The Open University

Inclusive Innovation, Engineering & Energy Transformation

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Life-changing Learning

Outline

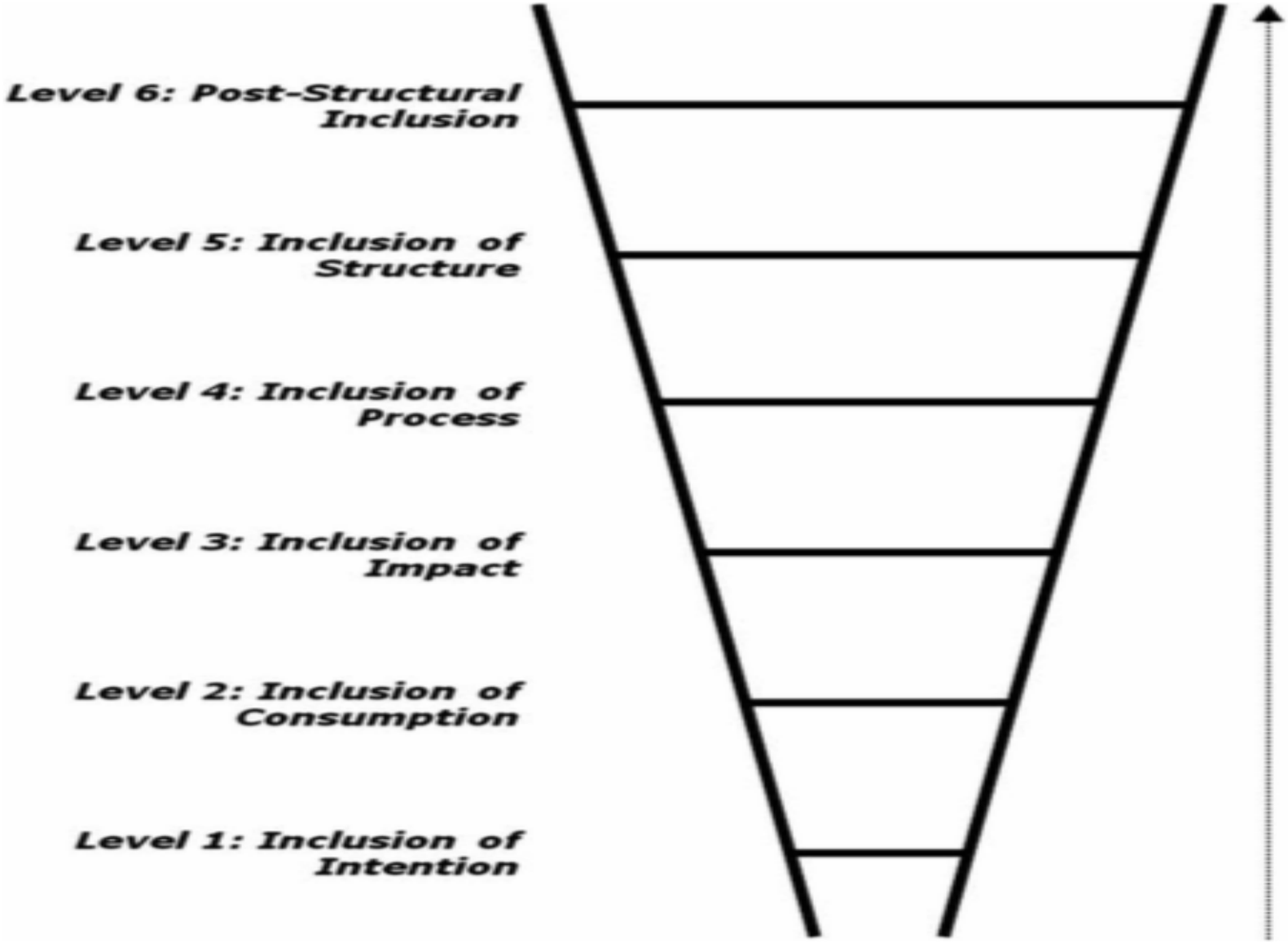
- Inclusive Innovation
- Engineering & International Development
  - Networks
  - Bricolage
  - Reflexivity
- Case: Solar off grid energy in South Africa

Inclusive Innovation

- Inclusion of groups currently marginalized in some aspect of innovation
- Emerges out of the appropriate technology movement – with a focus on addressing the needs of those excluded from the products of innovation.
- Driven by increased participation of the private sector in innovation for the poor.
- The development of poor consumers as an accessible market.
- Growth of technological capabilities in developing countries.
- Role of new technologies (especially ICT), such as mobile phones (Heeks, et al 2014).

Ladder of inclusive Innovation

Source: Heeks et al. (2014)



Engineering & International Development

- Has been defined as ‘applying engineering and economic research to the problems of poverty’ (*Journal of Development Engineering*).
- Engineering in practice is often about keeping things working (classic American cars in Cuba) and process (changes in the workplace to make things work better; improved standards), it is not always synonymous with innovation, but it can involve disruptive innovation (WWW, iPhone), small and medium innovations that together create transformation (wind and solar energy).
- In development engineering there may be tensions between ‘best with best’ – where researchers in the North connect with the best from the South to produce new world leading outputs (more science, theory and discipline based and high tech) – and ‘appropriate’ – engineering addressing the needs of the poor (more practice based, incremental, locally embedded).

Reflexive Engineering

Engineering that is both social and technical

	Traditional Engineers	Reflexive Engineers
Technology/society relationship	Technological shaping of society	Socio-technical dynamics
Perception of lay technical competence	Public dearth of understanding	Public is a knowledge resource
Means of making decisions about technology	Experts 'engage' and educate the public	Public/expert dialogue and agreement
View of development	Technologically driven	Livelihoods based
Technological uptake	Experts communicating to the public brings acceptance of technology	Social, economic, and environmental factors explain why technologies are adopted or rejected
Politics of knowledge	Engineers know best	Engineer/stakeholder partnership
Epistemological approach to problems and solutions	Technical specialisation	Complex systems
View of expertise	Narrow, discipline-based	Broad and holistic, interdisciplinary
Conceptual starting point	Designs	Socio-technical systems

Bricolage

- Engineering for development often occurs through the uneven and often creative combination of old and new practices and institutions, a development process which Frances Cleaver calls ‘Bricolage’, which she contrasts with ’Development by Design’.
- It may be thought of as ‘making do’, adapting and shaping what is locally available (processes, products, institutions).
- Some in the development field similarly argue that development interventions should increasingly be based on ‘whitewater rafting’ rather than ‘supertanker’ – improvisation and iteration.
- ‘The essence is to learn to dance with the system. I think if you are going to work in these kinds of environments you have to become more interested in dancing and less in controlling.’ (Duncan Green, Oxfam).

Networks and Partners

- Development engineering is facilitated by networks to make the most of different expertise and knowledge of various environments to effect change.
- These may involve academics, NGOs, development organizations, businesses, and they may be driven by key individuals.
- Programmes like the Royal Academy of Engineering Africa Catalyst aims to strengthen North/South and regional partnerships via the national professional engineering bodies (Institutes of Engineering) in order to meet international standards (Washington Accord).

South Africa: Off Grid Solar Homes

By Stephen Chipika

- South Africa has a universal access to electricity target for 2025 and a grid based system, which may mean that those in rural areas will not get power for some time.
- The project was undertaken in partnership with the private sector – challenges faced have been both administrative and policy-focused, as well as technical.
- The cost of rural grid electrification is high and the Solar Home System (based on solar panels) was seen as a feasible alternative.
- As of 2017 there were approximately 30,000 installations, households pay a monthly fee to cover maintenance and replacement battery costs. The monthly fee based model was so that local concessionaires would have an incentive to maintain a local presence in communities. The programme is heavily subsidized – both in terms of installing the system and the monthly energy cost, which was initially too high for poor rural customers.
- It raises the challenge of recovering capital and operations costs from the tariff alone - this raises possible questions about its sustainability.
- Implementation has been slow and there appears to be a lack of political will to drive the programme; it requires support and buy-in from the local municipal authority, which often prioritize other services over energy.

Addressing Challenges

- Clean and convenient energy for lighting, cell phones and a television has many benefits. E.g. It promotes increased literacy and gender equality by enabling women and children to study during the evenings.
- Households prefer grid electricity however, and there are challenges with integrating the solar with the grid system, non-payment levels are high, and maintenance has been difficult.
- In this particular case, local implementation has been a particular stumbling block.
- Here the functioning of different partners in the network (national government – setting the policy, local municipalities – implementing it, private sector concessionaires - installing and maintaining the system) is crucial.
- It suggests that the Department of Energy could play a stronger coordinating role to bring together the grid expansion policy, and address other infrastructure (roads for maintaining equipment) that is required for the system to work.
- Bricolage is suggested in the ways in which institutions need to be adapted in order to address the requirements of this particular system.
- Reflexivity is needed in the flexible adaptation to address challenges as they arise.

References

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