Institution: Robert Gordon University

Unit of Assessment: 16 Architecture, Built Environment and Planning

Title of case study: Design evaluation and visualisation

1. Summary of the impact (indicative maximum 100 words)

The research has led to participation in, and leadership of, high level groups at both national and European levels, and has had an impact on local engagement in planning and urban design, and led to support for sustainable design principles.

The research has concentrated on the **inclusion** of **wider groups** within urban and architectural design, and this has helped to encourage **engagement** in the provision of greenspace and sustainable urban transport. This is manifest through significant sustainable projects, including hydrogen and electric vehicles, and through engagement with the wider community, including children.

2. Underpinning research (indicative maximum 500 words)

Key research undertaken within the case study theme over the past fifteen years includes Streetscapes (99-01 Scottish Enterprise); Greenspace (2001-4 EC FP5); Aberdeen Architectural Audits (2006-10 ACHT and Historic Scotland) Understanding future environments (2005-7ESRC); and, CARE North (2009-12 ERDF Interreg). We have also been engaged with a wider range of North Sea Region projects, including undertaking focussed consultancy work within Build with CARE. Through the completion of this research, a series of applied methodologies have been developed which assist and facilitate a process of user engagement in design, and visualisation within architecture (Mahdjoubi *et al* 2013).

The earliest work referenced in this case study was jointly instigated by RGU and Scottish Enterprise (1999-2001), and concerned the use of combined visualisation and environmental economics in the consideration of streetscape redevelopment. The Streetscapes project aimed to develop a method whereby public participation in the design of streetscapes could be realised in an interactive and ultimately positive manner. This was achieved through the application of non-market valuation techniques (i.e. choice experiments) and computer generated images. Streetscapes present a complex and dynamic setting for urban life, and that complexity was reflected in the project methodology. The results from the study indicate that image based choice experiments do generate valid, useful results.

It was anticipated that the resulting methods would be of use to planners, designers and developers. The intention was to encourage creativity, stimulate discussion, refine ideas and ultimately produce designs which optimise the needs of all parties involved (Laing *et* al 2007, Conniff *et al* 2010).

Many European towns and cities possess attractive parks and recreational areas. The Greenspace project (FP7 2001-04) developed methodologies that identified the types and variety of open and green space that best satisfy peoples needs (Laing *et al* 2006 and 2009). Using case studies, it demonstrated how public participation can be brought into the strategic planning of greenspace on a continuing basis. The research assessed how strategic planning can maximise the contribution that different types of open and greenspace make to quality of life. By combining a planning, ecological and socio-economic assessment, the project categorised the existing provision of greenspace in sample cities. It describes how greenspace is used, and evaluated the extent to which existing greenspace meets social needs. The research also led to the involvement of RGU in the revision of planning policy guidance in Scotland regarding public open space.

Work undertaken though CARE North (and currently being extended through CARE North+, 2009-2013, ongoing) engaged with a consortium of six Municipal Authority partners from across the North Sea region, to help design, develop and evaluate approaches to low carbon urban transport.

The research group has been actively engaged also in the inclusion of wider groups within urban design, including school children (Zaman and Thaddeus 2013). Research methods and principles

central to our work in participatory design were applied within an inclusive study of school re-design, which engaged with children at primary and secondary levels.

Researchers associated with outputs (dates employed by RGU): Richard Laing (1997-present), Anna Conniff (2005-10), Tony Craig (2000-07), Carlos Galan Diaz (2009), Anne-Marie Davies (1999-2003), Stephen Scott (2001-08), Quazi Zaman (2008-present).

3. References to the research (indicative maximum of six references)

Reference through outputs (RGU staff in bold)

Mahdjoubi, L., Moobela, C. and R. **Laing** (2013) Providing real-estate services through the integration of 3D laser scanning and building information modelling, *Computers in Industry*, available online 25.10.13, http://dx.doi.org/10.1016/j.compind.2013.09.003.

Conniff, A., **Craig**, T., **Laing**, R. and **Galan-Diaz**, C. (2010) A comparison of active navigation and passive observation of desktop models of future built environments, *Design Studies* doi:10.1016/j.destud.2010.04.003

Laing, R, **Davies**, A-M, Miller, D, **Conniff**, A, **Scott**, S and J. Morrice (2009) The application of visual environmental economics in the study of public preference and urban greenspace, *Environment and Planning B*, **36**(May) doi:10.1068/b33140.

Laing, R., **Conniff**, A., **Craig**, T., **Galan-Diaz**, C. and S. **Scott** (2007) Design and use of a virtual heritage model to enable a comparison of active navigation of buildings and spaces with passive observation, *Automation in Construction*, **16**(6), 830-841. **doi:10.1016/j.autcon.2007.02.006**.

Laing, R, Miller, D, **Davies**, A-M. and S. **Scott** (2006) Urban Greenspace: the incorporation of environmental values in a decision support system, *IT in Construction*, **11**, 177-196.

Zaman, Q and F. Thaddeus (2013) Greening campus: a collaborative design with children. www.core77designawards.com/2013/recipients/greening-campus-collaborative-design-children/

Reference through grant awards

INTERREG IVB NWE, **CARE North**: Carbon responsible transport strategies for the North Sea Area, €4.8M total (**€453K** RGU component), 2009-2012. Co-PIs (RGU) Richard Laing and David Gray, Lead partners (Overall) City of Bremen.

Aberdeen City Council, **Urban Connections**: a study of public responses to urban redevelopment proposals in Aberdeen's urban realm, **£78000**, Completed May 2006. PI: Richard Laing

ESRC, **Understanding future environments**: active exploration versus passive observation, **£46000**, Completed October 2006. PI: Anna Conniff (RGU)

EC 5th Framework, **Greenspace**, total budget €1.4M, RGU grant **€250,000**, completed 2004. The RGU contribution was to lead work regarding the development of survey work across the consortium, and to develop and implement visualisation and contingent rating studies. PI (RGU) Richard Laing, Lead partner (overall) UCD Dublin.

4. Details of the impact (indicative maximum 750 words)

Process

The research has been undertaken with a philosophy that embraces a need to involve a wide constituency within the work. Key findings have had an impact on the study of IT within the visualization of design detail, environmental performance, and the application of innovative methods within urban design.

Beneficiaries

Beneficiaries of the research include partners whose engagement with our research has centred on the development of new policy, or the instigation of debate, or has focussed on undertaking studies related specifically to skills, expertise or methods available through RGU. Examples include Aberdeen City Council, who have been a close research partner throughout the REF period. Our work has enabled the development of **policy** (through the sustainable urban mobility

plan and transport masterplan) and through engagement with academic-led or –steered **debate** (including that within CARE North and Build with CaRe, where initiatives and aspirations of the authority were placed in a wider context). Our work with Robert Gordon's College allowed pupils and staff to engage in a participatory design process, which had **practical** (design of a green campus) and **educational** (engagement with University staff and students) benefits. Such positive outcomes for beneficiaries served to validate the approach to impact, and indicate a suitable route to impact for future research.

Reach: Work from the theme has been disseminated through high profile public lectures and events (2010 built heritage lecture series @ RGU, 2012 Professorial address by Laing; 2013 North Sea Commission Conference, Porsgrunn), and has been developed in partnership with industry partners (Innovation Vouchers 2008-2010) including the Scottish Government (via NB Planning and Architecture), and, Down to Earth Self-Build Housing.

Our research with Interreg (CARE North 2009-present, Build with CaRe baseline study 2009) has involved working with industry and public partners, including Municipal Authorities in Germany, the Netherlands, Sweden, Belgium, England and Scotland, to develop sustainable strategies towards low carbon urban environments. This process has led to the development of an innovative series of outputs, including those for both academic (conference) and industrial (films, fact sheets, public events) audiences. Recently, our work with Robert Gordon's College (a private school, without affiliation to RGU) during 2012-13 involved all pupils from the ages of 5-18 in a participatory design exercise. Apart from the immediate benefits to be derived from design outputs themselves, there are clear benefits to the participants in that they were enabled to participate in a large scale design process. Corresponding benefits to RGU were clear in that the challenging delivery of a high quality design experience resulted in a deeply satisfying (and award winning) research project.

Members of the group have organised and chaired high profile professional and academic conferences (*Bennadji, Laing*) throughout the submission period (ASCAAD 2010, IV/BuiltVis 2007-present), and have been active in the delivery of invited lectures across Europe. The group has represented the RICS on the European Construction Technology Platform since 2008 (*Laing*). Research from the architectural audits has been disseminated through exhibition and conference (*Scott 2006-10*).

Significance: Almost all of the group activity has been undertaken in partnership with colleagues from industry or the public sector, and has had a direct feed into policy and practice (e.g. Greenspace *EU* and *Scottish Government*, Streetscapes *Scottish Enterprise*, Urban Connections *Aberdeen City*).

Work from the group has appeared in leading international academic journals, within which work of significance and key to debate within the discipline is published. The work carries significance in terms of methodological innovation (*environmental monitoring, visualisation*) and in relation to online user participation (from *Streetscapes*, onwards).

Nature of the impact

RGU was a key partner in 'CARE North' (Interreg IVB), which aimed to promote the use of sustainable urban transport as a key component within urban design in the North Sea Region. Aberdeen City Council (ACC) commented that our role in this (and the associated Build with CARE project) provided visible improvements in City Mobility and Building Policy in the City- The City Car Club and renewable boiler at Marischal House (ACC headquarters) being tangible benefits and legacies from those projects, along with the renewable hydrogen buses which will be on the Aberdeen Streets by 2013/14. In early 2013, ACC was awarded the European Sustainable Transport Mobility Award in recognition of masterplanning which emerged from CARE North, and from processes involving RGU as a core partner.

- Engagement in smart cities stakeholder platform (link provided in section 5).
- Recognition through European sustainable mobility awards, with ACC.
- Instigation of new projects (i.e. low carbon transport, build with care)
- Robert Gordons College participatory design.

Evidence and indicators

- Participation in the smart cities stakeholder platform (including an RGU proposal highlighted from over 120 received)
- Robert Gordon's College project (public engagement, including children)
- Aberdeen City Council (2013) award winning sustainable urban mobility plan (including introduction of electric car club, hydrogen buses, and receipt of EU award). Co-hosting of major CARE North event, with elected members and members of the public (2010)
- Completion of participatory design (Core 77 design award 2013)

Dates when the impact occurred

- Heritage and professorial lectures (2010 and 2012)
- CARE North (2009-2013, development of sustainable urban mobility plan 2012)
- Build with CaRe (consultancy, seminar and baseline study 2009-2010)
- North Sea Commission (presentation and debate, Porsgrunn, 2013)
- Robert Gordon's College 'Greening the Campus' (2012-13)

5. Sources to corroborate the impact (indicative maximum of 10 references)

Publications

CARE North contribution to Rio+20
http://www.iclei-europe.org/topics/mobility/
http://www.iclei-europe.org/fileadmin/templates/iclei-europe/files/content/ICLEI_IS/Topics_pages/CARE-North_input_to_Rio_20_Final.pdf

CORE 77 award (http://www.core77designawards.com/2013/recipients/greening-campus-collaborative-design-children/)

Aberdeen City – Sustainable Urban Mobility Plan (http://www.aberdeencity.gov.uk/SUMP/), with RGU a member of the Project Team

Engagement in Smart Cities stakeholder platform (http://www.eu-smartcities.eu/content/smart-cities-stakeholder-platform-growing) including a link to proposal.

Contacts

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Senior Planner and Sustainable Urban Mobility Plan lead, Aberdeen City Council (CARE North)