Lay Designers: Grassroots Innovation for Appropriate Change Angus Donald Campbell

- 1 I have coined the term lay designer from the word layperson, which is most commonly used to refer to "a person who is not a member of a given profession." The etymology of the word has its earliest origins in the Greek laikos, meaning "of the people" or "common." The reason for not choosing other descriptors for such designers, for example, "citizen," "nonprofessional," "nonexpert," "informal," or "grassroots," is that many of these descriptors are already peppered with particular disciplinary meanings, and many of them insidiously hint at the superiority of the professional designer. A lay designer is therefore a common person who designs without any judgment of inferiority in terms of professionalized knowledge.
- 2 Kevin Slavin, "Design as Participation: A Consideration of Design as a Form of Participation in Complex Adaptive Systems," *Journal of Design and Science* 1 (2016), http://jods.mitpress.mit.edu/ pub/design-as-participation (accessed March 20, 2016); Bruno Latour, *Reas-sembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005).
- 3 Peter-Paul Verbeek, Moralizing Technology: Understanding and Designing the Morality of Things (Chicago: University of Chicago Press, 2011).
- 4 Ahmed Ansari, Danah Abdulla, Ece Canli, Mahmoud Keshavarz, Matthew Kiem, Pedro Oliveira, Luiza Prado, and Tristan Schultz, Decolonizing Design, http://www.decolonisingdesign.com/ general/2016/editorial/; Nabeel Hamdi, Small Change: About the Art of Practice and the Limits of Planning in Cities (Oxon, UK: Earthscan, 2004).
- 5 Anil Gupta, Grassroots Innovation: Minds on the Margin Are Not Marginal Minds (Haryana: Penguin Books India, 2016); Thomas P. Kasulis, Intimacy or Integrity:

We are all designers. Everyone actively plans and intentionally changes their circumstances with the goal of bettering themselves. Their efforts are relevant to their personal contexts, and even if these efforts fail, they are important lessons in a process of finding more suitable solutions. Despite actively designing lives in this way, not everyone is considered to be a "designer." This title is reserved for those who have been admitted into the profession through a mode of design education that sets the designer apart from the user. The result of this distinction is that professional designers often disregard the users' design agency. Negating the power of "lay designers,"¹ thus, is arguably at the cost of the relevance of the final design to those who are intended to use it. This is nowhere more evident than in so-called developing contexts, where people have always been driven to design and innovate due to inequality, poverty, and unmet needs. Too often in such contexts, professional designers individually develop solutions that are inappropriate for the intended users. It is argued that if design professionals were to align their skills with lay designers, the existing and highly appropriate attempts to solve problems undertaken by these creative people might be amplified, rather than disregarded.

This article intends to add to the current professional and academic design discourse on participation in a complex and highly networked society,² with particular relevance to ethical,³ political,⁴ and power inequalities.⁵ The exploration of lay designers adds to Ezio Manzini's recent book that introduces social innovation as a process of "design[ing], when everybody designs."⁶ In the milieu of diffuse and expert design, Manzini challenges contemporary designers by reminding them that they "find themselves in a world where everybody designs and where, as we have seen, their task tends to be to use their own initiatives to help a variegated array of social actors to design better."⁷ This article seeks to highlight the importance of the lay designer, specifically within marginalized communities, and challenges professional designers to shift their gaze beyond human-centered design to those who design without a formal title. It takes up Manzini's challenge by exploring how professional designers can bring about more authentic change by supporting the efforts of those designing on the margins. This is of particular relevance to contemporary professional designers who face worldwide economic and environmental unsustainability.

The article begins with an exploration of the metamorphosis of design from modern to more democratic, and then explores the concept of grassroots innovation and how it relates to lay designers. This is followed by a collection of visual examples of grassroots innovations from southern Africa. This collection of highly creative and particularly sustainable solutions, created by lay designers, shifts the professional designer's gaze to what already exists. Finally, the potential benefit of professional designers to amplify the work of lay designers is presented as a means to bring about more appropriate change.

From Modern to Democratic Design

Design has evolved greatly since the World War II transformation of wartime infrastructure into the production of products, services, or structures that represented a slick, consumer-focused, and resolutely modern image of the world. Professional design began as a technology-centered discipline, which sought to create "expert" solutions that could be imparted to users.⁸ At the turn of the twenty-first century, particularly in the context of international development, this modernizing approach was "heavily criticized for its ethnocentric view on the world, its lack of attention to local contexts and cultural diversity, and its assumptions that [...] technologies are neutral and value free and can therefore easily be transferred to other contexts."9 Critiques like these prompted professional designers to develop more participatory approaches to better contextualize their efforts. These approaches evolved to become a collection of human-centered design methods that focused on including potential users of products, services, and spaces in the design process.¹⁰ Although human-centered design is participatory, the focus is on understanding users and their context rather than exploring how people are already designing to meet their own needs. Social innovation is shedding some light on how lay designers are designing in their contexts, but the majority of professional designers have not been trained to consciously seek and identify lay designers within communities. This oversight has resulted in professional designers often missing the valuable insights and, in some cases, solutions offered by lay designers. This is of particular relevance when professional designers come from different contexts to those they are working with, especially when these communities are marginalized.

Philosophy and Cultural Difference (Honolulu: University of Hawai'i Press, 2002); Achille Mbembe, "Decolonizing Knowledge and the Question of the Archive," Africa Is a Country, 2015, https://africaisacountry.atavist.com/ decolonizing-knowledge-and-the-question-of-the-archive (accessed May 25, 2016).

- 6 Ezio Manzini, Design, When Everybody Designs: An Introduction to Design for Social Innovation (Cambridge, MA: MIT Press, 2015).
- 7 Manzini, *Design, When Everybody Designs*, 2.
- 8 Klaus Krippendorf, *The Semantic Turn: A New Foundation for Design* (Boca Raton, FL: Taylor & Francis, 2006), 31–32.
- 9 Dorien Baelden and Leo Van Audenhove, "Participative ICT4D and Living Lab Research: The Case Study of a Mobile Social Media Application in a Rural Tanzanian University Setting," *Telematics and Informatics* 32 (2015): 842–52.
- 10 Marc Steen, "Tensions in Human-Centred Design," *CoDesign: International Journal* of Cocreation in Design and the Arts 1 (March 2011): 45–60.

Grassroots Innovation

Similar concepts to that of a lay designer have been explored as "nonexpert" designers in social innovation," as "innovators and rationalizers" in technological disobedience,¹² as "informal" designers in informal urbanism,13 and fleetingly as "citizen" designers.¹⁴ However, upon wider exploration, an extensive body of literature exists about similarly ingenious people under the guise of the "grassroots innovator."15 Common colloquial descriptions of grassroots innovation include do-it-yourself or DIY (United States), hacking (England), jugaad (India), 自主创新 or zizhu chuangxin (China), Trick 17 (Germany), gambiarra (Brazil), système D. (France), and jua kali (Kenya). Descriptions within South Africa include: in isiZulu, izenzele; in Sesotho, iketsetse; and in Setswana, itirele; all refer to doing it your-self and being self-sufficient.16 Afrikaans speakers also describe how "'n boer maak 'n plan" [a farmer makes a plan]. Although originating from the same ingenious spirit, there are two forms of grassroots innovation, delimited by the inventor's socioeconomic position. The first exists due to the accessibility of decentralized and affordable technology, such as rapid prototyping, resulting in a more creative consumer,17 or "maker."18 The second, and the focus of this article, is a so-called low-tech approach consisting of improvised or makeshift solutions born from ingenuity and cleverness by knowledge-rich, economically poor people: "innovations by the poor for the poor."19

It is important to note that the terms *DIY*, *hack*, or *jugaard* do not necessarily have positive connotations. They can allude to fast and cheap solutions at the expense of quality workmanship. Ingenuity is not always thought to be positively pragmatic, since activities undertaken by people in desperation can sometimes be destructive. Unmet needs (and sometimes wants) drive people to creatively find solutions on both sides of the law, and hence one finds a problematic and pragmatic side of the same lay designer coin. From my experience, problematic solutions are only evident where basic human needs are not being met through current legitimate avenues or where legitimate avenues are economically exorbitant, as the English proverb highlights: "necessity is the mother of invention."

In his book *Making Do*, Steve Daniels explores grassroots innovation in Kenya's informal economy by roadside "engineers" or *jua kali*. *Jua kali* is Swahili for "hot sun,"²⁰ which describes the conditions these lay designers work under. These circumstances, however, have led the *jua kali* to demonstrate creative problem solving within limited means. The story of Malawian William Kamkwamba is similar. With limited access to textbooks at his local library, found materials, and gritty determination, he developed a basic electric windmill with the hope that it would power

- 11 Manzini, Design, *When Everybody Designs.*
- 12 Ernesto Oroza, "Technological Disobedience: From Revolution to Revolico.com," Technological Disobedience, 2016, http:// www.technologicaldisobedience.com/ (accessed July 20, 2016).
- 13 Christain Werthmann, "Informal Urbanism—Habitat Universities Thematic Hub," UN Habitat, 2014, http://unhabitat. org/wp-content/uploads/2014/03/Hub-Informal-Urbanism.pdf (accessed July 1, 2016).
- 14 Steven Heller and Véronique Vienne, Citizen Designer: Perspectives on Design Responsibility (New York: Allworth Press, 2003).
- 15 Gupta, Grassroots Innovation.
- 16 Neo Trinity Rakgajane, personal communication, July 9, 2015.
- 17 Anna Sansom, "Yes We Can!" Viewpoint: Exploring the Ways We Will Live 27 (2010): 35–41.
- 18 Chris Anderson, Makers: The New Industrial Revolution (London: Random House Business Books, 2012).
- 19 Anil Gupta, "Innovations by the Poor for the Poor," International Journal of Technological Learning, Innovation and Development 5, nos. 1/2 (2012): 28–39.
- 20 Steve Daniels, *Making Do: Innovation in Kenya's Informal Economy* (Raleigh, NC: Lulu, 2010).

- 21 William Kamkwamba and Bryan Mealer, *The Boy Who Harnessed the Wind* (London: HarperTrue, 2010).
- 22 Navi Radjou, Jaideep Prabhu, and Simone Ahuja, Jugaard Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth (San Francisco: Jossey-Bass, 2012), 2–4.
- 23 Daniels, Making Do, 101.
- 24 Navi Radjou and Jaideep Prabhu, Frugal Innovation: How to Do More with Less (London: The Economist, 2015), xvii.
- 25 Radjou, Prabhu, and Ahuja, *Jugaard Inno-vation*.
- 26 Radjou, and Prabhu, Frugal Innovation.
- 27 Eric von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2006).
- 28 Paul Mason, "The End of Capitalism Has Begun," *Guardian*, July 17, 2015, http:// www.theguardian.com/books/2015/ jul/17/postcapitalismendofcapitalismbegun? (accessed July 20, 2015).
- 29 See http://www.interdesign2005.org.za/.
- 30 Chris Bradnum, "The Manica Charcoal Stove Project," *Journal of Energy Southern Africa* 24, no. 2 (May 2013): 2–15.
- Chris Bradnum, "Alexandra Solar Lighting Project," FADA Research Newsletter, no. 16 (2012): 1–4.
- 32 See http://www.designsocietydevelopment.org/project/izindaba-zokudla.

his home. In time his invention not only brought electricity to his household but also powered a pump to bring water to his droughtstricken village.²¹ Another example is the Mitticool, a low-cost evaporation fridge developed by rural innovator Mansukhbhai Prajapati, after an earthquake devastated his village in Gujarat, India.²² His innovation went from local to international success, both meeting the needs of communities with limited electricity supply and creating local employment as demand increased. These grassroots innovators have all applied their abilities and sought knowledge to develop new technologies that would meet the needs of their local contexts, representing a new and highly localized path to development.

According to Daniels, the jua kali and those who follow in their spirit are able to teach Western economies that "economic and environmental efficiency can be gained from resource constraints, rather than boundless choice, and from linkages among small independent enterprises, rather than from vertical integration."23 Grassroots innovation is not only a phenomenon of developing societies but is evident worldwide where political, economic, and social circumstances force people into a creative corner. It is highly relevant for businesses and economies that aim to "do more with less" to meet the needs of consumers seeking more affordable, sustainable, and better quality products.²⁴ These new approaches to alternative modes of human endeavor have been publicized through books like Jugaad Innovation,²⁵ Frugal Innovation,²⁶ and *Democratizing Innovation.*²⁷ They highlight the risky and insecure nature of complex global markets, resulting in a loss of confidence in Western economic models. By documenting resource-savvy innovations at a local resource-scarce level, they show how such endeavors can contribute toward building a more equitable, sustainable future at a grassroots and enterprise level, challenging the current capitalist economic model.28

The rest of this article takes a visual turn, focusing on grassroots innovations made by lay designers that tend to be born out of a lack of economic resources. The photographs are a selection of objects and interventions I observed and documented while working on a range of design research projects in southern Africa, including Interdesign 2005: Sustainable Rural Transport (Rustenberg, Dwarsberg, and Pitsedisulejang, South Africa, 2005–2008),²⁹ the Manica Charcoal Stove Project (Manica, Mozambique, 2008),³⁰ Alexandra Solar Lighting Project (Alexandra, South Africa, 2011),³¹ and Izindaba Zokudla (Conversations About Food): Innovation in Soweto's Food System (Soweto, South Africa, 2013–2015).³² The photographs are classified according to food, water, shelter and energy—the four basic needs for all humanity to live sustainably.



Raised growing beds made from old baths, Noordgesig, Soweto. Photograph by Angus D. Campbell (January 24, 2013).



Figure 2 Old bedspring fence, Noordgesig, Soweto. Photograph by Angus D. Campbell (January 24, 2013).

Food

Oom (Uncle) Willem is a farmer in Soweto (South Western Townships), formerly a nonwhite township constructed by the apartheid South African government. He knew he was farming on marginal land since the site of his farm was an old dump site not far from the gold mine tailings (visible in the background of the photograph). He was aware that the soil quality was very poor in terms of soil health and possible contamination from the mining. By collecting discarded bathtubs and filling them with well-composted soil from a less polluted site, he was able to mitigate the effect of the soil quality on his crops (see Figure 1).

As opposed to expensive purpose-made fencing, Wendell another Sowetan farmer ingeniously used the bedsprings of discarded mattresses wired together as a barrier to hinder crop theft (see Figure 2). The bedsprings were selected not only because of their availability but because he knew that they are not a useful resource for scrap collectors. It is common for fencing to be stolen for scrap metal, but bedsprings contain little metal in relation to their size and are bulky and cumbersome to transport.

The farmers at Siyazenzela in Soweto have developed a highly innovative greenhouse in which to grow their seedlings. They first dug a rectangular hole about 10 cm into the soil and lined it with plastic and then placed a thin layer of coir (coconut husk) on top (see Figures 3 and 4). Their seedling trays were laid on the coir bed and covered with plastic over an arched frame to create a tunnel. The farmers were able to water the seedlings by simply placing a hose at one end of the bed. The plastic lining of the hole prevented the water from seeping into the soil, and the coir acted as a wick, absorbing and distributing the water evenly across the entire pit. This meant all the seedlings were irrigated from their base, eliminating time-consuming and harsh direct hand watering that might dislodge seeds and damage small seedlings. The plastic tunnel kept the interior warm, reduced evaporation, and protected the seedlings from pests and hail. Recessing the bed into the ground also insulated the seedlings, which enabled the farmers to plant them before the end of winter. Their consideration of all these factors resulted in much faster germination and meant the farmers could transplant the seedlings earlier than their competitors, enabling them to get their produce to market first.



Figures 3 (left) and 4 (right) Self-watering seedling greenhouse, Siyazenzela, Soweto. Photographs by Angus D. Campbell (September 17, 2014).

Water

The Transkei, a former apartheid homeland on the eastern coast of South Africa, has a significant amount of rain. However, due to its isolation and history, access to piped water is virtually nonexistent. In this photograph the owner of a clearly advertised *spaza* shop, or informal convenience store, has formed a gutter on the shop's roof to direct rain into a plastic storage drum. This water is used to clean the shop and provide water for the shop assistant. The flat tin roof, as opposed to the traditional thatched round home visible in the background, enables a more efficient and cleaner water capture, although the open drum is not the perfect solution for eliminating contaminants (see Figure 5).

The farming cooperative at the Setlakalana Molepo Adult Education Centre in Soweto is a group of about thirty pensioner farmers who supplement their state pensions from the sale of vegetables on their individual 12 m² plots. Although the farm operations are expansive due to the number of farmers, there is only access to two standpipes and a single hose at the education center. The farmers overcome this constraint by hand watering. They take turns to fill buckets of water at the standpipes and, using discarded food tins that have been pierced, they irrigate their crops (see Figure 6). The conversion of the tins into watering cans



Figure 5 (above) Rainwater capture, Zithulele, Transkei. Photograph by Angus D. Campbell (December 2, 2011).

Figure 6 (right) Tin watering can. Photograph by Angus D. Campbell (August 27, 2014).



Digging for water, Noordgesig, Soweto. Photograph by Angus D. Campbell (February 23, 2013).



is ingenious, but the irrigation remains laborious and time-consuming, greatly hindering the ability of farmers to expand their production to anything beyond subsistence levels.

Oom Willem's plot was next to the mine tailings and was a wetland. He attempted to dig down to see whether he could access "free" water. He was successful, but because of the mine tailings behind the site, he wondered about the quality of the water. It is also clear from the photograph that Willem dug through multiple layers of old rubbish to get to the water, and this did not bode well for water quality. In a recent article by Oliver Balch in *The Guard-ian*, he explains that many of the waterways in Soweto are highly polluted by radioactive uranium, iron, copper, and sulfur and are highly acidic.³³ These are the results of rainwater runoff from the mine tailings and clearly concur with Willem's caution and final abandonment of his efforts. Although not immediately obvious as a form of lay design, this effort is an important experiment in attempting to bring water to his farm (see Figure 7).

³³ Oliver Balch, "Radioactive City: How Johannesburg's Townships Are Paying for its Mining Past," *Guardian*, July 6, 2015, http://www.theguardian.com/ cities/2015/jul/06/radioactive-cityhow-johannesburgs-townships-arepaying-for-its-mining-past (accessed September 9, 2015).



DIY water pump, Pitsedisulejang. Photograph by Angus D. Campbell (March 23, 2007).

Pitsedisulejang is a town on the edge of South Africa with the hills of Botswana in view. It was formerly part of the apartheid Bophuthatswana homeland and remains a marginalized rural community. Its relative isolation has forced community members to innovate. With no tapped water, their ingenuity includes this locally produced hand-operated water pump (see Figure 8). It is made from plumbing components sourced from a local general dealer and concrete cast into an old oil drum. A chain and some carefully selected branches from local acacia trees are the pulley and handle. Bricks are placed on the ground under the water pipe to raise twenty-five-liter water containers so their spouts are as close as possible to the pipe, reducing spillage. The bricks also prevent mud from collecting on the bottom of the water containers that will be filled and transported back home in wheelbarrows on a daily basis.

Shelter

The informal home show in Figure 9, built in the former apartheid township of Alexandra, is made by layering and nailing down differently sized and shaped reclaimed melamine-faced chipboard and wooden pallets. A visual beauty results in its similarity to Mondrian's grid system, but the overlaying of materials is rather



Figure 9 Home built from reclaimed material, Alexandra. Photograph by Angus D. Campbell (September 2, 2011). intended to create a relatively waterproof and insulated interior. The hard wood and melamine allow for a reasonably secure living environment, which provides safekeeping for one's family and their belongings.

The aesthetic intentions of a creative homebuilder (see Figure 10) are clear from the effort taken to decorate his home. The walls have been constructed by taking discarded tin paint drums, removing the round base, cutting them vertically and then unrolling them to create an overlaid "shingle" wall. Waterproof and secure, the surface layering looks as though the exterior were painted in an array of color swatches. The colorful walls were supplemented with found discarded tiles, mosaicked to form an attractive *stoep* (veranda) shaded by a reclaimed billboard.

Advertising billboards are created to stand on roadsides under the harshest of conditions, including wind, rain, and intense sun. These billboards are printed on a triple-ply material consisting of two outer layers of vinyl sandwiching an inner rip-stop nylon mesh. They are strong, flexible, waterproof, and UV stabilized, thus their ubiquitous use as an informal housing construction material. The home in Figure 11 was constructed by simply draping the discarded billboard over the roof and using bricks to secure it in place. In many cases the billboard becomes a waterproof skin draped over other construction materials due to its limitation as a security barrier.



Figure 10 (above) Home built from reclaimed material, Alexandra. Photograph by Angus D. Campbell (September 2, 2011).

Figure 11 (right) Reclaimed billboard home covering, Alexandra. Photograph by Angus D. Campbell (September 2, 2011).





Figures 12 (above, left) Bottle cap washers, Alexandra. Photograph by Angus D. Campbell (September 2, 2011).

Figure 13 (above, right) Jam can chimney, informal settlement, Rustenburg. Photograph by Angus D. Campbell (April 4, 2005).

34 Duncan G. Fullerton, Nigel Bruce, and Stephen B. Gordon, "Indoor Air Pollution from Biomass Fuel Smoke Is a Major Health Concern in the Developing World," *Transactions of the Royal Society* of *Tropical Medicine and Hygiene* 102, no. 9, (September 2008): 843–51. As an addition to the billboard layer, the bottle cap washers seen in Figure 12 were used in a multitude of homes in Alexandra. Nails are needed to keep the billboard material attached to wooden armatures. Without the washers, the heads of the nails would pull through the fabric in high wind. Discarded bottle caps were used as washers to spread the nail's holding power over a larger area, providing a very cost-effective solution for local homebuilders.

Energy

This homemade chimney was observed in an informal settlement outside Rustenburg (see Figure 13). The maker was highly innovative in connecting food tins to form a ninety-degree joint at the base, then rolling and wiring a piece of galvanized sheet metal for the upright. The chimney was finally topped with a perpendicular perforated food tin, which keeps water out of the chimney when it rains. The ingenuity of the construction in this example is in its assembly and use of readily available materials to construct a chimney that removes harmful smoke from the home's interior fire, where there are many examples of homeowners who make no such efforts, to the detriment of their health.³⁴

DIY paraffin decanter, Alexandra. Photograph by Angus D. Campbell (September 2, 2011).



Paraffin is extensively used by many South Africans as an energy source for cooking, warmth and light.³⁵ This innovative entrepreneur in Alexandra constructed a small roadside stall from which he hung an old plastic paint container and added a tap (see Figure 14). This enabled him to decant bulk paraffin that he purchased from a local depot into recycled two-liter soft drink bottles for sale to local residents. His decanter hung over a large funnel that acted as the resting surface for the bottles while they were being filled and caught any spillage in a twenty-five-liter drum in which the funnel was placed. The purchase of small quantities of paraffin is very common in informal settlements, based on the unpredictability of income generation, which leads to an inability to purchase paraffin in bulk. Unfortunately this results in a higher cost per volume for the purchaser due to the margin made by such an entrepreneurial middleman. It has also resulted in the common accidental drinking of paraffin from soft drink bottles by small children and inattentive adults.³⁶

- 35 Louise Tait, Bruno Merven, and Mamahloko Senatla, Investigating the Current and Future Role of Paraffin in South Africa, report for the Paraffin Safety Association of South Africa (Cape Town: Energy Research Centre, 2013).
- 36 Paraffin Safety Association of Southern Africa, South African National Household Energy Surveillance System, 2015, http:// gis.paraffinsafety.org (accessed October 22, 2015).



DIY charcoal stove, Manica, Mozambique. Photograph by Angus D. Campbell (August 16, 2008).

Bradnum, "The Manica Charcoal Stove Project," 6.

39 Anthony Akubue, "Appropriate Technology for Socioeconomic Development in Third World Countries," *Journal of Technology Studies* 26, no. 1 (Winter/Spring 2000): 33–43. The photograph in Figure 15 is of a common locally produced charcoal *fugão* or stove in Mozambique, which are sometimes single but in this case double. In 2008 it was being sold for 200MZN (\$8.40) by a local artisan who manufactured it from old metal railway sleepers that were being replaced by the government for new concrete versions.³⁷ Sleepers were purchased for 100MZN (\$4.20) each and enabled four double stoves to be made, one every three to four hours. They are produced using relatively basic tools, which include electric grinders, hacksaws, arc welders, chisels, and hammers. The skill of the craftsmen to transform these steel railway sleepers into sellable stoves is impressive. The creative entrepreneur was even able to reuse the railway bolts for legs. Although praiseworthy as a product, it requires charcoal for use, and the poor management of forest resources by the state in Manica has resulted in significant deforestation.³⁸

Lay Designers

The endeavors documented here are not just creative but also appropriate to their contexts. Anthony Akube describes appropriate technology as "affordable, easy to maintain, compatible with existing infrastructure, efficient in the use of scarce natural resources, environmentally benign, and partial to small-scale."³⁹

³⁸ Ibid., 7.

Professional designers traditionally attempt to be contextually appropriate by employing ethnographic techniques as part of their design process. However, these are contexts that are difficult to understand without complete immersion,⁴⁰ which is a timebased luxury that most professional designers can ill afford. Since lay designers already have great enthusiasm for change, as evidenced by their interventions, should the role of the professional designer rather become that of supporting lay designers?

This question is likely to be a sensitive one for professional designers. Even though socially responsible design has become an elective in many design schools.⁴¹ I suspect that because professional designers are considered to be experts, one of the main hindrances to their ability to identify lay designers' efforts is a question of ego.

Ego is most likely at play in many designers' preference for large-scale interventions. Conversely, Nabeel Hamdi has shown that it is often small changes that have the most significant impact on marginalized communities.⁴² Hamdi cites the example of moving a bus stop to route it through a community as opposed to skirting it. This small intervention enabled the emergence of commerce, coffee houses, shoeshine shops, and other street hawkers to serve commuters.⁴³ Despite having an important impact on a community through such an appropriate and small intervention, designers will rarely find themselves winning prizes for moving bus stops, thus requiring the subjugation of the ego.

Another hindrance to professional designers recognizing lay design may be due to cultural biases. Kirtee Shah, architect and director of the Ahmedabad Study Action Group in India, suggests that due to cultural biases people, particularly designers, find it hard to recognize the innovative capacity of local populations.⁴⁴ Shah highlighted that in 2013 between 60 percent and 70 percent of India's housing was built by: "the people themselves-no architects, no engineers, no housing finance agencies. . . . These are major designers solving major problems. We have lost the ability to look at that. We are not supporting them. We are not recognizing them."45 Shah used the Gujarat Earthquake Rehabilitation and Reconstruction Project (GERR), implemented after a severe earthquake in Gujarat, India, in 2001, as an example of how lay designers were enabled, rather than disregarded, with positive effect. The GERR project enabled residents of 900 villages the opportunity to participate in the reconstruction of their homes after they were badly damaged or destroyed.

Another exceptional example of the recognition of the importance of lay designers is the Honey Bee Network,⁴⁶ which was started over twenty years ago by Anil K. Gupta, an agriculturist turned economist. Gupta has "been walking (around 6000 kms

- 40 Kyle Graham Brand and Angus Donald Campbell, "In-Context and Ecology Immersion for Resilience: An Exploration of the Design of a Household Farming Kit," in *Proceedings of the International Union of Architects World Congress: UIA 2014 Durban: Architecture Otherwhere: Resilience, Ecology, Values* (Durban: UIA 2014 Durban, 2014), 1332–43.
- 41 Smithsonian Institution, Design and Social Impact: A Cross-Sectoral Agenda for Design Education, Research, and Practice (New York: Smithsonian's Cooper-Hewitt, National Design Museum, 2013).
- 42 Hamdi, Small Change.
- 43 Hamdi, Small Change, 73-77.
- 44 Smithsonian Institution, *Design and Social Impact*, 23.
- 45 Ibid.
- 46 Honey Bee Network, http://www.sristi. org/hbnew/index.php (accessed January 6, 2016).

- 47 Anil K. Gupta, bio, http://www.iimahd. ernet.in/~anilg/ (accessed January 6, 2016).
- 48 National Innovation Foundation, India, http://nif.org.in/ (accessed January 6, 2016).
- 49 Gupta bio.
- 50 Angus Donald Campbell and Peter Hugh Harrison, "A Framework for Socio-Technical Innovation: The Case of a Human-Powered Shredder," in Proceedings of the Cumulus Conference, Milano 2015: The Virtuous Circle: Design Culture and Experimentation (Milan: McGraw-Hill Education, 2015), 211–30.
- 51 Amartya Sen, *Development as Freedom* (Oxford: Oxford University Press, 1999).
- 52 Martha C. Nussbaum, Creating Capabilities: The Human Development Approach (Cambridge, MA: Belknap Press, 2011).
- 53 Campbell and Harrison, "A Framework for Socio-Technical Innovation," 216–17.
- 54 John P. Kretzmann and John L. McKnight, Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets (Evanston, IL: Institute for Policy Research, 1993).
- 55 The Asset-Based Community Development Institute, Northwestern University, http://www.abcdinstitute.org/ (accessed January 14, 2016).
- 56 Kretzmann and McKnight, *Building Communities from the Inside Out*, 14–15.
- 57 Ibid., 13.

across India) for a week or more every summer and winter for [the] last 17 years as a part of *Shodhyatra* (journey on foot) to celebrate creativity at grassroots, to learn from grassroots teachers and share [the] creativity of communities encountered so far."47 The Honey Bee Network partnered with various governmental organizations to contribute toward Indian innovation by "documenting, adding value, protecting the intellectual property rights of the contemporary unaided technological innovators, as well as of outstanding traditional knowledge holders and disseminating them on a commercial as well as non-commercial basis."48 Thus far they have documented over 200,000 innovations from 545 Indian districts in the largest open-source innovation platform in the world; this all forms part of Gupta's grassroots to global (g2G) strategy for knowledge-based approaches to poverty alleviation and employment generation.⁴⁹ These examples illustrate that supporting lay designers is both possible and beneficial.

Professional designers wanting to support lay designers have precious few tools to guide them in doing so. From my experience,⁵⁰ the most appropriate of these tools is a theoretical framework from the discipline of development studies: the human development approach or capabilities approach, which was developed by Amartya Sen⁵¹ and Martha Nussbaum.⁵² The capabilities approach focuses on enabling people to achieve well-being by creating opportunities for them to use their own capabilities toward endeavors they value.53 It can be seen as a means of amplifying people's existing creative agency through appropriate intervention. Practically this is implemented in development projects through the method of asset-based community development (ABCD). ABCD is a method of mapping community assets including local institutions, citizens' associations, and the gifts of individuals as a means for these to become the building blocks for sustainable community development.54 This is achieved by "building on the skills of local residents, the power of local associations, and the supportive functions of local institutions."55 Most important, ABCD places the gifts of individuals in the center of the mapping process; these are divided into their skills, their community skills, and their enterprise interests and experience.56

While the raw material for community-building is the capacity of its individual members, some communities have failed to understand this. One of the reasons this basic resource is undeveloped in weak communities is because the community has come to focus largely on the deficiencies rather then the capacities of its members. This deficiency focus is usually described as a concern about the needs of local members. And these needs are understood to be the problems, shortcomings, maladies and dilemmas of people.⁵⁷

One of the advantages of ABCD is that it empowers communities to make changes as opposed to the disempowering approach of external "experts" identifying a need on their behalf and then communally exploring a solution. Unfortunately, participatory design most often follows this need-based approach. Although people have needs, they also have capabilities. Documenting an inventory of capabilities, as opposed to needs, creates the potential for professional designers to use their skills to amplify the capabilities of lay designers to bring about more authentic endogenic change.

Conclusion

Many of the photographs in this article present a southern African vernacular aligned with traditional and popular cultural norms, which challenge the construct of ethnocentric design. Are the examples evidence of "nonintentional design,"58 or "adhocism,"59 or are they in fact a more authentic reference to design modeled by creative people that sit on the periphery of the current concept of professional design? I choose to align with the latter not only in consideration of aesthetics but also in terms of the boundary of professional design. Returning to Manzini's challenge,⁶⁰ the activities of professional designers are clearly blurring into the activities of lay designers to result in highly necessary, sustainable solutions to everyday needs. We are all potential innovators full of latent creativity, but cultural norms and current education systems do not necessarily promote these qualities. The challenge now extends back into the academy to start to reconceptualize the role of the professional designer in society. This article explored the acts of ordinary people who are developing models or artifacts with frugal means and limited resources, while at the same time developing flexible, innovative solutions to problems at hand. Using professional design to amplify the grassroots innovations of lay designers should become an authentic means of sustainable change in marginalized communities and the world in general.

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- 59 Charles Jencks and Nathan Silver, Adhocism: The Case for Improvisation (Cambridge, MA: MIT Press, 2013).
- 60 Manzini, *Design, When Everybody Designs*, 2.

⁵⁸ Uta Brandes and Michael Erlhoff, *Non* Intentional Design (Cologne: Daab, 2006).