

BEYOND RULES OF THUMB

Kindling Environmental Design Education in East Africa

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Abstract: Acknowledging the importance and relevance of Environmental Sustainable Design (ESD) has kindled a shift in contemporary architecture education, with schools of architecture incorporate ESD as components of programmes: in specific course units; as electives; or in some cases transforming entire programmes, placing ESD at the core of architecture curricula. While this would seem to be a positive development, it is evident that this is not always matched with a change in teaching. This paper looks at the use of Rules-of-Thumb in teaching ESD in architecture education, as a possible problem or hindrance to the application of ESD principles in architectural design. The reliance on Rules-of-Thumb as the basis for teaching (and learning) ESD principles fails to recognise developments in the field and associated complexities associated with this. Going beyond the Rules-of-Thumb approach, may be key to engaging students (and faculty) in discourse on ESD as part of architecture education. It could be a basis for exploring context and engaging students in contextual design as a generator of both ideas and information. Through some examples, some of these opportunities will be explored as a way to go beyond Rules-of-Thumb, to stimulate ESD education in East Africa.

Keywords. Rule of Thumb, Architecture Education, Environmental Sustainable Design (ESD), East Africa.

1. Introduction

A *New York Times* article by Barbara Whitaker published in May 2006 stated ‘Architects are a lagging indicator for sustainable design’, suggesting that the lack of Environmental Sustainable Design (ESD) which is “the use of design principles and strategies which help reduce the ecological impact of buildings” (Fawcett, Palich & Nervegna, 2006), could in part be related to

limited, or a lack of ESD as part of architecture education. It is contended, for this paper, that Rules-of-Thumb as the basis for teaching ESD, may in part be responsible. Rules-of-Thumb, defined in the Oxford English Dictionary as, a “method or procedure derived from practice or experience, rather than theory or scientific knowledge,” may provide desirable solutions in some situations, however, they are not always effective or appropriate, given they are often derived in particular contextual settings, and largely unverified outside these socio-cultural settings. The extensive use of Rules-of-Thumb, equating then to what Kirschner and van Merriënboer (2013), would describe as “urban legends” in the context of education.

In East Africa, architecture education discourse has largely been based around making architecture students fit-for-practice, and what schools of architecture should teach to ensure graduates fit into existing practice settings. In this approach, contemporary issues, such as ESD, Design Computing, and even Contextual Relevance are often side-lined, with greater emphasis placed on the visibly and often easily transferred vocational aspects of architecture education, promoted at the expense of the ephemeral and ‘less sexy’ components of architecture education, such as the technical and professional studies. The low penetration of ESD in architecture education, as highlighted by a 2012 study by the African Association of Universities (AAU), indicated sustainability in engineering and allied professional programmes at less than 8% (Association of African Universities, 2011).

A review of exiting architecture curricula across East Africa indicated varying levels of engagement with ESD, and it is acknowledged that more needs to be done by both practice and academia to address the inherent shortcomings in mainstreaming ESD in design (Olweny, 2006, 2008). As part of these previous studies, it was also found that in many cases, use of Rules-of-Thumb formed the basis for teaching ESD and associated course content in the region, with limited engagement beyond this both within support courses, and in the quintessential component of architecture education, the design studio. While providing some useful information, —Rules-of-Thumb can at best be regarded as rudimentary, often not enabling full appreciation of some of the more intrinsic issues and problems that are presented by the various design challenges that could be possible if presented and engaged with in greater detail. The pervasiveness of Rules-of-Thumb has also led to their unquestioned use in contexts and scenarios in which they were not intended, often leading to inappropriate solutions, while also preventing engagement with more effective methods and tools.

With architecture education serving as the primary conduit for educating students in the nuances of ESD, it serves to reason that this becomes the initial point of contact to evaluate the state of architecture education with rela-

tion to ESD in the curriculum. This also acknowledges the dual mandate of architecture education: first, to educate students, and help them identify with the issues that they will be faced with in their chosen careers – the education of professionals who can engage in critical discourse related to the future of the profession in which they will be working; and second, to educate individuals in a particular discipline – architecture as a vocation. (Olweny and Olweny, 2010). Significant attention and effort has often been paid to the pragmatics of the vocational aspects of architecture, at times regarded as the *raison d'être* for architecture education. This narrow view of the role of architecture education unravels in light of global challenges related to contemporary practice challenges. What then is our responsibility as educators in this changing paradigm?

2. Making use of Rules of Thumb

Across East Africa, Rules-of-Thumb form the basis for teaching ESD to architecture students. As in other parts of the world, the requirement to provide students with vast quantities of necessary knowledge within the finite period of architecture education has, in some cases, led to a rather shallow treatment of content in order to get through the syllabus. While this approach may provide an outline of the basic requirements, and enable the achievement of somewhat appropriate solutions, their ubiquitous use may serve to hinder, rather than promote the development of reflective practice necessary for in depth engagement of subject content as part of design. This could lead to superficial application of principles that would serve to create impractical or unworkable solutions in some cases.

Investigating the use of Rules-of-Thumb in the daylighting of rooms, Nik Ibrahim, Hayman and Hyde (2009) concluded that Rules-of-Thumb do have limits to which they are applicable, often linked to particular locations or typologies. In effect, acknowledging that their wide application may not always be appropriate. This wide applicability is what Rules-of-Thumb are perceived to be, universally applicable within a diverse range of contexts and applications.

For architecture in East Africa, the application of the principles of tropical architecture, or more specifically, tropical modernism, which has, in the years since their “invention” as part of the colonial project, becomes more or less the *de facto* norm for tropical architecture design. Notable publications such as *Tropical Architecture in the Dry and Humid Zones*, by Maxwell Fry and Jane Drew (1964) and the *Manual of Tropical Housing and Building Design* by Otto Köenigsberger (1974), two significant publications on tropical architecture feature as the go-to publications for use in determining any

architecture in the region, albeit making use of only the basic elements: the Rules-of-Thumb. Notwithstanding the importance and significance of these publications, the context of these works is rarely cited, or acknowledged as part of the application of the principles, neither are the in depth examples and analysis provided over the years. The indiscriminant use of the Rules-of-Thumb derived from these, and other publications, has served to create a stereotypical approach to architecture, which in theory acknowledges the needs as presented, enabling designers to check the appropriate boxes, however, this does not necessarily mean that needs related to place or users expectations, are always met, as explored by Le Roux (2004a,b).

3. Ubiquitous Rules-of-Thumb in Architecture Education:

While courses related to ESD are on the increase, a persistent perception that architecture education generally geared to preparing graduates to participate in the production of architecture – as it exists today – effectively maintaining the ‘status quo’, could relate to the pervasiveness of Rules-of-Thumb as the basis of exploring certain aspects of architecture education. For ESD, these relate to, among many issues, teaching of natural ventilation, building location and orientation, choice of materials etc. For this paper, two frequently mis-represented elements in ESD education are highlighted, relating the solar path, and the associated shading of fenestration, and incorporation of the principles of natural ventilation.

Solar shading, an essential aspect of tropical design is based on a simple but effective premise; understand the movement of the earth around the sun, providing shading from direct sunlight to window openings in order to prevent overheating.

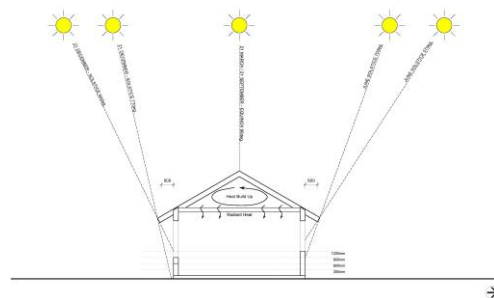


Figure 1. Variations in solar penetration

For many, the relative movement of the sun across the sky is presented as ‘passing directly overhead’ with no annual variation, and no relation to the passing of seasons. The relationship of the solar path to the need for effective shading is not fully explained, only emphasising the need for eaves as

necessary for shading. This Rule-or-Thumb approach, thus loses meaning in the simplified assumptions related to building orientation – buildings should generally have the long axis facing north-south and have the majority of windows (or openings) in these facades, which are generally easier to shade, than East and West facing windows. Inevitably, the eaves overhang, often prescribed as being 600mm is inadequate to shade all windows adequately, not only relative to the Equator, but in other areas to the north and south, where the presumption is that the Rule-of-Thumb is still applicable and therefore diligently applied, with anecdotal evidence suggesting that any attempt to break from the prescriptive solutions coming under intense scrutiny. The application of these principles to multi-storey buildings, for which it is commonplace to find eave overhangs at the top level fenestration, but no shading for lower level openings, and at times are also applied to East and West facing windows, naturally, with limited impact, highlighting how problematic the Rules-of-Thumb approach could be, more so as Rules-of-Thumb are often presented as prescriptive solutions.

A recent example that showcases the rule-of-thumb application of cross-ventilation principles to simple, low-cost housing typologies, saw a solution placing window opening on diagonally opposite walls. This placement however did not take into consideration a pertinent element in the design of spaces, the actual use of the room. As a bedroom the position of the bed is particularly important, and with the two full size windows, placing a bed in the space is difficult, given most people are not comfortable with the head of the bed directly beneath a low level window sill. While the application of the principle of ventilation was achieved, the practicality of the solution is clearly undesirable.



Figure 2. Application of rules of thumb for cross ventilation to building

The perseverance of Rules-of-Thumb, although well meaning, it appears are at odds with the nature of education in East Africa, whereby presentation of information can quickly be construed as fact, therefore not questioned or challenged, and thus, perpetuated. This has its basis in the approach to edu-

cation, which has largely perceived to be "... the transmission of packaged, or pre-digested, information - education as instruction administered to the 'ignorant' by experts ..." (Mills and Lipman, 1994). In the context of East Africa, this approach is mockingly referred to as making use of '*Yellow notes*' where lecture notes "... became yellow and dirty after many years of use ..." (Amutambi, 2012), and often outdated, adding to their ineffectiveness. To add to the problem, support for studio instructors seeking to provide an alternative approach Rules-or-Thumb is often lacking, scuttling such efforts, as was expressed by one instructor with regard to teaching ESD to upper level architecture students: "ZERO! Ok, Zero in the sense that, even when I want, ok, even when the students what, sometimes the academic, fellow academic staff can be the obstacle, ok. So in this case, well [...] these people are not interested in sustainable building design!"

While there are efforts to engage with ESD within architecture programmes, the use of Rules-of-Thumb may be a significant hindrance to the uptake and effective implementation of the espoused principles. This is further exacerbated by a separation of the design studio (the main-stay of the architecture curriculum and where students express their creative abilities), from support courses, perpetuating the notion in depth exploration of ESD principles as part of design is unnecessary, a consequence of instructors not having been exposed to these as part of their own education. Further, the lack of academics with backgrounds in ESD and who can adequately address these issues as part of design is lacking. This no doubt makes the application of an interactive approach as is possible with newer tools difficult.

4. Discussion and Conclusions:

As a key objective of architectural education to educate professionals capable of creating meaningful environments (Salama, 2002), a concerted effort in the teaching of ESD is necessary to ensure this objective can be realised. Going beyond just the use of Rules-of-Thumb is a significant and important step, but will require a monumental shift in the approach to teaching and learning, seeking to make greater use of evidence based models as the basis of engaging with ESD and other contemporary issues in architecture education.

Key to any strategy to incorporate ESD and EE into curricula is to acknowledge the limitations (perceived or otherwise) of existing approaches. First, we recognise that many faculty do not have the required experience and expertise to engage with ESD and EE as part of design, let alone be able to integrate it as part of an architecture curriculum; Second, the lack of contextual information and good local examples are a significant shortcoming in

the implementation of ESD (although this perceived lack of information itself could be a catalyst to transcend the generic Rules-of-Thumb approach); Finally, on the side of the students (and some faculty), is the perception that a single correct solution exists, as is promoted at lower levels of formal education. This one-size-fits-all approach negates a key concern for architects, who can act as "... moral citizens ... engaging in an open process of negotiation, criticism and debate ..." (Guy and Farmer, 2001: p.147).

To engage students at the level proposed by Guy and Farmer, key transformations to the perception of (university) education as a place to learn all there is to know about a subject (profession), with students expecting to be 'spoon-fed' all the indisputable facts and rhetoric that is 'architecture' in order to make them 'experts' in their chosen field. In effect, going beyond the perception that education is the '*studying about*' rather than '*participating in*' the profession. Nevertheless, how do we get beyond the inherent cultural idiosyncrasies that are intrinsically linked to this inherent approach to education? These questions and other form part of an ongoing investigation seeking to uncover the basis for more effective teaching and learning of ESD principles within the context of East Africa. As a next step, exploration of student output and their appreciation of these Rules-of-Thumb with specific feedback on how these are perceived and applied will be explored, and evaluated.

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