Title: Rebuilding in Ranongga: Reflecting on practice based research

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Abstract:
Two hundred million people are displaced annually due to natural disasters with a further one billion living in inadequate conditions in urban areas. Architects have a responsibility to respond to this statistic as the effects of natural and social disasters become more visibly catastrophic when paired with population rise. The research discussed in this paper initially questions and considers how digital tools can be employed to enhance rebuilding processes, but still achieve sensitive, culturally appropriate and accepted built solutions. Secondly the paper reflects on the impact ‘real-world’ projects have on architectural education.

Research aspirations encouraged an atypical ‘research by design’ methodology involving a focused case study in the recently devastated village Keigold, Ranongga, Solomon Islands. Through this qualitative approach specific place data and the accounts of those affected were documented through naturalistic and archival methods of observation and participation. Findings reveal a number of unanticipated results which would have been otherwise undetected if field research within the design and rebuilding process was not undertaken, reflecting the importance of place specific research in the design process. Ultimately, the study proves that it is critical for issues of disaster to be addressed on a local rather than global scale; decisions cannot be speculative, or solved at a distance, but require intensive collaborative work with communities to achieve optimum solutions. Architectural education and design studios would continue to benefit from focused community engagement and field research within the design process.
Keywords: Architectural Education, Design Studio, Digital tools, Post-disaster reconstruction, Solomon Islands

Introduction:
Natural and social disasters are becoming increasingly frequent and their effects more physically catastrophic. Research indicates that in the future this will continue to worsen, contributing to the global housing crisis and number of displaced persons. Architecture encompasses the act of providing shelter, one of the three basic requirements of survival. There is a great responsibility for architects to respond to this situation as disasters become increasingly frequent and population rise. Arayedh identifies a key concern; ‘architects are encumbered by the need to be original,’ this desire generally results in responses overlooking basic yet highly significant cultural considerations. Therefore, it is critical to examine the issues revolving around the responsibility of architects, their response to disasters and the needs of different cultures and communities as part of the design process from the early stages of architectural training within academic environments and beyond.

The research discussed in this paper initially questions and considers how digital tools can be employed to enhance rebuilding processes, but still achieve sensitive, culturally appropriate and accepted built solutions. Secondly the paper reflects on the impact ‘real-world’ projects have on architectural education by discussing Hannah’s research over a year long thesis unit and its effect on her design research and her practice as an architect. This case study explores the impact of onsite research and how engaging with ‘real world’ issues and communities allows students to understand fundamental design issues
in a deeper way, emphasising the importance of such learning activities to architectural education.iii

Background Context:
A review of literature pertaining to post-disaster reconstruction identifies a number of emergent issues surrounding the need for humanity and permanence in current rebuilding processes, with many occupants rejecting the infrastructure often provided.iv This rejection has the potential to trigger issues of social dysfunction, undervalued land and damaged socio-cultural networks, which can be directly attributed to architectural disaster responses.iv As interpreted and extracted from the current literature, common causes for rejection include:

- limited opportunities for customisation and individualism;
- restricted public engagement and social participation;
- unawareness of socio-cultural issues or ‘culturally alien architecture’;
- inappropriate material use;
- modest incremental housing models; and
- public rejection of radical ideasv

Further, Johnson argues that current approaches are overly expensive, implemented too late, too long lasting and attribute to a number of undesirable impacts on the urban environment as a result of their temporary nature.iv Responses are generally characterised by standardized one-size fits all prototypes which are often expensive in terms of materials, difficult to replicate and nonresponsive to place. It is through the lived
experiences and memories applied to a space by individuals or groups that a space becomes a place.\textsuperscript{vi} The understanding and creation of place is an important aspect of architectural and urban design\textsuperscript{vii} \textsuperscript{viii} and therefore needs to be considered when responding to post-disaster reconstruction.\textsuperscript{ix}

Digital tools are increasingly being used in the fabrication of architecture to test formal and aesthetic limits. However their presence in the field of humanitarian design is narrow and experimental. Literature challenges current approaches and questions whether form driven design is ethical, arguing that it’s undermining its powerful capabilities of generative modelling.\textsuperscript{x} The new mathematical and parametric capabilities of digital software provide the potential for current practices to shift from mass production to mass customisation. Sass defines digital design as ‘a self-contained way of designing within a computational environment through the employment of digital tools and technologies’.\textsuperscript{xi} More specifically, digital tools encompass any computational methods or means that may be employed in the design process from inception to post-evaluation that contribute and aid in the optimisation and efficiency of the architecture. Common digital software employed in architectural practice may include, but are not limited to: Building Information Modelling (BIM), Parametric Modelling, Genetic Algorithm (GA) and Project Quality Management software. This research focused on questioning the role and appropriateness of digital tools and technologies in the context of remote post-disaster regions, specifically in Keigold village, Ranongga, Solomon Islands.

\textit{Field Research – Ranongga, Solomon Islands:}
Ranongga is a 28 kilometre long, narrow island situated amongst the New Georgia Islands group of Western Province, Solomon Islands (Figure 1). In April 2007, Ranongga experienced devastation as a result of an earthquake and tsunami. Permanent rebuilding efforts were delayed with communities occupying the poor conditions of temporary UNHCR tents for a number of years following the disaster (Figure 2 and 3). Emergency Architects Australia (EAA) coordinated the rebuilding process through visiting and engaging the community of Ranongga and have established a number of ongoing projects to address community resilience (Figure 4). Between the 11th and 22nd of July 2011 Hannah participated in an EAA organised reconstruction project of latrine shelters for the disaster victims.
Figure 1. Ranongga Island location

Figure 2. Keigold village disaster effects
Methodology:

Qualitative methodologies involved two weeks of intensive fieldwork within the community of Keigold, Ranongga, and required participation in manual latrine construction (Figure 5), including:

1. Digging and preparation of the latrine pit
2. Sourcing and retrieval of building materials including timber, stone and sand
3. Mixing, pouring and curing of concrete for the latrine slab and footings
4. Assembly of timber structure
5. Cutting and fixing cladding and roof sheeting
6. Leveling of earthworks and improvement of site drainage
The aid work was completed within a multidisciplinary team of 12. Personal experience was recorded through the use of visual diaries, written journals and photo documentation. Volunteers worked in pairs, within the larger team, to build one latrine shelter for an allocated family. The purpose of the visit was to determine the effectiveness of existing processes of construction and speculate on the potential use of digital tools.

![Completed latrine project](image)

**Figure 5. Completed latrine project**

*Post-Field Research:*

A series of qualitative interviews with EAA volunteers, Architects, and Design professionals were conducted to question the role and appropriateness of digital tools and technologies in the reconstruction of post-disaster regions. The questions were structured to ascertain:

- whether there is a place for high-tech digital tools in remote disaster regions;
- what drives the appropriateness of digital tools, and;
- speculation and identification of specific appropriate digital tools.

Responses were analysed using a thematic approach identifying categories, themes and
patterns. The data from the multidisciplinary groups allowed a relevant reflection to be obtained pertaining to the immediate local experience at Ranongga, as well as projecting the discussion onto a global scale.

Findings:

Observations proved traditional construction methods employed were highly appropriate and successful in terms of place and culture, contributing to building community resilience through:

- collaborative community driven processes;
- sustainable material selection and sourcing; and
- sensitivity to vernacular through the employment and integration of local skill and craftsmanship (Figure 6, 7 and 8)
Observational field studies revealed the current success of manual rebuilding techniques highlighting the critical need for architects to engage in community and cultural living practices before constructing their understanding of place, to avoid imposing external misinformed values on a community. Field research exemplified the importance of the community in providing expertise and driving the design process. It became increasingly obvious that it is inappropriate to push a design agenda based on technology, economics or materials; rather there needs to be conscious consideration and incorporation of the cultural situation of that place. Drawing from lessons learnt in the field, there emerged a number of identifiable areas where digital tools such as; Personal Digital Assistant systems (i.e. palm pilots and tablets), optimisation and generative software (i.e.
Grasshopper and Rhinoceros), quality management systems and 3D visualisation software (i.e. Revit, ArchiCAD, 3D Studio Max) may be employed to improve current processes, specifically in their contribution towards; local training and education, communication, visualisation, optimisation and assessment.

Post Field Research: Determining the Role of Digital Tools

The access to and use of digital tools in alternate capacities was encouraged and described by interviewees as absolutely critical. Findings exposed the potential use of digital tools in two primary capacities; primarily as 3D modelling software and secondarily as digital communication devices. Participants suggested in locations as remote as the Solomon Islands, it is important to emphasise the building capacity of local people: ‘Whilst potential tools may be limited there remains a lot of scope for them’ [WY]. There was a common concern that the success of the tools and their input, relies on their ability to be simple and sophisticated for unskilled communities to use; ‘there is a lot of value in putting professional knowledge in the hands of semi-professional people however this relies on the simplicity, accessibility and practicality of the tool’ [DK].

Research participants identified and discussed a number of potential ways digital tools may be employed in such situations to facilitate aid assistance, these can be best categorised through five key themes:

- Digital tools in local training and education
- Digital tools in communication and visualisation
- Digital tools and parametric design for optimisation and efficiency
- Digital tools and evaluation
• Synthesising digital tools and local vernacular processes

However, as the study proves, it becomes particularly difficult to speculate where and to what extent digital tools would be appropriate due to distinctly different characteristics of place: ‘ultimately, architecture does have a role to play… where it is far more easily facilitated, digital processes are invaluable’ [PG].

Discussion:

*Hannah’s (The Students’ & Architects’) Reflections*

The Solomon Islands field research immensely affected my design approach. I went on the trip with a very clear research agenda, having formulated a number of expected research outcomes. The hypothesis and preconceptions vastly shifted as a result of observations gathered in the field and subsequently upon return, the original intent of the research required reconsideration based on the learnings that emerged. The field trip exemplified the importance of the community in providing expertise and driving the design process.

As a student the intensive hands on experience allowed an understanding of building processes, materials and sustainable practices, particularly the optimisation of resources and minimisation of material waste. This understanding involved developing an awareness of a materials lifecycle, particularly the labor and processes involved prior to materials arriving on site. Additionally, the fieldwork heightened my personal value of multidisciplinary teamwork and the importance of engaging and communicating with other experts to achieve the best design outcomes. Ultimately, the field experience broadened my understanding of the scope of architecture and the enormous contribution
that can be made in facilitating skilling and empowerment of communities through the
transfer of knowledge.

The learnings acquired as a student have translated to my current approach as a registered
architect. The research has challenged me to reflect and reconsider the current role and
dependence on digital tools in design processes and architectural practices, with their role
being reinterpreted as variable depending on the project. Additionally, the fieldwork
undoubtedly contributed to my construction knowledge. The ability to attain hands-on
experience is invaluable in the learning process, I identify the importance of being
involved in site visits as a significant contributor to early professional development.
A greater appreciation for the role of the client in the design process and the importance
of being able to communicate, gather and interpret their knowledge and requirements has
developed. This learning has contributed to increased skills and involvement in
community engagement, communication and work shopping, critical in acquiring
accurate preliminary briefing information. I maintain an ongoing interest and recognise
the role and responsibility of architects in raising awareness, funds and contributing to
more appropriate emergency design responses.

Recommendations for Architectural Education:

The research was conducted during the postgraduate course, Masters in Architecture, and
contributed to the development of specialised research knowledge. The trip was self-
funded, there was difficulty in attaining financial support for the research either internally
or externally to the university. Lack of funding limits research quality and possibilities.
As a result, ambitions are often compromised, with research either abandoned or
conducted in isolation to context. This model disadvantages both students and universities who are commonly striving for high quality educational and innovative research outcomes. The shifting nature of architecture drives the need for the development of a more appropriate research model to be adopted within architectural education. This may be addressed through resolving the synthesis between studio, research and practice, as detailed in these key recommendations:

- Strengthening and encouraging practice-based learning, through engaging practices and developing meaningful associations, allowing students to learn in a real world environment on real world projects;
- Through financial incentives and university funding at a course Masters level which encourages students to test diverse research agendas and ensures innovation and advancement;
- Encouragement of multidisciplinary research through collaboration with other schools within built environment and creative faculties that would simulate real world scenarios;
- Through study tours integrated in unit curriculum which would encourage students to learn together through the experience of different places and cultures; and
- Through the integration of projects which employ hands-on processes and require students to deliver built project outcomes.
Through this experience I have become increasingly aware that the shifting practice of architecture requires more diverse research opportunities and support through institutions to ensure the maintenance of high quality outputs. I identify the advantages of practice based research and the importance for issues of disaster to be addressed on a local rather than global scale. Decisions cannot be speculative, but rather require intensive collaborative work with communities to achieve optimum solutions. Sinclair’s work aligns with this aspiration; ‘All problems are local, all solutions are local’. xiii

_The Supervisor’s Reflections:_

Travelling to the Solomon Islands and participating in an Emergency Architects reconstruction project for the purpose of this research was not part of the formal curriculum of the unit. Hannah decided to extend her research past the classroom in search of a hands-on experience. The benefits of supporting and potentially providing informal learning experiences based on ‘real world’ situations such as this one, are continually being proven to be of increasing benefit to architectural education, ‘real world’ contexts provides an intense relationship between designing and building. xiv The integration of theory and practice, required for complex problem solving in real world settings, challenges the design studio and introduces a density of imaginative responses through collaboration and experimentation. xv Not only do community-based projects allow students to understand social issues, they develop a sense of civic responsibility and ethical practice. xvii

Hannah’s initial research question was broad and ambiguous. Her intention to explore the creation of culture through digital tools in post disaster reconstruction was worth
pursuing as it identified an area of investigation that could be developed further. The importance of place to her research only became evident once she had travelled to the Solomon Islands. Had she not done so, her research would not have gone past the speculative direction it was heading. As her supervisor this was a difficult situation to be in as I could not force or expect any student to step outside the classroom in such a manner. As Hannah immersed herself into the living practices of Rannonga and reflected on it through her journaling and photographic records she understood the intricacies and needs of the community at a much deeper level. She quickly realised that digital tools were not appropriate in the context of Rannonga. Although this may have been disheartening for the purpose of her initial inquiry, she was able to dive deeper into the research and identify additional questions that deserved attention.

Conclusion:

The unexpected findings that emerged through Hannah’s research journey engage with the notion that, ‘Architecture is a process of giving form and pattern to the social life of a community . . . [it] is not an individual act performed by an artist-architect charged with his emotions’\textsuperscript{xviii} whereby the success of the architecture is driven by community input. We can conclude that onsite research provides experiences that cannot be reproduced in the formal settings of university classrooms or studios and therefore needs to be supported, both financially and in kind, by academic institutions and practices. Understanding the needs of a community and place are fundamental to the design process, particularly in post-disaster reconstruction. Current architectural studio models would continue to benefit from ‘real world’ community-based projects in combining
theory with practice. Design is a form of research, the nexus of teaching and research remains within the scaffolding of the design process and practice.
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