

For Norman and Verganti (2012), design research can bring about radical innovation if it can address the fundamental questions of new meanings and interpretations in technology. This article has argued that the role of the researcher-designer is to facilitate processes of change towards radical socio-technological innovation. In that role, it must be acknowledged that radical change in under-served contexts may happen at a much slower pace than expected or hoped (Hussain, Sanders & Steinert, 2012). A slow design process is nevertheless desirable in the sense that there is more time for reflexive community deliberations. Figure 6.2 illustrates how a dynamic community of practise can engage in a reflexive, transdisciplinary process of socio-technological innovation, by turning opportunities (option spaces) into tangible but flexible solutions (probes).

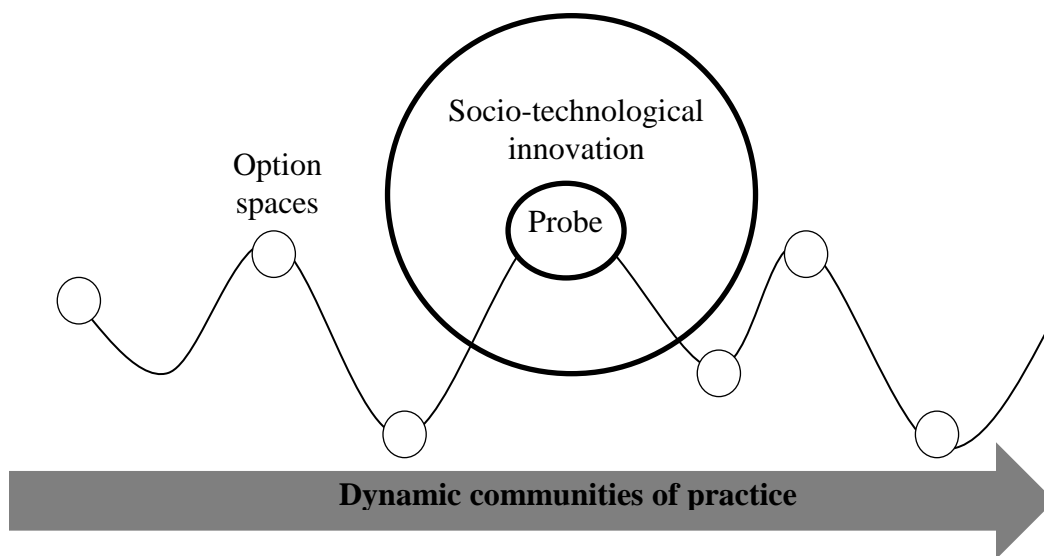


Figure 6.2 Conceptual model for design facilitation in under-served contexts

Ultimately, researcher-designers should adopt a broadened view of the design process and pay attention to design aspects such as the three Ps of: the design object (product), the designers and design users (people), the design (process). The interplay between these different components requires facilitation in order to enhance participation. Further, the design context (place) should be taken into account (Figure 6.3). In the Enkanini case, the product was the sanitation system; the people were the researchers, engineer and Enkanini residents; the process was the intervention; the place was the informal settlement and participation was the interplay between all these components.

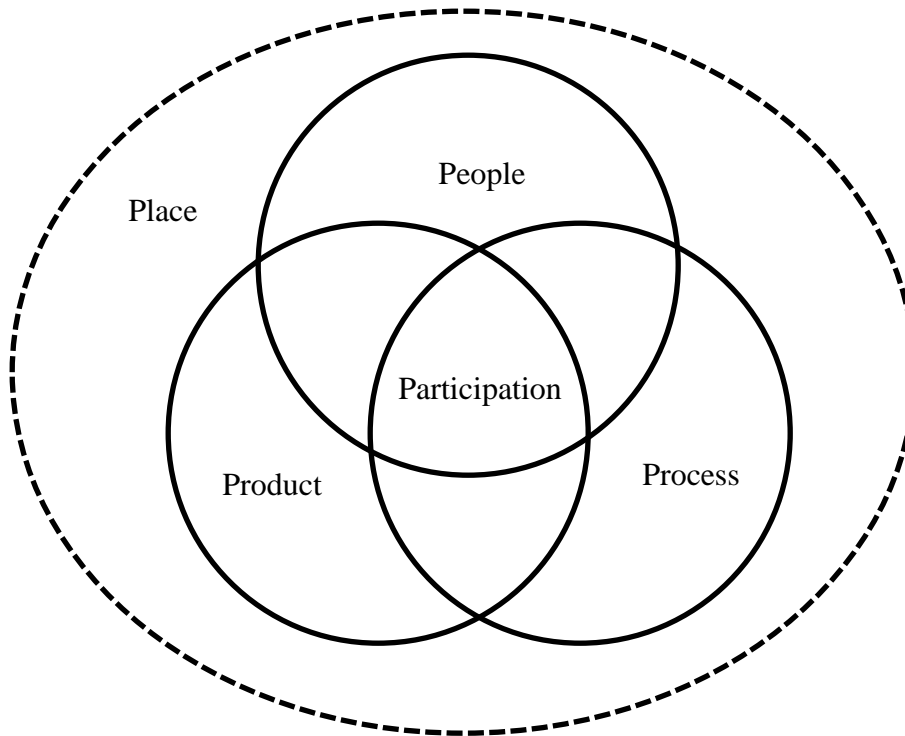


Figure 6.3 Considerations for design ethnography in informal contexts

6.3.4 Transformative Urbanism in Sub-Saharan Africa

To realise long-term transformative change, it is necessary to propose comprehensive approaches for improving urban areas in Sub-Saharan Africa. In the proposed approach of this dissertation (Figure 6.4), the first sphere is that of incubation where local and expert knowledge can be supported and integrated through research and innovation. Here, inclusive and disruptive technologies can be prototyped as alternatives to meet the unique needs of informal settlement dwellers. The idea is to promote hybridisation, so that different types of technological configurations, social arrangements and financial models can be considered. The second sphere is that of socialisation, where actors can build capacity and empower marginalised users to have a say in the improvement of their own environment. Such empowerment needs to go beyond sanitation provision for example, so as to tackle other challenging issues such as tenure, employment, among other social issues. The technical and managerial capacity of local operators is also considered in this sphere, so that they are built into the system from the outset to ensure sustainability beyond implementation. At the macro-level, national governments have to support these two spheres by enacting enabling programmes, policies and

coordination activities to guarantee sustainability, fairness and equity. Local governments can then oversee the enactment of policy and programmes at the local level.

The interrelationships between these three spheres can be complex and problematic and so they need to be facilitated. Such facilitation roles can be taken on by ‘social intermediaries’ who have to forge connections amidst difficult circumstances (Nitti & Dahiya, 2004). The three spheres can also be conceptualised as related sub-systems, in which change needs to occur simultaneously and on a sufficient scale, if the change is to be transformative.

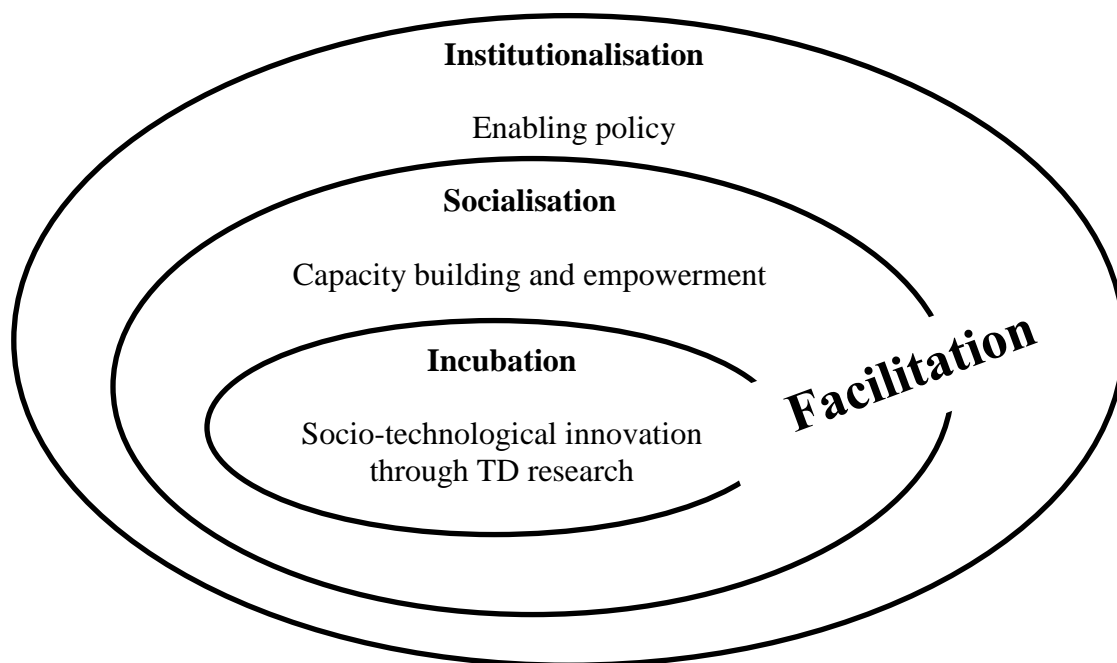


Figure 6.4 Conceptual model for transformative urbanism in Sub-Saharan Africa

6.4 Practical and Theoretical contribution

The TD approach of this dissertation was geared towards the production of three types of knowledge, (Gaziulusoy & Boyle, 2013; Pohl, 2011) namely:

- i) *Systems Knowledge* of the current status of the social problem under investigation i.e. the state of informal urban sanitation in South Africa
- ii) *Target Knowledge* of the desired status of the system that is to be attained i.e. alternative technologies and service co-production with informal settlement dwellers

- iii) *Transformation knowledge* about the means to change the social issue or problem i.e. Knowledge co-production for improving informal urban sanitation.

More specifically, the first article provided systems knowledge by giving an overview of the current status of informal urban sanitation in the three case studies. The emergent interfaces of the socio-technological reciprocity model are useful for the practical planning of informal urban sanitation exercises. The way forward for informal urban sanitation in the conclusion of the article provides target knowledge of the desired status for sanitation provision in South Africa.

The second article provided systems knowledge about the current status of TD practice using the experiences from the Enkanini case. The emerging themes of knowledge co-production from the Enkanini TD experience offer practical lessons for other TD researchers while also advancing TD research as a methodology for investigating complex problems. It therefore provides target knowledge for TD research methodology.

The third article provided target and transformation knowledge by proposing design ethnography as a facilitatory approach that can improve TD research in informal urban contexts. This is a significant theoretical contribution for mainstream professional design practice, which has so far failed to adequately meet the needs of under-served consumers such as informal settlement dwellers.

Further, the different types of knowledge produced in the articles have been extended in this chapter by proposing conceptual models of knowledge co-production. Those conceptual models provide target and transformation knowledge as follows:

- The framework of informal urban sanitation articulates the components (actors, services, software, and hardware) and levels (micro, meso and macro) of providing informal urban sanitation. These components and levels extend beyond the informal settlement to suggest a comprehensive framework for planning sanitation systems in informal urban areas.
- The proposed TD methods build on TD methodology by providing specific methods that can be applied in the field. These methods can also be used as analytical lenses to systematise TD research results.

- The proposed conceptual model for design facilitation in informal contexts has theoretical implications for design pedagogy and theory. In design pedagogy, this conceptual model can be useful, especially in Sub-Saharan Africa, where design students and researchers use mainstream methods that are incongruent to the continent's urban reality. In theory, the model can be applicable to other under-served design contexts that are not necessarily informal settlements.
- The considerations of design ethnography articulated as the five 'Ps' of people, product, process, participation, and place can inform and enhance the toolbox for designer ethnographers working in informal contexts.
- The proposed system for transformative urbanism has three spheres of incubation, socialisation and institutionalisation, which can be applied to comprehensive approaches of transformative innovation and change in Sub-Saharan Africa.

6.5 Further Recommendations for Future Research

The inadequacies of the TD approach need to be researched further so that a more coherent methodology is developed in line with the need for transformative social change. One way to do this is to explore the divergence and convergence between TD research and other social research paradigms such as transformative social innovation, critical theory or Sen's capability approach. TD researchers may also do well to borrow methods from established disciplines such as sociology, anthropology and linguistics, which are disciplines with a long history of studying societies and human interaction. The interdisciplinary field of science and technology studies (SST) may also provide theoretical lenses for organising a TD dissertation.

There is also a need to better understand how long-term, transformative change is actually achieved. This would be possible through longitudinal and comparative case studies, as well as impact assessments that collect evidence of how knowledge co-production processes are carried out over a considerable length of time in the same cases. Such studies require more time and resources, which can be accommodated in boundary organisations that empower and support non-academic participation. Boundary organisations need to be open to experimentation, hence they can be modelled as design and social innovation labs, in which new urban narratives and configurations are prototyped. In such labs,

researchers, informal settlement residents, experts and local municipalities can work more closely, and as flexible communities of practice.

In the case of South Africa, it has been recommended that local municipalities need to manage such collaborations with informal settlement dwellers. In other Sub-Saharan Africa countries, it would be necessary to explore options of how communities of practice in informal contexts are managed in the quest to co-produce contextualised knowledge and innovative solutions. Further, different African urban contexts require their own TD studies that will unveil a variety of socio-technological configurations that pay attention to the heterogeneous realities of Africa's emerging urbanism.

In design, the role of the researcher-designer in TD research and in informal urban contexts needs to be researched further, so as to develop a flexible toolbox of techniques that are congruent to the heterogeneous urban forms in Sub-Saharan Africa. There is also a need for change in design curricular, so that designers can prepare to work in more interdisciplinary and transdisciplinary settings that aim to solve the intractable changes facing Africa's burgeoning population.

7.0 REFERENCE LIST

- ACOSTA, G., MORALES, K., LAGOS, D. and ORTIZ, M., 2011. Addressing Human Factors and Ergonomics in Design Process, Product Life Cycle, and Innovation: Trends in Consumer Product Design. *Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques*, pp. 133-154.
- ADUBOFOUR, K., OBIRI-DANSO, K. and QUANSAH, C., 2013. Sanitation survey of two urban slum Muslim communities in the Kumasi metropolis, Ghana. *Environment and Urbanisation*, 25(1), pp. 189-207.
- AIYAR, S.A, 2014A. In: *The Informal City Reader: South Africa Edition*. Johannesburg: South African Cities Network.
- ALLENBY, B.R. and SAREWITZ, D., 2011. *The Techno-Human Condition*. US: MIT Press.
- ALTBACH, P.G., 2013. Advancing the national and global knowledge economy: the role of research universities in developing countries. *Studies in higher education*, 38(3), pp. 316-330.
- ANAND, C.K. and APUL, D.S., 2014. Composting toilets as a sustainable alternative to urban sanitation—A review. *Waste Management*, 34(2), pp. 329-343.
- ANDERSON, T., CURTIS, A. and WITTIG, C., 2014. *Definition and Theory in Social Innovation*. Krems: Danube University.
- ANDERSSON, J.C., ZEHNDER, A.J., WEHRLI, B., JEWITT, G.P., ABBASPOUR, K.C. and YANG, H., 2013. Improving crop yield and water productivity by ecological sanitation and water harvesting in South Africa. *Environmental science & technology*, 47(9), pp. 4341-4348.
- ANDRADE, A.D., 2009. Interpretive research aiming at theory building: Adopting and adapting the case study design. *The Qualitative Report*, 14(1), pp. 42-60.
- ANGROSINO, M., 2007. *Doing ethnographic and observational research*. London: Sage.
- APPEL, H., ANAND, N. and GUPTA, A. 2015. "The Infrastructure Toolbox." *Theorising the Contemporary*, Cultural Anthropology website, [ONLINE] Available at: <http://www.culanth.org/fieldsights/725-the-infrastructure-toolbox> [Accessed 2 February 2016]
- ARCHAMBAULT, C.S., DE LAAT, J. and ZULU, E.M., 2012. Urban Services and Child Migration to the Slums of Nairobi. *World Development*, 40(9), pp. 1854-1869.
- ARKU, F.S., ANGMOR, E.N. and SEDDOH, J., 2013. Toilet is not a dirty word: close to meeting the MDGs for sanitation? *Development in Practice*, 23(2), pp. 184-195.

- BÆRENHOLDT, J.O., BÜSCHER, M., SCHEUER, J.D. and SIMONSEN, J., 2010. Perspectives on design research. In: J. SIMONSEN, J.O. BÆRENHOLDT, M. BÜSCHER and J.D. SCHEUER, eds, *Design Research: Synergies from interdisciplinary perspectives*. Routledge, pp. 1-15.
- BANANA, E., CHIKOTI, P., HARAWA, C., MCGRANAHAN, G., MITLIN, D., STEPHEN, S., SCHERMBRUCKER, N., SHUMBA, F. and WALNYCKI, A., 2015. Sharing reflections on inclusive sanitation. *Environment and Urbanisation*, 0956247815569702.
- BAPTIST, C. and BOLNICK, J., 2012. Participatory enumerations, in situ upgrading and mega events: the 2009 survey in Joe Slovo, Cape Town. *Environment and Urbanisation*, 24(1), pp. 59-66.
- BARTRAM, J., CHARLES, K., EVANS, B., O'HANLON, L. and PEDLEY, S., 2012. Commentary on community-led total sanitation and human rights: should the right to community-wide health be won at the cost of individual rights? *Journal of water and health*, 10(4), pp. 499-503.
- BAŠKARADA, S., 2014. Qualitative Case Study Guidelines. *The Qualitative Report*, 19(40), pp. 1-18.
- BAXTER, G., 2012. Human factors and ergonomics in consumer product design: methods and techniques. *Ergonomics*, 55(9), pp. 1124-1125.
- BAXTER, P. and JACK, S., 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), pp. 544-559.
- BEEBEEJAUN, Y., DUROSE, C., REES, J., RICHARDSON, J. and RICHARDSON, L., 2013. 'Beyond text': exploring ethos and method in co-producing research with communities. *Community Development Journal*.
- BEVERIDGE, R. and GUY, S., 2011. Innovation to intermediaries: translating the EU urban wastewater directive. In: S. GUY, S. MARVIN, W. MEDD and T. MOSS, eds, *Shaping urban infrastructures: intermediaries and the governance of socio-technical networks*. London: Earthscan. Pp. 92-107.
- BHAGWAN, J., STILL, D., BUCKLEY, C. and FOXON, K., 2008. Challenges with up-scaling dry sanitation technologies. *Water Science and Technology*, 58(1), pp. 21.
- BHATTI, Y.A. and VENTRESCA, M., 2012. *The Emerging Market for Frugal Innovation: Fad, Fashion, or Fit?* Available at SSRN: <http://ssrn.com/abstract=2005983>
- BIJKER, W.E., HUGHES, T.P., PINCH, T., and DOUGLAS, D.G. 2012. *The social construction of technological systems: New directions in the sociology and history of technology*. MIT press.
- BILL AND MELINDA GATES FOUNDATION, 2014. *Reinvent the toilet challenge*. [ONLINE] Available at: <http://www.gatesfoundation.org/What-We-Do/Global-Development/Reinvent-the-Toilet-Challenge> [Accessed 15 November 2014]

BIOCYCLE. THE n.d [ONLINE] Available at: <http://www.theBiocycle.com/> [Accessed 20 April 2015]

BIOGASPRO AGAMA ENERGY, 2014. [ONLINE] Available at: <http://www.Biogaspro.com/products/biogas-digesters/product-information-downloads.html> [Accessed 20 April 2015]

BJÖGVINSSON, E., EHN, P. and HILLGREN, P., 2012. Design things and design thinking: contemporary participatory design challenges. *Design Issues*, 28(3), pp. 101-116.

BLOOR, M. and BLOOR, T., 2013. *The practice of critical discourse analysis: An introduction*. New York: Routledge.

BOLAANE, B. and IKGOPOLENG, H., 2011. Towards improved sanitation: Constraints and opportunities in accessing waterborne sewerage in major villages of Botswana. *Habitat International*, 35(3), pp. 486-493.

BRACKEN, L., BULKELEY, H. and WHITMAN, G., 2014. Transdisciplinary research: understanding the stakeholder perspective. *Journal of Environmental Planning and Management*, (ahead-of-print), pp. 1-18.

BRANDT, P., ERNST, A., GRALLA, F., LUEDERITZ, C., LANG, D.J., NEWIG, J., REINERT, F., ABSON, D.J. and VON WEHRDEN, H., 2013. A review of transdisciplinary research in sustainability science. *Ecological Economics*, 92, pp. 1-15.

BROWN, T. 2014 *Change by design*. HarperCollins e-books.

BROWN, T. and WYATT, J., 2010. Design thinking for social innovation. *Stanford Social Innovation Review*, 8(1), pp. 30-35.

BROWN-LUTHANGO, M., 2013. Community-university engagement: the Philippi CityLab in Cape Town and the challenge of collaboration across boundaries. *Higher Education*, 65(3), pp. 309-324.

BRUNDIERS, K., WIEK, A. and REDMAN, C.L., 2010. Real-world learning opportunities in sustainability: from classroom into the real world. *International Journal of Sustainability in Higher Education*, 11(4), pp. 308-324.

BUIZER, M., RUTHROF, K., MOORE, S.A., VENEKLAAS, E.J., HARDY, G. and BAUDAINS, C., 2015. A Critical Evaluation of Interventions to Progress Transdisciplinary Research. *Society & Natural Resources*, (ahead-of-print), pp. 1-12.

BULAYA, C., MWAPE, K.E., MICHELO, C., SIKASUNGE, C.S., MAKUNGU, C., GABRIEL, S., DORNY, P. and PHIRI, I.K., 2015. Preliminary evaluation of Community-Led Total Sanitation for the control of *Taenia solium* cysticercosis in Katete District of Zambia. *Veterinary parasitology*, 207(3-4), pp. 241-248.

CALLON, M. 2012. Society in the Making: The study of technology as a tool for sociological analysis. In W. E. BIJKER, T.P. HUGHES, T. PINCH, and D.G. DOUGLAS, eds, *The social construction of technological systems: New directions in the sociology and history of technology*. MIT press. pp 77-98.

CARMEL-GILFILEN, C. and PORTILLO, M., 2012. Where what's in common mediates disciplinary diversity in design students: A shared pathway of intellectual development. *Design Studies*, 33(3), pp. 237-261.

CESCHIN, F., 2014. How the design of socio-technical experiments can enable radical changes for sustainability. *International Journal of Design*, 8(3), pp. 1 – 21.

CESCHIN, F., 2013. Critical factors for implementing and diffusing sustainable product-Service systems: insights from innovation studies and companies' experiences. *Journal of Cleaner Production*, 45, pp. 74-88.

CHAI, K. and XIAO, X., 2012. Understanding design research: A bibliometric analysis of Design Studies (1996–2010). *Design Studies*, 33(1), pp. 24-43.

CHAMBERS, R., 2012. Sharing and Co-generating Knowledges: Reflections on Experiences with PRA1 and CLTS2. *IDS Bulletin*, 43(3), pp. 71-87.

CHANCE, K. R., 2012. Living Politics: Practices and Protests of 'the Poor' in Democratic South Africa. *Journal of Pan African Studies*, 5(1), pp. 284.

CHATAWAY, J., HANLIN, R. and KAPLINSKY, R., 2014. Inclusive innovation: an architecture for policy development. *Innovation and Development*, 4(1), pp. 33-54.

CHEN, C., ZHU, J., YU, J. and NOORI, H., 2012. A new methodology for evaluating sustainable product design performance with two-stage network data envelopment analysis. *European Journal of Operational Research*, 221(2), pp. 348-359.

CHILISA, B., 2012. *Indigenous research methodologies*. US: Sage.

CHINYAMA, A., CHIPATO, P. and MANGORE, E., 2012. Sustainable sanitation systems for low income urban areas—A case of the city of Bulawayo, Zimbabwe. *Physics and Chemistry of the Earth, Parts A/B/C*, 50, pp. 233-238.

CIPOLLA, C. and BARTHOLO, R., 2014. Empathy or inclusion: A dialogical approach to socially responsible design. *International Journal of Design*, 8(2), pp. 87-100.

CITY OF CAPE TOWN, 2015. *Informal settlements*. [ONLINE] Available at: <https://www.capetown.gov.za/en/Water/Pages/Informal-settlements.aspx>. [Accessed 24 February 2015]

CITY OF CAPE TOWN, 2008. *Water and sanitation service standard*. Preliminary draft 2.

COHRE, WATERAID, SDC and UN-HABITAT, 2008. *Sanitation, A Human Rights Imperative*. Geneva: Centre on Housing Rights and Evictions.

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR), 2007. Sanitation technology demonstration centre. [ONLINE] Available at: http://www.csir.co.za/Built_environment/santechcentre/ [Accessed 3 November 2014]

COSTANDIUS, E., 2010. Using Art as a Medium to Enhance Social Responsibility and Citizenship. *Discourse and Communication for Sustainable Education*, 1(2), pp. 74-81.

CROSS, N., 2011. *Design thinking: understanding how designers think and work*. Oxford: Berg.

CROUS, P., HAARHOFF, J. and BUCKLEY, C., 2013. Water demand characteristics of shared water and sanitation facilities: Experiences from community ablution blocks in eThekweni Municipality, South Africa. *Water SA*, 39(3), pp. 211-220.

CUMMING, G. and NORWOOD, C., 2012. The Community Voice Method: Using participatory research and filmmaking to foster dialog about changing landscapes. *Landscape and Urban Planning*, 105(4), pp. 434-444.

CUMULUS JOHANNESBURG, 2014. Design with the other 90%: changing the world by design. [ONLINE] Available at: <http://www.cumulusjohannesburg.co.za/> [Accessed 5 December 2014]

DACE, E., BAZBAUERS, G., BERZINA, A. and DAVIDSEN, P.I., 2014. System dynamics model for analysing effects of eco-design policy on packaging waste management system. *Resources, Conservation and Recycling*, 87, pp. 175-190.

DAHLMAN, C. and KUZNETSOV, Y., 2014. Innovation for the "base of the pyramid": Developing a framework for policy experimentation. *Making Innovation Policy Work*, , pp. 71-122.

DAKA, E. and TOIVANEN, H., 2014. Innovation, the informal economy and development: The case of Zambia. *African Journal of Science, Technology, Innovation and Development*, (ahead-of-print), pp. 1-9.

DARBELLAY, F., 2015. Rethinking inter- and transdisciplinarity: Undisciplined knowledge and the emergence of a new thought style. *Futures*, 65(0), pp. 163-174.

DAVIDSON, K., 2008. When CSR meets BOP: Ethical concerns at the base of the pyramid. In: P. KANDACHAR and M. HALME, eds, *Sustainability challenges and solutions at the base of the pyramid: Business, technology and the poor*. Greenleaf Pub., pp. 462-474.

DAVIS, M., 2006. Planet of slums. *New Perspectives Quarterly*, 23(2), pp. 6-11.

DAWSON, H.J., 2014. Patronage from below: Political unrest in an informal settlement in South Africa. *African Affairs*, 113(453), pp. 518-539.

- DE MELO RESENDE, V., 2012. Critical discourse analysis and ethnography: the crisis in the national street children's movement in Brazil. *Qualitative Research*, p.1468794112451040.
- DIK, S.J., 2014. Urbanisation, Racism and the Environment: Identifying the Effect of Racism-Driven Uneven Development on Environmental Injustice in Cape Town, South Africa.
- DONALDSON, K., 2008. Why to be Wary of "Design for Developing Countries". *Ambidextrous* 9 (2008), 35, 37.
- DONALDSON, K.M., 2006. Product design in less industrialised economies: constraints and opportunities in Kenya. *Research in Engineering Design*, 17(3), pp. 135-155.
- DORST, K., 2011. The core of 'design thinking' and its application. *Design Studies*, 32(6), pp. 521-532.
- DOVEY, K., 2014. Incremental Urbanism: the Emergence of informal settlements. *Emergent Urbanism: Urban Planning & Design in Times of Structural and Systemic Change*, pp. 45.
- DOVEY, K., 2013. Informalising Architecture: The Challenge of Informal Settlements. *Architectural Design*, 83(6), pp. 82-89.
- DOVEY, K. and KING, R., 2012. Informal urbanism and the taste for slums. *Tourism Geographies*, 14(2), pp. 275-293.
- EALES, K., 2008. Partnerships for sanitation for the urban poor: Is it time to shift paradigm? *Essay for Symposium on Urban Sanitation. IRC International Water and Sanitation Centre. Delft, The Netherlands* 2008.
- ECHANOVE, M. and SRIVASTAVA, M., 2014A. In: *The Informal City Reader: South Africa* Edition. Johannesburg: South African Cities Network.
- ERFURT IV, E. 2015. *Tactical urbanism*. [ONLINE] Available at: <http://restlessurbanist.com/2015/03/18/tactical-urbanism/> [Accessed 05 April 15].
- ERNSTSON, H., LAWHON, M. and DUMINY, J., 2014. Conceptual vectors of African urbanism: 'engaged theory-making' and 'platforms of engagement'. *Regional Studies*, 48(9), pp. 1563-1577.
- FAIRCLOUGH, N., 2005. Critical discourse analysis in transdisciplinary research. *A new agenda in (Critical) Discourse Analysis: theory, methodology and interdisciplinarity*. Amsterdam, pp. 53-70.
- FARIAS, I., 2010. Introduction: decentring the object of urban studies. In: I. FARIAS and T. BENDER, eds, *Urban assemblages: how actor-network theory changes urban studies*. Oxfordshire: Routledge, pp. 1-24.

- FINLAY, L., 2002. Negotiating the swamp: the opportunity and challenge of reflexivity in research practice. *Qualitative research*, 2(2), pp.209-230.
- FLORES, A., BUCKLEY, C. and FENNER, R., 2009. Selecting sanitation systems for sustainability in developing countries. IWA.
- FOX, S., 2014. The political economy of slums: theory and evidence from sub-Saharan Africa. *World Development*, 54, pp. 191-203.
- FUENTES, M., 2012. *A new sanitation system for slums in urban dense areas*. Delft University of Technology.
- FUJII, L.A., 2014. Five stories of accidental ethnography: turning unplanned moments in the field into data. *Qualitative Research*, 1468794114548945.
- FUTURE EARTH. 2015. *Future earth, research for global sustainability*. [ONLINE] Available at: <http://www.futureearth.org/>. [Accessed 07 May 15].
- GARCIA, R.R., GONZÁLEZ, S.M. and GARCÍA, L.M., 2013. Eco-design workshop: Delivering new concepts for future designs, *New Concepts in Smart Cities: Fostering Public and Private Alliances (SmartMILE)*, 2013 International Conference on 2013, IEEE, pp. 1-3.
- GAZIULUSOY, A.I. and BOYLE, C., 2013. Proposing a heuristic reflective tool for reviewing literature in transdisciplinary research for sustainability. *Journal of Cleaner Production*, 48, pp. 139-147.
- GEORGE, G., MCGAHAN, A.M. and PRABHU, J., 2012. Innovation for inclusive growth: towards a theoretical framework and a research agenda. *Journal of Management Studies*, 49(4), pp. 661-683.
- GEORGE, R., 2008. *The big necessity: Adventures in the world of human waste*. London: Portobello Books.
- GOLDSCHMIDT, G. and RODGERS, P.A., 2013. The design thinking approaches of three different groups of designers based on self-reports. *Design Studies*, 34(4), pp. 454-471.
- GONÇALVES, M., CARDOSO, C. and BADKE-SCHAUB, P., 2014. What inspires designers? Preferences on inspirational approaches during idea generation. *Design Studies*, 35(1), pp. 29-53.
- GOOGLE MAPS 2015A. Western Cape Province, South Africa, 34° 0' 0" S, 20° 0' 0" E. [ONLINE] Available: <https://www.google.co.ke/maps/place/Western+Cape,+South+Africa/@-32.6316328,20.9899868,7z/data=!3m1!4b1!4m2!3m1!1s0x1dcc5d887a698df3:0xe98e798f2136a28b?hl=en&hl=en> [Accessed 7 July 2015]
- GOOGLE EARTH 2015B. Grabouw, South Africa, 34° 9' 0" S, 19° 1' 0" E [ONLINE] Available: <https://www.google.co.ke/maps/place/Grabouw,+South+Africa/@->

34.1558455,19.0152269,14z/data=!3m1!4b1!4m2!3m1!1s0x1dc5e4522f8fdd:0x70ff7e2a4d35e2e6?hl=en&hl=en [Accessed 7 July 2015]

GOOGLE EARTH 2015C. Klipheuwel, South Africa, 33° 43' 26.4" S, 18° 42' 25.2" E [ONLINE] Available: <https://www.google.co.ke/maps/place/Klipheuwel,+Cape+Town,+South+Africa/@-33.7209679,18.7074929,15z/data=!3m1!4b1!4m2!3m1!1s0x1dccb92dd6b557e7:0x398a1cc417c5987e?hl=en&hl=en> [Accessed 7 July 2015]

GOOGLE EARTH 2015D. Stellenbosch, South Africa, 33° 55' 12" S, 18° 51' 36" E [ONLINE] Available: <https://www.google.co.ke/maps/place/Stellenbosch,+South+Africa/@-33.9466914,18.8445859,12z/data=!3m1!4b1!4m2!3m1!1s0x1dccb2f75188e2a5:0x7009aa00dee36be2?hl=en&hl=en> [Accessed 7 July 2015]

GOUNDEN, T., PFAFF, B., MACLEOD, N. and BUCKLEY, C., 2006. Provision of free sustainable basic sanitation: the Durban experience. *Conference proceedings: 32nd WEDC International Conference, Sustainable Development of Water Resources, Water Supply and Environmental Sanitation*, Colombo 2006.

GOVENDER, T., BARNES, J.M. and PIEPER, C.H., 2010. Living in low-cost housing settlements in Cape Town, South Africa—the epidemiological characteristics associated with increased health vulnerability. *Journal of Urban Health*, 87(6), pp. 899-911.

GRANT, R., 2014. Sustainable African Urban Futures Stocktaking and Critical Reflection on Proposed Urban Projects. *American Behavioural Scientist*, 0002764214550301.

GREIF, M.J., 2012. Housing, medical, and food deprivation in poor urban contexts: implications for multiple sexual partnerships and transactional sex in Nairobi's slums. *Health & place*, 18(2), pp. 400-407.

GREYLING, M., 2013. An Undivided Landscape: Dissolving Apartheid buffer zones in Johannesburg, South Africa, University of Waterloo.

GRIN, J., FELIX, F., BOS, B. and SPOELSTRA, S., 2004. Practices for reflexive design: lessons from a Dutch programme on sustainable agriculture. *International Journal of Foresight and Innovation Policy*, 1(1), pp. 126-149.

GROENEWALD, L., HUCHZERMEYER, M., KORNIENKO, K., TREDOUX, M.J., RUBIN, M. and RAPOSO, I., 2013. Breaking down the binary: meanings of informal settlement in southern African cities. In: S. BEKKER L. FOURCHARD eds. *Governing cities in Africa- Politics and policies*, pp 93-115

GROSSE-HERING, B., MASON, J., ALIAKSEYEU, D., BAKKER, C. and DESMET, P., 2013. Slow design for meaningful interactions, *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems 2013*, ACM, pp. 3431-3440.

GRUNDLINGH, A. and SCOTT, D., 2012. Heritage- contextualising heritage production. In: M. SWILLING, B. SEBITOSI and R. LOOTS, eds, *Sustainable Stellenbosch: Opening dialogues*. AFRICAN SUN MeDIA, pp. 236-243.

GUEVARA, N.K.A., 2014. Informality and Formalization of Informal Settlements at the Turn of the Third Millennium: Practices and Challenges in Urban Planning. *Journal of Studies in Social Sciences*, 9(2).

GULYANI, S., BASSETT, E.M. and TALUKDAR, D., 2014. A tale of two cities: A multi-dimensional portrait of poverty and living conditions in the slums of Dakar and Nairobi. *Habitat International*, 43, pp. 98-107.

GULYANI, S. and TALUKDAR, D., 2010. Inside informality: The links between poverty, microenterprises, and living conditions in Nairobi's slums. *World Development*, 38(12), pp. 1710-1726.

GUNN, W. and DONOVAN, J., 2012. Design anthropology: an introduction. In: W. GUNN and J. DONOVAN, eds, *Design and Anthropology*. Ashgate Publishing Ltd, pp. 1-16.

GÜNTHER, I., NIWAGABA, C.B., LÜTHI, C., HORST, A., MOSLER, H. and TUMWEBAZE, I.K., 2012. When is shared sanitation improved sanitation?-The correlation between number of users and toilet hygiene.

HADDOCK, S.V. and TORNAGHI, C., 2013. A transversal reading of social innovation in European cities. In: F. MOULAERT, D. MACCALLUM, A. MEHMOOD and A. HAMDOUCH, eds, *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research*. Edward Elgar Publishing, pp. 264-273.

HADORN, G.H., HOFFMANN-RIEM, H., BIBER-KLEMM, S., GROSSENBACHER-MANSUY, W., JOYE, D., POHL, C., WIESMANN, U. and ZEMP, E., 2008. *Handbook of transdisciplinary research*. Springer.

HAGEN, P. and ROBERTSON, T., 2012. Social Technologies: The Changing Nature of Participation in Design. *Design Issues*, 28(3), pp. 77-88.

HAHN, R., 2008. Sustainable development at the BoP: On integrated approaches beyond trade-off thinking. In: P. KANDACHAR and M. HALME, eds, *Sustainability challenges and solutions at the base of the pyramid: Business, technology and the poor*. Greenleaf Pub., pp. 446-461.

HALL, J., 2014. Innovation and entrepreneurial dynamics in the Base of the Pyramid. *Technovation*, 34(5), pp. 265-269.

HALL, J., MATOS, S.V. and MARTIN, M.J., 2014. Innovation pathways at the Base of the Pyramid: Establishing technological legitimacy through social attributes. *Technovation*, 34(5), pp. 284-294.

- HALSE, J., 2008. Design Anthropology: Borderland Experiments with Participation. *IT University of Copenhagen*.
- HAMILTON, M.L., SMITH, L. and WORTHINGTON, K., 2008. Fitting the methodology with the research: An exploration of narrative, self-study and auto-ethnography. *Studying Teacher Education*, 4(1), pp.17-28.
- HAQ, G. and CAMBRIDGE, H., 2012. Exploiting the co-benefits of ecological sanitation. *Current Opinion in Environmental Sustainability*, 4(4), pp. 431-435.
- HARRIS, J.C., 2014. The confounding influence of urban informality on innovation and production specialisation in production clusters: evidence from Nairobi. *African Journal of Science, Technology, Innovation and Development*, 6(6), pp. 529-539.
- HASAN, A., 2008. Financing the sanitation programme of the Orangi Pilot Project—Research and Training Institute in Pakistan. *Environment and Urbanisation*, 20(1), pp. 109-119.
- HASAN, A., 2006. Orangi Pilot Project: the expansion of work beyond Orangi and the mapping of informal settlements and infrastructure. *Environment and Urbanisation*, 18(2), pp. 451-480.
- HAWKINS, P., BLACKETT, I. and HEYMANS, C., 2013. Poor-Inclusive Urban Sanitation: An Overview. World Bank.
- HEGGER, D.L., VAN VLIET, J. and VAN VLIET, B.J., 2007. Niche management and its contribution to regime change: the case of innovation in sanitation. *Technology Analysis & Strategic Management*, 19(6), pp. 729-746.
- HENDRIKSEN, A., TUKAHIRWA, J., OOSTERVEER, P.J. and MOL, A.P., 2012. Participatory decision making for sanitation improvements in unplanned urban settlements in East Africa. *The Journal of Environment & Development*, 21(1), pp. 98-119.
- HICKEL, J., 2014. “Xenophobia” in South Africa: Order, Chaos, and the Moral Economy of Witchcraft. *Cultural Anthropology*, 29(1), pp. 103-127.
- HILLGREN, P., 2013. Participatory design for social and public innovation: Living Labs as spaces for agonistic experiments and friendly hacking. *Public and collaborative: Exploring the intersection of design, social innovation and public policy*, pp. 75-88.
- HILLGREN, P., SERAVALLI, A. and EMILSON, A., 2011. Prototyping and infrastructuring in design for social innovation. *CoDesign*, 7(3-4), pp. 169-183.
- HILLIGAN, J., SPIEGEL, A. and ARMITAGE, N., 2012. Cape Town study confirms that toilets count, people matter: sanitation. *Water Wheel*, 11(4), pp. 28-31.

- HOLDERNESS, T., KENNEDY-WALKER, R., ALDERSON, D. and EVANS, B., 2013. *An Evaluation of Spatial Network Modeling To Aid Sanitation Planning In Informal Settlements Using Crowd-Sourced Data*. University of Wollongong.
- HOLM, J., SØNDERGÅRD, B. and HANSEN, O.E., 2010. Perspectives on design reseach. In: J. SIMONSEN, J.O. BÆRENHOLDT, M. BÜSCHER and J.D. SCHEUER, eds, *Design Research: Synergies from interdisciplinary perspectives*. Routledge, pp. 123-137.
- HOSSAIN, M.S.J. and AHMAD, N., 2011. Green design principles and trends of using them among Bangladeshi consumer goods manufacturers, *Industrial Engineering and Engineering Management (IEEM), Conference proceedings: 2011 IEEE International Conference*, IEEE, pp. 467-471.
- HUBBARD, B., SARISKY, J., GELTING, R., BAFFIGO, V., SEMINARIO, R. and CENTURION, C., 2011. A community demand-driven approach toward sustainable water and sanitation infrastructure development. *International journal of hygiene and environmental health*, 214(4), pp. 326-334.
- HUCHZERMEYER, M., 2014A. In: *The Informal City Reader: South Africa Edition*. Johannesburg: South African Cities Network.
- HUCHZERMEYER, M., 2014B. Invoking Lefebvre's 'right to the city' in South Africa today: A response to Walsh. *City*, 18(1), pp. 41-49.
- HUCHZERMEYER, M., 2009. The struggle for in situ upgrading of informal settlements: a reflection on cases in Gauteng. *Development Southern Africa*, 26(1), pp. 59-73.
- HUCHZERMEYER, M., 2008. Slum Upgrading in Nairobi within the Housing and Basic Services Market A Housing Rights Concern. *Journal of Asian and African Studies*, 43(1), pp. 19-39.
- HUNTER, M. and POSEL, D., 2012. Here to work: the socioeconomic characteristics of informal dwellers in post-apartheid South Africa. *Environment and Urbanisation*, 24(1), pp. 285-304.
- HURN, K., 2014. *Reinventing the toilet: academic research meets design practice in the pursuit of an effective sanitation solution for all*. Loughborough University.
- HUSSAIN, S., SANDERS, E.B. and STEINERT, M., 2012. Participatory design with marginalised people in developing countries: Challenges and opportunities experienced in a field study in Cambodia. *International Journal of Design*, 6(2), pp. 91-109.
- ISHACK PROJECT, THE 2015. [ONLINE] Available at: <https://www.facebook.com/iShackproject.org?fref=ts>. [Accessed 16 July 2015].
- JAGLIN, S., 2014. Regulating service delivery in southern cities: rethinking urban heterogeneity. In: S. PARNELL and S. OLDFIELD, eds, *The Routledge handbook on cities of the global south*. Routledge, pp. 434-447.

- JAGTAP, S., LARSSON, A., HIORT, V., OLANDER, E., WARELL, A. and KHADILKAR, P., 2014. How design process for the Base of the Pyramid differs from that for the Top of the Pyramid. *Design Studies*, 35(5), pp. 527–558.
- JESSOP, B., MOULAERT, F., LARS, H. and HAMDOUCH, A., 2013. Social Innovation Research: A New Stage in Innovation Analysis? In: F. MOULAERT, D. MACCALLUM, A. MEHMOOD and A. HAMDOUCH, eds, *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research*. Edward Elgar Publishing, pp. 110-127.
- JONES, B.G., 2012. ‘Bankable Slums’: the global politics of slum upgrading. *Third World Quarterly*, 33(5), pp. 769-789.
- JOSHI, D., FAWCETT, B. and MANNAN, F., 2011. Health, hygiene and appropriate sanitation: experiences and perceptions of the urban poor. *Environment and Urbanization*, 23(1), pp. 91-111.
- JØRGENSEN, M.S., JØRGENSEN, U. and CLAUSEN, C., 2009. The social shaping approach to technology foresight. *Futures*, 41(2), pp. 80-86.
- JÜRGENS, U., DONALDSON, R., RULE, S. and BÄHR, J., 2013. Townships in South African cities—Literature review and research perspectives. *Habitat International*, 39, pp. 256-260.
- KABIRU, C.W., BEGUY, D., NDUGWA, R.P., ZULU, E.M. and JESSOR, R., 2012. “Making It”: Understanding Adolescent Resilience in Two Informal Settlements (Slums) in Nairobi, Kenya. *Child & Youth Services*, 33(1), pp. 12-32.
- KANDACHAR, P. and HALME, M., 2008. Introduction: Farewell to pyramids, how can business and technology help eradicate poverty? In: P. KANDACHAR and M. HALME, eds, *Sustainability challenges and solutions at the base of the pyramid: Business, technology and the poor*. UK: Greenleaf publishing, pp. 1-27.
- KAR, K., 2012. Why not Basics for All? Scopes and Challenges of Community-led Total Sanitation. *IDS Bulletin*, 43(2), pp. 93-96.
- KAR, K. and CHAMBERS, R., 2008. Handbook on community-led total sanitation. London: Plan UK and Brighton: IDS.
- KARNANI, A., 2012. Markets of the Poor: Opportunities and Limits. *International Journal of Rural Management*, 8(1-2), pp. 7-17.
- KARWOWSKI, W., SOARES, M.M. and STANTON, N.A., 2011. *Human Factors and Ergonomics in Consumer Product Design: Uses and Applications*. CRC Press.
- KELLER, A., 2012. *Conceptualising a sustainable energy solution for in situ informal settlement upgrading*, Stellenbosch: Stellenbosch University.

- KIM, B., 2001. Social constructivism. *Emerging perspectives on learning, teaching, and technology*, 1(1), pp. 16
- KLEIN, J.T., 2015. Reprint of “Discourses of transdisciplinarity: Looking back to the future”. *Futures*, 65(0), pp. 10-16.
- KOBEL, D. and DEL MISTRO, R., 2012. Evaluation of non-user benefits towards improvement of water and sanitation services in informal settlements. *Urban Water Journal*, 9(5), pp. 347-359.
- KOBEL, D. and DEL MISTRO, R., 2015. Valuing the non-user benefits of improving water and sanitation in informal settlements: a study of Cape Town. *Urban Water Journal*, 12(3), pp. 248-261.
- KOOLA, J. and ZWANE, A.P., 2014. Water Supply and Sanitation. In: A.J. CULYER, ed, *Encyclopedia of Health Economics*. San Diego: Elsevier, pp. 477-482.
- KORIA, R., BARTELS, F., ANDRIANO, L. and KOESZEGI, S., 2014. Effectiveness and Efficiency of National Systems of Innovation: the importance of ICT, the Cases of Ghana and Kenya, *IST-Africa Conference Proceedings, 2014* 2014, IEEE, pp. 1-18.
- KUIJER, L. and DE JONG, A.M., 2011. Practice theory and human-centered design: A sustainable bathing example. *Nordes*, (4).
- KVARNSTROM, E., MCCONVILLE, J., BRACKEN, P., JOHANSSON, M. and FOGDE, M., 2011. The sanitation ladder-a need for a revamp? *Journal of Water, Sanitation and Hygiene for Development*, 1(1), pp. 3-12.
- LAGARDIEN, A., MUANDA C. and BENJAMIN A., 2012. User acceptance and functioning of mobile communal sanitation facilities for informal settlements of South Africa. WRC report No. 2017\1\12. Gezina: WRC.
- LANG, D.J., WIEK, A., BERGMANN, M., STAUFFACHER, M., MARTENS, P., MOLL, P., SWILLING, M. and THOMAS, C.J., 2012. Transdisciplinary research in sustainability science: practice, principles, and challenges. *Sustainability science*, 7(1), pp. 25-43.
- LATOUR, B., 2005. *Reassembling the social-an introduction to actor-network-theory. Reassembling the Social-An Introduction to Actor-Network-Theory*. Oxford University press.
- LARSEN, T.A., GEBAUER, H., GRÜNDL, H., KÜNZLE, R., LÜTHI, C., MESSMER, U., MORGENROTH, E., NIWAGABA, C.B. and RANNER, B., 2014. Blue Diversion: a new approach to sanitation in informal settlements. IWA.
- LE ROUX, K. and COSTANDIUS, E., 2013. The viability of social design as an agent for positive change in a South African context: mural painting in Enkanini, Western Cape. *Image & Text: a Journal for Design*, 21, pp. 106-120.

- LEAVY, P., 2011. *Essentials of transdisciplinary research: Using problem-centered methodologies*. CA: Left Coast Press.
- LENSKJOLD, T.U., 2011. Accounts of a Critical Artefacts Approach to Design Anthropology. *Nordes*, (4).
- LIGHTHOUSE MISSION, n.d. [ONLINE] Available at: <http://www.lighthouse-mission.com/about-us.php>. [Accessed 13 May 2015]
- LINGARD, L., SCHRYER, C.F., SPAFFORD, M.M. and CAMPBELL, S.L., 2007. Negotiating the politics of identity in an interdisciplinary research team. *Qualitative Research*, 7(4), pp.501-519.
- LOPES, A.M., FAM, D. and WILLIAMS, J., 2012. Designing sustainable sanitation: Involving design in innovative, transdisciplinary research. *Design Studies*, 33(3), pp. 298-317.
- LUNDIN, S., 2013. Dry Toilets as a Sanitation Solution in Makana Municipality, South Africa. Novia University of Applied sciences.
- LURY, C. and WAKEFORD, N., 2012. Introduction: a perpetual inventory. In: C. LURY and N. WAKEFORD, eds, *Inventive methods: The happening of the social*. London: Routledge, pp. 1-24.
- LÜTHI, C., MCCONVILLE, J. and KVARNSTRÖM, E., 2010. Community-based approaches for addressing the urban sanitation challenges. *International Journal of Urban Sustainable Development*, 1(1-2), pp. 49-63.
- MAATHAI, W., 2009. *The challenge for Africa*. London: Arrow books.
- MALAUQUAIS, D., 2011. Anti-teology. In: N. EDJABE and E. PIETERSE, eds, *African Cities Reader II: Mobilities and Fixtures*. Chimurenga and African Centre for Cities, pp. 7-23.
- MALUTI GSM CONSULTING ENGINEERS. 2014. Pour-flush Trials in the Western Cape. WRC Report No. KV 332/13. Gezina, WRC.
- MANGENA, S., 2012. Anger at Zille disrupts SAHRC Water and Sanitation Hearing in Western Cape. [ONLINE] Available at: <http://www.sahrc.org.za/home/index.php?ipkArticleID=156> [Accessed 2 December 2014]
- MANZINI, E., 2014. Making Things Happen: Social Innovation and Design. *Design Issues*, 30(1), pp. 57-66.
- MANZINI, E., 2010. Small, local, open, and connected: design for social innovation and sustainability. *The journal of Design strategies, Change Design*, 4(1), pp. 8-11.
- MANZINI, E. and RIZZO, F., 2011. Small projects/large changes: Participatory design as an open participated process. *CoDesign*, 7(3-4), pp. 199-215.

- MARA, D., 2012. Sanitation: What's the Real Problem? *IDS Bulletin*, 43(2), pp. 86-92.
- MARA, D. and BROOME, J., 2008. Sewerage: a return to basics to benefit the poor. *Municipal Engineer*, 161(4), pp. 231-237.
- MAZEAU, A., REED, B., SANSOM, K. and SCOTT, R., 2014. Emerging categories of urban shared sanitation. *Water and Environment Journal*, 28(4), pp. 592-608.
- MCCOMB, C., CAGAN, J. and KOTOVSKY, K., 2015. Rolling with the punches: An examination of team performance in a design task subject to drastic changes. *Design Studies*. 36, pp. 99–121
- MCFARLANE, C., DESAI, R. and GRAHAM, S., 2014. Informal urban sanitation: Everyday life, poverty, and comparison. *Annals of the Association of American Geographers*, 104(5), pp. 989-1011.
- MCGRANAHAN, G., 2013. Community-driven sanitation improvement in deprived urban neighbourhoods. *Pubs.iied.org*.
- MCGRANAHAN, G., 2015. Realising the Right to Sanitation in Deprived Urban Communities: Meeting the Challenges of Collective Action, Co-production, Affordability, and Housing Tenure. *World Development*, 68(0), pp. 242-253.
- MEHROTRA, R. and ROSE, P., 2014. Incremental Urbanism from Montreal. *Harvard Design Magazine: architecture, landscape architecture, urban design and planning*, (37), pp. 48.
- MELLES, G., KUYS, B., KAPOOR, A., RAJANAYAGAM, J., THOMAS, J. and MAHALINGAM, A., 2015. Designing Technology, Services and Systems for Social Impact in the Developing World: Strong Sustainability Required. *ICoRD'15—Research into Design Across Boundaries Volume 2*. Springer, pp. 89-97.
- MELO, J.C., 2005. The experience of condominium water and sewerage systems in Brazil. *Case studies from Brasilia, Salvador and Parauapebas*. Lima: Water and Sanitation Program Latin America.
- MELS, A., CASTELLANO, D., BRAADBAART, O., VEENSTRA, S., DIJKSTRA, I., MEULMAN, B., SINGELS, A. and WILSENACH, J., 2009. Sanitation services for the informal settlements of Cape Town, South Africa. *Desalination*, 248(1), pp. 330-337.
- METH, P., 2013. 'I Don't Like My Children to grow up in this Bad Area': Parental Anxieties about Living in Informal Settlements. *International Journal of Urban and Regional Research*, 37(2), pp. 537-555.
- MILES, I. and RIGBY, J., 2013. Demand-led innovation. In: D. COX and J. RIGBY, eds, *Innovation Policy Challenges for the 21st Century*. Routledge, pp. 36-63.
- MITCHELL, C., 2011. *Doing visual research*. London: Sage.

- MIT PRESS, 2015. Design issues. [ONLINE] Available at: <http://www.mitpressjournals.org/loi/desi> [Accessed 7 May 2015]
- MITLIN, D., 2008. With and beyond the state- co-production as a route to political influence, power and transformation for grassroots organisations. *Environment and Urbanisation*, 20(2), pp. 339-360.
- MJOLI, N. and BHAGWAN, J., 2012. Turning sanitation policy into practice. *Water Research Commission*. [ONLINE]. Available: http://www.ewisa.co.za/literature/files/68_19%20Mjoli.pdf. [Accessed 29 April 2015]
- MOLLATT, M.C., 2014. *Ecological Food Sense: Connections between food waste flows and food production in Enkanini Informal Settlement*. Stellenbosch University.
- MOORE, M.L. and WESTLEY, F., 2011. Surmountable chasms: networks and social innovation for resilient systems. *Ecology and Society*, 16(1), pp. 5.
- MORALES, M.D.C., HARRIS, L. and ÖBERG, G., 2014. Citizenshit: the right to flush and the urban sanitation imaginary. *Environment and Planning*, 46(12), pp. 2816-2833.
- MOREAU, C.P., 2011. Inviting the amateurs into the studio: understanding how consumer engagement in product design creates value. *Journal of Product Innovation Management*, 28(3), pp. 409-410.
- MOVIK, S. and MEHTA, L., 2009. Going with the flow? Directions of Innovation in the Water and Sanitation Domain.
- MPE, R. and OGRA, A., 2014. Making great places in slums/informal settlements, *Conference Proceedings: Planning Africa*.
- MUHAR, A., VISSER, J. and VAN BREDA, J., 2013. Experiences from establishing structured inter- and transdisciplinary doctoral programs in sustainability: a comparison of two cases in South Africa and Austria. *Journal of Cleaner Production*, 61, pp. 122-129.
- MUHULA, S.O., MEMIAH, P., SIBHATU, B, NDIRANGU, M. and KYOMUHANGI, L., 2015. Effects of highly active antiretroviral therapy on the survival of hiv-infected adult patients in urban slums of Kenya. *Pan African Medical Journal*, 20(63).
- MULLER, M., 2011. Iconography and iconology as a visual method and approach. In: E. MARGOLIS and L. PAUWELS, eds, *The Sage handbook of visual research methods*. London: Sage, pp. 281-297.
- MUNYAI, K. and M'RITHAA, M., 2010. Local indigenous cultures and modern design innovations: a South African perspective. *Conference proceedings Cumulus 2010 ShangHai conference, Young Creators For Better City & Better Life 2010*, ShangHai, pp. 347-352.

MURPHY, H.M., MCBEAN, E.A. and FARAHBAKHS, K., 2009. Appropriate technology—A comprehensive approach for water and sanitation in the developing world. *Technology in Society*, 31(2), pp. 158-167.

MURPHY, J., 2008. Transforming innovation and development practice in the Global South? Myths, realities and the prospects for base of the pyramid approaches. In: P. KANDACHAR and M. HALME, eds, *Sustainability challenges and solutions at the base of the pyramid: Business, technology and the poor*. Greenleaf Pub., pp. 412-429.

MURRAY, R., CAULIER-GRICE, J. and MULGAN, G., 2010. *The open book of social innovation*. The Young foundation, Nesta.

MURRAY, A. and RAY, I., 2010. Commentary: Back-End Users: The Unrecognised Stakeholders in Demand-Driven Sanitation. *Journal of Planning Education and Research*, 30(1), pp. 94-102.

MURUNGI, C. and VAN DIJK, M.P., 2014. Emptying, Transportation and Disposal of faecal sludge in informal settlements of Kampala Uganda: the economics of sanitation. *Habitat International*, 42, pp. 69-75.

MUSEMWA, M., 2010. From 'Sunshine City' to a Landscape of Disaster The Politics of Water, Sanitation and Disease in Harare, Zimbabwe, 1980–2009. *Journal of Developing Societies*, 26(2), pp. 165-206.

NANCE, E., 2013. *Engineers and Communities: Transforming Sanitation in Contemporary Brazil*. Plymouth: Rowman & Littlefield.

NANCE, E. and ORTOLANO, L., 2007. Community Participation in Urban Sanitation Experiences in Northeastern Brazil. *Journal of Planning Education and Research*, 26(3), pp. 284-300.

NARAG, R. and MAXWELL, S.R., 2013. Understanding cultural context when collecting field data: lessons learned from field research in a slum area in the Philippines. *Qualitative Research*, p.1468794112473496.

NEWELL, A.F., GREGOR, P., MORGAN, M., PULLIN, G. and MACAULAY, C., 2011. User-sensitive inclusive design. *Universal Access in the Information Society*, 10(3), pp. 235-243.

NILSSON, D., 2006. A heritage of unsustainability? Reviewing the origin of the large-scale water and sanitation system in Kampala, Uganda. *Environment and Urbanization*, 18(2), pp. 369-385.

NILSSON, B., PETERSON, B., HOLDEN, G. and ECKERT, C., 2011. Design Med Omtanke: Participation and sustainability in the design of public sector buildings. *Design Studies*, 32(3), pp. 235-254.

NITTI, R. and DAHIYA, B., 2004. Community Driven Development in Urban Upgrading. Washington DC: World Bank.

NJOH, A.J., 2015. An OLS analysis of the impact of colonialism on inter-country differentials in slum incidence in Africa. *Cities*, 44, pp. 104-111.

NORMAN, D.A. and VERGANTI, R., 2014. Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change. *Design Issues*, 30(1), pp. 78-96.

NYENJE, P., HAVIK, J., FOPPEN, J., MUWANGA, A. and KULABAKO, R., 2014. Understanding the fate of sanitation-related nutrients in a shallow sandy aquifer below an urban slum area. *Journal of contaminant hydrology*, 164, pp. 259-274.

O'REILLY, K. and LOUIS, E., 2014. The toilet tripod: Understanding successful sanitation in rural India. *Health & place*, 29, pp. 43-51.

OBENG-ODOOM, F., 2014. The State of African Cities 2014. *Journal of Asian and African Studies*, 0021909614547604.

ODOM, W., SELBY, M., SELLEN, A., KIRK, D., BANKS, R. and REGAN, T., 2012. Photobox: on the design of a slow technology, *Proceedings of the Designing Interactive Systems Conference 2012*, ACM, pp. 665-668.

OKURUT, K., KULABAKO, R., ABBOTT, P., ADOGO, J., CHENOWETH, J., PEDLEY, S., TSINDA, A. and CHARLES, K., 2014. Access to improved sanitation facilities in low-income informal settlements of East African cities. IWA.

OKURUT, K., KULABAKO, R.N., CHENOWETH, J. and CHARLES, K., 2015. Assessing demand for improved sustainable sanitation in low-income informal settlements of urban areas: a critical review. *International journal of environmental health research*, 25(1), pp. 81-95.

OLDFIELD, S. and PARNELL, S., 2014. From the South. In: S. PARNELL and S. OLDFIELD, eds, *The Routledge handbook on cities of the global south*. Routledge, pp. 1-4.

O'NEILL, M., 2015. Ecological Sanitation-A Logical Choice? The Development of the Sanitation Institution in a World Society. *Tampereen teknillinen yliopisto. Julkaisu-Tampere University of Technology. Publication; 1284*.

OOSTERVEER, P. and SPAARGAREN, G., 2010. Meeting social challenges in developing sustainable environmental infrastructures in East African cities. Social perspectives on the sanitation challenge. Springer, pp. 11-30.

OPP-RTI (ORANGI PILOT PROJECT RESEARCH AND TRAINING INSTITUTE) 2012. [ONLINE] Available at: <http://www.oppinstitutions.org/>. [Accessed 2 December 2014]

- OSTROM, E., 1996. Crossing the great divide: co-production, synergy, and development. *World Development*, 24(6), pp. 1073-1087.
- O'SULLIVAN, D., and DOOLEY, L., 2009. *Applying innovation*. CA: Sage.
- OTI, S.O., VAN DE VIJVER, S. and KYOBUTUNGI, C., 2014. Trends in non-communicable disease mortality among adult residents in Nairobi's slums, 2003-2011: applying InterVA-4 to verbal autopsy data. *Global health action*, 7, pp. 25533.
- OTSUKI, K., GERA, W. and MUNGAI, D., 2013. Multi-Actor Approaches to Total Sanitation in Africa. *Policy Brief*, (8). United Nations University Press.
- OWEN, C., DOVEY, K. and RAHARJO, W., 2013. Teaching Informal Urbanism: Simulating Informal Settlement Practices in the Design Studio. *Journal of Architectural Education*, 67(2), pp. 214-223.
- OWEN, R., MACNAGHTEN, P. and STILGOE, J., 2012. Responsible research and innovation: From science in society to science for society, with society. *Science and Public Policy*, 39(6), pp. 751-760.
- PANSERA, M. and OWEN, R., 2014. Framing resource-constrained innovation at the 'bottom of the pyramid': Insights from an ethnographic case study in rural Bangladesh. *Technological Forecasting and Social Change*. 92, pp. 300–311
- PAPAIOANNOU, T., 2014. How inclusive can innovation and development be in the twenty-first century? *Innovation and Development*, 4(2), pp. 187-202.
- PAPANEEK, V. and FULLER, R.B., 1972. *Design for the real world*. London: Thames and Hudson.
- PARNELL, S. and WALAWEGE, R., 2011. Sub-Saharan African urbanisation and global environmental change. *Global Environmental Change*, 21, pp. S12-S20.
- PARNELL, S. and ROBINSON, J., 2012. (Re)theorising Cities from the Global South: Looking Beyond Neoliberalism. *Urban Geography*, 33(4), pp. 593-617.
- PATEL, S., 2015. The 20-year sanitation partnership of Mumbai and the Indian Alliance. *Environment and Urbanisation*, 0956247815569698.
- PATERSON, C., MARA, D. and CURTIS, T., 2007. Pro-poor sanitation technologies. *Geoforum*, 38(5), pp. 901-907.
- PEINE, A. and HERRMANN, A.M., 2012. The sources of use knowledge: Towards integrating the dynamics of technology use and design in the articulation of societal challenges. *Technological Forecasting and Social Change*, 79(8), pp. 1495-1512.

- PENNINGTON, D.D., SIMPSON, G.L., MCCONNELL, M.S., FAIR, J.M. and BAKER, R.J., 2013. Transdisciplinary research, transformative learning, and transformative science. *Bioscience*, 63(7), pp. 564-573.
- PERIAGO, M.R., FRIEDEN, T.R., TAPPERO, J.W., DE COCK, K.M., AASEN, B. and ANDRUS, J.K., 2012. Elimination of cholera transmission in Haiti and the Dominican Republic. *The Lancet*, 379(9812), pp. e12-e13.
- PERRY, G., MALONEY, W., ARIAS, O., FAJNZYLBER, P., MASON, A. and SAAVEDRA, J., 2007. Informality: Exit and Exclusion, World Bank Latin America and Caribbean Studies. World Bank, Washington DC.
- PIETERSE, E., 2011A. Rethinking African urbanism from the slum. *Power*, 26(14.1), pp. 40.8.
- PIETERSE, E., 2011B. Building new worlds: Design and the second urban transition. In: C.E. SMITH, ed, *Design with the other 90%: Cities*. New York: Cooper-Hewitt, National Design Museum, Smithsonian institution, pp. 40-53.
- PIETERSE, E., 2010. Cityness and African urban development, *Urban Forum 2010*, Springer, pp. 205-219.
- PIETERSE, E., 2013. Grasping the unknowable: coming to grips with African urbanisms. In: E. PIETERSE and A. SIMONE, eds, *Rogue urbanism: emergent African cities*. Jacana Media, pp. 19-36.
- PINK, S., 2012. *Advances in visual methodology*. London: Sage Publications Ltd.
- PITHEY, S., 2007. Water and Sanitation in the City of Cape Town—Integrated Analysis Baseline Report. *Report compiled for the UNDP*. Stellenbosch: Sustainability Institute.
- PITHOUSE, R., 2014. The Shack Settlement as a Site of Politics: Reflections from South Africa. *Agrarian South: Journal of Political Economy*, 3(2), pp. 179-201.
- POHL, C., RIST, S., ZIMMERMANN, A., FRY, P., GURUNG, G.S., SCHNEIDER, F., SPERANZA, C.I., KITEME, B., BOILLAT, S. and SERRANO, E., 2010. Researchers' roles in knowledge co-production: experience from sustainability research in Kenya, Switzerland, Bolivia and Nepal. *Science and Public Policy*, 37(4), pp. 267-281.
- POHL, C., 2011. What is progress in transdisciplinary research? *Futures*, 43(6), pp. 618-626.
- POHL, C. and HADORN, G.H., 2008. Core terms in transdisciplinary research. In: G.H. HADORN, H. HOFFMANN-RIEM, S. BIBER-KLEMM, W. GROSSENBACHER-MANSUY, D. JOYE, C. POHL, U. WIESMANN and E. ZEMP, eds, *Handbook of transdisciplinary research*. Springer, pp. 427-432.
- POLK, M., 2015. Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. *Futures*, 65(0), pp. 110-122.

POLK, M., 2014. Achieving the promise of transdisciplinarity: a critical exploration of the relationship between transdisciplinary research and societal problem solving. *Sustainability Science*, 9(4), pp. 439-451.

PORTABLE SANITATION ASSOCIATION INTERNATIONAL, 2013. The poo wars in Cape Town, South Africa have escalated. [ONLINE] Available at: <http://psai.org/the-poo-wars-in-cape-town-south-africa/> [Accessed 3 April 2015]

POULIS, K., POULIS, E. and PLAKOYIANNAKI, E., 2013. The role of context in case study selection: An international business perspective. *International Business Review*, 22(1), pp. 304-314.

PRACTICAL ACTION, 2014. Water and sanitation. [ONLINE] Available at: <http://practicalaction.org/water-and-sanitation>. [Accessed 23 April 2015]

PRAHALAD, C., 2012. Bottom of the Pyramid as a Source of Breakthrough Innovations. *Journal of Product Innovation Management*, 29(1), pp. 6-12.

QUESENBERY, W. and BROOKS, K., 2010. *Storytelling for user experience: Crafting stories for better design*. New York: Rosenfeld Media.

RADMORE, J.V., 2015. Microfranchising alternative service delivery configurations—creating economic and energy resilience with the iShack, Unpublished Masters Thesis, Stellenbosch University.

RAIJMAKERS, B., VAN DIJK, G., LEE, Y. and WILLIAMS, S.A., 2009. Designing Empathic Conversations for Inclusive Design Facilitation. *Include 2009*.

RAZZOUK, R. and SHUTE, V., 2012. What is design thinking and why is it important? *Review of Educational Research*, 0034654312457429.

REGEER, B.J. and BUNDERS, J.F.G., 2009. Knowledge co-creation: Interaction between science and society. *A Transdisciplinary Approach to Complex Societal Issues*. Den Haag: Advisory Council for Research on Spatial Planning, Nature and the Environment/Consultative Committee of Sector Councils in the Netherlands [RMNO/COS].

REMENYI, D., 2012. *Case study research, the quick guide series*. United Kingdom: Academic publishing ltd.

RICHARDS, L., 2009. *Handling qualitative data: A practical guide*. London: Sage.

RICKINSON, M., SEBBA, J. and EDWARDS, A., 2011. *Improving research through user engagement*. New York: Routledge.

RITCHIE, J., LEWIS, J., NICHOLLS, C.M. and ORMSTON, R., 2013. *Qualitative research practice: A guide for social science students and researchers*. Los Angeles: Sage.

- ROBERTSON, T. and SIMONSEN, J., 2012. Challenges and opportunities in contemporary participatory design. *Design Issues*, 28(3), pp. 3-9.
- ROBINS, S., 2014A. Poo wars as matter out of place: 'Toilets for Africa' in Cape Town. *Anthropology Today*, 30(1), pp. 1-3.
- ROBINS, S., 2014B. The 2011 Toilet Wars in South Africa: Justice and Transition between the Exceptional and the Everyday after Apartheid. *Development and Change*, 45(3), pp. 479-501.
- ROSENDAHL, J., ZANELLA, M.A., RIST, S. and WEIGELT, J., 2015. Scientists' situated knowledge: Strong objectivity in transdisciplinarity. *Futures*, 65(0), pp. 17-27.
- ROY, A., 2014. Worlding the South- towards a post-colonial urban theory. In: S. PARNELL and S. OLDFIELD, eds, *The Routledge handbook on cities of the global south*. Routledge, pp. 9-22.
- ROY, D., LEES, M.H., PALAVALLI, B., PFEFFER, K. and SLOOT, M.P., 2014. The emergence of slums: A contemporary view on simulation models. *Environmental Modelling & Software*, 59, pp. 76-90.
- SAHRC (South African Human Rights Commission) 2014. Report on the right to access sufficient water and decent sanitation in South Africa. SA: SAHRC.
- SALDAÑA, J., 2013. *The coding manual for qualitative researchers*. London: Sage.
- SANDERS, E.B. and STAPPERS, P.J., 2008. Co-creation and the new landscapes of design. *Co-design*, 4(1), pp. 5-18.
- SANTOLARIA, M., OLIVER-SOLÀ, J., GASOL, C.M., MORALES-PINZÓN, T. and RIERADEVALL, J., 2011. Eco-design in innovation driven companies: perception, predictions and the main drivers of integration. The Spanish example. *Journal of Cleaner Production*, 19(12), pp. 1315-1323.
- SATTERTHWAITE, D., MITLIN, D. and BARTLETT, S., 2015. Is it possible to reach low-income urban dwellers with good-quality sanitation? *Environment and Urbanisation*, 27(1), pp. 3-18.
- SCHAPER-RINKEL, P. and WAGNER-LUPTACIK, P., 2014. Design thinking. In A. BUTZIN, A. DAVIS, D. DMITRI, H. JÜRGEN, K. CHRISTOPH, A. KESSELRING, R. KOPP, J. MILLARD, P. OEIJ, D. REHFELD, P. SCHAPER-RINKEL, M. SCHWARZ, A. SCOPPETTA, P. WAGNER-LUPTACIK, and M. WEBER, 2014. Other authors. *Theoretical Approaches to Social Innovation—A Critical Literature*. D1.1. Dortmund: Social Innovation: Driving Force of Social Change (SI-Drive)
- SEBITOSI, B., 2012. Alternative solutions for sustainable waste water management. In: M. SWILLING, B. SEBITOSI and R. LOOTS, eds, *Sustainable Stellenbosch: Opening dialogues*. Stellenbosch: AFRICAN SUN MeDIA, pp. 139-150.

- SEELIGER, L. and TUROK, I., 2014. Averting a downward spiral: building resilience in informal urban settlements through adaptive governance. *Environment and Urbanisation*, 26(1), pp. 184-199.
- SENGERS, P., BOEHNER, K., DAVID, S. and KAYE, J., 2005. Reflective design, *Proceedings of the 4th decennial conference on Critical computing: between sense and sensibility 2005*, ACM, pp. 49-58.
- SERNA-MANSOUX, L., POPOFF, A. and MILLET, D., 2014. A Simplified Model to Include Dynamic Product-User Interaction in the Eco-Design Process. *Journal of Industrial Ecology*, 18(4), pp. 529-544.
- SHI, L. and CHEW, M.Y.L., 2012. A review on sustainable design of renewable energy systems. *Renewable and Sustainable Energy Reviews*, 16(1), pp. 192-207.
- SHORTT, N.K. and HAMMETT, D., 2013. Housing and health in an informal settlement upgrade in Cape Town, South Africa. *Journal of housing and the built environment*, 28(4), pp. 615-627.
- SILVA, C.N., 2013. Colonial architecture and urbanism in Africa. Intertwined and contested histories. *Planning Perspectives*, 28(1), pp. 156-159.
- SILVA, C.N., 2012. Urban planning in Sub-Saharan Africa: A new role in the urban transition. *Cities*, 29(3), pp. 155-157.
- SIMONE, A. 2015. "Infrastructure: Introductory Commentary" Curated Collections, Cultural Anthropology Online, [ONLINE] Available at: http://www.culanth.org/curated_collections/11-infrastructure/discussions/12-infrastructure-introductory-commentary-by-abdoumalik-simone [Accessed 2 February 2016]
- SIMONE, A., 2006. South African urbanism: between the modern and the refugee camp. In: M.J. MURRAY and G.A. MYERS, eds, *Cities in contemporary Africa*. Palgrave Macmillan, pp. 241-247.
- SKUSE, A. and COUSINS, T., 2007. Spaces of resistance: informal settlement, communication and community organisation in a Cape Town township. *Urban Studies*, 44(5-6), pp. 979-995.
- SLAVIN, T., 2015. The winning entry in a Bill Gates-funded design challenge provides clean water, generates power ... and makes a profit. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/2015/jan/20/turning-human-waste-into-drinking-water>. [Accessed 30 January 2015]
- SMITHSONIAN DESIGN MUSEUM, n.d. Design other 90 network. [ONLINE] Available at <http://www.designother90.org/> [Accessed 5 May 2015]
- SMULDERS, F., DORST, K. and VERMAAS, P., 2014. Applying design thinking elsewhere: Organisational context matters, *Proceedings of the 19th DMI: Academic design management conference, 2797-2817. (2014)*. The Design Management Institute.

- STANFORD UNIVERSITY, 2012. Extreme, design for extreme affordability. [ONLINE] Available at: <http://extreme.stanford.edu/>. [Accessed 2 February 2015]
- STAPPERS, P.J. and VISSER, F.S., 2007. Bringing participatory design techniques to industrial design engineers, *DS 43: Proceedings of E&PDE 2007, the 9th International Conference on Engineering and Product Design Education, University of Northumbria, Newcastle, UK, 13.-14.09. 2007* 2007.
- STATISTICS SOUTH AFRICA, 2012. Census 2011. Statistical release (Revised) P0301.4.
- STEEN, M., 2011. Tensions in human-centred design. *CoDesign*, 7(1), pp. 45-60.
- STELLENBOSCH MUNICIPALITY, 2013. *Enkanini (Kayamandi) Household Enumeration report*, Stellenbosch.
- STERN, N.H., 2007. *The economics of climate change: the Stern review*. Cambridge University press.
- STILL, D. and LOUTON, B., 2012. Piloting and testing the pour-flush latrine technology for its applicability in South Africa. WRC Report No. 1887/1/12. Gezina: WRC.
- STRAUSS, M. and LIEBENBERG, S., 2014. Contested spaces: Housing rights and evictions law in post-apartheid South Africa. *Planning Theory*, 1473095214525150.
- SUSTAINABLE DEVELOPMENT KNOWLEDGE PLATFORM, 2015. [ONLINE] Available at: <https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals> [Accessed 11 May 2015]
- SWAHN, M.H., BRAUNSTEIN, S. and KASIRYE, R., 2014. Demographic and psychosocial characteristics of mobile phone ownership and usage among youth living in the slums of Kampala, Uganda. *Western Journal of Emergency Medicine*, 15(5), pp. 600.
- SWILLING, M., 2013. Reconceptualising urbanism, ecology and networked infrastructure. In: E.A. PIETERSE and A. SIMONE, eds, *Rogue urbanism: emergent African cities*. Jacana Media, pp. 65-82.
- SWILLING, M., 2012A. So what is so unsustainable about the global economy?: main article. *CME: Your SA Journal of CPD: Climate change and health*, 30(3), pp. 68-71.
- SWILLING, M., 2012B. Preface. In: M. SWILLING, B. SEBITOSI and R. LOOTS, eds, *Sustainable Stellenbosch: Opening dialogues*. AFRICAN SUN MeDIA, pp. xiii-xiv.
- SWILLING, M., 2010A. Africa 2050—Growth, Resource Productivity and Decoupling, *Policy brief for the 7th meeting of the International Panel for Sustainable Resource Management of the United Nations Environment Programme (UNEP) 2010*.
- TAEBI, B., CORRELJE, A., CUPPEN, E., DIGNUM, M. and PESCH, U., 2014. Responsible innovation as an endorsement of public values: The need for interdisciplinary research. *Journal of Responsible Innovation*, 1(1), pp. 118-124.

TAING, L., PAN, S., HILLIGAN, J., SPIEGEL, A. and ARMITAGE, N., 2013. Challenges facing sanitation-provision partnerships for informal settlements: a South African case study. *Journal of Water, Sanitation and Hygiene for Development*, 3(2), pp. 230-239.

TAVENER-SMITH, L., 2012. Housing: The challenge of informal settlements. In: M. SWILLING, B. SEBITOSI and R. LOOTS, eds, *Sustainable Stellenbosch: Opening dialogues*. AFRICAN SUN MeDIA, pp. 68-81.

TAYLOR & FRANCIS ONLINE, 2015. Codesign, international journal of cocreation in design and the arts. [ONLINE] Available at: <http://www.tandfonline.com/toc/ncdn20/current> [Accessed: 7 May 2015]

THOMAS, G., 2011. A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative inquiry*, 17(6), pp. 511-521.

TILLEY, E., STRANDE, L., LÜTHI, C., MOSLER, H., UDERT, K.M., GEBAUER, H. and HERING, J.G., 2014. (TILLEY ET AL. 2014A). Looking beyond Technology: An Integrated Approach to Water, Sanitation and Hygiene in Low Income Countries. *Environmental science & technology*, 48(17), pp. 9965-9970.

TILLEY, E., ULRICH, L., LÜTHI, C., REYMOND, P. and ZURBRÜGG, C., 2014. (TILLEY ET AL. 2014B). *Compendium of sanitation systems and technologies*. 2nd edition edn. Dübendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag).

TISSINGTON, K., 2011. *Basic Sanitation in South Africa: A Guide to Legislation, Policy and Practice*. Johannesburg: Socio-Economic Rights Institute of South Africa (SERI).

TINOCO, M., CORTOBIUS, M., GRAJALES, M.D. and KJELLÉN, M., 2014. Water Co-operation between Cultures: Partnerships with Indigenous Peoples for Sustainable Water and Sanitation Services. *Aquatic Procedia*, 2(0), pp. 55-62.

TONKISS, F., 2013. *Cities by design: the social life of urban form*. UK: John Wiley & Sons.

TROJER, L., RYDHAGEN, B. and KJELLQVISTT, T., 2014. Inclusive innovation processes—experiences from Uganda and Tanzania. *African Journal of Science, Technology, Innovation and Development*, 6(5), pp. 425-438.

TSANG, E.W., 2013. Case study methodology: causal explanation, contextualisation, and theorising. *Journal of international management*, 19(2), pp. 195-202.

TSENG, T. and RESNICK, M., 2014. Product versus process: representing and appropriating DIY projects online, *Proceedings of the 2014 conference on Designing interactive systems 2014*, ACM, pp. 425-428.

TUKAHIRWA, J.T., MOL, A.P.J. and OOSTERVEER, P., 2013. Comparing urban sanitation and solid waste management in East African metropolises: The role of civil society organisations. *Cities*, 30, pp. 204-211.

TUMWEBAZE, I.K., NIWAGABA, C.B., GÜNTHER, I. and MOSLER, H., 2014. Determinants of households' cleaning intention for shared toilets: case of 50 slums in Kampala, Uganda. *Habitat International*, 41, pp. 108-113.

TURNHOUT, E., STUIVER, M., KLOSTERMANN, J., HARMS, B. and LEEUWIS, C., 2013. New roles of science in society: Different repertoires of knowledge brokering. *Science and Public Policy*, 40(3), pp. 354-365.

TUROK, I., 2013. Securing the resurgence of African cities. *Local Economy*, 28(2), pp. 142-157.

UMANDE TRUST, 2014. Bio-centre innovations. [ONLINE] Available at: <http://umande.org/bio-center-innovations/> [Accessed 12 December 2014]

UN (United Nations), 2015. We can end poverty, Millennium development goals and beyond 2015. [ONLINE] Available at: <http://www.un.org/millenniumgoals/environ.shtml> [Accessed 04 April 2015]

UNDERHILL, G., 2013. 'Zille: Poo-flinging attacks politically motivated', Mail & Guardian. [ONLINE] Available at: <http://mg.co.za/article/2013-08-30-zille-poo-flinging-attacks-politically-motivated> [Accessed 17 November 2014]

UN-HABITAT, 2004. The challenge of slums: global report on human settlements 2003. Nairobi: UN-Habitat.

UN-HABITAT. 2013. State of the world's cities 2012/2013: prosperity of cities. Routledge.

UN-HABITAT, 2014. The State of African Cities: Re-Imagining Sustainable Urban Transitions. Nairobi: UN-Habitat.

UNICEF, 2003. Water, sanitation and hygiene, Statistics. [ONLINE] Available at: http://www.unicef.org/wash/index_statistics.html [Accessed 15 April 2015]

UNICEF, 2014. WASH technical brief: Key findings of a sanitation supply chains study in Eastern and Southern Africa. Eastern and Southern Africa regional office.

USHIJIMA, K., IRIE, M., SINTAWARDANI, N., TRIASTUTI, J., HAMIDAH, U., ISHIKAWA, T. and FUNAMIZU, N., 2013. Sustainable design of sanitation system based on material and value flow analysis for urban slum in Indonesia. *Frontiers of Environmental Science & Engineering*, 7(1), pp. 120-126.

- VAISMORADI, M., TURUNEN, H. and BONDAS, T., 2013. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & health sciences*, 15(3), pp. 398-405.
- VALLET, F., EYNARD, B., MILLET, D., MAHUT, S.G., TYL, B. and BERTOLUCI, G., 2013. Using eco-design tools: An overview of experts' practices. *Design Studies*, 34(3), pp. 345-377.
- VAN BOEIJEN, A. and STAPPERS, P.J., 2011. Preparing Western designers for the use of contextmapping techniques in non-Western situations, *DS 69: Proceedings of E&PDE 2011, the 13th International Conference on Engineering and Product Design Education, London, UK, 08.-09.09. 2011*.
- VAN OUDHEUSDEN, M., 2014. Where are the politics in responsible innovation? European governance, technology assessments, and beyond. *Journal of Responsible Innovation*, 1(1), pp. 67-86.
- VAN VLIET, B.J., SPAARGAREN, G. and OOSTERVEER, P., 2011. Sanitation under challenge: contributions from the social sciences. *Water Policy*, 13(6), pp. 797-809.
- VAN VLIET, B., SPAARGAREN, G. and OOSTERVEER, P., 2010. *Social perspectives on the sanitation challenge*. Springer.
- VAN VUUREN, L., 2014. No flash in the pan: how pour-flush toilets are driving away SA's sanitation backlog. *Water wheel*, 13(4), pp. 16-20.
- VASUDEVAN, A., 2014. The makeshift city: Towards a global geography of squatting. *Progress in Human Geography*, 0309132514531471.
- VERBEEK, P., 2012. Introduction: humanity in Design, a few notes on the relations between anthropology and materiality. In: W. GUNN and J. DONOVAN, eds, *Design and Anthropology*. Ashgate Publishing Ltd, pp. 163-176.
- VEZZOLI, C. and MANZINI, E., 2008. *Design for environmental sustainability*. London: Springer Verlag.
- VEZZOLI, C., DELFINO, E. and AMBOLE, L.A., 2014. System Design for Sustainable Energy for all. A new challenging role for design to foster sustainable development. *FORMakademisk*, 7(3).
- VON DER HEYDE, V., 2014. *Towards a sustainable incremental waste management system in Enkanini: A transdisciplinary case study*. Stellenbosch University.
- VON THIENEN, J., NOWESKI, C., MEINEL, C. and RAUTH, I., 2011. The Co-evolution of Theory and Practice in Design Thinking—or—"Mind the Oddness Trap!" *Design Thinking*. Springer, pp. 81-99.
- WALDMAN, R.J., MINTZ, E.D. and PAPOWITZ, H.E., 2013. The cure for cholera- improving access to safe water and sanitation. *New England Journal of Medicine*, 368(7), pp. 592-594.

WALKER, S., 2011. *The spirit of design*. London: Earthscan.

WALL, J., STAHL, B. and DAYNES, S., 2014. Critical Discourse Analysis as a Theory and Review Methodology. *Proceedings of the Twentieth Americas Conference on Information Systems 2014*, Savannah.

WARR, A. and O'NEILL, E., 2005. Understanding design as a social creative process, *Proceedings of the 5th conference on Creativity & cognition 2005*, ACM, pp. 118-127.

WATER AND SANITATION PROGRAM (WSP), 2011. *Water Supply and Sanitation in South Africa: Turning Finance into Services for 2015 and Beyond*. Nairobi: World Bank.

WATER DIALOGUES SYNTHESIS REPORT 2009-CAPE TOWN CASE STUDY, THE. 2009. Cape Town (informal sanitation). [ONLINE] Available: <http://www.waterdialogues.org/south-africa/documents/p.46CapeTownCaseStudySummary.pdf>. [Accessed 14 February 2015]

WATER RESEARCH COMMISSION (WRC), 2014. *Sanitation matters a magazine for Southern Africa*. Issue 6- 2014. Gezina: WRC.

WATKINS, A., PAPAIOANNOU, T., KALE, D. and MUGWAGWA, J., 2014. National innovation systems, developing countries, and the role of intermediaries: a critical review of the literature. In *15th International Conference of the International Joseph A. Schumpeter Society (ISS)*, 27-30 July 2014, Jena, Germany.

WATSON, V., 2014. African urban fantasies: dreams or nightmares? *Environment and Urbanisation*, 26(1), pp. 215-231.

WATTSJOHNSON, Y., 2009. Narrative inquiry and the discovery of self within the academy. In: S. KOURITZIN, N.P. PIQUEMAL and R. NORMAN, eds, *Qualitative research: Challenging the orthodoxies in standard academic discourse (s)*. New York: Routledge, pp. 247-262.

WEISS, L.M., 2014. Informal settlements and urban heritage landscapes in South Africa. *Journal of Social Archaeology*, 14(1), pp. 3-25.

WESSELS, B.S., 2015. *Turning points: Exploring power transitions in an incremental upgrading process in Enkanini*, Unpublished Masters thesis, Stellenbosch University.

WHAT IS UNIVERSAL DESIGN? 2015 [ONLINE] Available at: http://www.universaldesign.com/index.php?option=com_content&view=article&id=327:what-is-universal-design&catid=2196:universal-design&Itemid=113 [Accessed 23 April 2015]

WHO\UNICEF, 2014. *Progress On drinking water and sanitation- 2014 update*. Geneva: WHO.

WHO\UNICEF, 2008. *Progress On drinking water and sanitation- special focus on sanitation*. New York: UNICEF, and Geneva: WHO press.

- WICKSON, F. and CAREW, A.L., 2014. Quality criteria and indicators for responsible research and innovation: learning from transdisciplinarity. *Journal of Responsible Innovation*, 1(3), pp. 254-273.
- WICKSON, F., CAREW, A.L. and RUSSELL, A.W., 2006. Transdisciplinary research: characteristics, quandaries and quality. *Futures*, 38(9), pp. 1046-1059.
- WIEK, A., HARLOW, J., MELNICK, R., VAN DER LEEUW, S., FUKUSHI, K., TAKEUCHI, K., FARIOLI, F., YAMBA, F., BLAKE, A. and GEIGER, C., 2015. Sustainability science in action: a review of the state of the field through case studies on disaster recovery, bioenergy, and precautionary purchasing. *Sustainability Science*, 10(1), pp. 17-31.
- WINTER, K., 2010. Water and sanitation in the city of Cape Town: Sustainability uncertain. In: M. SWILLING, ed, *Sustaining Cape Town: imagining a livable city*. Sun Press/Sustainability Institute, pp. 101-114.
- YANG, C.J. and CHEN, J.L., 2011. Accelerating preliminary eco-innovation design for products that integrates case-based reasoning and TRIZ method. *Journal of Cleaner Production*, 19(9), pp. 998-1006.
- YIN, R.K., 2013. *Case study research: Design and methods*. Sage publications.
- YIN, R.K., 2011. *Qualitative research from start to finish*. Guilford Press.
- YIN, R.K., 2009. *Case study research: Design and methods*. London: Sage Publications, Inc.
- ZAKARIA, F., GARCIA, H.A., HOOIJMANS, C.M. and BRDJANOVIC, D., 2015. Decision support system for the provision of emergency sanitation. *Science of the Total Environment*, 512–513(0), pp. 645-658.
- ZAPPULLA, C., SUAUA, C. and FIKFAK, A., 2014. The pattern making of mega-slums on semantics in slum urban cultures. *Journal of Architecture and Urbanism*, 38(4), pp. 247-264.
- ZIERVOGEL, G., WADDELL, J., SMIT, W. and TAYLOR, A., 2014. Flooding in Cape Town's informal settlements: barriers to collaborative urban risk governance. *South African Geographical Journal*, (ahead-of-print), pp. 1-20.
- ZURBRÜGG, C. and TILLEY, E., 2009. A system perspective in sanitation - Human waste from cradle to grave and reincarnation. *Desalination*, 248(1–3), pp. 410-417.