Education In Ghana: Management Delivery And Challenges. Int. J. Soc. Sci. Hum. Invention 1(6):411-424 ISSN: 2349-203

Full Length Research Paper

The role of the 'hands-on' teaching approach in vernacular architecture education: A case study of University of Jos, Nigeria

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This paper focuses on a study of pedagogical techniques employed for the teaching of vernacular architecture modules, at the University of Jos, Nigeria. It looks at the way the hands-on approach and other methods were employed in teaching the modules from the early formative stages to the final year of the bachelor's programme before changes were made to the teaching methods. As methodology, the study employed the use of basic statistical methods in terms of percentages in examining the level of students' interests in undertaking vernacular architecture related projects for their BSc dissertations between 1985/86 to 2005/06 sessions. The aim was to see if the level of students' interest in vernacular architecture had been affected by the changes made to the way the modules were taught. Although continuous dissertation records spanning the entire 20 sessions could not be obtained, inference was drawn from existing ones. The results indicated a significant drop in the percentage of students undertaking vernacular architecture related projects for their BSc dissertations after changes in the teaching techniques were effected. This study reveals the significance of hands-on learning in vernacular architecture education and further highlights the importance of module-specific approaches in higher education pedagogy in general.

Keywords: Vernacular architecture, hands-on approach, pedagogy, students' interests.

INTRODUCTION

From the late 1960s architecture began experiencing a gradual split that created two distinct industries; an institutionalized one stemming from theoretical reasoning and built on technological innovations; and another void of such technological backing. The later, which is referred

to as vernacular or traditional architecture, is often associated with antiquarian, technologically backward and sometimes primitive forms of buildings. However, current interests in cultural and heritage studies, as well as the conservation of ancient buildings, has allowed the

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study of the vernacular to make its way into the curricula of some schools of architecture in the world. The extent to which academic instruction in the area of the vernacular has been incorporated into conventional architecture programmes varies from school to school. Some universities renowned for their study of vernacular environments and dwellings offer at least one module each year of the programme, or one module at some stage in the entire duration of the programme. These modules could be either core subjects or electives. Schools that adopt this course, tailor modules to incorporate facets of what vernacular architecture entails at different levels in the programme. Like every other course, module-specific teaching techniques are required to optimise the learning outcomes of the students in this field.

There is no shortage of studies done on teaching techniques for the design studio module or even on vernacular architecture education. However, research of a longitudinal nature that shows an eventual measurable effect of teaching techniques for vernacular architecture modules on students over time is lacking. The need to measure how certain pedagogical techniques or the change of these techniques affect students' interest in that module is the focus of this paper. Knowing how pedagogical techniques or the change of these techniques affect the level of students' interest in design modules justifies the use of these techniques and the relevance of this study.

What constitutes vernacular architecture?

Due to the nature of the concept, a study in vernacular architecture requires an inter-disciplinary fusion of anthropology, cultural geography, archaeology, history and architecture (Rapaport, 1969). Although the use of the term 'vernacular' has been popularly subscribed to by most scholars, there is no commonly accepted definition. Oliver (2006) suggests that the term has as many meanings as the cultures and languages that there are. Aysan (1988) is of the opinion that "the definition of vernacular is infinitely variable" (1988: X). Taking several factors into consideration Oliver (1997) defines vernacular architecture as architecture that,

Comprises the dwellings and all other buildings of the people, related to their environmental contexts and available resources, they are customary or community built, utilizing traditional technology. All forms of vernacular architecture are built to meet specific needs, accommodating the values, economies and ways of living of the cultures that produce them" (1997:1).

In a study on vernacular architecture compiled two decades ago, vernacular architecture was viewed as a product, a process and as knowledge. As a product he examines the information about the form and the idea

behind it; as a process it focuses on the relation of complex man-environment interaction; and as knowledge it looks at the natural and built environment (Turan, 1990). But since there are no set rules, scholars began focusing more on categorisation than on a single definition. Aysan, focused primarily on three things; firstly, a critical analyses of the process by which definitions of the 'vernacular' were made; secondly, the process by which methodologies for the study of the vernacular was chosen; and thirdly, the criteria by which buildings were considered to be vernacular or not (Aysan, 1988).

However, it was Rapoport (1990) that actually looked at the definition of vernacular design in detail. His definition is not based on a single characteristic; rather it is a form of characterization that fits between extremes of a continuum but tending towards an ideal type. Within this continuum is a wide range of attributes of which, a dwelling type may possess some but not necessarily all of these attributes. He sub-divides these attributes into process and product characteristics. Product in this case describes the nature and qualities of the environment, while process looks at how the environment is formed and the various factors that combine to bring it to be.

Seventeen attributes make up the process characteristics, while twenty attributes make up the product characteristics. The product characteristics include the relationship between culture, environment, climate, natural resources within the geographical location and the eventual architectural product. It highlights the role all these aspects play in the realisation of the product. The process is obtaining and harnessing the intuitive know-how required in blending these different facets into achieving a built form. Within these process/product characteristics is the aspect of variations of the built model, the existence of which adds to the characterisation of vernacular architecture.

Although Table 1 provides a list of attributes providing a range or continuum within which the vernacular exists in its barest form to its most ideal form, what ultimately distinguishes vernacular designs from other forms of architectural designs is the relationship to culture. Rapoport emphasizes this when discussing the importance of culture for house form (Rapoport, 1969) and for design (Rapoport,2001,2005) and in the later volume he offers an explanation of the concept of culture. Rapoport (2001) lists a set of mechanisms: worldviews, values, ideals, norms, lifestyle and activity systems, which he refers to as 'components and expressions of culture' and examines how these mechanisms impact on the built environment which ultimately translates to what is regarded as vernacular architecture.

The art of teaching vernacular architecture

Most scholarly works on architectural education seem to focus more on pedagogical techniques bothering about

Table 1. Polytechnic classification of vernacular design attributes.

S/No	Process characteristics	Product characteristics
1	Identity of designers	Degree of cultural and Place-specificity
2	Intention and purpose of Designers	Specific model, plan forms, morphology, shapes, transitions
3	Degree of anonymity of Designers	Nature of relationship among Elements and the nature of underlying rules
4	Reliance on a model with Variations	Presence of specific formal qualities
5	Presence of a single model or many models	Use of specific materials, textures, colours, etc
6	Extent of sharing of model	Nature of relation to landscape, Site, geomorphology, etc
7	Nature of schemata underlying the model	Effectiveness of response to climate
8	Consistency of use of a single (same) model for different parts. Of the house-settlement system	Efficiency in use of resources
9	Types of relationships among models In different types of environments	Complexity at largest scale due to place specificity
10	Specifics of choice model of design	Complexity at other scales due to use of a Single model with variations
11	Congruence of choice model and its Choice criteria with shared ideals of users	Clarity, legibility and comprehensibility of the environment due to the order expressed by the model used
12	Degree of congruence and nature of the relation between environment and Culture/lifestyle	Open-endedness allowing additive, subtractive and other changes
13	Use of implicit/unwritten vs. Explicit/ Legalistic design criteria	Presence of 'stable equilibrium' (vs. the 'unstable equilibrium' of high style)
14	Degree of self-consciousness/unself-Consciousness of the design process	Complexity due to variations over time (changes to model not of model)
15	Degree of constancy/invariance vs. change/originality (and speed of change over time) of the basic method	Open-endedness regarding activities
16	Form of temporal change	Degree of multisensory qualities of environment (large range of non-visual Qualities)
17	Extent of sharing of knowledge about design and construction	Degree of differentiation of settings
18		Effectiveness of environment as a setting for Lifestyle and activity systems and other aspects of culture
19		Ability of settings to communicate Effectively to users
20		Relative importance of fixed-feature element Vs. semi-fixed feature element

(Adapted from Rapoport 1990).

the design studio course or the jury systems. This is not surprising as design studio is often regarded as the nucleus of the architecture programme. However, much like the design studio or every other course in the architectural curriculum, module-specific teaching techniques are also required to optimise the learning outcomes of the students in the vernacular architecture course. Abu-Ghazze (1997) emphasizes that the question for educators today is not if vernacular architecture should be taught but rather how it should be taught. He emphasizes the study of the history of the region in question, as a key foundation in the pedagogical process and adds that students undertaking fieldwork of vernacular settlements in their settings, accompanied by

tutors will enhance the learning outcomes. Students of architecture undertaking this course can be likened to apprentice builders understudying master craftsmen or artisans because of the technicalities involved in transmitting indigenous knowledge. However Davis (2006) is of the opinion that formal education can not only be helpful in the production of vernacular built forms but also in the training of professional architects skilled in the design and construction of vernacular built forms. But for that to happen he suggests that such formal architectural education needs to be "fundamentally different". Rather than an outright ideological opposition to traditional forms of knowledge it needs to be open to share and draw from such knowledge. He argues for the return to architectural

apprenticeship similar to medical training from direct experience; a new system of architectural education that includes more practical academic content; community service as well as recognizing a variety of stake holders and roles in the built industry.

In addition, Marchand (2006) sees teaching the vernacular architecture studio as the gestation of technical learning and socialization that occurs throughout a mason's apprenticeship and ultimately forges his professional identity. He argues for the appreciation of the apprenticeship-style learning in western societies. His work demonstrates that pedagogy of such technical workers is not language-based but rather obtained via 'on-site' participation. Philokyprou (2011) also believes that a combination of theoretical teaching and practical projects constitutes a pedagogical approach that will lead to the acquisition of skills for understanding and preserving traditional settlements. Another interesting teaching technique was that described by Khattab (2002), where students were made to reconstruct an existing traditional Kuwaiti house complex using scaled drawings and models as a basis for the formal analysis of the house. Although this exercise was done as part of the regular design studio course on residential designs, Khattab (2002) describes the learning outcome as a practical way to comprehend the effect of cultural difference in the design process. Nay (2001) also reports on a similar design reconstruction exercise done by students for traditional courtyard buildings in the UAE as part of the design studio course. Qin (2008) further suggested the use of interactive sessions in teaching theoretical aspects of the vernacular architecture course.

The methods proposed or described by the various scholars stated above and others not cited here, have one thing in common which is the importance of the hands-on experience as an effective teaching method in achieving the intended learning outcomes of the vernacular architecture course. It was stated that only fieldwork will provide the student the first-hand knowledge of the different components of vernacular architectural space and add other components that will culminate in creating a vernacular style (Abu-Ghazzeah 1997).

However, the term 'fieldwork' is still ambiguous. Rather what should be emphasized is what specific tasks are undertaken during fieldwork and beyond. If the goal of the fieldwork is to carry out surveys of existing vernacular dwellings from which formal analysis can be done, that may go a long way to enhance the cognitive levels of the students but it will be insufficient as a learning method. The reason is that the study of vernacular architecture goes beyond the spatial, structural, material, cultural and environmental factors of indigenous built forms to the arduous tasks of design and build. Design in this context involves spatial arrangement using materials with non-standardized sizes, often unprocessed; less reliance on mechanical systems for ventilation and air flow as well as, lighting; while

embracing culture-specific symbolisms, beliefs and values. Building involves the know-how for the actualization of these forms with less reliance on heavy and expensive machinery amongst other things.

But beyond fieldwork and reconstruction exercises is the 'hands-on' approach. This is where rather than scale models of vernacular dwellings being reconstructed; actual live replicas of the dwellings are produced after the initial fieldwork has been carried out. Oliver (2006) in discussing about the need to study vernacular architecture mentions the changes that have occurred in the teaching approach in the Architecture Association School. He highlights the shift from simply making models of tribal or folk shelter to building investigation, documentations or restoration exercises involving actual travelling and hands-on projects. Although most studio budgets may not necessarily cover actual size reconstruction of certain types of vernacular dwellings, restoration and conservation works on derelict or old vernacular buildings can be used as viable alternatives where possible. Philokyprou (2011) stated that much of today's building activity takes place in sensitive historic environment and the principles for their conservation and reuse constitute some of the essential elements of a compulsory course in the architecture programme at the University of Cyprus.

The hands-on approaches involves a design and build exercise to construct actual sizes of new vernacular environments or restore old vernacular buildings, supervised by both tutors and actual indigenous master craftsmen. The idea of design-build has already been explored by some schools of architecture with positive results and incorporated into their curriculum as reported by Carpenter (1997) in learning by building.

RECENT TRENDS IN TEACHING DESIGN STUDIO: LIVE PROJECT PEDAGOGY

In his work, *Spatial Design Education*, Salama (2015) discussed the different progressive stages of design pedagogy from the traditional approaches to modern trends adopted in schools of architecture today. Some of such forms of pedagogies increasingly gaining ground for use in studio design courses are what he collectively termed as Interchangeable Design Pedagogies. These include community based design pedagogy; design-build and the pedagogy of making; and live project pedagogy. Although these have been adapted specifically for studio design course, they are included as part of the literature review discussions because of the emphasis placed on hands-on learning experience.

Community Based Design Pedagogy

This is a democratic design practice where students work directly with their local communities on real re-development or design issues in their environment.

Students are expected to learn to proffer urban problem solutions through the politics of decision making, policy implementations and eventual design solutions. Sanoff (2003, 2010) emphasized this as part of his concept of inclusive approaches to design where students work in close collaboration with the community. However, two issues that were raised in some quarters over the viability of this technique were; firstly the availability of such community based projects on yearly basis to make this design studio type sustainable. Secondly, the issue that students lack the needed level of training at this stage to make on-site design decisions or properly interpret policies for implementation.

Design – Build and the Pedagogy of Making

This is different from the community based design pedagogy in that it does not focus on the politics of decision making. However, it is designed to make students undertake actual projects from design inception to completion with the specific learning outcome of developing construction and building skills alongside design knowledge based on group work, hands-on building experiences. Projects could range from buildings, interior spaces, product designs and installations. Design-build studio is fast gaining ground as a new form of design pedagogy. It incorporates class work and community service into its curriculum. Hinson (2007) wrote on design-build as a teaching method that offers the student a learning experience that will shape their values about design and designers.

Live Project Pedagogy

Salama (2015:279) states that “live project pedagogy is a first-hand design-build method and practice wherein students design real-life projects for actual clients and users”. It first started in the Birmingham School of Architecture, UK in 1951 and was used for 10 years before being discontinued (Brown, 2012). However, it has experienced a gradual resurgence into mainstream curricula as an alternative form of design pedagogy. It offers students the full compliments of practice experience with client engagements, limitations of design brief, budgets, fixed time frames and above all, a hands-on experience at various levels during construction.

METHODOLOGY

This study takes on a longitudinal approach spanning a 20 year period using secondary data. The data involves records of students’ dissertations obtained from five academic sessions were available between 1985/86 – 2005/06. Results prior to 2002 were still kept in manual

filing methods and as such some years were not easily recoverable from piles accumulated over time. Within this 20 year time frame the course content, teaching techniques employed and subsequent changes made to these techniques have been studied and documented. Particular emphasis will be placed on the impact these changes have had on the level of student interest generated in vernacular architecture. Students’ interest has been measured through the number of students who undertake projects in vernacular architecture for their dissertations.

The records used for this study are BSc dissertations which were chosen over MSc thesis, due to the fact that modules in vernacular architecture are only offered in the BSc stage. This means the students make a choice of their dissertation topics having just had fresh background knowledge of the course. The results of the registered interests were converted into charts using basic statistics methods from which percentages were obtained for each session. Conclusions were drawn purely on percentage outcomes.

Case Study: School of Architecture, University of Jos, Plateau State, Nigeria

The city of Jos is located in one of the highest areas above sea level in Nigeria known as Plateau State. The land mass is predominantly rocky and picturesque with a slightly temperate climate, making this area a tourist attraction. The architecture programme at the University of Jos was initiated in 1979 but commenced in 1980 and being set in an environment surrounded by most of the earth’s natural endowments, the school easily adopted organic architecture as one of its philosophies, thus promoting nature and culture through design.

Salama (2015) carried out a study of eight schools of architecture in Africa and the Middle East to ascertain to what level the course content in their curricula reflected the mission statement or philosophy of the school. His findings showed that courses classified under socio-cultural domain were the least considered in any of the schools of architecture investigated. Only the school of architecture in Ahmadu Bello University, Zaria in Nigeria which was one of the eight, had as much as four courses with socio-cultural content in its curriculum. However, an examination of the curriculum of the school of architecture in university of Jos showed that they offered as much as six courses with strong socio-cultural content. Thus, showing that its course content does largely reflect the natural/ socio-cultural philosophy it aims to promote.

Traditional Architecture/ Socio-cultural Courses: Course Structure and Teaching Methods

Traditional, indigenous, primitive and spontaneous

architecture has all been used as alternate terminologies to or before the use of vernacular architecture at some points since the incipience of this field of study. There have been several debates as to the political and academic correctness of some of these terms, leading to their disuse. However the term traditional architecture is still accepted and retained in some scholarly works, and is often used interchangeably with vernacular architecture. The architecture programme at the University of Jos still retains this term in its module titles for the course. It runs one core module for each of the four years that make up the undergraduate BSc programme. Each module is assigned a different title and credit unit, depending on the content and overall learning outcome it is intended to provide. Modules with 2 credit units are theoretical courses with not more than 1 hour of lectures in a week, while modules with 3 credit units have combined theory and practical sessions. The modules at each stage are designed to progressively follow-up on preceding ones and eventually culminate with equipping the student with both theoretical 'knowledge' and the practical 'know how' that is required (Pont 2006).

1st Year – History of Arts (2 Credit units)

In viewing architecture as part of the arts, a holistic perspective is taken on period based works of art and architecture. Emphasis is laid on both cultural and ideological movements that influenced the works of the masters. The module is split into two; the most prominent art movements and periods from the international scene; as well as those from Nigerian history are studied. The module runs for the two semesters that make up a session.

Teaching Techniques: The module is mainly theoretical but is often combined with a planned excursion of students and tutors to the Museum of Traditional Nigerian Architecture (MOTNA) in Jos, Nigeria. It is the first of its kind in West Africa, dedicated entirely to recreating live and monumental models of prominent traditional architectural styles of historical significance in Nigeria.

Assessment Methods: Students are assessed by mid semester tests and written examinations at the end of the second semester.

Elective courses with socio-cultural content in 1st Year include – Anthropology (2 Credit units)

2nd Year – Introduction to Traditional Architecture and Techniques (2 Credit units)

At this stage the focus is on studying the different types of vernacular architecture obtainable in the African region. The different vernacular architectural styles are those contained within the four major geographical zones in

Africa which are, the Sahel Savannah, the Sudan Savannah, the Guinea Savannah and the Mangrove Rainforest regions. At this stage, emphasis is laid on acquainting the students with issues of climate, culture and design and enhancing students' abilities in the identification, documentation and classification of vernacular architectural typologies. The use of manual visual representation methods in producing detailed descriptive analyses is also encouraged at this level. This module also runs through the entire session.

Teaching Techniques: It is entirely theoretical with instructions given by tutors.

Assessment Methods: Similarly, students are assessed using mid-semester written tests and end of session examinations.

Elective courses with socio-cultural content in 2nd Year include – Sociology of the Family (2 Credit units)

3rd Year – Traditional Architecture and Techniques (3 Credit units)

The focus on Nigerian traditional architecture is narrowed down to indigenous tribes within the larger Plateau region of which Jos is the capital. This module requires the students to undertake both tutorials and a practical class project which they are expected to defend at the end of the session. The class is split into teams and each team is assigned by ballot a specific tribe in the Plateau region. Field trips are organized by each team, to travel and conduct studies of the vernacular architecture of the indigenous tribes in their vernacular settings. A historical documentation and full reconnaissance survey involving photographs, measured drawings, recordings and interviews are expected to be obtained by the students. This is a semester-long project.

Teaching Techniques: In addition to regular class work and theoretical instructions passed on by tutors, undertaking a reconnaissance study field trip and carrying out a hands-on project by building a live-size replica of one of the building types documented during the fieldwork was also an integral part of this course content. The class teams are given freehand to organize themselves, apportion tasks, raise funds and manage their resources to accomplish the group project stated above. General instructions are given at the initial tutorial session and only minimal guidance is offered by the tutor afterwards.

Assessment Methods: Teams are encouraged to submit hand-written and handcrafted bound copies of the reports, with artistic representations of the buildings and traditional environments included. The submitted reports are assessed based on depth of information obtained and interpretation of data collected. A jury session is

organised towards the end of the semester where each team is expected to defend their field project. The jury is reviewed by both the students' peers as well as the course tutor. After the jury, the entire class is expected to select a building type from all the documented building samples obtained from field study and embark on a hands-on project of constructing a live-size replica of the selected building. Each team member is awarded the corporate grade given for the project report after the jury and for participation in the hands-on project. The summation of these grades constitutes the final assessment for each student for the module in that session. No other examinations or tests are required.

4th Year – Modern Trends in Traditional Architecture (3 Credit units)

This module gives the students the “opportunity to test their notions of rurally appropriate forms of modern architecture” (Lim 2004) or modifications of rural vernacular for modern uses. It is intended to teach the students to incorporate aspects of vernacular architecture into contemporary built forms. Similarly, the course content is made up of both tutorial sessions and practical sessions. This module was tailored as a design-build course where hands-on construction by the students, under the supervision of master builders in private vernacular practice forms part of the assessment. The module runs for one semester in the session.

Teaching Techniques: A typical vernacular type building is selected from any of the regions around Nigeria and slight modifications are made in its design, to adapt it to some other use. This design modification is often made as a collaborative effort between student and tutor. The project ends with the entire class of students involved in actual hands-on construction of the agreed model, using traditional materials and vernacular construction techniques. Guidance is received from local master craftsmen when encountering areas in local construction that require specialized skills. The backyard of the school of architecture was designated as an exhibition park where all live-size vernacular buildings constructed by the students were displayed (Figures 1 and 2).

Assessment Methods: Grading during hands-on activities formed part of the assessment while end of semester exams made up the other part.

Change in Teaching Techniques

During the 1999/2000 session, major changes were made in the teaching techniques employed in the 4th year module – Modern Trends in Traditional Architecture and the 3rd year module - Traditional Architecture and Techniques. In both modules, the practical hands-on

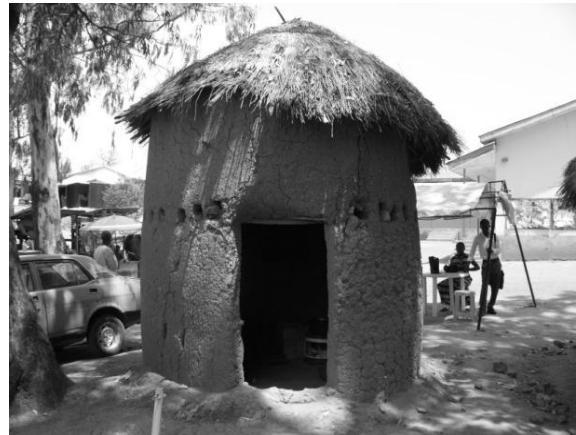


Figure 1. Traditional huts built by students for the 3rd and 4th year group projects in 1997 and 1998 sessions (The author was part of the class group who built the hut in fig 1).



Figure 2. Traditional huts built by students for the 3rd and 4th year group projects in 1997 and 1998 sessions (The author was part of the class group who built the hut in fig 1).

sessions were discontinued and only theoretical instructions were given. Assessments were then made purely on written examinations at the end of the semester. In subsequent sessions, other changes were also made to the 3rd year module – Traditional Architecture and Techniques. The class field trip to undertake reconnaissance and historical data collection surveys were also discontinued and reduced to mere term papers, with the emphasis on actual field work replaced with literature reviews. The resultant effect these changes were likely to have on the school's image as an advocate for culture, sustainability and organic architecture and also the student's opinion on retaining the hands-on teaching method, was not considered by the successive heads of school.

Table 2. Available data obtained from the school of architecture, Jos

Year/Session	Total No. of Students	No. of Trad Arch projects	(%)
1985/86	31	14	45%
1986/87	27	12	44.4%
1995/96	57	20	35%
2002/03	50	3	6%
2005/06	104	19	18%

BSc Students' Projects 1985/86 Session



Figure 3. Pie chart showing percentage of students who did vernacular (Trad) related projects and those who did not 1985/86 session.

BSc Students' Projects 1986/1987 Session

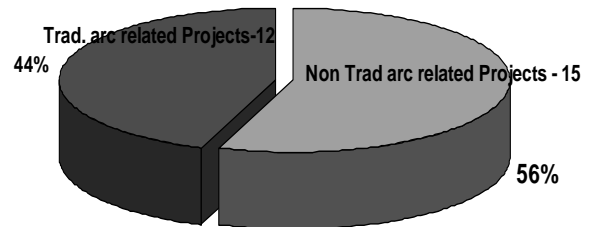


Figure 4. Pie chart showing percentage of students who did vernacular (Trad) related projects and those who did not in 1986/87 session.

Data analysis

In 2009, as part of my PhD research work in Vernacular architecture, I decided to visit my Alma Mata to obtain data for my research work, when I observed this issue. However, to ascertain the effect these changes may have had on students' interest in vernacular architecture, the percentage of students who carried out vernacular architecture related projects for their BSc dissertations were obtained before and after the 1999/2000 session. Due to manual storage at the time of field work, some BSc dissertations for some of the years were not available. Only dissertations from a total of six sessions were complete, hence results obtained from these may not necessarily be conclusive but they are indicative of the level of student interest, following the trend of percentages before and after the changes.

Table 2 and Figures 3-7 show a massive decline in number of students involved in vernacular (Traditional) architecture projects from the 2002/03 and 2005/06 sessions. This is in relation to the total number of students enrolled in the class each session. The results also show that between the 1985/86 and 1995/96 session, the mean percentage of students that undertake vernacular architecture related projects is 41.5%. This means that slightly less than half the total number of students enrolled, undertook vernacular architecture related projects in their dissertation before the change in

BSc Students' Projects 1995/96 Session

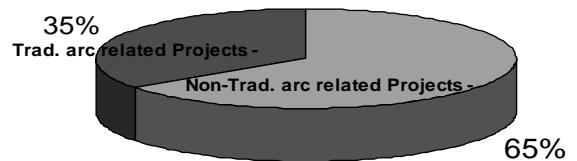


Figure 5. Pie chart showing percentage of students who did vernacular (Trad) related projects and those who did not in 1995/96 session

teaching techniques were instituted. After the 1999/2000 session, results show that the percentage of students that undertook vernacular architecture related projects for their dissertations, drastically reduced when compared with the total number of students enrolled in those academic sessions. The number of sessions used in this study may be limited but they reveal consistencies in results that are indicative of the level of student interest in

BSc Students Projects 2002/2003 Session

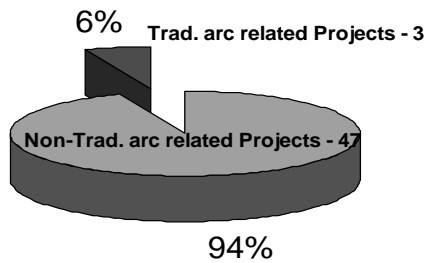


Figure 6. Pie chart showing percentage of students who did vernacular (Trad) related projects and those who did not in 2002/03 session

BSc Students' Projects 2005/2006 Session

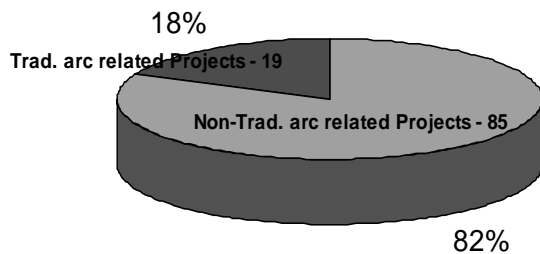


Figure 7. Pie chart showing percentage of students who did vernacular (Trad) related projects and those who did not in 2005/06 session

the course, before and after pedagogical changes were affected.

DISCUSSION AND RECOMMENDATIONS

The study findings reveal the following:

1. The philosophy of the school of architecture, University of Jos focuses on promoting nature and culture through design and this is reflected in the number of courses having socio-cultural content in the curriculum.
2. From the 1999/2000 session, less emphasis was placed on fieldwork and live-build projects and the pedagogy of making was prominently removed as a teaching technique in the traditional architecture module and replaced with theoretical work.
3. Regular appraisals on effectiveness of pedagogic techniques being adopted or changes made to them, and

the effects of new course inclusions or removals on student cognitive levels are not carried out by the school authorities.

4. Students' interests in the traditional architecture course as indicated in their willingness to undertake traditional architecture related projects for their BSc dissertations had reduced after changes were made in the teaching techniques.

The four preceding points highlight the main aspects that were observed and sum up the study findings, the crux of which is the dwindling student interest in the vernacular architecture module as a result of changes in the pedagogical techniques. The reason given for the change in teaching techniques adopted for traditional architecture was attributed to budget cuts to project funds. Available funds were to be channelled towards student excursion projects for design studio course which has always been regarded as the nucleus of design education.

It is believed that with such widely held notions, courses like vernacular architecture will always be relegated to the back burner unless there is a paradigm shift amongst popular schools of thought. The shift requires an understanding that designing for socio-cultural inclusiveness and the use of natural unprocessed building materials should be regarded as an integral part of the design studio course. As such, instead of treating vernacular architecture as a separate course, live-build vernacular architecture projects should be included as part of the design studio at different stages of the programme, similar to how sustainable design or green architecture projects are currently included in design studio classes. This would imply then that funding need not be shared but channelled into the same studio module, the only difference being the variety of projects undertaken in studio. Fixsen (2015) writes on how the Japanese architect Toshiko Mori brought her design studio class at Harvard's Graduate School of Design to the remote village of Sinthian in Senegal. They embarked on a live-build project for the Albers Foundation, an artists' residence with striking design features using local materials such as bamboo, thatch and bricks and also using local construction methods. This is an example of incorporating vernacular architecture into the design studio course with a live-build vernacular themed project that offers the students the much needed hands-on experience.

Based on the findings, it is evident that there is also a need to carry out regular appraisals on the effectiveness of the pedagogic techniques used in architectural instruction as well as the resultant effects in student cognitive levels when changes have been made in these areas. For instance, Lim (2004) discussed the possible connection between student cognitive levels and 'hands-on' approach to teaching or "construction-based problem learning methods".

With vernacular architecture education as one of the

few With vernacular architecture education as one of the few ways of preserving cultural identity, ensuring conservation of our heritage and creating good architectural value judgement, it is strongly recommended further research in this area and an emphasis on the hands-on approach into in pedagogical system of schools of architecture.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Abu-GhazzeH (1997). "Vernacular Architecture Education in the Islamic Society of Saudi Arabia: Towards the Development of an Authentic Contemporary Built Environment", *Habitat Intl.* 21(2):229-353.
- Aysan Y (1988). "An Understanding of the Vernacular Discourse". Unpublished PhD Thesis, Oxford Polytechnic, UK.
- Brow JB (2012). "A critique of live project", PhD Dissertation, Queen's University, Belfast.
- Carpenter WJ (1997). "Learning by Building: Design and Construction in Architectural Education", John Wiley & Sons.
- Davis H (2006), "Architectural Education and Vernacular Buildings in Asquith, L and Vellinga, M (ed) Vernacular Architecture in the 21st Century: Theory, Education and Practice". Taylor and Francis; New York, London.
- Fixsen A (2015). "Thread: Artists' Residence and Cultural Center Sinthian, Senegal" *Architectural Record Digital*, June 2015. McGraw Hill Publishing.
- Hinson D (2007). "Design as Research: Learning from doing in the design-build studio", *J. Architect. Educ.* 61(1):23-26.
- Khattab O (2002). "Reconstruction of Traditional Architecture A Design Education Tool", *Global Built Enviro. Rev.* 2(2):29-39.
- Lim J (2004). "Design Cognition in a Building Expedition", *Inter. J. Technol. Design Educ.* 14:291-300.
- Marchand THJ (2006). "Endorsing Indigenous Knowledge: the role of masons and Apprenticeship in sustaining vernacular architecture – the case of Djenne in Asquith, L and Vellinga, M (ed) Vernacular Architecture in the 21st Century: Theory, Education and Practice". Taylor and Francis; New York, London.
- Nay EM (2001). "A Case Study in Design Education in the Gulf – The Courtyard Prototype", *Open House International* 26(4):38-45.
- Oliver P (1997). "Encyclopaedia of Vernacular Architecture of the World", Cambridge University Press.
- Oliver P (2006). "Built to meet needs: Cultural issues in vernacular architecture", Oxford architectural press.
- Philokyprou M (2011). "Teaching Conservation and Vernacular Architecture", *J. Architect. Conservat.* 17(2):7-24.
- Pont G (2005). "The Education of the Classical Architect from Plato to Vitruvius", *Nexus Network J.* 7(1):76-85
- Rapoport A (1969). "House, Form and Culture", Englewood Cliffs, N.J., Prentice-Hall.
- Rapoport A (1990). "Defining Vernacular Design", in Turan, M.(ed), *Vernacular Architecture: Paradigms of Environmental Response*, Avery, Gower Publishing Company England.
- Rapoport A (2001). "Theory, Culture and Housing", *Housing Theory Soc.* 17:145-165.
- Rapoport A (2005). "Culture, Architecture and Design", Locke science publishing Company.
- Salama AM (2015). "Spatial Design Education: New Directions for Pedagogy in Architecture and Beyond", Ashgate Publishing Limited; England.
- Sanoff H (2003). "Three decades of design and community". Raleigh, NC: College of Design, North Carolina state University.
- Sanoff H (2010). "Democratic design: Participation case studies in urban and small town environments", Saarbrücken, Germany: VDM Verlag.

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