Literature Review: EdQual Project

School Design Matters! - Reviewing design influences on Education Performance and the contemporary school's existence as a 'community asset', or 'development hub' in Africa

International Literature on School Design
There is a limited amount of literature that attempts to measure the effect of school design on educational attainment. Broadly, it fits into two categories; case studies that focus primarily on examples of innovative school designs within the contextual environment of the pupils or learners involved. The second category deals more with statistical indicators of educational performance in different regions and countries.

Much of the literature on school design is confined to the Western world, Dudek, has produced a series of books on school design from Kindergarten to Secondary which epitomize current trends and innovation in school design. In his latest volume, (Dudek:2007) he groups a set of international case studies showing innovative educational design. In the UK, particularly over the past decade there has been an overhaul of ageing school infrastructure, and the construction of new schools to fit with the Labour Government's policies of improving and increasing access to education at all levels. Scotland, for example has built more than 28 secondary schools between 1999 and 2003.

In much of Africa, schools have had less innovation in their contemporary design. Despite being the subject of a number of reports by bodies such as the World Bank, where the basis for research has tended to focus on issues related to school buildings achieving basic levels of sanitation and other services.

The World Bank, its subsidiary the IDA, and other economics-focused funding bodies have looked in particular at research indicators that have considered the effect of resources such as teaching input, educational material, and local access to schools have had on educational attainment. School design, being less easily measured or quantified, has hardly been used as a criterion for assessment.

Whilst it is difficult therefore to set out parameters for educational quality or achievement related to school design, there are a number of schools in different continents that this review cites which demonstrate the possibilities that are available, for innovative school design in different contexts. Historically UNESCO, the United Nations Educational Social and Cultural Organisation have consistently published school design guidelines and case studies since the 1960s.

In contemporary times there has been an emphasis on access education being one of the United Nation's Millennium Development Goals (MDGs), especially for disadvantaged groups at regional/continental and also national level. School provision, and in some cases its form of design, has become a factor to be considered in some cases relating to female access to education in regions were this has been traditionally low.

Both South Africa and Ghana, have put in place new educational policies in keeping with both the widening access MDG goals and also national policies and funding to increase educational development and funding. In South Africa, the onus has largely been left to regional educational departments to organise their funding within the guidelines of a national or federal education framework. Provinces have been able to adapt to this limited autonomy differently. The most published of this new collection of schools are probably those built in the Western Cape by the award-winning South African architect Jo Noero. Dalweide Primary school, built in Paarl, a rural region of the Western Cape, through provincial government funding and the CSIR-sponsored Thuba

Makote schools in different provinces of South Africa, also represents the diversity of approach to new school building that is currently taking place.

In the Latin American newly industrialising, and developing countries including Brazil and Venezuela, there is a higher level of educational attainment, than in Africa despite similarly low funding levels available for the state sector. In much of Latin America, there has been a conceptual shift by education planners to fit the school around the needs of the child. This often means allowing schools to be flexible enough to allow poorer children work as well as go to school during later shifts, or in the case of Ecuador with the *Educatodos* scheme, provide non-formal education to all learners.

A new educational policy in Brazil further gives cash incentives to enable poorer families depend less on child labour and send children to school in the *Bolsa Familia* programme. In poorer areas there are also shift-teaching systems for those children who have to work to help support families, the school term holidays also coincide closely to agricultural cycles where students might help with the harvest etc. Governments have also developed different forms of schools, mobile schools, village and informal school types, to best match the educational needs of the communities that are being targeted.

The School Within the Community:
Whilst it is taken to be the norm for most schools to be located within a community context, at urban or rural level, some schools are still constructed with residential or boarding facilities. This is especially true of secondary schools in rural areas worldwide. In the UK Scottish children living in remote communities in the highlands and Islands still largely attend secondary schools in nearby towns with boarding facilities, students normally opting to be weekly boarders and return to their families at the weekends. Primary schools, which this study focuses on, are almost exclusively non-boarding and located locally.

In remote parts of Africa, boarding schools remain the norm also when school locations are too for from the villages and communities that they serve. Unesco and national planning guidelines suggest that primary schools should be built within walking distance of most pupils, thus being part of the local neighbourhood or community. In rural areas in the developing world this is rarely the case. Access to schools in rural Africa and elsewhere remains low, therefore many pupils walk considerable distances to school, if no boarding facilities exist.

In terms of school design the imperative then for many countries has fundamentally been to build more schools to improve access – some commentators note however that the rush to improve access has often had a detrimental effect if any on the actual quality of education provided, as new schools which are not properly equipped or staffed do not in themselves guarantee improved educational standards. In some areas of Ghana, educational drop out rates increased despite the introduction of an externally funded school building programme.

The idea of the school being an integral part of the community it is argued has been historic, since the evolution of Western Education in the late 18th Century, education has been perceived as being developmental and a contributor to the community in which it exists. The missionaries, the initial purveyors of Western Education to coastal Africa, took an holistic view to education co-locating missionary buildings, workshops, schools and dispensaries / hospitals all within the 'Mission Station', the ultimate destination for health, education and spiritual development.

Last century the European architect Walter Gropius designed Impington Village College with Max Fry. Its design became a key exemplar of the Village Colleges Movement, a post-war set of schools designed to ensure that secondary, vocational and community education could take place in these 'village colleges'. These Colleges being designed as buildings that became inherently part of the villages in which they were built and important social and educational spaces for their occupants.

In Africa, from the end of the colonial era, most schools at primary level remained designed to the standards and functions of the former colonial administration. The distinction between 'church-funded' and state funded schools remaining in place. In Nigeria and Ghana the grants-in-aid system meant that school funding for non- Government-run colleges, such as church colleges was determined by the school's performance at national exit level examinations and also the school's performance at nationally conducted educational inspections.

Boarding schools did, and are often still the norm for secondary schools in much of West Africa, the thesis being that it is better to remove the child from the influences of the environment and have them resident as boarders in the improving aura of the secondary school. In more urbanised parts of Africa including much of urban South Africa schools are more likely to be non-residential at both primary and secondary level.

UNESCO initially declared 1970 as the decade in which free education for all children at global level would be achieved. Most of Africa was unable to deliver this goal. South Africa, being the most extreme case, was now fully entrenched in its Apartheid-influenced educational regime, this effectively racialised education and ended the Church's direct involvement in education for the African population, especially in urban areas, which became segregated.

Nigeria tried, and failed, to deliver free primary education with its 'UPE" scheme launched in 1973. This resulted in the rapid building of school classrooms, of limited quality, and a crash teaching course for new primary school teachers to deliver the new curriculum, which was introduced at the same time. There was also the short-lived introduction of the 'shift-school' system, in urban areas specifically which meant that schools could be utilised to their fullest and effectively have two groups of learners using the school at different times.

The idea of the school being integral to the community was no longer central to the 1970s educational ethos. Driven by the global policies and aspirations of a liberal leaning UNESCO, which supported national education policies as the main instrument for ensuring educational development and delivery at all levels. Despite this there were a number of regional school research bodies set up in cities such as Dakar,Senegal; (f.1970) and Bangkok; Thailand, (f.1961) and Santiago de Chile (f. 1969).

A function of these bodies was to work with architects and educationists to come up with ideal space standards for schools at primary and secondary level. These were generic templates to be used or consulted by planners and designers of new schools. The emphasis was on the functionality and costing of the planning, with little consideration given to what design relationships it might have with its local community. Often this was compounded by the use of external consultants to work on these standards, - most had limited knowledge of the countries and the societal relationships with education and the school. Possibly the Latin American planners were the most attuned to this with the introduction of the shift school at primary and secondary level, which acknowledged societal realities and commitments for the disadvantaged.

School design in this era however, rarely changed from the colonial and missionary models of

schools based on post-war Western educational design standards. Despite the introduction and use of new theories in educational pedagogy, especially for early years learning in Europe, the basic classroom remained unchanged in its design in much of the world. Access remained the key consideration; not necessarily content, teaching, or environment.

Up until the mid-1980s the move towards improved access to and enrolment in education was partially fulfilled in most of the developing world, although global access to free education was never achieved. However, by the end of the 1980s the decline in the world economy and its devastating impact on the developing world meant that much of these gains were wiped out with school enrolment in decline, teachers and other educational resources all in short supply. Importantly also, the built infrastructure, was neither developed or designed to incorporate emerging new technologies, and due to poor or no maintenance unable often to be fully utilised for basic educational needs.

The resultant dip in education quality since the 1980s thus can be traced to a number of factors, arguably school design contributed significantly to this. In West Africa the newly introduced educational curriculum placed a new emphasis on vocational technical training. In Nigeria technical teachers were trained in Eastern Europe and equipment bought. National directives suggested that communities build the classrooms to house the equipment, - for communities who had historically had links to schools often through former missionary activity or schools in the area, the classrooms were duly built. Elsewhere there was little reponse or commitment from communities to do this. In effect the government often deployed equipment to schools were there were neither the buildings nor the teachers to use them, and conversely some communities had the teachers and classrooms but no equipment.

Contemporary Educational Design
Since the 1990s, there has been revived interest in schools being more than mono-functional educational buildings. The World Bank and other major educational financing organisations, have responded to the criticisms received in preceding decades and focused on helping alleviate poverty in developing countries. Education has been one of the areas that has benefited from increased investment and development. Much of the emphasis has now moved back to developing local/community partnerships with educational providers. Educational providers are also no longer deemed to be only national governments, the liberalisation policy has re-introduced actors such as religious groups, and private consortiums as school developers.

This period has coincided in the UK and other parts of Europe with major school building programmes to both replace post war and earlier housing stock and also to enable the construction of new school infrastructure that is able to incorporate new technologies for learning and respond to new needs for learning and facilities use.

In South Africa the period has coincided with the fundamental transition from the 40-year Nationalist government's apartheid education policies to the democratically-focused ANC new National policy on Education. In much of the rest of Africa the economic destabilisation of the 1980s, had come to an end, but even with the more compassionate and liberal development policies of the major international donor bodies it has been a major undertaking to both improve access and as importantly improve quality of education in most countries. The United Nations, in recognition of this major dilemma announced its millennium development goals in 2000, which reinforce the aspiration to improve educational access to the most vulnerable.

There have therefore been a number of publications, reviews and reports on the state of education at

global and more local levels. In South Africa there was the 1997 Schools Educational Needs Survey (South Africa Government 1997), This had been preceded by the Learning Spaces Development Conference (Criticos and Uduku:1995), and succeeded by a further conference by the same title organised in 1997, (Bulcock: 1997). More recently Karlsson's thesis (Karlsson:2003) has looked at childrens' relationship to school spaces in the post-apartheid South African state. Also John Pampalis has considered the use of Private Public Partnership (PPP) relationships for school building programmes in the new South Africa (Pampalis:undated).

In Ghana a number of education reviews have taken place since the introduction of the Junior Secondary-Senior Secondary school programme in 1987, (Ghana 2002, 2004), the most significant being the two reviews mentioned which have sought to explore the impact of the educational reforms of the late 1980s, on Ghanaian families in the light of the crushing economic downturn in the mid-80s to mid-90s.The recently published review (Ghana:2007) incorporates a similar model to that of South Africa, with the introduction of two years of kindergarten followed by a six year compulsory primary education programme, and a three year Junior High School system comprising first cycle fee-free education. Pilot school feeding schemes are also now in place.

In the UK there has been a major review of education policy in England and Wales, (and also in Scotland) resulting in a new curriculum for education from pre-nursery to tertiary level. These have had direct implications on the major school building programme that is taking place in parallel to this process. A series of new schools have been designed which have responded to both educational research and user/community requirements. Kingsdale School, in London for example, had considerable documentation and research conducted on its innovative community participation-led design process, and was shortlisted for a RIBA building award in 2006.

Despite the specificity of UK and European requirements and considerations for school design and the vastly different budgets involved, there are general lessons that can be drawn from the design process derived that can be applied to African schools. Similarly the levels community integration achieved in schools in South Africa are an exemplar for what is possible with limited resources in areas of gross disadvantage.

Much of the European participatory design process emphasises participation of all stakeholders. In educational design this means the children and staff, the primary users have considerable voice and influence on final design decisions, - both at the physical and material level. The most successful of these new schools are thus designed to represent these views, and in some cases lead to quirky solutions, that none the less have ensured the schools have had good post occupancy evaluation and local community use.

In the successful South African schools the new designs have been able to add necessary social infrastructure to deprived communities, often more than just the community hall, - this may take the form of a community-accessible full stocked local library or in some cases, on-site primary health care facilities. (Gibberd,2005, 2007)

Linkages to Education Quality-
There have been no definitive studies on the linkages of school design directly to educational quality. In the UK the new schools for the future programme has in its remit to do this over the next few years through funded research. Edwards (2007) has investigated the effect of sustainable design strategies on the school environment in selected schools in the UK, this research suggested a positive correlation between sustainable design and the case study schools he visited.

Earlier World Bank research suggests that the provision of schools close to rural communities improves educational enrolments, and improves retention levels also. This does not necessarily translate into improved educational performance. Similarly in attempting to achieve the stated millennium development goals related to increased access to females in schools, there has been a report that discusses the preferred design requirements to provide 'girl-friendly environments' to protect girls from school campus violence and other dangers..

Performance Measurement
Building performance is notoriously difficult to measure accurately. The nature of the built environment is that it has both physical and non-tangible qualities that elicit individual responses. The measurement of the physical is usually quantitative; one can measure building areas and calculate environmental conditions such as airflow and solar radiation. It is more difficult to measure qualitative conditions such as comfort. (Schneider:2002)

Educational quality is equally difficult to quantify. There are definite space standards which have been determined through earlier research , published in guidelines and reference volume such as Neufert's (2000) Architectural Design Handbook's section on school desing standards, and Unesco's, (1992) Educational Spaces, Newsletter, Building Basic Education. There are also school examination performance results which can be gleaned from national education ministries, although the veracity of examination results as determining standards are continually debated in education circles. For most public buildings also in contemporary times there are post occupancy surveys conducted that give an idea of user views of buildings. In new schools in the UK this has informed much of the new design interventions.

Quantitatively it is also possible to enumerate community use of facilities such as joint school/local libraries, and after school classes, which can also give an indication of the success or otherwise of buildings. This is a standard for public facilities such as libraries and swimming pools. Similarly construction managers are able to calculate the average maintenance costs for various types of generic building. Schools are generic in use and do have these anticipated costs, for both building and maintenance.

In the course of the research project the investigators will have to develop an evaluation framework by which to develop a performance index by which to measure education quality in the chosen case studies, this will take into account this and other context-related factors, that are likely to be identified on site.

Conclusions
The objective of this paper was to identify literature and other research sources on school design and its effect on education quality. It has uncovered a range of different information sources. The majority, as expected, comprise of official reports on specific issues related school design, provision, or buildings. However of equal importance has been the historic overview of publications related to school design. The review of contemporary research into aspects of school design and building evaluation identified the complexity of the process, and in effect the need to infer or extrapolate relevant information to test the hypothesis, that there is a link between schools designed as part of a community infrastructure network, with multifunctional uses, being more successful than traditional schools with a mono-functional, education-only remit.

Of equal interest is the information that there is similar current research taking place in the world, and in the UK specifically; that seeks to evaluate the success of schools designed and built in the last decade. This bodes well for comparative evaluations and also for determining the choice of

research instruments that might be appropriate for use to enable the information gathered from the proposed school surveys to be conducted to have international comparators.

The broad nature of the project incorporates research from West and South Africa, the literature reviewed highlights some of the differences that each region has in its socio-historic context and in its educational past. We feel that the project will enable use find out more about these differences first-hand as the case studies will inevitably uncover further differences and identify further areas for research collaboration.

A key theme for this research project is its focus on both collaboration and the sharing of research knowledge. The timing and context of this project enables it to benefit greatly from both these objectives. We hope in the course of the project to be able to gain from work being done in the UK and Europe on similar surveys, despite the dissimilar primary context. We see however our primary role as being instigators of inter-regional research co-operation in school design in Africa, a process we hope will be the beginning of more significant collaborations in the future.

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